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KHUNG PHÁP LÝ ÁP DỤNG CHO HỢP ĐỒNG THÔNG MINH: NGHIÊN CỨU SO SÁNH VÀ BÀI HỌC KINH NGHIỆM CHO VIỆT NAM

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Tóm tắt

Cuộc cách mạng công nghiệp lần thứ tư kéo theo thời đại công nghệ số, có tác động đáng kể đến một số khía cạnh của đời sống kinh tế xã hội. Ý tưởng về hợp đồng thông minh, tự động thực hiện các thỏa thuận được mã hóa bằng công nghệ blockchain, là một bước đột phá đáng chú ý. Chúng được sử dụng trong nhiều ngành công nghiệp khác nhau, nhưng chúng cũng có những nhược điểm. Việt Nam vẫn chưa chính thức công nhận hợp đồng thông minh, mặc dù một số quốc gia đã thiết lập khuôn khổ pháp lý cho hợp đồng thông minh. Vì vậy, để trao quyền cho doanh nghiệp và cải thiện sự kiểm soát của chính phủ trong hệ sinh thái kỹ thuật số đang mở rộng của Việt Nam, việc nghiên cứu tính hợp pháp của họ và ý tưởng để đưa vào các văn bản chính thức là rất cần thiết. Chúng tôi phát hiện ra rằng do hợp đồng thông minh thiếu sự công nhận pháp lý cụ thể nên các doanh nghiệp thận trọng khi tham gia vào công nghệ này và có khả năng bị lạm dụng. Vì vậy, điều quan trọng là tạo ra một khuôn khổ pháp lý hiệu quả phù hợp với luật pháp quốc gia và quốc tế nhằm tạo thuận lợi cho thương mại và đầu tư đồng thời giải quyết các mối quan tâm quan trọng.

Từ khóa: Smart contracts, block-chain, technology, law, legal framework

LEGAL FRAMEWORK APPLICABLE TO SMART CONTRACTS: A COMPARATIVE STUDY AND LESSONS LEARNED FOR VIETNAM

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Abstract

The Fourth Industrial Revolution resulted in the age of digital technology, which has had a significant impact on a number of aspects of socioeconomic life. The idea of smart contracts, which automatically carry out encoded agreements using blockchain technology, is one noteworthy breakthrough. Smart contracts reduce the need for middlemen and promote confidence between parties by providing speed, security, and automation. They are used in many different industries, but they also have drawbacks like rigidity, potential coding errors, and the necessity for strict regulation. Vietnam has not yet formally recognized smart contracts, despite some nations having established legal frameworks for them. Therefore, to empower enterprises and improve government control in Vietnam's expanding digital ecosystem, research into their legality and ideas for inclusion in official documents are essential. Based on a qualitative research methodology, the research aims to explain smart contracts, examine how they fit into different legal contexts, with a focus on how they are used in Vietnam, and then offer suggestions for creating a legal framework for smart contracts inside the Vietnamese legal system. The investigation finds that because smart contracts lack particular legal recognition, businesses are cautious to engage in this technology, and there is the possibility for misuse. So it is crucial to create an effective legislative framework that conforms with both national and international laws in order to ease trade and investment while addressing critical concerns like as legal recognition, effective timetables, contract specifics, security safeguards, and dispute resolution procedures.

Keywords: Smart contracts, block-chain, technology, law, legal framework

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Our heartfelt thanks also go out to the related enterprises who provided us with the essential data and insights required to complete this report to the best of our abilities. Their willingness to collaborate and share their expertise has been instrumental in ensuring the depth and accuracy of our research.

Despite our efforts, this report may not fully meet all the anticipated requirements. The authors acknowledge that limitations were encountered along the way, stemming from limited time and resources. These unavoidable shortcomings emphasize the importance of constructive feedback and suggestions for improvement. The authors eagerly anticipate such feedback, as it will undoubtedly contribute to the refinement and enhancement of our work.

Beyond its immediate scope, the authors hope that this paper can serve as a valuable point of reference for other researchers embarking on scientific investigations in the realm of smart contracts. Our aspiration is that the findings and insights presented within these pages will

advance the understanding of this field and pave the way for the broader and more widespread application of smart contracts in the future.

