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Original Research

The Role of Emerging Technologies in Enhancing Contractual Security: A Comparative Study of the Iranian and English Legal Systems

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Contractual security, as one of the fundamental pillars of legal systems, concerns the assurance of the parties regarding stability, predictability, and the effective performance of contractual obligations. In recent decades, the emergence and expansion of modern technologies (including smart contracts, blockchain, electronic signatures, and Online Dispute Resolution systems) have significantly transformed the methods of concluding, executing, and guaranteeing contracts, presenting traditional concepts of contractual security with new challenges and opportunities. The core problem of this research is to determine the extent to which these technologies have enhanced contractual security and how the legal systems of Iran and England have approached their legal implications. The research methodology is descriptive-analytical with a comparative approach. To this end, while examining the theoretical foundations of contractual security, legal instruments, judicial precedents, and doctrinal views in Iranian and English law regarding modern contractual technologies are analyzed, and the commonalities and divergences between the two systems are identified. The findings indicate that English law, by adopting a flexible and technology-oriented approach, has facilitated the recognition and acceptance of the legal effects of modern tools, thereby strengthening contractual security. In contrast, while Iranian law possesses suitable jurisprudential and legal capacities, legislative gaps and legislative caution have hindered the efficiency of these technologies in ensuring contractual security. Ultimately, it is recommended that by reforming and updating contractual regulations, explicitly recognizing technological tools, and drawing upon the successful experiences of the English legal system, the necessary framework for promoting contractual security in Iranian law be established.

Keywords: *Contractual Security, Emerging Technologies, Smart Contracts, Blockchain, Iranian Law, English Law.*

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1. Introduction

As the most vital instrument for regulating private relations, a contract has always required a degree of certainty, stability, and predictability that enables parties to undertake economic and legal planning. In legal literature, these characteristics are discussed under the concept of contractual security. Contractual security concerns the guarantee of valid formation, legal force, stability, enforceability, and predictability of contractual effects over time. In fact, the more confident the parties are regarding the legal validity of an agreement, its interpretation, and the possibility of effectively enforcing obligations, the higher the level of contractual security will be (McKendrick, 2023).

In Iranian law, although the term contractual security has not been explicitly used in statutory texts, concepts such as the principle of the binding force of contracts, the rule of pacta sunt servanda, the presumption of validity, and the protection of the legitimate expectations of contracting parties reflect an implicit acceptance of this concept (Katouzian, 2019). Conversely, in English law, contractual security is considered one of the fundamental objectives of contract law and is ensured through judicial precedent, the principle of certainty, the doctrine of party autonomy, and the protection of reasonable expectations (Poole, 2020).

With the emergence of modern technologies, particularly digital technologies, the framework for concluding and performing contracts has undergone fundamental transformation. Instruments such as electronic signatures, smart contracts, blockchain technology, electronic trading platforms, and online dispute resolution mechanisms have not only changed traditional methods of contracting but have also raised new questions regarding the legal security of contracts (De Filippi & Wright, 2018).

The core problem of the present research stems from the fact that, although modern technologies are designed to increase the speed, accuracy, and transparency of contractual relations, they do not necessarily and automatically enhance contractual security. Contractual security is not merely the result of technical progress; rather, it depends on the degree of alignment between these technologies and the legal system, their acceptance by the legislature and judiciary, and the ability of law to respond to emerging challenges. In English law, a pragmatic and flexible approach has been adopted toward modern technologies (Werbach, 2022). Courts and legal scholars, especially in recent years, have attempted to adapt traditional concepts of contract law to technological realities, such that smart contracts and digital documents, provided that intention, consideration, and certainty are established, may produce valid legal effects (Green & Randall, 2021). This approach has strengthened the confidence of economic actors in technology-based contracts and has thereby contributed to the enhancement of contractual security.

In contrast, within the Iranian legal system, although scattered laws such as the Electronic Commerce Law have recognized certain modern instruments, there is still no coherent framework for analyzing the legal effects of technologies such as blockchain and smart contracts. This situation has created uncertainty regarding the validity, interpretation, and enforcement of such contracts, which in practice may undermine contractual security (Emami, 2021). Thus, the fundamental question of this research is as follows: under what conditions can modern technologies contribute to the promotion of contractual security, and how does the divergence between the approaches of Iranian and English law toward these technologies affect the level of contractual security?

A review of the existing literature indicates that a significant portion of previous research has either focused on the technical analysis of emerging technologies or examined the subject solely from the perspective of a single domestic legal system. In Iranian law, existing studies have mainly addressed the jurisprudential legitimacy of smart contracts or the possibility of aligning them with the general rules of contracts, while paying less attention to contractual security as an independent analytical criterion (Ansari, 2022). On the other hand, comparative studies between Iranian and English law in this area remain limited and often lack a deep analysis of the practical effects of technologies on contractual trust and the stability of legal relations. This research gap highlights the need for a comparative and problem-oriented study.

