

The Smart Contract: Prospects of Its Application in Algerian Civil Law

العقد الذكي: أفاق تطبيقه في القانون المدني الجزائري

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Date of submission:03/04/2025 Date of final acceptance06/06/2025 Date of publication :juine 2025

Abstract:

The smart contract is one of the modern topics that has garnered increasing attention in the fields of technology and law. This type of contract is characterized by its ability to self-execute once specific conditions are met, utilizing blockchain technology and digital programming. This ensures accuracy and speed in fulfilling obligations without the need for direct human intervention.

This research paper aims to explore the concept of the smart contract while analyzing its compatibility with the fundamental principles of Algerian civil law. It also seeks to highlight potential legal challenges that may arise when applying this type of contract.

The study concludes that the smart contract represents an innovative solution that could enhance the efficiency of the Algerian legal system in light of modern digital challenges. However, achieving this objective requires legislative amendments and the integration of new technologies into the legal framework to ensure a balance between technological advancements and the protection of individuals' legal rights.

Keywords: Smart Contract; Blockchain; Self-Execution; Legal Challenges; Contract Theory.

ملخص:

يُعتبر العقد الذكي من الموضوعات الحديثة التي حظيت باهتمام متزايد في مجالي التكنولوجيا والقانون. يتميز هذا النوع من العقود بقدرته على التنفيذ التلقائي بمجرد تحقق شروط محددة، وذلك باستخدام تقنيات البلوك تشين والبرمجة الرقمية، مما يضمن الدقة والسرعة في تنفيذ الالتزامات دون الحاجة إلى تدخل بشري مباشر.

تسعى هذه الورقة البحثية إلى استعراض مفهوم العقد الذكي، مع تحليل مدى انسجامه مع المبادئ الأساسية للقانون المدني الجزائري. كما تهدف إلى إبراز التحديات القانونية المحتملة التي قد تنشأ عند تطبيق هذا النوع من العقود.

توصلت هذه الدراسة إلى أن العقد الذكي من الحلول المبتكرة التي قد تساهم في تحسين فعالية النظام القانوني الجزائري في ظل التحديات الرقمية الحديثة. إلا أن تحقيق هذا الهدف يتطلب تعديلات تشريعية ودمج تقنيات جديدة في بنية النظام القانوني بما يضمن التوازن بين التطور التكنولوجي وحماية الحقوق القانونية للأفراد.

الكلمات المفتاحية: العقد الذكي؛ البلوك تشين؛ التنفيذ الآلي؛ التحديات القانونية؛ نظرية العقد.

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Introduction:

The contract is one of the most prominent legal concepts governing transactions between individuals and companies, serving as the legal framework that ensures the obligations of parties and defines their rights. However, with the advancement of digital technology and the widespread adoption of blockchain technology, new tools have emerged in the realm of contracting, known as "smart contracts." These contracts do not rely on paper or traditional documentation but are executed automatically through programming codes based on blockchain technology, simplifying procedures and reducing human intervention.

Smart contracts represent a fundamental shift in the way agreements are formed between parties, particularly in digital and commercial transactions. This mechanism embodies significant progress in the field of contract drafting, characterized by high efficiency, transparency, and security. However, these advantages may pose several challenges to the traditional legal system, which still relies on customary rules and conventional legal texts predating this technology's emergence.

The Algerian Civil Code, as the general framework for laws, has not addressed smart contracts. Thus, the following legal issue arises: Does the theory of contracts in Algerian civil law possess sufficient flexibility to encompass and regulate the concept of the smart contract within its current framework? Or does achieving this goal require legislative amendments to provide an appropriate legal framework that aligns with this innovative mechanism?

To address this issue, our study is divided into two main axes: the first examines the concept of the smart contract, and the second explores the legal challenges of adapting smart contracts within Algerian civil law.

This study adopts a descriptive-analytical methodology, analyzing the subject of smart contracts from various perspectives and comparing them with traditional principles to provide practical solutions for integrating smart contracts into the Algerian legal system.