In conclusion, the authors wish to reiterate our gratitude to all those who have supported us on this journey. The authors look forward to continued collaboration and growth, and the authors remain committed to advancing knowledge and innovation in our chosen field of study.

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Introduction

The paper shows the importance of smart contracts in the digital age, driven by blockchain technology's automation of legal processes. The paper recognizes their benefits, including cost reduction, mistake reduction, and improved security and transparency, while addressing problems like as immutability and security concerns. The study's goal is to define smart contracts, investigate international and national legal frameworks, and give practical insights for their use in Vietnam. It aims to be a beneficial resource for the government, businesses, and researchers, providing advice to help smart contracts integrate into Vietnam's legal framework and economic environment.

1. Introduction of smart contracts

1.1. Definition

1.1.1. Block-chain

A simple block-chain is a sequence of records called blocks, where the blocks are linked and cryptographically secure. The characteristics of each block include some transaction data, a timestamp, and the hash of the previous block.

Consensus algorithms are developed to confirm the reliability of blocks. Consensus algorithms determine which node will store the next block and how the newly added block validation will be performed by other nodes. There are three notable typical consensus algorithms, Proof of Work (PoW), Proof of Stake (PoS) and Practical Byzantine-Fault Tolerance (PBFT). Distributed consensus algorithms can ensure that transactions are carried out without the intervention of third parties such as banks. Therefore, block-chain technology saves transaction costs. Furthermore, users transact using virtual addresses instead of their real identities so that user privacy can also be protected.

1.1.2. Smart contract

First used by Nick Szabo in the mid-1990s, smart contracts can be referred to as a great advance in block-chain technology, which was proposed as a computerized transaction protocol executing the contractual terms of an agreement. Contractual clauses that are embedded in smart contracts will be enforced automatically when a certain condition is satisfied.

A broad definition of smart contract proposed by Clack et al. was that smart contract is “an automatable and enforceable agreement. Automatable by computer, although some parts may require human input and control. Enforceable either by legal enforcement of rights and obligations or via tamper-proof execution of computer code.”

Blockchain is enabling smart contracts. In other words, smart contracts are basically deployed on block-chain. Approved contract terms are converted into code and embedded in

software or hardware. Logical connections between contract terms have also been preserved as logical flows in programs (e.g. if-else-if statements). Each executed contract statement is recorded as an immutable transaction stored in the block-chain. Appropriate access control and contract enforcement are also guaranteed under smart contracts. In particular, the developer can assign access rights to each function in the contract. The triggered statement automatically executes the corresponding function in a predictable manner, once a condition in the smart contract is satisfied.

1.2. Practical application

1.2.1. Finance

Decentralized finance (DeFi) dApps represent a formidable alternative to traditional financial services, and they are becoming more and more popular due to their trustless, immutable, and transparent characteristics of block-chain technology and smart contracts. DeFi dApps provide parallel services for the banking and financial services industries — such as lending, borrowing, trading, and a host of other financial services — along with product catalogs and samples. completely new. Decentralized business can provide huge benefits and utility to users. dApps have given a better chance to entry into the financial services sector for everyone around the world, due to the increasing transparency offered by smart contracts (along with 24/7 functionality and reduced costs),

1.2.2. Gaming

Thanks to the appliances of block-chain technology in the gaming industry, you can reduce in-game purchases, sell them to other players, or transfer them to other supported games. Meanwhile, the scarcity of in-game NFT purchases is provable through immutable records embedded in the NFT's underlying block-chain network — as well as its ownership history. Since NFTs are unique and can be designed to retain value beyond the game they originate from, blockchain-based games and dApps have the potential to expand the game economy, establishing categories of new games, and promote the development of new games. Block-chains with significant game development include Ethereum, TRON, EOSIO, and NEO.

1.2.3. Real Estate

Smart contracts, leveraging cryptography, facilitate fractional ownership of assets, particularly in real estate through platforms like RealT and SolidBlock. These contracts reshape transaction processes and documents, exemplified by the blockchain-based land registry project in the Republic of Georgia and similar endeavors in the United Arab Emirates (UAE). Smart contracts have the potential to reduce or eliminate hidden costs in real estate transactions, such as closing fees and brokerage costs, while simplifying complex agreements like rentals and mortgages. This technology could diminish the reliance on legal and consulting services, offering cost-cutting opportunities in the real estate industry.