The main limitation of the present research is the dynamic and rapid evolution of technologies, such that certain technical developments may occur before legislative intervention or the formation of judicial precedent. Furthermore, limited access to Iranian domestic judicial precedents concerning disputes arising from technological contracts constitutes another limitation of this study. The research methodology of this article is descriptive-analytical with a comparative approach. This means that the concepts and theoretical foundations of contractual security and emerging technologies are first explained descriptively, and their legal effects in the legal systems of Iran and England are then examined analytically. The research tools used in this study include library sources, scholarly articles, official reports, statutes and regulations, and relevant legal documents. Data analysis has been conducted qualitatively and is based on legal reasoning.

This research seeks to answer the following primary question: to what extent and under what conditions can

emerging technologies enhance contractual security, and what is the divergence between the legal systems of Iran and England in this regard? Accordingly, the main hypothesis of the study is as follows: it appears that emerging technologies enhance contractual security only when the legal system identifies and regulates their legal effects through a flexible and adaptive approach; this condition has been realized to a far greater extent in English law than in Iranian law, leading to a higher level of contractual security in the former system. In light of the foregoing, reviewing the research background and the theoretical foundations of contractual security and modern technologies constitutes the first step in a precise analysis of this subject. Subsequently, theoretical perspectives and previous domestic and international research will be examined, followed by an explanation of the theoretical foundations of contractual security and its place in contract law. The following sections will focus on the comparative analysis of Iranian and English law, the discussion and analysis of findings, the conclusion, and finally the presentation of legislative and practical recommendations.

2. Theoretical Perspectives and Previous Domestic and International Research

Research on contractual security and the impact of emerging technologies can be categorized into two broad streams: first, theoretical studies on contractual security and the evolution of contract law; and second, research focused on modern technologies, particularly smart contracts and blockchain, and their legal implications. In recent years, these two research currents have gradually converged, yet significant analytical gaps remain. In classical contract law literature, contractual security is primarily linked to concepts such as certainty of contract, pacta sunt servanda, and the protection of the parties' legitimate expectations. Emphasizing the principle of certainty, McKendrick argues that contractual security is achieved when parties can predict the legal consequences of their contract with reasonable assurance and when courts refrain from unpredictable intervention (McKendrick, 2023). This perspective has formed the basis for much subsequent analysis in English law. Following this approach, Poole views contractual security as the result of the interaction between party autonomy and the regulatory role of the courts, asserting that any technological evolution must ultimately be evaluated within the framework of these two elements (Poole, 2020). From this perspective, technology is not necessarily a threat but may function as a potential tool for enhancing contractual security, provided that traditional rules of contract law are interpreted flexibly. This analysis has paved the way for the gradual acceptance of digital contracts in English legal thought and practice.

Conversely, some authors have adopted a more critical stance toward emerging technologies. Werbach, in examining the architecture of trust in blockchain, argues that replacing legal trust with technological trust may undermine the role of legal institutions and reduce contractual flexibility (Werbach, 2022). However, this view has been challenged by authors such as De Filippi and Wright, who contend that blockchain and smart contracts do not necessarily replace law; rather, they may facilitate a form of interaction between code and law which, if properly regulated, can enhance contractual security (De Filippi & Wright, 2018).

In applied studies, legal analyses of smart contracts represent an important turning point in the legal treatment of technology-based contracts. By examining the essential elements of contract formation under English law, such studies conclude that smart contracts, provided that intention, consideration, and certainty are established, may possess legal validity and receive judicial protection (Green & Randall, 2021). This conclusion has been supported by subsequent researchers and has played a vital role in increasing contractual security in technological contexts (Zetzsche et al., 2020).

In Iranian legal literature, studies related to contractual security are often analyzed within the framework of the general rules of contracts. Katouzian, emphasizing the principles of binding force and pacta sunt servanda, considers contractual security a prerequisite for economic order and social trust (Katouzian, 2019). However, his analysis does not directly address the effects of emerging technologies and pertains primarily to traditional contracts. In recent years, research focusing on smart contracts has emerged in Iranian law. Ansari, examining the feasibility of aligning smart contracts with jurisprudential and legal rules, concludes that substantively there is no obstacle to recognizing these contracts in Iranian law; however, the absence of a transparent legislative framework may weaken

contractual security (Ansari, 2022). This view is supported by studies emphasizing that legislative gaps not only create doubt regarding the validity of technology-based contracts but also diminish the confidence of economic actors in these tools (Heidari, 2022).

In contrast, some authors have adopted a more cautious approach. Emami, emphasizing the role of contractual intent and human will, raises doubts regarding the self-executing nature of smart contracts and views it as a challenge to legal security (Emami, 2021). This perspective has been critiqued by researchers who argue that the parties' intent can be manifested at the code-design stage and that self-execution does not necessarily negate human will (Anahid & Zareh-Sani, 2024). A synthesis of previous research indicates that, in English law, the link between theories of contractual security and emerging technologies is more cohesive than in Iranian law. While most Iranian researchers emphasize the substantive possibility of accepting these technologies, they have paid less attention to their practical impact on contractual security. This analytical gap highlights the necessity of the present study, which seeks to provide a clearer picture of future capacities and challenges by integrating the theoretical literature of contractual security with a comparative analysis of emerging technologies.