Section I: The Concept of the Smart Contract

Modern technology and advancements in contracting are among the most significant issues occupying legal scholarship. The execution of contracts has gone beyond the use of electronic means to express intent, evolving into what is now known as the automatic execution of contracts—referred to as "smart contracts." This axis will address the emergence and definition of smart contracts, their parties, their relationship with blockchain technology, and finally, their characteristics.

A) The Emergence of Smart Contracts:

Professor Nick Szabo¹ was the first to refer to smart contracts in 1998. In his theory, he advocated for the adoption of self-executing contracts, or what he termed "ledger," emphasizing the decentralization of smart contract execution².

Nick Szabo described smart contracts as a set of promises, digitally specified, incorporating specific protocols for executing these promises. He focused on the idea of replacing traditional intermediaries in contracts, such as lawyers and banks, with digital systems capable of executing contractual terms autonomously and securely. However, the concept of smart contracts remained theoretical at the time due to the lack of technical infrastructure, such as blockchain technology and digital currencies³.

The idea of smart contracts gained momentum with the emergence of blockchain technology, particularly with the launch of the Ethereum platform in 2015. Ethereum allows contracts to be stored and executed on a decentralized network, ensuring transparency, security, and reduced reliance on intermediaries⁴.

B) The Definition of Smart Contracts

The term "smart contracts" is relatively new and still evolving, leading to differing definitions based on the perspectives of legal scholars and legislative frameworks. Below, we address the jurisprudential and legal definitions of smart contracts:

1 – Jurisprudential Definition of Smart Contracts

The jurist *Mustapha Mekki* considered the smart contract as an informational program rather than a contract in the precise sense of the word. It operates autonomously, executing certain actions and transactions automatically⁵.

Smart contracts have also been defined as "self-executing contracts built and programmed within a decentralized network (blockchain). Their terms and conditions are organized between the seller and buyer without the need for a central authority (third party). They ensure trust by being irreversible⁶."

Another definition describes them as software applications, supported by algorithms, designed to execute programming commands automatically and autonomously. These contracts function within the blockchain system, which accepts all instructions and commands provided by the contracting parties and ensures that the obligations of the parties are fulfilled without interference⁷.

In summary, smart contracts can be defined as encrypted digital agreements based on blockchain technology. They clearly specify the rights and obligations of the parties and are executed automatically without human intervention.

2- Legal Definition of Smart Contracts

Most legal frameworks have not explicitly defined smart contracts in their legislation. Below are examples of legal systems that have addressed the concept of smart contracts:

2-1. United States

- **Tennessee (2021):** Under Section 2, Tennessee law defines a smart contract as: "A computer program that is event-driven, executed on an electronic, decentralized, shared, and replicated ledger, used to automate transactions⁸."
- **Arizona:** Section 44-7061(2)⁹ of the Arizona Revised Statutes defines a smart contract as: "An event-driven program with state that runs on a distributed, decentralized, shared, and replicated ledger and can manage or instruct the transfer of assets."

2-2. Malta

The Malta Digital Innovation Authority Bill defines a smart contract as¹⁰: "A form of innovative technological arrangement consisting of: a computer protocol or an agreement wholly or partially executed in electronic form, which is automatically enforceable through computer code."

2-3. Arab World

Smart contract legislation in the Arab world is still in its early stages, but some initiatives aim to establish legal and regulatory frameworks for this technology:

- **Arab Monetary Fund (December 2022):** Published a guide titled "Adopting Smart Contracts and Their Legal Enforcement in Arab Countries." The guide aims to raise awareness of the opportunities and risks associated with smart contracts and provides recommendations for designing regulatory frameworks to protect data, consumers, and ensure market integrity¹¹.
- **International Islamic Fiqh Academy (November 2019):** Issued Resolution No. 230 (1/24) regarding smart contracts, discussing their activation and annulment. The resolution defines

smart contracts as: "Agreements between two parties executed automatically, based on a peer-to-peer (P2P) system without intermediaries, through a decentralized network (blockchain) and conducted using encrypted currencies such as Bitcoin and others." The resolution also noted that smart contracts are executed via specific platforms, which can be centralized or decentralized, and often utilize encrypted currencies.

