

Exploration of Legal Issues in the Judicial Practice of Smart Contracts

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Abstract: The process of smart contracts, from conceptualization to actual landing applications, is accompanied by the continuous development of blockchain technology. China attaches great importance to the application of blockchain technology represented by smart contracts in judicial practice, with the background of the construction of smart courts, relying on the construction of judicial blockchain, according to the unique automated execution characteristics of smart contracts, the mediation and execution of civil disputes filed as an entry point, to explore the high-quality development of the judicial trial and execution business. In the current judicial practice, smart contracts face a lack of legal norms, technical construction loopholes, and information security risks. To guarantee the reasonable and compliant stable operation of smart contracts within the legal framework, it is necessary to clarify the legal positioning of smart contracts, strengthen the construction of the rule system for the judicial application of smart contracts, introduce the ODR to broaden the rights' relief channels, and at the same time, encourage the participation of diversified subjects in the construction of the judicial blockchain, and establish the legalized review mechanism of smart contracts.

Keywords: Smart Contracts; Judicial Practice; Legal Regulation.

1. Smart Contracts Introduction

1.1. Concepts and Features of Smart Contracts

The concept of a smart contract was first proposed by cryptographer Nick Szabo in 1994, who proposed that a smart contract was a set of promises in digital form, including an agreement for the fulfillment of the promises by the participating parties [1], but this was only a conceptual description, and it did not have practical efficacy. However, the emergence of the second-generation blockchain—Ethereum, has provided technical support for the application of smart contracts. Along with the arrival of the blockchain 2.0 era, the development of the blockchain, with smart contracts as the core technology, is rapidly changing. The smart contract, as a kind of computerized transaction agreement, can automatically execute the pre-set contract terms to ensure that the contractual obligations are strictly fulfilled free from interferences, and therefore it can be said that the smart contract is a modular, self-executing script running on the blockchain and is capable of realizing data processing, value transfer, asset management and a series of other functions.

Smart contracts are characterized by three typical features: decentralized management, non-modifiability, automated execution. Firstly, decentralized management means that the operation of smart contracts does not need to be controlled and managed by intermediaries or third-party organizations, and the pre-set terms and conditions can be executed on the chain. Secondly, modifiability is based on the chain structure of the blockchain, where the data recorded on each block is both relatively independent and corroborated with each other, thus ensuring that the data is open and transparent and difficult to be tampered with at the same time. Finally, automated execution refers to the fact that the parties to a smart contract set the execution conditions in advance, and once the execution conditions are met, the smart contract will automatically trigger the execution until the end.

1.2. Value of Smart Contracts in Judicial Practice

Technology serves justice and improves the quality and efficiency of trials. The integration and application of smart contracts and judicial blockchain can not only make the computer code able to efficiently complete the execution task but also help the high-quality development of the judicial trial execution business, making it more intelligent, open, transparent. The operation of smart contracts can reduce manual intervention, improve the authenticity, usability, credibility of information from the technical level, rationally allocate trial resources, realize the intelligent contextualization of litigation activities[2], further promote the fast execution of simple cases and the precise execution of difficult cases, use technical means to realize the filing of cases, intelligently capture the necessary information, reduce the pressure on judicial resources, and reduce the burden of the judicial sector in handling cases and increase the efficiency.

Breaking down information silos and collaborative multi-party governance. Due to the poor flow of information within the judicial system, it is difficult for the court to obtain sufficient and effective information during the execution process, thus hindering the rapid, stable, powerful promotion of the court's execution work. The emergence of judicial blockchain makes each department become a node on the blockchain, establishes a safe and reliable data-sharing mechanism through smart contracts, breaks the data silos and deep wells of value, realizes business interconnection and data interoperability, and openly and transparently shares and verifies the information on the chain to all the organizations and institutions participating in the construction of the judicial blockchain, which guarantees efficient, true and reliable information transmission[3].

Innovate creditworthiness incentives and reshape the credit system. The important purpose of credit system construction is to prevent and manage credit risks, reduce trustworthy

behaviors, and improve the credit level and organizational reputation[4]. There are various forms of credit models in the social credit system, and smart contracts have given rise to algorithmic credit with their unique technical attributes, i.e., smart contracts relying on weakly centralized consensus mechanisms and objective algorithms constructed for the endorsement of all parties [5], which can dispose of and resolve legal risks more efficiently.