3. Theoretical Foundations of Contractual Security and Its Place in Contract Law

Contractual security, as one of the fundamental concepts of contract law, concerns the establishment of a condition in which the parties to a contract can make decisions and plans with reasonable assurance regarding the validity, stability, and enforceability of their contractual obligations. This concept is rooted in the economic and social functions of contract, for a contract can fulfill its role as a regulator of private relations only when the parties' trust in its legal effects is guaranteed. From this perspective, contractual security is not only a legal value but also an essential element in achieving economic order and reducing transaction costs (McKendrick, 2023). In contract law, contractual security is the result of the interaction between classical principles, such as party autonomy, the binding force of contracts, and pacta sunt servanda, on the one hand, and the regulatory role of the legislature and the courts, on the other. Although the principle of freedom of contract allows parties to determine the terms of their agreement, this freedom leads to security only when the legal system protects the legitimate expectations of the parties by ensuring the certainty, predictability, and stability of contractual relations (Poole, 2020). Thus, contractual security should be understood as the result of a balance between private will and minimal yet effective legal intervention.

Developments arising from emerging technologies have presented these theoretical foundations with new challenges and have required their redefinition. Tools such as smart contracts and blockchain, through their self-executing nature and reduced reliance on traditional enforcement institutions, raise the question of whether contractual security can be achieved solely through technological guarantees or whether it still requires legal and institutional support. The predominant answer in legal literature is that technology, at best, serves as a complement to contract law, and sustainable contractual security is realized only within the framework of legal recognition and regulation of these tools.

3.1. The Concept and Components of Contractual Security in Legal Theories

Contractual security is a concept regarded in legal literature, particularly in contract law, as a key element in ensuring stability and predictability in contractual relations. In much classical research, contractual security is implicitly explained through principles such as certainty of contract, pacta sunt servanda, and the protection of the parties' legitimate expectations. McKendrick, one of the prominent theorists of English contract law, argues that certainty regarding contractual terms and access to judicial remedies for the enforcement of obligations are two essential components of contractual security (McKendrick, 2023). According to this view, the clearer the contract is and the more predictably its enforcement can be guaranteed, the higher the level of contractual security will be.

In Iranian legal literature, although the term contractual security is not directly used in legislative texts, researchers have highlighted its importance in explaining contractual justice and economic trust. For instance, Dehghan Dehnavi et al., in an analytical study of contractual security in Iranian and English law, state that contractual security refers not merely to the legal

validity of a contract but to a set of institutional and legal mechanisms that guarantee the parties' trust (Dehghan Dehnavi et al., 2026). This definition emphasizes that contractual security is also an institutional framework operating beyond the contractual text and encompassing legal and procedural guarantees.

One of the primary components of contractual security is legal predictability. Predictability refers to the ability of the parties to estimate the legal consequences of a contract before its conclusion. In domestic research, this component has been regarded as a prerequisite for ensuring justice in contractual relations, since a lack of predictability may lead to economic mistrust and increased transaction costs (Katouzian, 2019). From Katouzian's perspective, a clear and predictable sanction for breach of contract is one of the pillars of contractual order, without which legal stability and transactional security would be undermined.

The role of pacta sunt servanda is also highly prominent in contractual security. In classical analyses of contract law, pacta sunt servanda signifies the obligation of the parties to perform their contractual commitments, and its breach damages contractual credibility and economic trust. This principle not only confirms the force of the contract but also represents a form of cohesion between private will and legal guarantee, thereby strengthening contractual security (Poole, 2020). This theory further demonstrates that contractual security lies not only in the text of the obligations but also in the legal guarantee of their performance.

With the advent of emerging technologies in the field of contract formation and performance, the classical components of contractual security have undergone revision. These developments have introduced new components, such as digital transparency, data integrity, and self-execution. Research indicates that technologies such as blockchain-based smart contracts can strengthen certain dimensions of contractual security, for example by providing greater transparency in the automated execution of contractual terms and reducing reliance on legal intermediaries (Werbach, 2022). However, these technologies themselves require legal safeguards to ensure legal security and judicial validity; otherwise, self-execution may lead to legal instability rather than increased security.

This point has also been addressed in domestic research. Ansari, in analyzing smart contracts within Iranian law, concludes that adopting emerging technologies in contracts without a clear legal framework can lead to a decrease in contractual security, because the parties may not know which legal body or court has jurisdiction over interpretation and dispute resolution in the event of conflict (Ansari, 2022). This view indicates that, in the technological era, the components of contractual security must not only include traditional elements such as certainty and pacta sunt servanda but also pay serious attention to the legal mechanisms governing technology.

Another significant dimension of contractual security emphasized in modern theories is the protection of economic trust and the reduction of information asymmetry. Interdisciplinary research suggests that a lack of contractual security can lead to increased information asymmetry, reduced economic participation, and ultimately the withdrawal of capital from the market. This perspective underscores not only the legal dimension but also the economic and institutional dimensions of contractual security, making it vital in comparative analyses (Williamson, 1985).