1.3. Key features

1.3.1. Electronic form

Unlike classic contracts, which may exist in various forms including but not limited to oral form, and written form, it is not possible for smart contracts to exist in any form other than electronic as they use cryptography, require electronic digital signatures, and are based on

encryption technology or block-chain (Savelyev, 2016). The electronic form includes functionality that allows parties to initiate performance depending on specific electronic triggers embedded into the block-chain (Catchlove, 2017). This allows the code to manage the rules of the contract as well as execute part, or all, of the conditions of the contract (Werbach & Cornell, 2017). Smart contracts accomplish this by registering the ownership of digital assets or digital representations of offline assets in block-chain (Catchlove, 2017).

1.3.2. Conditional framework

According to contract law, promises are given in return for additional promises: if x performs this, y will do this (Golding & Edmunson, 2005). Similarly, a conditional framework lies at the core of smart contracts and the code that executes them (Lewis, 2016). Conditional statements are critical in the codification of smart contracts, as computer code is also based on statements like "if "x" then "y" (Savelyev, 2016). In other words, code can only do what it is programmed to do, and transactions are only completed when obligations are fulfilled (McGuinness, 2004). This shows that the foundation for operation of classic contracts and smart contracts are inherently alike.

1.3.3. Greater level of certainty

It is established that the core of smart contracts is software code, and their terms are to be expressed in computer languages. Instead of using a discretionary interpretation like classic contracts, where terms are interpreted subjectively by the human brain, smart contracts follow Boolean logic, in which all values are converted into either TRUE or FALSE (Team Polyrific, 2017). Simply put, ambiguity is not tolerated in computer coding, therefore mitigating possible issues from differences in the interpretation of contractual terms. Smart contracts offer a higher level of confidence because of this trait - reliance on strict syntax (Ryan, 2017).

1.3.4. Performance-oriented

Once the contract terms have been encoded and deployed onto a block-chain , it is no longer necessary to acquire additional permissions or approvals from contracting parties (Catchlove, 2017). Since transactions made under smart contracts are irreversible, they are technically binding for all parties involved, diminishing the possibility of unilateral termination, breaching, or cheating (Savelyev, 2016). This feature ensures a greater likelihood of performance than traditional contracts.

Smart contracts offer numerous benefits, including autonomy by removing the need for intermediaries, ensuring cost efficiency through automation of cross-organizational processes, providing data backup through duplication on a blockchain, enhancing transparency and security through encryption, speeding up operations by automating tasks, and ensuring accuracy by eliminating human errors and maintaining a verifiable record of activities on a distributed ledger. These advantages make smart contracts a valuable tool for various industries by streamlining processes, reducing costs, and increasing reliability and security.

2. Smart contracts in different legal systems and practices

2.1. International legal practices

2.1.1. CISG

2.1.1.1. Scope of application of CISG in validating smart contracts

Offeror consent to enter the contract

According to Article 14 of CISG, the primary condition in forming a contract is that the offeror must show his or her intention to enter into a contract. There is an argument that smart contracts which contain binary characters and the expression of code language only will make it hard to demonstrate any intentions to be bound by the contract. And also, even if an offer is sufficiently explicit and addressed to at least one specific person, a proposal to make a contract will not be recognized as an offer unless it can be demonstrated that the offeror meant to be bound by the proposal (Fatma Esra Güzelolu, 2016). This is because "a proposal does not always attempt to conclude a deal but may maybe try to initiate sales conversations."

However, there is an argument that computer language has the objectivity of description and the preciseness of logic to reflect the legal meaning and logic (Meng et al., 2021). Moreover, smart contracts have a predefined language of implementation. Smart contracts significantly limit the potential dangers of large misunderstandings in international trade produced by misconceptions in the face of traders from diverse cultural backgrounds and legal systems.