2. The Development History and Current Situation of Judicial Practice of Smart Contracts in China

2.1. The Development of Judicial Practice of Smart Contracts in China

The White Paper on the Development of Blockchain Technology and Applications in China, released in 2016, mentions smart contracts as an architectural system to support various typical industry applications. The White Paper on the Development of Blockchain Technology and Applications in China, released in 2018, further emphasizes that smart contracts are one of the six core technologies for the construction of the blockchain. The Supreme People's Court, in 2019, released a white paper on "Internet Justice in China's Courts", which proposes to promote the combination of blockchain technology and judicial applications under the court system in the construction of smart courts and to form a court blockchain application system under smart justice[6]. Smart contracts, as an important part of judicial blockchain technology, can take into account data security and sharing while automating execution and are the focus of development. 2020 The Supreme People's Court issued the Implementation Opinions on Deepening the Comprehensive Complementary Reform of the Judicial Accountability System, proposing that each Higher People's Court vigorously push forward the application of blockchain and smart contract technology, and deepen the application and exploration of smart contracts. 2022 The Supreme People's Court issued the Opinions of the Supreme People's Court on Strengthening the Judicial Application of Blockchain in May 2012, which put forward the overall goal of building a blockchain alliance for interoperability and sharing between the people's courts and all walks of life in society, and forming a more complete standard system for the application of blockchain in the judicial field, by 2025[7]. The construction of smart courts faces the problem of how to combine technology with justice. Smart contract technology can help us improve judicial efficiency, thus realizing judicial trust and deepening the practice of digitally empowered judicial applications.

2.2. Current Status of Smart Contract Application Practice in China

The traditional way of filing an execution case requires the party concerned to apply to the judge for compulsory execution with legal documents, including the certificate of entry into force of the instrument, the conciliation or judgment, and the application for execution. However, in the real environment, most of the materials required to be provided by the parties to apply for compulsory execution have already existed due to previous trial procedures, which are repetitive operations, making the whole process of applying for execution time-consuming and cumbersome,

greatly slowing down the judicial efficiency of the trial-execution interface. If a smart contract is introduced in this link, with judicial blockchain technology as the underlying structure, the pre-agreed specific and clear rights and obligations are entered into the smart contract, and at the same time, the conditions and consequences of triggering the execution are set and then made public on the judicial blockchain[3]. When the pre-set conditions are triggered, for example, if one party fails to fulfill its obligations in time within the performance period, and the other party confirms the existence of such failure, the smart contract will carry out automated execution, and the acquisition and verification of relevant information will also be completed by the smart contract technology, which will eliminate the need for the parties to submit the information of the party concerned, the application for execution, and the basis for execution, and will directly complete the execution of the case.

Beijing Internet Court established the Tianping Chain Electronic Evidence Deposit Platform in 2018 as an initial attempt to build a judicial blockchain. When dealing with an online infringement dispute in 2019, the Beijing Internet Court tried for the first time to use smart contracts to realize "one-click filing and execution". This means that smart contracts were introduced in civil dispute cases where mediation was conducted by the court and a mediation agreement was reached between the plaintiff and the defendant. According to the fulfillment conditions agreed in the mediation agreement, the judicial staff will make relevant deployments on the judicial blockchain, and then according to the fulfillment conditions confirmed by the parties, the smart contract will trigger different execution actions accordingly. If one of the parties confirms the existence of unfulfilled conditions, then the case will automatically enter the filing process, and the relevant filing information will be automatically captured by the smart contract. If both parties confirm on the smart contract that the mediation has been completely fulfilled, then the smart contract will automatically generate a fulfillment report, and will synchronously store the fulfillment result on the Tianping chain[8].