In a comparative analysis of domestic and international perspectives, it can be asserted that, in English law, contractual security is typically viewed through the lens of legal institutions and judicial precedent, whereas in Iranian legal literature, the discussion is primarily centered on jurisprudential concepts and the general rules of contracts. This divergence in approach has caused the components of contractual security to be reflected differently across legal systems. Nevertheless, what remains common among these perspectives is that contractual security is a multidimensional concept that cannot be confined to a single component or legal instrument. Rather, it must be analyzed within a broader framework of principles, rules, and institutional mechanisms.

In summary, the components of contractual security can be categorized into three primary levels: traditional structural and legal components, such as certainty of contract, pacta sunt servanda, and predictability; institutional and executive components, including judicial sanctions, the role of courts, and legal guarantees; and technology-oriented components, which emerge with the advent of modern contractual technologies, such as digital transparency, self-execution, and data integrity. This classification ensures that the theoretical analysis of contractual security

remains cohesive and authoritative, not only within the context of contract law but also in confronting the challenges posed by technology.

3.2. The Relationship Between Contractual Security and the Fundamental Principles of Contract Law

Contractual security is not an abstract concept independent of the fundamental principles of contract law; rather, it is shaped within the very core of these principles and derives its meaning from their interaction. Principles such as party autonomy, the binding force of contracts, pacta sunt servanda, the presumption of validity, good faith, and the protection of legitimate expectations each play a role in realizing or undermining contractual security. Therefore, analyzing the relationship between contractual security and these principles requires examining the position of each within the structure of contract law.

A) Contractual Security and the Principle of Party Autonomy

The principle of party autonomy, as the cornerstone of contract law, signifies the freedom of individuals to enter into contracts and determine their terms. On one hand, this principle provides the platform for achieving contractual security, as parties, relying on their free will, enter into obligations that they expect to be protected by law. In Katouzian's view, a contract is a manifestation of the free will of individuals, and respecting it is a prerequisite for social trust and legal order (Katouzian, 2019). However, party autonomy alone does not guarantee contractual security. Freedom of contract leads to security only when the legal system supports the outcomes of this will and refrains from unpredictable intervention. Otherwise, unregulated freedom can lead to legal insecurity and instability in contractual relations. Some Iranian authors emphasize that contractual security is achieved only when freedom of will is guided within the framework of mandatory rules and public order (Shahidi, 2021).

B) The Principle of Binding Force and Its Role in Contractual Security

The principle of the binding force of contracts is considered one of the most vital guarantees of contractual security. This principle dictates that a contract is legally binding and that neither party can unilaterally withdraw from it except in cases explicitly provided by law. In Iranian law, Article 219 of the Civil Code is an explicit manifestation of this principle and plays a fundamental role in stabilizing contractual security. Katouzian regards the principle of binding force as the backbone of contractual order, asserting that without it, a contract is transformed from a reliable instrument into a fragile agreement (Katouzian, 2019). In the same vein, comparative analysis of Iranian and English law shows that the intensity and manner of applying the principle of binding force have a direct relationship with the level of contractual security; the broader and more opaque the exceptions to this principle are, the more contractual security diminishes (Dehghan Dehnavi et al., 2026).

C) Performance of Obligations and Guaranteeing Contractual Trust

The performance of obligations, as a moral-legal principle, plays a pivotal role in achieving contractual security. This principle not only guarantees the execution of contractual commitments but also strengthens the parties' trust in the legal system. In Iranian law, the performance of obligations is deeply rooted in Imami jurisprudence and is recognized as one of the most significant foundations for the binding nature of contracts (Emami, 2021). Theoretically, the performance of obligations serves as the link between private will and legal sanction. If the legal system fails to guarantee the enforcement of commitments, contractual security collapses, even if the contract is substantively and formally valid. Some researchers argue that, in the technological era, the performance of obligations does not merely entail human execution but may also be realized through digital self-executing mechanisms; however, this fosters security only when supported by legal and judicial backing (Ansari, 2022).

D) The Presumption of Validity and the Reduction of Legal Uncertainty

The presumption of validity is another fundamental principle of contract law with a direct impact on contractual security. According to this principle, whenever there is doubt regarding the validity or nullity of a contract, the presumption is in favor of its validity. This rule reduces legal uncertainty and contributes to the stability of contractual relations. Emami regards the presumption of validity as a tool for protecting the parties' trust, without which every contract would be subject to constant instability (Emami, 2021). In modern literature, the presumption of validity has gained

increased importance in relation to novel and technology-based contracts. If digital or smart contracts are constantly subjected to doubt regarding their validity, contractual security will be severely undermined. Therefore, some authors suggest that the presumption of validity should be interpreted broadly and in accordance with technological developments in order to preserve legal security (F. Nouri, 2020).

