Establishment of Smart Financing Contracts on Blockchain Platforms with an Emphasis on Consumer Protection: A Comparative Study of the Iranian Legal System and Canadian Regulatory Framework

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Abstract

Housing financing contracts, as one of the most significant instruments for securing legal and economic rights, play a fundamental role in promoting economic stability and social justice. However, due to the inherent imbalance of bargaining power between financial institutions and borrowers, these contracts are consistently exposed to legal and enforcement-related challenges. The regulation of residential financing agreements within the Iranian legal system is primarily grounded in general principles of contract law, bank-centered regulations, and administrative directives. This situation has contributed to inadequate protection of financial consumers, reduced contractual transparency, and an increased likelihood of legal disputes. In contrast, the Canadian legal system has adopted a proactive approach to financial regulation. Through the implementation of federal and provincial regulatory frameworks, together with preventive and systematic supervisory mechanisms aimed at consumer protection, Canada seeks to maintain contractual balance within the lending market. Using a descriptive-analytical approach and a comparative legal methodology, this article examines the extent of convergence and divergence between the Iranian legal system and Canadian regulatory frameworks regarding the smart regulation of financing contracts, with particular emphasis on consumer protection. The study seeks to demonstrate that significant differences exist between the two legal systems in areas such as contractual transparency, consumer support mechanisms, and the role of regulatory institutions.

Keywords: Financial Regulation, Financing Contracts, Blockchain, Consumer Protection, Comparative Law.

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1. Introduction

The central issue addressed in this article is whether the Iranian legal system has moved toward new models of financial regulation and consumer protection in governing financing contracts, or whether it continues to follow a bank-centered and reactive approach. If such a development is possible, the question is what legal and institutional reforms, inspired by the emerging experience of smart contracts and Canadian federal regulatory approaches, could improve contractual justice for consumers and enhance the efficiency of the financing market in Iran.

Smart contracts are computer programs that operate on a blockchain. Blockchain technology enables data to be recorded, stored, and shared securely and transparently through distributed computer networks without the need for a central authority or server. Contractual terms can be embedded in programming code, and such contracts may be executed automatically, thereby reducing the need for intermediaries.

At present, Iran lacks specific legislation governing smart contracts, and such contracts are generally assessed within the broader framework of the Civil Code and the Electronic Commerce Law. The absence of a clear statutory definition of smart contracts in Iranian law creates uncertainty regarding their validity and enforceability.

Given the growing use of blockchain technology, Iran should move toward the development of comprehensive legislation to regulate smart contracts.

In Canada, smart contracts are gradually entering the legal system; however, legal ambiguities remain concerning their juridical status and enforceability. What is clear is that these ambiguities must be examined in order to reduce risks for consumers, legal practitioners, and market participants.

In Canada, given the strong emphasis on consumer rights, smart contracts must be designed and regulated in a manner that fully respects consumer interests and legal protections.

In both countries, attention to consumer rights and contractual justice in the field of smart contracts is essential. In Iran, legal reforms are needed to protect consumers and create greater contractual transparency, while in Canada, it must first be ensured that consumer rights are not undermined and that the existing legal framework operates effectively in this regard.

Although both countries seek to use new technologies in smart contracts, Iran faces more substantial legal challenges and requires specific legislation, whereas Canada is developing legal frameworks that facilitate the use of this technology in the blockchain environment.

New technologies, particularly artificial intelligence and digitalization, will have significant effects on contractual justice and consumer rights in both Iran and Canada. These effects may be both positive and negative within the current legal systems of the two countries. The positive aspects of smart systems include increased access to information, greater speed in judicial processes, enhanced transparency, and more agile access to justice.

On the other hand, these technologies may create inequalities in access to technological infrastructure and may generate deeper human rights concerns. Complex algorithms used in smart systems may lead to racial or gender-based discrimination and may affect social justice.

2. Advantages of Smart Contracts over Traditional Contracts

Smart contracts, as an innovation in law and electronic commerce, have significant advantages over traditional contracts. These contracts can be executed automatically and do not require human intervention. From a legal perspective, the self-executing nature of smart contracts means that they automatically perform contractual terms once predefined conditions are met, without requiring a further declaration or consent from either party (Endara, 2023).