In addition, the Hangzhou Internet Court launched a blockchain smart contract judicial application system in 2019, uploading the code of the smart contract and every step of the execution process to protect the rights and interests of the parties without derogation. Meanwhile, "credit blacklists" and "credit whitelists" will be operated in the fields of online services and online finance, i.e., users judged to be blacklisted will be restricted or prohibited from applying the relevant services provided by members of credit unions, whereas whitelisted users will receive a lower contract threshold and exclusive preferential prices. The whitelisted users will be offered a lower threshold for signing up and exclusive preferential rates at [9]. In addition, the Jilin Higher People's Court went online with an electronic evidence platform in May 2020, which utilizes the blockchain's distributed and unmodifiable characteristics to fix the key elemental information of the electronic evidence, effectively avoiding the problem of electronic data loss or tampering that may occur with unilateral deposits, in which the smart contract utilizes real-name authentication, the CA's digital authentication technology, and digital certificate products to achieve an effective Electronic signature to clarify the identity of the contract signing, to have the same legal effect as the paper contract.

3. Analysis of the Dilemma of Smart Contract Judicial Practice

3.1. Absence of Legal Norms

As an emerging technology, smart contracts are still in the process of rapid development and evolution, and the legal nature of smart contracts has not been clarified, so it is not possible to reach the standard and extent of the formulation of laws and regulations, and the application of smart contracts can only be regulated by the principles of the law, and there is a lack of specific and clear regulatory specifications. In addition, the judicial application of smart contracts needs to rely on the judicial blockchain to have practical significance, and the current specific legal provisions on blockchain mainly include the Specification for the Electronic Evidence Platform of Hangzhou Internet Court (for Trial Implementation) and Judicial Review Rules for Electronic Data Evidence in Civil Litigation issued by the Hangzhou Internet Court in 2018, the Access and Management Specification for the Electronic Evidence Platform of the Beijing Internet Court issued by the Beijing Internet Court, and the Access and Management Specification for the Electronic Evidence Platform of the Supreme People's Court in 2018. Management Specification, the Provisions on Several Issues Concerning the Trial of Cases in Internet Courts issued by the Supreme People's Court in 2018, and the Provisions on the Administration of Blockchain Information Services issued by the State Internet Information Office in 2019, which are centrally applied in the judicial practice of Internet courts and are mostly guiding opinions with a very limited scope of application. In the latest legislative plan issued by the Standing Committee of the 14th National People's Congress, the construction of the legal and regulatory system on smart contracts has not yet been specifically elaborated and remains in a blank state.

3.2. Technical Construction Risk

The judicial practice of smart contracts relies on the judicial blockchain operation, which is the legalization of a computer code expression, the professional norms of the legal language into a mechanical single code language so that the smart contract can accurately express the original legal text, which has the same strict requirements for the smart contract controller of the application of the law and the code writing, after all, human error is the most likely to make the smart contract the root cause of errors. After all, human error is the easiest source of errors in smart contracts. Embedding smart contracts in mediation cases, the effective mediation agreement for the rights and obligations of both parties is clear and legally effective, if one party does not fulfill its obligations, the other party applies for enforcement, the probability of error generated by the automated implementation of smart contracts in this case already belongs to the lowest degree of the legally controllable range, and the risk of human error is much higher than this. In addition, smart contracts are also theoretically subject to the risk of hacking, smart contracts rely on blockchain technology, and the Internet provides the hardware foundation for blockchain, just as there is a threat of computer viruses in computers, smart contracts are theoretically subject to the threat of corresponding smart contract viruses, and personal information is easy to be stolen by hackers or tampered with and destroyed by viruses, and even infections that may modify other contracts may occur. Chain reaction, thus

affecting the security of personal information of numerous smart contracts.

3.3. Information Security in Doubt

The application of smart contract in judicial practice is based on computer code, with laws and regulations as the logical framework, with the real intention of the parties as the operation guide, only the code is accurate, and the construction of a complete smart contract can carry the real will of the participants. Smart contract has the characteristic of not being tampered with, applied in judicial practice makes the information entered have strong credibility, and can effectively prevent the occurrence of illegal tampering with information behavior. At the same time, smart contracts are characterized by automated execution, once the pre-set execution conditions are triggered, the smart contract will start to execute automatically. However, not all smart contracts should be executed, some may be invalid from the beginning to the end due to the violation of mandatory provisions of the law, and some may be revoked due to the existence of material misinterpretation, fraud, duress, and manifest unfairness. If a smart contract is written and completed due to changes in the objective environment leading to changes in circumstances or errors or loopholes are found, and cannot be deleted based on its non-modifiable characteristics, then it is difficult to correct the errors that deviate from the real personal information, resulting in the subject of the right to information to lose the autonomy of personal information, and in turn infringing on personal information autonomy[10]. In addition, according to Article 1035 of the Civil Code of China, "Personal information shall be handled by the principle of necessity, and shall not be excessively handled." This provision means that the personal information recorded in the smart contract, once entered into the judicial blockchain, will become part of the blockchain as a node on the blockchain, and can no longer be deleted or changed, but can only expand the relevant data and information[11], which is, in principle, mutually exclusive with the provision of minimizing the processing of personal information. At the same time, the personal information recorded in the smart contract will be permanently traced, and even if part of the information is hidden, it can still be traced back to the source, resulting in the information being obtained legally but utilized illegally, which is potentially dangerous to the security of personal information.