E) Good Faith and the Protection of Legitimate Expectations

The principle of good faith, particularly at the contract performance stage, plays an essential role in contractual security. Good faith prevents the abuse of contractual rights and protects the legitimate expectations of the parties. In Iranian law, although good faith is not explicitly mentioned in the Civil Code, it has been accepted in legal doctrine and certain judicial approaches as a governing principle of contractual relations (Safai, 2020). Contractual security is inconceivable without the protection of legitimate expectations. The parties to a contract must be assured that unfair conduct or a purely formalistic interpretation of contractual terms will not be supported by law. In this regard, Dehghan Dehnavi et al. emphasize that contractual security is the result of the synergy between the principles of binding force, good faith, and the protection of legitimate expectations and cannot be reduced to any one of these principles alone (Dehghan Dehnavi et al., 2026). In conclusion, contractual security is a concept formed through an intimate link with the fundamental principles of contract law. Party autonomy provides its platform, the principles of binding force and pacta sunt servanda stabilize it, the presumption of validity reduces uncertainty, and good faith protects it against abuse. Any weakening or unbalanced interpretation of these principles directly threatens contractual security. This conceptual link provides a theoretical framework for examining the role of emerging technologies in enhancing or undermining contractual security, which will be addressed in the following section.

3.3. The Impact of Technological Developments on the Redefinition of Contractual Security

Contemporary technological developments, particularly in the digital sphere, have not only transformed the methods of contract formation and performance but have also confronted the theoretical foundations of contractual security with fundamental redefinitions. Contractual security, which in the traditional view was primarily based on the certainty of contractual terms, judicial enforcement, and the role of classical legal institutions, has become intertwined, in the context of modern technologies, with new elements such as self-execution, data-driven transparency, and reduced reliance on intermediary institutions. This evolution raises fundamental questions regarding the relationship between law and technology and the role of each in guaranteeing contractual security.

One of the most significant manifestations of this shift is the emergence of smart contracts. A smart contract is generally defined as an agreement whose terms are formulated as computer code and whose execution occurs automatically without direct human intervention. Some researchers have identified this feature as a factor that may increase contractual security, arguing that the removal of intermediaries and the reduction of potential breaches enhance the parties' level of trust (Szabo, 1997). However, recent legal literature emphasizes that self-execution does not necessarily equate to legal security and may even lead to reduced flexibility and increased risk in certain cases.

In Iranian law, emerging research indicates that contractual security in technology-based contracts is no longer limited merely to the performance of obligations; rather, legal security arising from the possibility of interpretation, modification, and dispute resolution also gains significance. For example, Heidari, in examining the legal effects of smart contracts, concludes that the automated execution of terms, in the event of error or a change in circumstances, may result in the unfair enforcement of obligations, which conflicts with the philosophy of contractual security (Heidari, 2022). This perspective suggests that, if regulated without legal intervention, technology may reduce contractual security to mere technical security.

Blockchain technology has also played a crucial role in redefining contractual security. Features such as data immutability and transaction transparency contribute to increased trust between parties on the one hand but create challenges regarding the amendment or rescission of contracts on the other. Some Iranian authors believe that the immutability of blockchain is in potential conflict with legal institutions such as options,

contractual modification, and mandatory rules of civil law, and that this conflict may threaten contractual security (Mirzaii, 2023). Consequently, contractual security in the blockchain era requires a reappraisal of traditional rules and their adaptation to technological requirements.

From a comparative perspective, English law has adopted a more pragmatic approach toward these developments. Instead of attempting to fully replace legal institutions with technology, the legislature, courts, and legal doctrine have emphasized the coexistence of technology and law. In this approach, technology is regarded as a tool for increasing efficiency, not as an independent source of contractual security. Analytical research shows that this outlook has allowed contractual security to remain grounded in traditional legal principles while using technological capacities for its reinforcement (Brownsword, 2019).

In Persian legal literature, this view has gradually gained traction. Some authors argue that contractual security in the digital age should be analyzed as a multilayered concept, meaning that the technical layer, including data security and execution; the legal layer, including validity, interpretation, and enforcement; and the institutional layer, including courts and dispute resolution bodies, must be addressed simultaneously (Rezaei, 2021). This analysis demonstrates that technology alone is incapable of ensuring contractual security; rather, it must operate within a responsive legal system.

Furthermore, modern technologies have led to a shift in the legitimate expectations of contracting parties. Today, parties expect contracts to be performed faster, more transparently, and more cost-effectively. If the legal system fails to meet these expectations, contractual security, in its social and economic sense, will be weakened. In this regard, some studies emphasize that contractual security is no longer a purely legal concept but refers to a form of techno-legal trust formed at the intersection of law and technology (Lessig, 2006). Overall, technological developments have redefined contractual security from a purely legal concept into a hybrid concept encompassing technical, legal, and institutional elements. Within this framework, contractual security is achieved not through the rejection of technology but through its conscious and intelligent legal regulation. This redefinition paves the way for a comparative analysis of the efficacy of the Iranian and English legal systems in addressing emerging technologies.