2-4. Algeria

Although electronic contracts are recognized under Law No. 15-04¹², which was a significant step toward promoting digital transformation in Algeria, laying the legal foundations for the safety and reliability of electronic transactions and regulating electronic certification authorities, the legal status of smart contracts remains undefined. This lack of clarity presents legal challenges regarding their recognition and enforcement in Algerian courts.

C) Parties to the Smart Contract:

The parties to the smart contract are the entities or individuals involved in creating, using, or benefiting from the smart contract. Generally, they can be classified into the following categories:

1- Contracting Parties:

The contracting parties are the individuals or entities that enter into the contractual relationship through the smart contract, regardless of their number or nature, whether natural, legal, or customary persons. They work on documenting their agreement to the terms of the contract through their digital signatures, as the contracting parties can sign using their private keys¹³.

The law requires them to have legal capacity and mental soundness. Regarding smart contracts, the existence and eligibility of contracting parties, whether in terms of age or mental capacity, can theoretically be verified by collecting information when opening the account and initiating the contractual relationship. However, practically, reliance is placed on the declaration of the contracting party, which raises challenges in identifying the other party in the smart contract. The other party could, in fact, be a fictitious entity such as a "robot" or a person below the legal age for contracting.

2- Contract Creator:

The contract creator is the party or entity responsible for writing the program code of the smart contract. Typically, the creator is an individual, a team of programmers, or a technology company. Their primary role is:

- Designing the contract in line with the intended objectives;
- Ensuring that the code is free from security vulnerabilities;
- Deploying the contract on the blockchain network.

3- Platform or Network:

This refers to the blockchain network hosting the smart contracts, a decentralized electronic platform where the contracts are deployed, enabling contract automation¹⁴.

4- Smart Agent:

The smart agent is additional program code or a system that works on implementing the automatic clauses or conditions within the contract. The American legislator has defined it through several legislations, as the Uniform Electronic Transactions Act (UETA) of 1999 defined the smart agent in Section 02, Paragraph 06 as: "An electronic means used to perform an action or respond wholly or partially to an electronic record, without review or intervention by the user¹⁵."

The smart agent represents an advanced mechanism for contracting within the digital environment, as it has been approved by many legal frameworks associated with electronic

commerce as a means for automatic and efficient contract execution and management. However, it is noticeable that the Algerian legislator, despite issuing Law No. 18-05 on electronic commerce, has not explicitly addressed the concept of the smart agent or regulated its use, leaving a legislative gap regarding its legal framework, whether in terms of its definition, scope of use, or associated guarantees. This gap may lead to legal challenges in practical application, especially with the rapid development of artificial intelligence and smart contract technologies.

5- External Parties or Supporting Services:

These are the entities or systems that interact with the contract to provide data or services. For example, a smart insurance contract relies on weather data to verify the occurrence of a particular incident.

Finally, it should be noted that the parties to the smart contract differ depending on the nature of the contract (sale, leasing, service) and the entity dealing with it.

D) The Relationship Between Smart Contracts and Blockchain Technology:

Smart contracts are programming protocols that rely on blockchain technology as the primary platform for their storage and automatic execution. Blockchain technology provides a secure and decentralized environment where smart contracts are stored as encrypted codes on the blockchain, making the data immutable once recorded.

Smart contracts operate based on "conditional execution," where clauses are executed automatically upon meeting specific predefined conditions, without the need for intermediaries or human intervention¹⁶. This technology enhances transparency and security due to the decentralized nature of blockchain, allowing all parties to access the same version of the data in real-time, thereby reducing the risks of manipulation or fraud.

For instance, smart contracts are used in transferring funds, managing supply chains, and even electronic voting, making them a versatile tool applicable across various sectors¹⁷.

Smart contracts fundamentally depend on blockchain technology, which provides a decentralized and secure environment for recording and automatically executing contracts without intermediaries. These contracts are stored as programming codes on blockchain networks, ensuring transparency and preventing data manipulation. This relationship represents a significant transformation in how digital transactions are carried out, characterized by efficiency and security.