4. Optimization Path of Smart Contract Judicial Practice

4.1. Clarify the Legal Position and Strengthen the System

According to the current status quo of judicial practice of smart contract, its application value lies in prompting the civil legal relationship between the applicant for executor and the executor of the smart contract to change according to law, i.e. from the abnormal state of non-performance or defective performance to the normal state of contractual fulfillment[12]. From a substantive point of view, the establishment of a smart contract has similar constituent elements as a traditional contract, i.e., parties with contracting capacity, true expression of meaning and content that does not violate the law and social public interest, but unlike a traditional contract, the smart contract is designed and run through a series of computer code programs from writing to execution, which are

stored in the data nodes of the judicial blockchain[13], and the contents of the smart contract will automatically change after meeting the trigger conditions. The programs are stored in the data nodes of the judicial blockchain, and the contents will be executed automatically when the triggering conditions are met after they are set, without the need for the parties to take action and without external intervention. From a procedural point of view, a smart contract is a kind of auxiliary means to promote the fulfillment of a contract on time through technical support, while the computer code constituting the smart contract itself does not have the legal effect of establishing a contract[14], and is essentially a means to help the parties to fulfill the contract on time[15]. To clarify the legal positioning of the judicial practice of smart contracts, this paper tends to the smart contract is located in an intelligent new type of contract, although by the automated execution of the technical code composition, it's set by human control, by the consensus of the parties to the dispute after the deployment of the judicial blockchain recorded, is the new way of expression of the meaning of the two parties.

If the code is the law, then the first step is to strengthen the construction of the rule system of smart contracts, especially in terms of contracts, intellectual property rights, liability, and compliance[16]. Because of the legal issues that may be triggered, study and judge in advance, explore the establishment of rules, and help build a systematic and standardized legal governance mechanism. Improve the legal regulation of the judicial practice of smart contracts, introduce a specific and clear system of smart contract standards for the People's Court, adhere to the judicial demand orientation, standardize the technical standards and management norms closely related to the operation of smart contracts, clarify the responsible subject of smart contracts, refine the management authority, ensure the effectiveness, security, and reliability of smart contracts, and improve the automated execution capability[17]. Secondly, the legal text is a professional text applied to legal practice by using standardized legislative language, pursuing plainness, directness, rigor, and accuracy in expression. Establishing a unified specification for the use of the legal text of smart contracts is conducive to clarifying the rights and obligations of all parties on the one hand, i.e., through the unified standard and specification, all parties in the smart contract can better carry out the contract under the condition of clarifying their rights and obligations. On the one hand, the establishment of a unified legal text is conducive to clarifying the rights and obligations of the parties, i.e., through the unified standards and norms, the parties in the smart contract can better carry out the contract signing and execution under the condition of clarifying their rights and obligations, avoiding the disputes due to the unclear or ambiguous terms, ensuring the validity of the smart contract, and reducing the legal risks.

4.2. Broadening the Channels of Redress for Rights

The resolution of smart contract disputes requires the intervention of law, but the intervention of law not only requires the design of institutionalized rules to filter the possible negative impact on the order but also needs to ensure the necessary institutional space for the pluralistic resolution of disputes in the process of justice, to prevent the alienation of rules[18]. The construction of a diversified dispute resolution mechanism integrating offline and online, i.e., the introduction of ODR (Online Dispute Resolution) in smart

