



Using Blockchain to Promote the Construction of Smart Court

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Abstract. This Blockchain is considered to be a new technology to reshape the world, and China has listed the blockchain as an integral part of its national strategy. The smart court is a court information system with the characteristics of networking, transparency, and intelligence. Private blockchain, Consortium blockchain, and Public blockchain each have their characteristics, and the corresponding scenarios should be selected to be used in the construction of a unified, whole-process, integrated smart court system across the country. Cooperate with other judicial agencies to create a full-process and integrated judicial blockchain system centered on trials, actively explore the construction of a blockchain system for international judicial cooperation. Give full play to the traceability and immutability of the distributed ledgers, smart contracts and the data generated by the blockchain, information symmetry and transparency, technical credit, automatic processing, and other unique functions to ensure judicial justice, improve judicial efficiency and enhance judicial credibility..

Keywords: Blockchain · Smart court · Judicial justice · Judicial efficiency · Judicial credibility

1 Technical Characteristics of Blockchain and Construction of Smart Court

1.1 Technical Characteristics of Blockchain

In 2008, Satoshi Nakamoto designed an electronic cash system without a trusted third party in *Bitcoin: A Peer-to-Peer Electronic Cash System* and put forward the concept of Bitcoin. As the underlying technology of Bitcoin is blockchain, this paper is recognized as the theoretical origin of blockchain. In January 2009, Satoshi Nakamoto, inventor of blockchain, created the first block (The foundation block), and the blockchain moved from theoretical design to practical application. Melanie Swan, the founder of American Blockchain Research Institute, divided the blockchain into three stages in her book *Blockchain: Blueprint of New Economy*. blockchain 1.0 represented by digital currency, blockchain 2.0 represented by smart contract, and blockchain 3.0 which transcends currency, economy, and market in the fields of justice, government management, and

notarization [1]. Blockchain has entered the 2.0 stage and is moving towards the 3.0 stage.

Blockchain does not change the TCP/IP protocol of the Internet, so why not link these ledgers with the Internet? The answer lies in the technical characteristics of the blockchain and the unique advantages. It is generally believed that blockchain technology has the following characteristics: First, it is decentralized. The blockchain has no central control. Through distributed accounting and storage, each node realizes self-verification, transmission and management of information. Decentralization is the most prominent and essential feature of blockchain. The second is openness. The foundation of blockchain technology is open source. Except that the private information of all parties to the transaction is encrypted, the data of the blockchain is open to everyone. Anyone can query blockchain data and develop related applications through the public interface. The entire system information is highly transparent. The third is independence. Based on consensus specifications and agreements, the entire blockchain system does not rely on other third parties, and all nodes can automatically and safely verify and exchange data in the system without any human intervention. The fourth is safety. If you cannot control more than 51% of the data nodes, you cannot modify the network data, which makes the blockchain itself relatively safe [2]. The above description provides a concise summary of the main characteristics of the blockchain, and is also suitable for observing and understanding the blockchain from the perspective of the rule of law.

Regarding the characteristics of the blockchain, a multi-angle observation will lead to different conclusions. From the perspective of the equality of rights and obligations, the blockchain uses distributed accounting and storage, and there is no centralized management agency. Therefore, the rights and obligations of each node are equal, and the data blocks in the system are jointly maintained by all nodes with maintenance functions in the entire system. From the perspective of autonomy, the blockchain does not require any human intervention. It uses consensus-based specifications and protocols to enable all nodes in the entire system to automatically and securely verify and exchange data. The reason why the blockchain automatically verifies and exchanges data without human intervention is because of the characteristic functions of smart contracts. The concept of smart contract was first proposed by Nick Szabo in 1993. It refers to an agreement that is automatically executed according to the conditions set on the blockchain. In the transaction, the smart contract can automatically calculate the amount to be paid by the parties to the contract and arrange the payment, and the payment behavior of the party will automatically trigger the other party to perform the corresponding obligations. For example, the ownership or use right of the subject matter is automatically transferred through electronic records.

In summary, the technical characteristics of the blockchain can be summarized in the order of legal logic: the anonymity of the subject, the intelligence of transactions or management, the decentralization of management, the autonomy of the rules on the chain, the immutability of data, and automation of rewards and punishments.

It should be noted that blockchain does not exclude the application of artificial intelligence, big data, cloud computing, and the Internet of Things. Moreover, blockchain can and needs to be integrated with these technologies, and the construction of smart court is no exception. As for the relationship between the Internet and blockchain, simply

speaking, blockchain does not change the TCP/IP protocol of the Internet but is only the top-level application of the Internet, but blockchain has the above-mentioned technical characteristics completely different from the Internet.