4. Comparative Analysis of Iranian and English Law Regarding Contractual Security and Emerging Technologies

A comparative analysis of Iranian and English law in the field of contractual security and the impact of modern technologies requires simultaneous attention to legal structures, sources of law, the role of courts, and legislative approaches in both systems. The fundamental differences between Iran's civil-law-oriented system and the English common law system have led each to follow a distinct path in addressing technological phenomena and redefining contractual security. Nevertheless, the ultimate objective of both systems remains the guarantee of stability in contractual relations and the protection of the legitimate expectations of the parties.

In English law, contractual security is traditionally ensured through judicial precedent. Courts play an active role in interpreting contracts and adapting them to economic and technological shifts. According to Beatty, contractual security in common law is less a product of legislation and more the result of the gradual accumulation of judicial decisions (Beatty, 2018). This characteristic has given English law a higher capacity to absorb modern technologies and align them with traditional principles of contract law. In contrast, in Iranian law, contractual security is primarily based on the general rules of the Civil Code, jurisprudential principles, and statutory law. Although these rules possess considerable conceptual flexibility, the limited role of judicial precedent and legislative caution have resulted in slower adaptation to technological phenomena. Some Iranian researchers emphasize that contractual security in Iranian law is more a normative concept than an institutional-executive one (Jafari, 2022).

One of the most critical axes of this comparative analysis is the legal recognition of technological tools such as electronic signatures, digital documents, and smart contracts. In English law, the recognition of these tools has primarily occurred through a broad interpretation of traditional contractual concepts. Legal doctrine and judicial approaches indicate that the primary criterion is the verification of the parties' intention and the attributability of the obligation rather than the

traditional form of the contract (Green & Randall, 2021). Conversely, in Iranian law, the recognition of technological tools depends largely on specific and fragmented statutes. The Electronic Commerce Law recognizes certain tools such as electronic signatures but remains silent regarding several emerging technologies. This legislative silence, as noted by some authors, has led to legal uncertainty and a reduction in contractual security in technology-based transactions (Sadeghi, 2021b).

The role of courts in guaranteeing contractual security is one of the most significant points of divergence between the two legal systems. In England, courts are not merely dispute resolution bodies but are also key actors in developing legal concepts related to technology. On numerous occasions, by accepting digital documents and analyzing automated contracts, English courts have attempted to preserve contractual security even when the tools used are novel (Smith, 2020). In Iranian law, courts generally adopt a cautious approach and, in the absence of an explicit statutory provision, refrain from fully recognizing the legal effects of technological tools. While this caution may be justifiable from the perspective of maintaining public order, in practice it can undermine contractual security, since parties cannot enter into technological contracts with certainty regarding judicial protection (S. M. Nouri, 2020).

One prominent feature of English law is its flexibility in managing contractual risks. In this system, contractual security does not imply the total elimination of risk but rather the predictability of how risk is allocated between the parties. This approach has adapted well to modern technologies and has enabled the formulation of complex technology-based contracts (Cartwright, 2019). In contrast, Iranian law focuses more on risk mitigation through mandatory rules and the protection of the weaker party. While this approach contributes to contractual justice in certain areas, it can act as a barrier to innovation and to the adoption of modern tools in the technological sphere. Some researchers argue that contractual security in Iranian law is overly dependent on formal stability and pays less attention to economic efficiency (A. A. Kazemi, 2023).

Comparative analysis reveals that institutional differences between the two legal systems play a decisive role in the level of contractual security. In England, the existence of specialized institutions, strategic reports, and continuous interaction between legal experts and technologists has ensured that contractual security is not undermined when facing technology. In other words, technology is perceived as a regulatable challenge rather than a threat to law (Murray, 2022). Conversely, in Iran, the lack of specialized institutions and coherent strategic frameworks in the field of law and technology has resulted in legal responses that are often ex post and reactive. This situation has subjected contractual security to fluctuation and has diminished the confidence of economic actors (Abbasi, 2022). In summary, the comparative analysis indicates that the primary difference between Iranian and English law lies not in the fundamental principles of contract law but in the manner of their application and interpretation in the face of emerging technologies. By relying on flexible judicial precedent and an institutional outlook on contractual security, English law has succeeded in placing technology at the service of reinforcing contractual security. On the other hand, Iranian law, despite its rich jurisprudential and legal capacities, has yet to fully exploit the potential of technology to enhance contractual security due to legislative gaps, judicial caution, and institutional weaknesses. This comparative analysis suggests that enhancing contractual security in Iranian law does not require abandoning traditional principles; rather, it requires their creative reappraisal and the use of comparative experiences from English law.

5. Discussion of Findings

The findings of this research indicate that, in light of technological developments, the concept of contractual security has evolved from a classical notion based on formal stability and mere predictability into a multilayered and dynamic concept that simultaneously encompasses legal, institutional, technological, and economic dimensions. The review of theories, doctrinal perspectives, and the comparative analysis of Iranian and English law has enabled a critical evaluation of the capacities and challenges of both systems in addressing emerging technologies.