contracts, is an effective way to broaden the channels of rights redress. ODR is suitable for resolving disputes over smart contracts because it works by the operation of the Internet, which makes the redress procedure independent of the legal system and directly set up in the agreement itself. The legal system is set up directly in the agreement itself[19]. Judicial ODR has the effect of public remedy, because the automated execution of smart contracts has traces of operation on the judicial blockchain, and the current application of smart contracts in judicial practice is carried out with the participation of the judicial department staff, adding the ODR clause when setting up a smart contract, when there is a change in circumstances caused by objective environmental changes that will damage the rights of one or both parties to the continuation of the implementation of the smart contract, the party whose rights are or may be harmed will have the right of the party whose rights are or may be harmed by the ODR to continue to implement the smart contract. If the rights of one or both parties are jeopardized by a change in circumstances due to a change in objective circumstances, the party whose rights are jeopardized or likely to be jeopardized shall apply to invoke the ODR clause, thereby freezing the execution of the smart contract. At the same time, the number of times the ODR clause can be used is strictly limited to avoid malicious abuse.

4.3. Enhanced Regulatory Review Mechanism

With the technical background of judicial blockchain, the data of the entire process of filing, trial, and execution in the court is real, legal, and traceable. When the Supreme People's Court formulated the specifications for judicial blockchain depository, it joined hands with several departments and units to provide normative guidance for the construction of judicial blockchain platforms for courts at all levels across the country [20]. Traditional blockchain has three modes of operation, namely public chain, private chain and alliance chain (A public chain is an open domain on the blockchain where any organization, unit, or individual can participate at any time to conduct transactions and bookkeeping and get valid confirmation. A private chain, on the other hand, refers to a blockchain that is not open, and its writing needs to be attached with certain conditions or restricted to a specific subject, which is the opposite of the public chain, and only opens up writing and reading privileges to specific private users. A coalition chain synthesizes the characteristics of public and private chains, users can participate in the node with other users, reflecting the common participation.), China's judicial blockchain adopts the exploratory development mode of alliance chain and adopts the method of restricting the use of the information arising from civil disputes that is not suitable for public disclosure, whereas for the information related to the information that can be disclosed, the information will be published in a way to retain the public chain [3]. Encourage diversified subjects to participate in the construction and become participating nodes of the judicial blockchain, give full play to the functional roles of all relevant departments, connect courts at all levels and political and legal units, external enterprises, and institutions, and effectively integrate grassroots power and resources. Promote the efficient and credible flow of smart contracts, accept the supervision of multiple participating subjects to improve the effectiveness of smart contracts in serving the judicial trial and execution, and realize the one-stop resolution of conflicts and disputes.

Establish a review mechanism for the legalization of smart contract technology, improve the consensus mechanism for the supervision and management of the design and operation process of smart contracts, require the developers of smart contracts to comply with the program development norms and professional ethics from the source, ensure that the construction algorithms and the operation of smart contracts are subject to the constraints of the due process of justice, and provide a reasonable explanation of the results of the operation of the smart contracts that can be traced back when necessary, and uphold the concept of goodness of science and technology. The concept is to uphold the goodness of science and technology and prevent algorithmic discrimination. When the smart contract is signed and uploaded to the blockchain, the important information protection mechanism is activated, and for the personal information recorded in the smart contract, before applying or even entering into the judicial blockchain, the judicial authorities shall fully inform the information right subject of the relevant risks and obtain his/her explicit consent, and abide by the principle of voluntariness of both parties concerned. At the same time, the smart contract is set to anonymize the personal information after its execution so that it cannot identify a specific individual, thus safeguarding the security of personal information.

5. Conclusion

The change in technology does not necessarily lead to the change of law. The judicial practice of smart contracts is the proper meaning of the new era of intelligent court construction, is a necessary way to enrich the judicial blockchain business construction, is a powerful way to enhance the quality of judicial trial and execution, is to promote multi-sectoral and multi-objective collaborative governance, reconstructing the social credit system of innovative initiatives. Admittedly, the legal nature and positioning of smart contracts have not been clarified at the level of laws and regulations, and are limited to the handling of civil disputes in mediation cases in the current judicial practice, but smart contracts still have a broad prospect of judicial application to digitally facilitate the development of multidisciplinary dispute resolution business, promote the collaborative application of judicial cross-chain business, and provide a strong technical support for the deepening of the construction of the Smart Court and the modernization of the trial system and trial capacity.

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