This feature reduces the time and resources required for contract performance and makes the process faster and more efficient. The security and immutability of these contracts are high because they are stored on a blockchain platform and therefore cannot easily be altered or manipulated. This feature helps reduce the risk of fraud and misunderstanding, increases trust between contracting parties, and enhances transactional security. By eliminating intermediaries and related expenses, this method reduces costs and lowers transaction costs, especially in large and complex transactions. It may therefore generate significant financial savings. Smart contracts can also facilitate complex transactions and agreements that would be difficult or impossible to implement through traditional contractual mechanisms. All transactions and terms of smart contracts are public

and traceable. This transparency allows parties to access information, helps prevent legal disputes, and may accelerate settlement processes, whereas similar procedures may take days or weeks in traditional contracts.

However, it should be noted that smart contracts on blockchain platforms also create challenges, including the need for technical knowledge, proper implementation, accurate code identification, and regulatory compliance. Nevertheless, their overall benefits can improve efficiency and reduce costs across many industries.

3. Blockchain's Function in Smart Contract Security

Smart contracts in the blockchain environment are now among the most widely discussed issues in international trade. Through coded instructions and algorithms, contracting parties can specify performance guarantees, prevent possible disputes, and complete predetermined transactions in the shortest possible time (Bayat, 2024).

Blockchain technology ensures decentralized consensus and can expand the contractual space through smart contracts. Creating decentralized consensus requires the distribution of information, which necessarily changes the information environment. Blockchain is a technology that is usually managed in a decentralized manner, and Bitcoin was first recognized as the first encrypted cryptocurrency. Many industry actors argue that blockchain technology has the potential to disrupt trade and financial services in the same way that the Internet disrupted offline commerce (Azezi, 2022).

As an emerging technology, blockchain ensures the security of smart contracts through several features, including immutability. Once data and contracts are recorded on the blockchain, they cannot be changed or deleted.

All transactions and contracts on the blockchain are publicly recorded and may be viewed by network participants. This transparency helps reduce the risk of fraud and corruption and increases trust between contracting parties. Blockchain also uses advanced cryptographic techniques and complex algorithms to secure data.

To understand and identify smart contracts in the blockchain context, it is necessary to examine this technology more deeply. Blockchain is a database of all transactions in a network. In the context of digital currency, it records Bitcoin transactions in a decentralized ledger composed of a chain of blocks. Blockchain technology has many applications, among which smart contracts are one of the most widely used.

Blockchain uses consensus mechanisms such as proof of work and proof of stake for transactions. These mechanisms are used to verify transactions, prevent cyberattacks and possible manipulation, and thereby ensure network security.

The combination of these features makes blockchain a secure and reliable platform for executing smart contracts and helps reduce risks while increasing trust in digital transactions.

4. Key Security Challenges of Smart Contracts

Smart contracts, as self-executing instruments on the blockchain, face numerous security challenges that may lead to misuse and capital loss.

Smart contracts can help the traditional, cumbersome, and slow machinery of contract law keep pace with the much faster transactions enabled by contemporary technologies (Selvadurai, 2023).

The most common challenge is reentrancy attacks. These attacks occur when a contract repeatedly calls itself during execution. This may lead to the unauthorized withdrawal of funds. To prevent such attacks, developers and programmers should use secure coding algorithms that can stop or disable contracts in cases of doubt or emergency.

Smart contracts usually depend on oracles to receive real-world data. If these oracles are manipulated, they may provide incorrect information. The use of reliable oracles and the implementation of data validation mechanisms can help reduce potential risks in the structure of such contracts.

Addressing these security challenges requires a multifaceted approach that includes secure coding practices, preservation of decentralization principles, and protection of privacy. With the systematic development of smart contracts, continued research, ongoing collaboration, and adherence to best practices can provide a secure and resilient foundation for the future of decentralized applications.

5. Effective Governance in Smart Contracts

Appropriate governance mechanisms must be implemented in smart contracts. One effective method is the use of decentralized autonomous organizations as blockchain-based governance entities, allowing parties and stakeholders to vote on changes or updates to smart contracts. This form of governance promotes greater transparency and participation. In addition, the use of multi-signature wallets, which require the signatures of multiple stakeholders and collective approval to complete a transaction, can operate as a governance mechanism.

6. Challenges Facing Iranian Law in the Field of Smart Contracts

One of the main challenges in each country is the absence of a codified legal framework for smart contracts. Although smart contracts are designed on the basis of blockchain technology, existing laws in many countries are mostly related to traditional contracts regulated through physical documents and signatures. This may create difficulties for the recognition and enforcement of smart contracts.

In Iran, laws such as the Civil Code do not specifically address this type of contract. According to Article 190 of the Civil Code, contracts are traditionally concluded through the voluntary agreement of the parties.