E) Characteristics of Smart Contracts:

Smart contracts have several distinct characteristics that set them apart from traditional contracts. Below are some of these features:

1- Automatic Execution:

Smart contracts are characterized by their ability to automatically execute agreed-upon terms once the conditions are met, without the need for intermediaries or human intervention. The contract is programmed in a coding language to specify conditions and outputs, minimizing human errors and saving time. This feature relies on blockchain networks, ensuring secure and efficient contract execution¹⁸.

For example, consider a smart contract for renting an apartment between the landlord (property owner) and the tenant. The landlord wants to receive the monthly rent automatically, while the tenant wants assurance of receiving the keys immediately upon payment. The technical steps for creating a smart contract in such a scenario are as follows:

- Programming the Smart Contract: The contract is written using a language like Solidity on a network such as Ethereum. The contract includes the following conditions:
 - The monthly rent amount is deposited into the smart contract.

- Upon receiving the amount by the agreed date, a token is generated to allow the tenant to use a smart lock to access the apartment.
- If the deposit is not made by the deadline, both parties are notified, and the landlord can regain control of the apartment.
- Payment Verification: Ensuring the tenant has paid the rent.
- Releasing the Digital Key: The digital key token is automatically sent to the tenant.
- Handling Non-Payment: If the payment is not made, penalties can be imposed, or the contract can be automatically terminated.

2- Transparency and Immutability:

All transactions conducted within a smart contract are recorded on blockchain technology, ensuring transparency between the contracting parties. Additionally, the recorded data cannot be altered or deleted, enhancing trust and reducing potential disputes. This characteristic makes smart contracts an ideal tool for transactions requiring the highest levels of reliability¹⁹.

Smart contracts based on blockchain technology represent a revolutionary development in the field of law and contract management, achieving a high degree of transparency and trust. However, technical and legal challenges remain, which must be addressed to ensure their fair and effective use.

3- High Security:

Smart contracts rely on encryption to secure data and conditions, making them resistant to hacking or tampering. Due to their decentralized nature, no single entity can control or alter the contract, providing enhanced protection against cyberattacks. This feature is crucial for sensitive data and financial transactions²⁰.

4- Decentralization:

Smart contracts are executed on decentralized blockchain networks, meaning they are not controlled by any central authority. This reduces costs associated with intermediaries and prevents disruptions caused by failures at a central point. This decentralization makes smart contracts a flexible and global option²¹.

The decentralization of smart contracts has revolutionized the way transactions and agreements are carried out. Their flexibility, cost efficiency, and reliability make them an attractive choice for global applications. However, improving legal frameworks and technical aspects is essential to minimize potential challenges.

5- Cost-Effectiveness:

By eliminating intermediaries and reducing administrative procedures, smart contracts are a low-cost option compared to traditional contracts. Transactions are executed directly and swiftly, saving time and resources for the contracting parties. This feature is widely applied in e-commerce and financial services²².

Smart contracts offer significant cost efficiency by leveraging technology, eliminating traditional obstacles such as intermediaries and complex procedures. This makes them an appealing choice for institutions and individuals seeking to enhance efficiency and reduce expenses.

F) The Legal Nature of Smart Contracts

The smart contract is considered a new development in the concept of the traditional contract, combining the legal nature of contracts with the technical aspect of their execution. A smart contract is characterized by being an agreement written in a programming language, stored, and automatically executed through blockchain technology. This raises questions about its legal nature; below, we mention some juristic opinions on this matter:

Some jurists believe that the smart contract is not an independent legal contract but rather a technical tool to execute the terms of a traditional contract agreed upon by the parties beforehand²³.

This opinion is based on the fact that blockchain technology used in smart contracts only deals with the execution of obligations and does not provide space to discuss intent or negotiate during execution. According to this view, the smart contract relies on the existence of a traditional written or verbal contract expressing the parties' intent.

Another group of jurists sees the smart contract as a legal contract in its own right if it meets the basic conditions of contracting, such as consent, subject matter, and cause. They consider that the programming code represents the expression of the parties' intent, supporting their argument that programming language is a tool to express intent similar to verbal or written expression. If the smart contract fulfills the legal conditions, it must be recognized as a legal contract²⁴.