It is reasonable to assume that it is a default binding offer. This complies with the standards of Article 14. The legal aspects of smart contracts under the CISG (United Nations Convention on Contracts for the International Sale of Goods) suggest that if an offeror can demonstrate their willingness to execute the contract, even in pure code form, it can be considered a binding offer under Article 14. The paper also highlights the requirement for smart contracts to be sufficiently definite, ensuring clarity on the quality, price, and quantity of the contract's primary objects. Additionally, it explores how smart contracts can meet the elements of a promise as defined in Article 18 of the CISG, particularly in cases where the offeree commits to performing an act without further notice, emphasizing the importance of secure electronic signatures in smart contract legality. Finally, it argues that digital signatures in smart contracts should have the same legal force as traditional signatures under Article 11 of the CISG, focusing on the contract's substance and the consent of the parties.

2.1.1.2. Limitations on the application of CISG in validating smart contracts

Scope limitations

The CISG only applies to international sales of goods contracts between parties with places of business in different Contracting States. Furthermore, the CISG generally applies to contracts of commercial sale of goods, not of consumer sales and "goods bought by auction; on execution or otherwise by authority of law; of stocks, shares, investment securities, negotiable instruments or money; of ships, vessels, hovercraft or aircraft; of electricity" (Fritz Enderlein & Dietrich Maskow, 1992)

Unconcern with the validity of a contract

The CISG's applicability is limited to contract legality, as stated in Article 4: "save as otherwise specifically stipulated in this Convention, it is not concerned with the validity of the contract, any of its contents, or any usage." Because "validity" is not specified in Article 4 or any of the CISG's other provisions, the meaning of validity is left to the individual domestic courts (Ulrich Drobnig, 1992). Legal experts and domestic courts in various Contracting States have adopted diverse methods to clarify the validity issue of Article 4 due to the vagueness of Article 4. While some advocate for a broad interpretation of Article 4, saying that only domestic law should be used to determine validity issues, others support a more restrictive interpretation that would allow the CISG's provisions to take precedence over domestic law even on matters that are typically thought to be relevant to the validity of a contract in domestic law.

2.1.2. UCC

When assessing the legality of smart contracts under the Uniform Commercial Code (UCC), Article 2 is crucial. It stipulates that a contract must involve offer, acceptance, intent, and consideration, with a focus on mutual assent through offer and acceptance. The UCC's flexibility in recognizing agreements in informal contexts aligns with smart contracts' standardized and formalized code-based negotiations. Section 2-204 of the UCC allows for contracts through circumstances showing agreement, and its adaptable definition of "acceptance" suits various scenarios, making smart contracts compliant. However, differences arise when comparing the Parol Evidence Rule and Perfect Tender Rule in the CISG and the UCC. The CISG's allowance for extrinsic evidence favors smart contracts under its governance, while UCC-governed contracts may face challenges in demonstrating intent, especially in the presence of coding errors. The CISG's substantial deprivation standard increases enforcement, while the UCC's perfect tender rule eases contract termination. Ultimately, the validity of smart contracts under international legal practices hinges on the parties' consent, with some uncertainty under the UCC but more favorability under the CISG

2.2. National legal systems

2.2.1. The United States

2.2.1.1. Federal Level

As of December, 2017, there was no official US Federal Legislation defining smart contracts. But so far, the federal Electronic Signatures in Global and National Trade Act of 2000 ("E-Sign Act") may offer enough legal weight for smart contracts to be enforced under current law. It highlighted that electronic signatures and contracts shall have the same legal effect as signatures on paper, therefore a contract relating to such transaction may not be denied legal effect, validity, or enforceability solely because an electronic signature or electronic record was used in its formation. Thus, block-chain smart contracts, like any other 'electronic contract,' may fall under the scope of the E-Sign Act.

There are no grounds for believing that an electronic contract written in code would be unenforceable, as long as the parties, subject matter, and terms are stated clearly in a way that is translatable to English, as if it were a foreign language, along with evidence of mutual consent and consideration from both parties in implementing the contract.

2.2.1.2. State Level

Several U.S. states, including Arizona, Tennessee, Delaware, Vermont, Nevada, Hawaii, New Hampshire, Illinois, and California, are actively pursuing legislation to recognize and harness the potential of smart contracts and blockchain technology. Arizona and Tennessee have provided comprehensive definitions of smart contracts, emphasizing their legality and enforceability. These states acknowledge the binding nature of fully automated smart contracts executed on a blockchain, even in the absence of a traditional word-format contract. Parties entering into smart contracts may benefit from selecting the law of a jurisdiction such as Arizona, Delaware, or Tennessee, which explicitly recognizes the legal validity of these contracts, ensuring their enforceability. This growing legislative interest highlights the evolving landscape of smart contract regulation in the United States.