1.2 Blockchain Helps to Promote the Goal of Building a Smart Court

On January 29, 2016, Zhou Qiang, President of the Supreme People's Court, first proposed the development goal of building a smart court. At the end of 2017, the People's Court Information Construction Version 3.0 came to a perfect conclusion, and the pattern of smart court has taken shape. The informatization construction of the people's court is divided into three stages, version 1.0, version 2.0 and version 3.0. In version 1.0, the informatization construction of the People's Court has realized paperless regular office, electronic file management, networked process monitoring, and computerized trial records. In version 2.0, the People's Court has realized online case filing, case handling, enforcement, letters and visits, and disclosure. In addition, it has built a platform for public trial procedures, public trial activities, public judgment documents, and implementation information disclosure platforms (referred to as the "Four Major Public Platforms") to achieve full supervision of trials and implementation work, and effectively promote the trial system and trial capabilities modernization.

The Opinions on Accelerating the Construction of Smart Courts issued by the Supreme People's Court in April 2017 pointed out that smart courts are a form of organization, construction and operation in which people's courts make full use of advanced informatization system to support online handling of all businesses, lawful openness of whole process and all-around intelligent services and to realize impartial justice and justice for the people. It can be considered that smart court are a new type of organization, construction, and operation based on the informatization of the people's courts. It is an informatization system of the people's courts that is networked, transparent, and intelligent. The People's Court Information Construction Version 2.0 has basically achieved networking and transparency. The focus of the construction of smart court (People's Court Information Construction Version 3.0) is to further transform and enhance network and transparency through intelligence, or smart court. The networking and transparency of the smart court will be intelligent networking and transparency, and the three will complement each other and work together in the construction of smart court.

In the process of intelligent social development, the Internet of Things, blockchain and artificial intelligence are all important means of intelligence. The construction of smart court also needs and should integrate and use these technologies to promote the construction of smart court. Blockchain has gradually been widely recognized, and future blockchain applications will be expanded to various social fields, including the judicial field. We should fully tap the judicial value of blockchain and actively expand the judicial practice functions of blockchain, and make full use of the technical characteristics of blockchain to promote the construction of smart court.

2 Practice and Application Status of Blockchain in Smart Court Construction

How to link to form a smart judicial system faces two choices, the Internet of Things and blockchain (the Internet of Things can be linked to the Internet or blockchain). Compared with blockchain, the construction cost of the Internet is lower and the construction difficulty is smaller. The completion of parole cases handled by the Guangzhou Intermediate People's Court with the public security organs and procuratorial organs through the Internet is a useful exploration in this field. The application of blockchain is not widespread, but it has special advantages. In the practice of building a smart court, the judicial application of blockchain has achieved positive results.

On September 7, 2018, the Supreme People's Court issued *Provisions of the Supreme People's Court on Several Issues Concerning the Trial of Cases by Internet Courts*, which recognized blockchain as a technical means to collect, fix, and tamper-proof data, and affirmed the legal effect of the evidence of blockchain deposit. In August 2019, the Supreme People's Court announced the establishment of a unified judicial blockchain platform. At present, 27 nodes of the Supreme People's Court and 20 local courts, multiple dispute mediation platforms, notary offices, and judicial authentication centers have been completed.

Hangzhou Internet Court has officially launched the first judicial blockchain on September 18, 2018. Judicial blockchain makes the whole process of electronic data generation, storage, dissemination, and uses credible. The blockchain consists of three layers: First, the blockchain program, users can directly record the whole process of operation behavior in the blockchain through the program, such as submitting electronic evidence such as electronic contract, rights protection process, and service process details online; The second is the blockchain full link capability layer, which mainly provides real-name authentication, electronic signature, timestamp, data deposit certificate and trusted services of the whole blockchain process; The third is the judicial alliance layer, which uses blockchain technology to connect notary offices, CA/RA institutions, judicial authentication centers, and courts, and each unit becomes a node in the chain. Through the whole and complete structure, it can solve the generation, storage, dissemination, and use of electronic data in the whole life cycle on the Internet, especially the whole process credibility of the generation end [3]. In October 2019, Hangzhou internet court began to implement the first judicial application of blockchain intelligent contract ("version 2.0" of judicial blockchain). by creating a closed-loop of the whole process of network behavior "voluntary signing-automatic performance-performance cannot be intelligently filed-intelligent trial-intelligent execution", it designed judicial governance mechanism and dispute resolution to boost the execution efficiency of intelligent contracts and efficiently handle a few default behaviors. Reduce the interference of human factors and uncontrollable factors, build a new form of contract signing and performance in the Internet era, and truly realize the whole process recording of network data and network behavior, full link credibility, full node witness, and all-round cooperation [4].