Since agreements in smart contracts occur in the form of code and without the physical presence of the parties, legal problems such as non-recognition of digital signatures and enforcement disputes in the event of technical defects may arise. Iranian law has not clearly addressed smart contracts, which may result in the lack of adequate enforcement guarantees (Majles Research, 2024).

Another challenge is the absence of a clear and specific definition of smart contracts in Iranian law, which creates ambiguity regarding the validity and enforceability of these contracts before courts.

The mechanisms for resolving disputes arising from smart contracts remain unclear, and it has not yet been determined which general or specialized judicial authority should have jurisdiction over such disputes. The absence of legal infrastructure and specific legislation regulating smart contracts prevents their widespread adoption. Another important point is that the real identity of the contracting parties in smart contracts is not always evident, and digital identifiers are used for authentication. Therefore, in the event of default, it may be difficult for individuals to bring a legal claim. Although this problem may be reduced within a smart contract framework, exceptional cases may still create serious challenges (Khansari & Qalich, 2019).

Protecting the interests of contracting parties is a fundamental principle of contract law. In traditional contracts, the parties know each other, and the contract is binding in nature. Therefore, filing a lawsuit and claiming damages is relatively straightforward. This issue can become problematic in legal and commercial fields that require transparency and security.

The limitations of blockchain technology and infrastructure in Iran remain considerable and require greater investment and technical expertise in order to support smart contracts effectively.

Resistance from traditional institutions, banks, and notaries is also likely to be significant, because smart contracts may reduce their role and clearly affect their institutional interests.

Another legal challenge in smart contracts concerns the law governing the contract because of their cross-border nature. This issue remains difficult because, given the conclusion of contracts through coded instructions, parties conclude their contracts in the form of written digital commands, while the possibility of determining the governing law in the event of potential disputes is often not adequately considered (Nasser & Sadeghi, 2019).

Public awareness and knowledge of smart contracts in Iran remain limited, and educational and awareness-raising campaigns are needed to increase the knowledge of the public and economic actors in this field. These challenges indicate the need for legal reforms and the development of appropriate infrastructure for the acceptance and use of smart contracts in Iran.

Key Iranian Strategies for Improving the Existing Legal Infrastructure for Smart Contract Adoption

Engineering and developing technological infrastructure, investing in blockchain infrastructure, and creating a domestic version of such infrastructure can help facilitate the adoption of smart contracts and increase the confidence of foreign investors by providing greater security and transparency in this sector.

Government cooperation with blockchain startups can help implement smart projects and provide practical experience in this field. Legal and regulatory reforms, particularly in relation to smart contracts, can facilitate dispute resolution and promote public acceptance.

7. Status of Smart Contracts in Canada

From a legal perspective, the validity of smart contracts must be recognized by each country's legal system. In Canadian law, from a civil-law perspective, smart contracts are generally recognized on the basis of three requirements for the validity and effectiveness of contracts: consent, object, and cause (Endara, 2023).

Smart contracts in Canada constitute an important issue in the field of financial technology law. At the provincial or federal level, Canadian law does not yet contain an independent legal regime that explicitly determines the enforceability of smart contracts.

However, if a smart contract contains the four main elements of contract formation—offer, acceptance, consideration, and the legal capacity of the parties—it may still be enforceable.

Electronic commerce laws in Canada generally treat digital contracts as equivalent to paper-based contracts in terms of legal effects. From the perspective of contract law, the fact that an agreement is expressed in code does not, by itself, prevent the validity of the contract.

8. Case Law and Online Contracts

Canadian courts have previously recognized online contracts, such as sign-in-wrap and clickwrap agreements, as valid where the user has had the opportunity to review the contractual terms and has clicked "I agree." Therefore, the mere fact that an agreement is automated or digital does not invalidate the contract. Contracts must be enforceable and capable of dispute resolution, and they must be identifiable and understandable to the parties; otherwise, their enforcement becomes difficult.

Canada does not yet have a specific legal framework for smart contracts, but the prevailing approach is to adapt technology to traditional contract-law rules rather than create an entirely new legal order.

The main challenges ahead are likely to arise in areas such as liability for algorithmic errors, network security, determination of the governing law, and identification of the rights of the parties.

9. The Future of Blockchain

The future of blockchain legislation is moving toward more coherent, transparent, and data-driven regulatory regimes. Unlike the early period, when governments were largely passive, the global trend now shows that blockchain is entering the framework of economic and financial law.

Blockchain regulation in the field of smart contracts may be regarded as one of the most important developments in technology law in the coming decade. New regulations will not only change the way these contracts are designed but will also direct their automated and decentralized nature toward legal and regulatory compliance.