2.2.2. Canada

For a smart contract to be legally enforceable in Canada, it must align with the key elements of a valid contract under Canadian law. This includes a "meeting of the minds" between capable parties, where consensus ad idem, or the exchange of consents, is essential.

The execution of actions through machines does not hinder the legality of smart contracts, as Canadian courts have long recognized the validity of e-commerce contracts, even considering computers eligible to express consent. Canadian common law requires valid contracts to include consideration, differentiating them from gifts. Some argue that encoding "finality" into smart contracts resolves issues related to gift promises, allowing parties to organize their actions with mechanical certainty. However, concerns persist about whether smart contracts meet the consideration requirement, although some argue that this is not an inherent issue and should not limit their validity.

Challenges may arise in applying contract law principles that nullify or terminate contracts to smart contracts, particularly concerning public policy directives and the duty of good faith. A contract conflicting with public policy is considered illegal under Canadian common law and will not be legally recognized. While legal enforceability may not be a significant obstacle, practical implementation of these principles in smart contracts could present challenges.

2.2.3. Australia

In Australia, smart contracts are legally binding and enforceable, provided they adhere to traditional contract law principles like consideration and the absence of coercion. However, existing Australian laws are seen as inadequate in governing smart contracts comprehensively, despite government efforts to bridge the technology-legal framework gap. Challenges such as misrepresentation, jurisdiction, enforcement, and security are not entirely eliminated by smart contract codes, making legal counsel and dispute resolution services essential.

One specific issue is contractual capacity, where Australian law stipulates that minors under 18 generally lack the capacity to enter into contracts, except for necessary items or services. Smart contracts may inadvertently involve minors, posing risks. In common law countries like Canada and Australia, smart contracts are considered valid when they align with traditional contract law principles. In contrast, the United States has provided more detailed regulations, including the E-Sign Act 2000 and state laws in states like Arizona, Tennessee, Vermont, and Delaware. Nevertheless, Canada and Australia's laws on smart contracts are

deemed insufficient, necessitating lawyer involvement in their execution and resolution of related issues.

2.2.4. Austria

The Austrian Civil Code outlines the essential elements of a valid contract, emphasizing clear offers and acceptances. Smart contracts must conform to these criteria, ensuring they contain clear and fair terms and provide necessary information. The evolving landscape of globalization and legal norms aims to harmonize rules in international trade, making smart contracts valuable components of civil contracts for businesses. These contracts gain legal enforceability by explicitly stating mutual consent while recognizing implicit offers or acceptances through blockchain transactions. To maintain legal validity, smart contracts must avoid incomprehensible or unethical terms, comply with regulations, and align with civil code standards.

2.3. Learning points for forming legal framework for smart contracts in Vietnam

According to the information mentioned above, there are some conclusions on the legal framework of Smart Contracts.

2.3.1. From international legal systems

Because of the distinctions between the CISG and the U.C.C. when dealing with a parol-proof rule or a perfect tender rule, a smart contract under the CISG is considerably more likely to be enforced. Because of the offer and acceptance conditions, broad definition of writing, flexible proof procedures, and proclivity toward enforcement, a smart contract is likely to be regarded as legitimate under the Convention.

For CISG, Article 14 plays a crucial role in determining offeror's consent to enter the contract and sufficiently definite characteristics. Article 11 also supports smart contracts meeting promise-making criteria, Whereas, Article 18 concerning the definition of elements of a promise creates a party-permission barrier and the insecurity of personal information for smart contracts. The scope limitations and contract legality of CISG are also obstacles to smart contracts.

Under the Uniform Commercial Code, Article 2 is a critical factor in the legality of smart contracts. Sections 2-204, 2-205, and 2-206 of the UCC, in reality, reflect a flexible approach to deal closing that gives legitimacy to even the most informal circumstances in talks. This flexibility is, critical for recognizing smart contracts. Smart contracts can be accepted under the terms outlined in the definitions of acceptance and offer.