The first significant finding of the study is that technology, particularly digital technologies and smart contracts, has not inherently undermined contractual security; rather, it may reinforce it by reducing executive

uncertainty and accelerating the fulfillment of obligations. However, this enhancement of security is realized only if the legal system can adapt itself to the logic of technology. In English law, contractual security has been guaranteed through the gradual adoption of technology and a broad interpretation of traditional contract concepts; whereas in Iranian law, the lack of full alignment between traditional rules and technological realities has created a gap between theoretical security and practical security.

This finding aligns with the views of certain Iranian authors who argue that contractual security in Iran remains an abstract and normative concept rather than a product of institutional functioning (Jafari, 2022). In contrast, the English experience demonstrates that contractual security becomes meaningful only when enforceability, judicial interpretation, and institutional responsiveness to modern developments are guaranteed. Furthermore, the findings suggest that the common intention of the parties and legitimate expectations continue to form the core of contractual security, yet the methods of their verification and protection have undergone transformation. In technology-based contracts, especially smart contracts, the parties' intention is manifested not only in the text of the agreement but also in the code, algorithm, and technical structure of the contract. By accepting this evolution, English law has expanded the traditional criteria for verifying intent, emphasizing the function of the contract rather than its form.

In Iranian law, although jurisprudential rules such as the presumption of validity and the principle of performance of obligations possess the theoretical capacity to protect legitimate expectations, in practice, the lack of full recognition of technological manifestations of intent has led to instability in contractual security. Some researchers attribute this situation to the distance between dynamic jurisprudence and static legislation (F. Nouri, 2020). The findings of this research support this view and indicate that, without a creative reappraisal of the traditional concepts of intent and consent, contractual security will not be fully realized in technological contexts.

Another finding of the research is the significant difference in the role of courts within the two legal systems. In England, courts, by playing an active role, have managed to compensate for legislative gaps and guarantee contractual security even in areas lacking explicit statutes. This approach has elevated security from the level of statutory text to the level of institutional trust. Conversely, Iranian courts predominantly adopt a cautious and text-centric approach which, while defensible from the perspective of maintaining public order, leads to reduced predictability and contractual insecurity in the technological sphere. This finding aligns with critical analyses of Iranian legal scholarship, which argue that judicial conservatism amid rapid technological transformation becomes a factor in legal instability (Sadeghi, 2021a). Therefore, contractual security is not merely a function of the quality of laws but also depends on the dynamism of judicial interpretation.

The comparative study revealed that, in English law, contractual security is closely linked to risk management. In this system, contracts are structured so that technological risks are identified, allocated, and predicted. This approach defines security not as the elimination of risk but as the predictability of outcomes. In contrast, in Iranian law, the dominant focus is on mitigating or nullifying risk through mandatory rules, which in practice reduces the flexibility of technology-based contracts. The research findings indicate that this difference in approach has a direct impact on the level of contractual security. Security based on risk management is more dynamic and sustainable than security based on ex ante restrictions. This finding highlights the necessity of rethinking the concept of contractual security in Iranian law (R. Kazemi, 2023).

One of the most critical findings of the research is the existence of an institutional gap in Iranian law. Unlike England, where specialized institutions, policy reports, and interactions between law and technology have been strengthened, the lack of such institutions in Iran has resulted in legal responses to technology that are fragmented and uncoordinated. This situation has undermined contractual security, particularly in complex technological transactions. Some Iranian authors consider this institutional void more significant than the legislative gap, arguing that even the best laws cannot guarantee contractual security without efficient institutions (Abbasi, 2022). The findings of this research support this view and suggest that enhancing contractual security requires an institutional and cross-sectoral approach. At the theoretical level, the findings show that contractual security is not a static and traditional

concept but must be redefined within the framework of technological developments. At the practical level, the results indicate that, to enhance contractual security, Iranian law needs to integrate jurisprudential capacities with successful comparative experiences. The English experience demonstrates that contractual security in a technological context can be achieved without breaking away from the fundamental principles of contract law. In summary, the discussion of the findings indicates that the primary challenge for Iranian law in the field of contractual security is not the absence of theoretical foundations but the weakness in translating these foundations into executive, judicial, and institutional mechanisms.

6. Conclusion

The present research was conducted with the aim of analyzing the role of emerging technologies in enhancing contractual security through a comparative approach between Iranian and English law. The primary research problem concerned how technological developments, specifically smart contracts and blockchain technology, redefine and enhance contractual security, and to what extent the legal systems of Iran and England have responded efficiently to these shifts. Furthermore, the central hypothesis was formulated on the basis that modern technologies may increase contractual security, yet the realization of this security is contingent upon appropriate legal and institutional regulation; in this regard, the English legal system possesses a greater capacity for exploiting these technologies compared with Iranian law.