A smart contract is no longer merely code; rather, it must be auditable and compliant with financial regulations.

10. Legal Requirements for Smart Contracts on the Blockchain

The most important legal requirement for smart contracts is their enforceability. Smart contracts must comply with governmental requirements concerning writing and signature. In other words, just as traditional written contracts are recognizable and enforceable before competent courts, smart contracts must also possess such legal capacity (Shields, 2019).

Smart contracts must comply with the laws governing the principal contract. It is important to evaluate the legal implications and requirements of the smart contract in relation to the relevant laws.

Another important issue in smart contracts is the possibility of security vulnerabilities, which must be taken into account. Relevant information must be provided to the contracting parties in a fully secure manner. Compliance with existing regulations should also be anticipated, because most aspects of smart contracts are covered by laws and regulations relating to traditional

contracts. Therefore, attention must be paid both to the compatibility of smart contracts with existing regulations and to the closure of regulatory gaps.

Blockchain will soon move from legal loopholes toward more comprehensive frameworks. Regulations in the European Union have created a unified framework for crypto-asset issuers and service providers, imposing requirements related to transparency, necessary licenses, and investor protection.

These regulations are designed to increase the security and supervision of digital markets while supporting innovation.

Meanwhile, digital currencies such as Bitcoin, which are currently discussed within international trade law and international economic law, are virtual currencies without intermediaries or traditional backing. Their transfer is carried out without the supervision of a specific authority and without attachment to a particular geography. In this field, some transactions have produced legal and regulatory reactions by the governments of transferors and transferees (Hashemi-Nejad, 2022).

Today, strong emphasis is being placed on financial transparency and taxation by crypto-related organizations, and users' transactions and financial operations can be shared transparently. From 2026 onward, platforms outside the European Union will also be required to report the transactions of European users, and thus absolute anonymity on the blockchain will gradually diminish in the near future.

Security concerns and financial crimes are increasing.

The Financial Action Task Force has warned that regulatory gaps may have global implications, and users with invalid addresses may have illegally withdrawn billions of dollars from digital wallets since 2024.

New research shows that public blockchains lack sufficient mechanisms for private activity. For this reason, it has been proposed that smart contracts be linked with electronic seals in order to verify regulatory compliance automatically. This model could make it possible to authenticate the identities of the parties. For smart contracts to be valid, the consumer and the contracting party must still comply with traditional rules, and in cases of disagreement, human and judicial intervention remains necessary.

The future of smart contracts in banking and capital markets is largely connected to the digital transformation created by blockchain technology and regulatory change. This technology has the potential to transform traditional financial structures in terms of speed, transparency, and cost.

A Brief Overview of Current Canadian, American, and European Legislation on Blockchain Technology in the Field of Smart Contracts

A comparison of Europe, the United States, and Canada in the field of blockchain and smart contract legislation reveals three distinct legal approaches.

The European approach is comprehensive, proactive, and directed toward creating a harmonized system for the entire European Union market.

This approach can increase consumer protection, financial certainty, and market transparency.

11. Conclusion

By requiring crypto companies to obtain licenses, this approach can also manage legal and financial risks.

At the same time, this approach may produce consequences for Europe, such as higher compliance costs. Although this may be suitable for employees of banks and financial institutions, it may also increase the regulatory burden on market participants.

As a result, Europe is becoming one of the safest legal environments for enterprise blockchain applications.

In the United States, regulation is fragmented and enforcement-based. The United States still lacks a single comprehensive law, and the absence of a specific definition has created legal uncertainty. However, two states, Arizona and Tennessee, have recognized the legal validity of smart contracts. Electronic contracts are agreements between two or more parties formed through offer and acceptance in an electronic environment. In terms of their legal nature, they do not differ substantially from traditional contracts; their main distinction is that they are concluded in an electronic context. Accordingly, smart contracts are electronic contracts concluded through the offer and acceptance of the parties in the blockchain environment and have sufficient validity in American law (Nasser & Sadeghi, 2019).

The United States may be considered a suitable environment for startups; however, for large financial institutions, it remains a legally risky environment.

Canada is a moderate and adaptive regulator. It generally adopts a balanced approach.

Canadian crypto platforms are regulated by Canadian securities authorities.

Many digital assets may be subject to securities laws.

An important feature of the Canadian approach is its focus on regulating activities rather than banning technology.

As a testing ground for the crypto market and smart contracts on blockchain platforms, Canada may become a secure environment for financial innovation in the future.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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