2.3.2. From national legal systems

The research discusses the suitability of common law over civil law for smart contracts, highlighting the United States' efforts to legislate smart contract usage. Several U.S. states, including Arizona, Delaware, Nevada, Tennessee, and Wyoming, have introduced legislation recognizing the legal bindingness of smart contracts. It also mentions the federal Electronic Signatures in Global and National Trade Act of 2000 as a potential legal framework for smart contracts. In Canada, the validity of e-commerce contracts is well-established.

The research offers recommendations for the Vietnamese legal framework for smart contracts, emphasizing flexibility in defining and applying smart contracts, clear legal criteria

for parties and contract clauses, and using common law systems like the USA and Canada as references. It also raises the issue of data sources, highlighting the preference for public data sources over private ones due to potential legal challenges.

3. The legal framework of smart contracts in Vietnam and suggestions for the legal framework

3.1. The legal framework of smart contracts in Vietnam

3.1.1. The legality of smart contract in Vietnam

Vietnamese law currently lacks explicit regulations for smart contracts, with existing laws primarily focused on electronic transactions. To consider a smart contract legally binding, it must meet specific criteria. Firstly, it should satisfy the conditions of a civil contract, ensuring parties have the capacity and willingly engage in the transaction, with lawful content. Secondly, it should meet the requirements of an electronic contract, involving agreements to use electronic methods, often with digital signatures. The Law on Electronic Transactions 2005 acknowledges digitally signed transactions in various fields. Lastly, smart contracts must adhere to their own validity conditions, functioning as algorithmic formulas within a blockchain. While Vietnam's legal framework doesn't explicitly address smart contracts, analyzing them through these legal lenses reveals potential recognition and requirements.

3.1.2. Application of smart contract in Vietnam

In Vietnam, although the adoption of blockchain technology and smart contracts is still relatively limited, notable cases showcase their potential impact across various sectors. Triip.me, for instance, employs a "Crowdsourcing" model within the travel industry, where local individuals, known as "Triip creators," design personalized travel experiences. These details are stored in blockchain-based smart contracts, requiring validation from "Triip reviewers" before tourists can book a trip using tokens. This approach creates a robust user data repository, reducing reliance on traditional marketing methods.

In real estate, Revex serves as an intermediary platform connecting investors and property developers through blockchain-based smart contracts. These contracts ensure the immutability and transparency of transaction information, allowing investors to start with minimal capital and invest without limitations. This innovative method alleviates bottlenecks in real estate projects.

In the advertising sector, Bigbom Eco operates as a decentralized advertising ecosystem, streamlining interactions between parties involved in online advertising. It utilizes Ethereum's ERC20 technology to create customizable smart contracts, promoting transparency and data accuracy. Bigbom Eco's presence highlights the growing importance of technology in global business, particularly in the field of online advertising, as it bolsters investor confidence and profitability while demonstrating the potential for future technological advancements in the industry.

3.2. Suggestions to the legal framework

3.2.1. Suggestion for a new concept and recognition of commercial contracts' legality

3.2.1.1. Specific definition and legality of smart contracts

Cuong, Anh, and Nhi (2023) propose a comprehensive definition for smart contracts, considering them as legally valid agreements executed through code on blockchain or similar decentralized platforms. They emphasize the need for Vietnamese law to explicitly recognize smart contracts and provide specific guidelines for their validity.

Firstly, the authors argue for the official recognition of smart contracts under Vietnamese law. They highlight the outdated nature of existing legal documents, like the Law on Electronic Transactions 2005, which indirectly and vaguely allude to smart contracts. Official recognition would equate smart contracts with electronic contracts, granting them the same legal status as traditional contracts. This recognition would extend to aspects like subject conditions, contract content, and dispute resolution, ensuring legal clarity and consistency.

Secondly, the authors stress the necessity of specific legal guidance regarding the validity conditions of smart contracts. They propose regulations governing contract parties, including the identification of contract participants, the establishment of an information management system, and standards for participant confirmation and consensus. Additionally, they advocate for detailed rules regarding the understanding of terms encoded in programming languages, placing responsibility on programmers and service providers for the contract's technical operation.

In conclusion, the research argues for the legal recognition of smart contracts in Vietnam, the establishment of clear guidelines for their validity conditions, and the definition of responsibilities and standards for parties involved in smart contract transactions. This legal framework aims to ensure compliance with the law, prevent conflicts of responsibility, and enhance the security of automated information systems in smart contract interactions.