Based on the theoretical and comparative findings, a clear answer can be provided to the primary research question. The results indicate that emerging technologies, particularly smart contracts, are technically capable of increasing executive certainty, accelerating the fulfillment of obligations, and reducing transaction costs; hence, they possess potential capacity for enhancing contractual security. However, contractual security is not a purely technical concept but a legal-institutional notion that is not fully realized without legal recognition, judicial interpretation, and institutional guarantees. In response to the main question, it must be stated that emerging technologies lead to a genuine enhancement of contractual security only if they are regulated within a legal framework that is flexible, responsive, and aligned with technological developments. This condition has largely been fulfilled in English law, whereas in Iranian law it continues to face legislative, judicial, and institutional challenges. Therefore, the answer to the main question is conditional and bifurcated: technologies are tools for enhancing contractual security, not substitutes for the legal system. The primary hypothesis was predicated on the idea that modern technologies potentially increase contractual security, but the realization of this security depends on the legal system's approach, with English law demonstrating more successful performance than Iranian law. The research findings indicate that this hypothesis is generally confirmed. Comparative analysis showed that, in English law, technology-based contracts are interpreted within the framework of fundamental principles such as freedom of contract, the common intention of the parties, and legitimate expectations, with courts playing an active role in filling legislative gaps. Consequently, contractual security in technological contexts has not only remained uncompromised but has also been reinforced in many instances. In contrast, while Iranian law possesses the necessary jurisprudential and theoretical foundations to support contractual security, the lack of transparent regulations, excessive judicial caution, and the weakness of specialized institutions have hindered the full use of technological capacities. Thus, the research hypothesis regarding the relative superiority of the English legal system in adapting to emerging technologies and enhancing contractual security is confirmed, although this superiority is not absolute, and Iranian law retains significant reformable potential.

One of the important theoretical achievements of this research is the redefinition of contractual security in light of technological shifts. In its traditional sense, contractual security was primarily limited to the stability of the contract and the guarantee of its judicial enforcement. However, the research findings suggest that, in the digital age, contractual security is a multidimensional concept encompassing technical security, including data integrity and safety; legal security, including validity, interpretation, and enforcement; and institutional security, including the efficiency of courts and dispute resolution bodies. In this framework, although smart contracts can guarantee the automated execution of obligations, the absence of legal

mechanisms for modification, rescission, or interpretation may lead to inequitable enforcement and, consequently, a reduction in contractual security. This finding indicates that contractual security should not be conflated with technical certainty; rather, genuine security is realized through a balanced interaction between technology and law.

The synthesis of the comparative analysis demonstrates that the primary difference between Iranian and English law lies not in the fundamental principles of contract law but in the manner of applying and interpreting these principles in the face of emerging technologies. By relying on dynamic judicial precedent and incremental legal policy-making, English law has succeeded in aligning contractual security with technological shifts. Conversely, Iranian law remains overly dependent on traditional rules and restrictive interpretations, which reduces the level of predictability and contractual trust. Nevertheless, the research shows that the jurisprudential foundations of Iranian law, such as the principle of bindingness, the principle of performance of obligations, and the presumption of validity, possess the necessary theoretical capacity to support contractual security in technological contexts. The primary challenge is not a lack of foundation but rather a weakness in efficient legislation and specialized institution-building.

Ultimately, it can be concluded that emerging technologies are neither an inevitable threat to contractual security nor a miraculous solution for it. Contractual security in the age of technology is the product of an intelligent interaction between law and technology. The research findings suggest that the more active and flexible a legal system is in adopting, regulating, and guiding technology, the more contractual security will be reinforced. Therefore, the answer to the main research question is clear: contractual security can be enhanced in light of emerging technologies, but this enhancement is possible only through informed legal regulation and by drawing upon successful comparative experiences, particularly the English legal experience.

1-5) Legislative and Practical Recommendations

Based on the findings of this research, enhancing contractual security in light of emerging technologies necessitates the adoption of a set of legislative, judicial, and practical recommendations that can simultaneously address the requirements of traditional law and the exigencies of modern technologies. The first legislative recommendation is the explicit recognition of technological and smart contracts within the Iranian legal system. The absence of a clear legal definition for these types of contracts has led to ambiguity regarding their validity, legal effects, and the methods for resolving disputes arising from them. Drawing inspiration from the English legal experience, the legislator could provide a flexible and interpretive framework for the recognition of these contracts without imposing rigid regulations.

The second recommendation is to strengthen the role of will and the common intention of the parties in technology-based contracts. It is essential to specify in relevant laws or regulations that computer code, provided that it reflects the genuine will of the parties, can be regarded as a means of expressing intent rather than a total substitute for the contract. This approach prevents the reduction of contractual security to mere technical security and allows legal intervention in cases of error or change of circumstances.

The third recommendation involves empowering judicial precedent and dispute resolution bodies in dealing with litigation arising from technology-based contracts. Specialized training for judges, the involvement of technical experts, and the establishment of specialized chambers or institutions can play a vital role in increasing predictability and contractual trust. The experience of the English legal system demonstrates that the dynamism of judicial interpretation is decisive in guaranteeing contractual security.

Finally, from a practical perspective, economic and legal actors are advised to prioritize risk management and contractual transparency when drafting technology-based contracts. Incorporating clauses for adjustment, rescission, and dispute resolution tailored to the nature of the technology can reinforce contractual security in practice. Collectively, these recommendations can pave the way for a transition from traditional contractual security to smart and balanced contractual security in Iranian law.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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