According to this view, if the smart contract satisfies the fundamental conditions of contracting, it can be considered an independent legal contract. However, legal systems need to provide a clear legal and regulatory framework to address these contracts, particularly regarding the understanding of the programming code by the parties and mechanisms for resolving disputes. There must also be harmony between the technical and legal aspects to ensure justice and transparency.

Another group believes that the smart contract is a hybrid system that combines legal and technical aspects, supporting their opinion that smart contracts add a new dimension to legal relationships, integrating automatic execution (via programming code) with a legal framework (that governs obligations and resolves disputes)²⁵. According to this view, the smart contract depends on a combination of legal rules that determine rights and obligations and blockchain technologies that ensure automatic execution.

Meanwhile, another group believes that smart contracts are not contracts in the traditional sense, as they lack the flexibility that characterizes traditional legal contracts, such as the possibility of amending terms or negotiating during execution. They see that smart contracts are closer to automated systems for executing obligations²⁶.

As for our opinion, smart contracts represent a significant development in the field of traditional contracts, but they need the development of a specialized legal framework to address their unique nature.

Section II: Legal Challenges in Adapting Smart Contracts to Algerian Civil Law

Smart contracts are among the modern technologies that have sparked widespread interest in legal and commercial fields due to their ability to automatically execute obligations without the need for an intermediary. However, adapting these contracts faces legal challenges under Algerian civil law, which is based on traditional principles that may not accommodate the digital and decentralized nature of these contracts. Among these challenges, we mention the following:

A) The Absence of a Legislative Framework for Smart Contracts

Smart contracts are considered one of the most significant applications of blockchain technology, allowing contracts to be concluded and executed autonomously. However, the application of these contracts in Algeria encounters several legislative challenges, primarily the absence of specific legislation addressing smart contracts.

Referring to the Algerian Civil Code, which is the primary source for regulating contracts, there is no legal provision that addresses the topic of smart contracts or blockchain technology. Similarly, specialized laws are lacking in this regard. For instance, while the legislator enacted Law No. 15-04²⁷ on electronic signatures, aligning with the nature of electronic transactions, it does not address the topic of smart contracts. The same applies to Law No. 18-05 on electronic commerce²⁸.

Furthermore, Algerian law does not recognize cryptocurrencies, which are often used to execute smart contracts²⁹. This directly impacts the feasibility of dealing with such contracts. The "most significant legal challenge" is that adopting these contracts requires fundamental changes to existing laws. Achieving this cannot happen quickly, especially since this technology affects various stakeholders, from governments and institutions to individuals. Therefore, addressing this issue requires significant efforts and extended time to ensure the stability of related legal and regulatory frameworks.

B) Challenges Related to Consent in Smart Contracts

According to traditional civil law, a contract is a voluntary agreement between two or more parties that creates legal obligations. Consent is considered the fundamental pillar for the formation of a contract under Algerian civil law.

Article 59 of the Civil Code states: *"A contract is concluded as soon as the two parties exchange expressions of their matching wills..."*

Thus, consent represents a clear expression of the free will of the contracting parties and is achieved through the alignment of offer and acceptance.

In smart contracts concluded via blockchain technology, the will is expressed through the issuance of a clear offer and a corresponding acceptance. Once the wills align, the contract is formed. According to Article 67 of the Algerian Civil Code, such contracts are considered agreements made via electronic means between absent parties, where their conclusion does not require the presence of the parties in the same place or time. In terms of time, the contract is concluded at the moment acceptance meets the offer, while the place of the contract is determined as the location where acceptance reaches the offeror.

Consent is a fundamental element of a contract, and its absence invalidates the agreement. For consent to be valid, the party expressing it must have legal capacity, and their will must be free of defects, such as error, fraud, duress, or exploitation.

Referring to smart contracts, they lack mechanisms to verify the legal capacity of the contracting parties. This is because any individual can create an account without ensuring they meet the legal capacity requirements. Moreover, a single person can possess multiple digital identities based on different encryption keys, enabling them to use an identity that may be ambiguous or obscure their true identity. As a result, encryption keys become the primary factor in identifying parties, with the contractual relationship based on the interaction between the encryption keys themselves rather than between individuals directly³⁰.