3.2.1.2. Specific law

The research paper proposes several recommendations for the recognition and regulation of smart contracts in Vietnam. These include adding a dedicated section on "Smart Contracts" in the Civil Code, updating the Law on Electronic Transactions to address smart contracts, establishing guidelines for international transactions, and promoting human resources and technology to address smart contract issues effectively.

3.2.2. Specific legislation suggestion

3.2.2.1. Contract conclusion

In the technology era 4.0, the rise of smart contract brings great economic opportunities for businesses. Therefore, Vietnam must establish explicit laws and regulations on smart contracts to ensure its legality, minimize risks and protect parties from potential disputes. This directly impacts the process of concluding a smart contract, which also requires an official legal framework to follow. The Civil Code and the Electronic Transactions Law are the most appropriate principles to recognize the additional laws on smart contracts.

In detail, the government needs to provide a specific, unified definition of smart contracts as well as clear regulations on the rights and obligations of parties involved to ensure contract conclusions acceptable to the law. Moreover, it is necessary to establish a set of obligatory requirements applicable to the database, code programmers, and service providers for smart contracts to maintain a secure online environment for contract conclusion. For example, formal verification, secure development practices or code auditing for code providers and code whitelisting, data encryption, and access control for service providers.

3.2.2.2. Payment

Currently, cryptocurrency has not been accepted, which is regulated in Clause 2, Article 6 of the Law of State Bank of Vietnam in 2010: "Cryptocurrency is not a means of foreign exchange." This means issuing, providing, and using Bitcoin, Litecoin, or other cryptocurrencies for payment is considered illegal in Vietnam. Therefore, if smart contracts' activities are bound to the exchange and payment related to electronic currencies, validating them in Vietnam is impractical. The reason behind this is that the legalization of cryptocurrency can harm national financial security, for example, the lack of control scope for SBV or other illegal activities such as money laundering, fraud, tax, or evasion.

However, in recognition of the importance and the compatibility of Block-chain worldwide in the meantime, Vietnam regulation should accept the validity of cryptocurrencies as a means of payment. Secondly, to elucidate the potential issues of these currencies, the SBV should develop, experiment, and issue fiat currencies in control of the bank itself. By implementing this suggestion, the fiat currency of Vietnam can remedy the weaknesses of cryptocurrencies while potentially becoming a legal means of payment on the Block-chain platform. Relating to the payment method of smart contracts, the government should also clearly regulate that fiat currency can be used as a means of payment, transfer, circulation, and a store of value, just like money which can be applied in our case. Also, there should be clear regulations relating to currency management in smart contracts applying to E-commerce, tax, import, and export fields.

In June 2021, the Prime Minister of Vietnam requested SBV to research the use of cryptocurrencies on the Block-chain platform between 2021 and 2023. This is a closer step to creating a legal basis for developing stablecoin, which can be implemented in smart contracts in the future.

3.2.2.3. Dispute settlement

One of the biggest challenges related to dispute settlement is determining the party authorized to solve the dispute, especially with cross-border and incognito transactions. Smart contracts occur on the Block-chain platform on the Internet, where full control can not be possessed by one country only. Therefore, incognito identity is allowed if there is consent from both parties. Consequently, an authorized party with applicable laws can not be determined in case a dispute happens. In this case, the government should establish regulations requiring both parties to provide their identity. This solution also aims to bring the clarity of the seller and buyer identity, and the product into consideration to protect the right of the consumers.

Another approach to dispute settlement is an issuing of a sample smart contract by the government, determining the common problems, solutions, and potential disputes in order to minimize risks related to smart contracts while maintaining the security of the two parties bound by the contract.

4. Conclusion

Smart contracts are gaining popularity due to their advantages and are poised to replace traditional contracts across various sectors. However, their complex and novel nature poses challenges for legal systems worldwide. Even developed countries like the US, UK, and Switzerland lack comprehensive and stringent legal frameworks for smart contracts. To stay current, the Vietnamese government must prepare and establish robust legislation, especially given the growing role of private businesses and startups. Legal protection is essential to mitigate potential risks associated with smart contract applications. Research comparing practical smart contract use in developed nations and Vietnam provides valuable insights to inform the development of a more comprehensive and precise legal system for smart contracts in Vietnam.

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