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The Feasibility of Smart Contract Formation as a Legally Valid Contract: A Comparative Study in Iranian and Swiss Law

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Abstract

Smart contracts represent a groundbreaking innovation at the intersection of law and information technology, offering numerous capabilities for managing digital assets and facilitating economic transactions. These contracts, which operate on blockchain technology and are powered by artificial intelligence, execute the obligations of the parties automatically and without the need for intermediaries. Their unique characteristics have attracted widespread attention, including self-execution, decentralization, accuracy, security, immutability, transparency, and reliability. They ensure real-time tracking of transactions, reduce the need for third-party involvement, and can even aid in crime prevention by minimizing opportunities for fraud. Moreover, smart contracts enable the resolution of disputes through online systems, can be executed by advanced computer systems or decentralized autonomous organizations (DAOs), and often do not require the physical presence of the parties. These features make smart contracts highly flexible and commercially viable.

Despite these advantages, the lack of clear legal frameworks surrounding smart contracts poses challenges to their acceptance and use. This research investigates the feasibility of recognizing smart contracts as legally binding agreements in the legal systems of Iran and Switzerland. The first task was to determine the nature of these contracts and assess whether they qualify as contracts in the legal sense. A contract is traditionally defined by the mutual consent of two or more parties and the establishment of a legal relationship. This study categorizes smart contracts into different types based on their compliance with this definition. Some smart contracts, despite the label, serve merely as tools for storing data, such as in banking or insurance applications, and do not constitute legal contracts. Others act only as proof or mechanisms for enforcing pre-existing legal

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agreements, using blockchain to automate execution and provide a verifiable record. In these cases, the legal contract is formed separately from the smart contract itself. However, there are also smart contracts that create legal effects through mutual agreement and can be classified as legal contracts in the traditional sense.

Once the legal nature of smart contracts was established, the study examined the general principles of contract validity in the context of smart contracts, focusing on the legal systems of Iran and Switzerland. Switzerland does not yet have specific legislation on smart contracts, but existing general laws, such as the Code of Obligations, are deemed applicable with certain modifications. Swiss courts and regulatory bodies recognize smart contracts and believe that existing laws can be adapted to cover them. In Iran, the general rules of contracts and the Electronic Commerce Law must be applied to smart contracts. One of the primary elements of contract formation is the intent and consent of the parties, which, in smart contracts, is expressed digitally. The moment of contract formation, under Iranian law, is upon the declaration of acceptance, while in Swiss law, it is linked to the receipt of the acceptance.

The capacity of the parties is another essential requirement for the validity of contracts in both Iranian and Swiss law. However, verifying capacity in smart contracts is challenging due to the anonymity of the parties and the lack of direct knowledge of their identities. One way to address this issue is through the use of digital signatures, which can verify the identity and legal standing of the parties. For legal entities, capacity can be confirmed through the authorization to use digital signatures and hold cryptocurrencies. Advanced electronic signatures are also considered an effective tool in this regard and are recognized as valid under Swiss law, similar to the regulations of the European Union. By implementing these measures, the problem of verifying the capacity of the parties in smart contracts can be mitigated.

Regarding the subject matter and legality of the purpose, the subject of smart contracts may involve digital assets like cryptocurrencies, but there is no restriction on including non-digital goods or services. In Switzerland, the subject matter must be lawful, and contracts concerning illegal goods are deemed void. Similar rules apply in Iran, where the legality of the subject matter and purpose is essential for the validity of the contract. Furthermore, any breach of mandatory provisions, such as consumer protection laws, is not allowed in either jurisdiction. Unusual or unpredictable clauses that violate consumer rights in smart contracts are not enforceable.

This study also highlighted a significant distinction between the legal approaches of Switzerland and Iran. While Swiss doctrine and legal studies recognize the categorization of smart contracts based on their legal effects, Iranian research has yet to address this distinction comprehensively. In Iran, all forms of smart contracts are often treated as legally binding agreements without considering the specific nature and purpose of the contract. This lack of

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	differentiation may lead to confusion in the application of legal rules and the interpretation of smart contracts. To address these challenges, the study suggests several legal and technical reforms. For instance, the inclusion of specific provisions for smart contracts in the Iranian Electronic Commerce Law and monetary regulations could provide clarity and guidance. Defining terms such as "smart contract" and "oracle" within the legal framework would help establish their legal status and functionality. For example, a smart contract could be defined as "a type of electronic contract that is created and executed automatically on a blockchain platform upon the fulfillment of predefined conditions agreed upon by the parties." Furthermore, regulations concerning the use of cryptocurrencies as a subject matter or means of payment should be aligned with existing banking laws. The establishment of a digital asset registration system, along with mechanisms for verifying digital assets by official authorities, could enhance the reliability and transparency of smart contracts. Additionally, the role of advanced electronic signatures in contract formation and the requirement for certification by authorized entities should be clarified. Determining the exact moment of contract formation—whether linked to the acceptance or its receipt—would also contribute to harmonizing Iranian laws with international legal standards. In conclusion, smart contracts that are entered into with the intent to create legal obligations between two or more parties and meet the essential conditions for contract validity can be considered legally binding contracts. However, addressing the existing gaps in legal frameworks and adopting a more nuanced approach to their classification and regulation would facilitate their broader acceptance and practical implementation in both Iranian and Swiss legal systems. This research underscores the need for a dynamic legal framework that accommodates the unique characteristics of smart contracts while ensuring their compliance with traditional legal principles.
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