Smart contracts operate autonomously based on the programming codes managed via blockchain networks. This means there is no internal mechanism to verify the parties' capacity.

Based on the above, smart contracts raise several legal issues regarding the legal capacity of the parties, including³¹:

- Lack of capacity verification;
- Anonymity and the existence of multiple identities;
- Dependence on the encryption key as the basis for identity;
- In the event of a dispute, it is challenging to link smart contracts to real identities unless there is a process for documentation or external identity verification;
- Loss of the private key is equivalent to losing the digital identity, which could expose individuals to significant losses.

In traditional contracts, it is assumed that the parties have legal capacity and a sound will, with no requirement for the party relying on the contract's validity to prove this. Instead, the burden

of proof lies on the party claiming incapacity or a defect in the will. However, this assumption faces challenges in smart contracts, where verifying the identity and capacity of the contracting parties is difficult, making it more complex to prove the integrity of the will and trace potential defects³².

Therefore, we propose that the Algerian government adopt digital identity systems to ensure transparency and trust.

C) The Issue of Interpreting Smart Contracts

Contracts are interpreted in line with the mutual intention of the parties, rather than the literal meaning of the terms, as stated in Article 111 of the Civil Code. However, smart contracts differ fundamentally from traditional contracts; they are programs written on blockchain technology, executing contractual terms automatically when specific conditions are met. These contracts rely on programming code as the means of fulfilling obligations instead of written texts. Since programming code is a technical language that may not be understood by judges or lawyers, how can the "text," which is essentially code, be interpreted in the event of a dispute?

The execution of smart contracts depends on the conditions encoded in the program. However, one party may not fully comprehend these conditions due to a lack of technical understanding. How can the mutual intent of the parties be determined when the contract is written in a technical language incomprehensible to both parties?

Additionally, smart contracts may conflict with the principle of good faith in contract performance, as stipulated in Article 107 of the Civil Code. Smart contracts might execute certain terms in ways that seem unfair or contrary to good faith due to programming errors or misinterpretations of the code.

Smart contracts represent a new challenge to Algerian civil law. To address interpretation issues, legislators must develop a legal framework compatible with technological transformations while preserving the fundamental principles of civil law. At the same time, collaboration between legal professionals and technical experts is essential to ensure fair and balanced interpretation of these contracts.

D) Writing and Proof Requirements in Smart Contracts

The Algerian Civil Code requires that formal contracts be drafted in an official format by a notary.

According to Article 324 of the Civil Code, a formal contract must be in written form and signed before a notary to ensure its validity and legal enforceability. Therefore, formal documentation is a fundamental requirement for the establishment of civil contracts in such cases.

In smart contracts, there is no physical document or the physical presence of parties before a notary. These contracts utilize digital signatures, but Article 324 might require written signatures before a notary.

Given the current legal framework, applying Article 324 to smart contracts faces significant challenges related to formal documentation and automatic execution. Digital signatures are recognized under Law 15-04, as previously mentioned.

To align Article 324 with smart contracts, it is necessary to introduce new legal provisions that recognize and regulate them. Furthermore, it is essential to integrate notaries into this technology to verify and certify the validity of such contracts.

E) The Inability of Smart Contracts to Adapt to Emerging Circumstances

Contracts are one of the primary sources of obligations in Algerian civil law. They reflect the parties' intentions and mutual commitments. However, contracts may face challenges in adapting to unforeseen circumstances that make their execution impossible or unfairly burdensome to one of the parties. This is where the importance of legal theories arises, such as the theory of termination

(Article 119), the theory of invalidity (e.g., Article 97), the theory of unforeseen circumstances (Article 107), and force majeure (Article 125/2).

Smart contracts rely on software and technology to form and execute the commitments agreed upon between the parties. Despite their high efficiency, the greatest challenge lies in their inability to adapt to unforeseen circumstances due to their technical nature. They are rigid and strictly adhere to pre-programmed conditions, without flexibility or automatic responses to changing circumstances.

The rigid nature of smart contracts makes them incapable of adapting to emerging situations. This poses a significant challenge to implementing this technology within the Algerian legal environment. Civil law offers flexible tools to address unforeseen circumstances, but these tools rely on human judgment to assess fairness and equity, something absent in smart contracts. Thus, it is essential to develop new legal and technical mechanisms to integrate these contracts into the current legal system.

F) Risks of Self-Execution in Smart Contracts

The principle of privity of contract stipulates that the effects of a contract are limited to its parties and do not extend to third parties, except in specific and limited cases³³. In other words, the binding nature of a contract only impacts the contracting parties and those in equivalent positions³⁴.

With regard to smart contracts, it might initially seem that they reinforce this principle due to their technical nature, which relies on the automatic execution of pre-programmed conditions, reducing the likelihood of intervention or influence by third parties. However, legal issues may arise due to the impact of these contracts on third parties, either directly or indirectly, especially given their transparency and storage on blockchain technology, which allows third parties to view their details or be affected by their outcomes.

For instance, if two companies enter into a smart contract that determines the price of a particular product, this could impact competitors in the market, raising questions about the legality of competitive practices. Furthermore, smart contracts may include clauses affecting the rights of third parties without their consent, such as executing a condition related to an asset owned by a third party without their permission. An example would be if the contract stipulated the transfer of ownership of a specific asset, but it later became evident that the asset was legally seized or owned by a third party. In such cases, the automatic execution of the contract could violate the rights of this third party.

Additionally, smart contracts may have economic or legal repercussions on third parties, such as harming competitors in the market through unlawful monopolistic or restrictive practices, or infringing on personal reputation or rights if the contracts involve using personal data without the owners' consent.

Regarding blockchain technology's impact on the privity of contracts, it records all transactions in a decentralized manner, which could involve indirect participation by third parties in the contract's execution. For instance, workers or auditors on the network might contribute to recording or executing the contract. Although these parties are not considered parties to the contract in the legal sense, they could still bear certain liabilities, such as liability for software. If the program code contains errors that cause harm, the entity that developed the contract may bear responsibility under professional or contractual liability rules.

Based on the above, smart contracts, due to their technical nature, may directly impact third parties without their consent, raising questions about their adherence to this principle. This highlights the need to adapt civil law to keep pace with technological developments and ensure a balance between the principle of privity and the protection of legitimate interests for both parties and third parties.

Conclusion

Smart contracts are a technological innovation representing a leap forward in legal transactions, enabling automatic and precise execution of obligations through the use of blockchain technology. However, their application within the Algerian legal system faces multiple challenges related to aligning with the traditional principles of civil law.

This study concludes that smart contracts hold significant potential for enhancing the efficiency and transparency of legal transactions. At the same time, they underscore the need for a comprehensive review of the current legislative framework in Algeria. Smart contracts offer advantages such as automatic execution, high security, and transparency. Yet, the absence of specific regulations hampers the full utilization of these benefits. Challenges related to consent, interpretation, adaptation to unforeseen circumstances, and the principle of privity of contracts present major obstacles to the widespread adoption of this technology.

In light of these findings, the following recommendations can be made to develop the Algerian legal system in a way that keeps pace with modern technological advancements:

- **Developing the Legislative Framework:** Enact specific laws for smart contracts that officially recognize and regulate them, alongside amending certain provisions in the civil code to include clauses addressing digital contracts.
- **Integrating Legal Technology:** Establish reliable platforms that combine blockchain technology with traditional legal services to ensure the validity and documentation of smart contracts.
- **Enhancing Legal Interpretation:** Train judges and lawyers to read and understand the programming code used in smart contracts and involve technical experts in resolving disputes related to these contracts.
- **Programming Smart Contracts for Flexibility:** Design smart contracts to include clauses that address unforeseen or emergency circumstances, ensuring fairness and equity among the parties.
- **Recognizing Cryptocurrencies:** Work on regulating cryptocurrencies as a medium for executing smart contracts within a legal framework that ensures oversight and protects contracting parties.
- **Awareness and Training:** Organize training programs and awareness workshops for legal and technical professionals on the applications and challenges of smart contracts.

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