The current judicial application of blockchain is mainly concentrated in the field of evidence. Evidence is called the "king of court". The collection, fixation, review and judgment of electronic data evidence are more difficult, so the credibility of the entire process of electronic data undoubtedly has extremely high judicial value. However, the

judicial application of blockchain should not be limited to electronic data evidence. Some courts and related companies are also actively exploring, such as the first blockchain smart contract judicial application promoted by the Hangzhou Internet Court. In general, the judicial application of blockchain is still in its infancy, and the unique rule of law function of “blockchain + justice” should be fully exploited and fully and effectively applied to the construction of smart court.

3 The General Idea of Using Blockchain to Promote the Construction of Smart Court

On July 31, 2019, the Supreme People’s Court issued the *Opinions of the Supreme People’s Court on Building One-stop Diversified Dispute Resolution Mechanisms and One-stop Litigant Service Centers*, which specifically stated: “Promoting the building of smart litigation services. A new mode of “smart litigation services” relying on big data, cloud computing, artificial intelligence, the Internet of Things, and other information technology, integrating service halls, hotlines, websites, and mobile terminals, permitting litigation business in the whole process to be transacted, shall be shaped. Online service functions shall be expanded, the China Mobile Micro Court shall be fully applied, the channel for authentication of parties shall be unblocked, and one-stop services such as online guidance, case docketing, payment and refunding of fees, check, consulting, file consultation, preservation, trial, and petition shall be provided. The construction of lawyer service platforms shall be strengthened to provide services such as online case docketing, check, file consultation, submission of materials, contacting judges, evidence exchange, mediation, court in session, representing petitioners, and application for enforcement. Intelligent equipment such as all-in-one computers for facilitative services shall be assigned to litigation service halls. The 12368 litigation service hotline intelligent answering system shall be improved. The integration of service platforms including “service halls, websites, hotlines, and circuits” shall be promoted to achieve the mutual accessibility and automated linking of information resources and provide the public with litigation services by harmonized standards, based on data from the same source.” The overall vision of the blockchain in this regard is as follows:

3.1 Classification of Blockchain and Its Application Scenarios in the Construction of Smart Court

From the application form, blockchain can be divided into public blockchain, consortium blockchain, and private blockchain, and different types of blockchain are suitable for different application scenarios. Public blockchain is a completely open blockchain, and its participants can enter the system at any time for data reading, transaction sending and confirmation, competitive accounting, and system maintenance. Common applications of public blockchain include Bitcoin and Ethereum. Consortium blockchain is a blockchain managed by several institutions, which belongs to a hybrid blockchain between public blockchain and private blockchain. Each institution runs and manages one or more nodes in the chain, and its data can only be read and written by the institutions in the alliance. All institutions can send transactions and record transaction data

together. Typical applications include super ledger, enterprise Ethereum and so on. Private blockchain refers to a blockchain whose write permission is controlled by an organization or institution, and whose read permission can be opened to the outside world or restricted to a certain extent [5]. In the construction of smart court, we can choose to build specific judicial blockchain according to different needs. Among them, private blockchain can be used to build the internal system of smart court, consortium blockchain can be used to build smart judicial system, smart international judicial cooperation system and external cooperation system between smart courts and banks, and public blockchain can be used in court litigation services, publicity of rule of law, judicial openness and other scenes open to public participation.

3.2 Using Blockchain to Build a National Unified Whole Process and Integrated Smart Court System

The mode of informatization construction of the People's Court is that the Supreme People's Court carries out the overall design and solves important issues at the same time. The local courts actively explore and develop various system platforms with local characteristics. The advantage of this construction mode is that it can mobilize the enthusiasm of local courts and make concerted efforts to build. It was a suitable choice in the past informatization construction of the People's Court and actually achieved the expected results, but it is not necessary to follow this mode in the future construction of smart court. The shortcomings of this model are mainly as follows: the repeated construction of local courts will lead to a huge waste of manpower, financial resources, and material resources; Constrained by factors such as construction conditions, the construction quality is uneven; There are many system platforms, which are often incompatible, and have poor synergy and sharing; Excellent construction achievements are inconvenient to be fully popularized in the national court system.

The construction of smart court is a complex systematic project. According to the construction goal and current situation of smart court, the construction of smart court should focus on building a unified whole-process and integrated smart court system, that is, relying on the Internet or blockchain. The construction of smart court is a complex systematic project. According to the construction goals and status quo of the smart court, the focus of the construction of the smart court is to build a unified, whole-process and integrated smart court system across the country. Relying on the internal and external systems of smart court based on the Internet or blockchain, a smart litigation system with "smart judges" (smart court artificial intelligence systems) as the core is established for smart case filing, trial, judgment, and execution. Connected with intelligent prosecution and intelligent policing to form a trial-centric smart judicial system to fully realize the systematic litigation function between smart court. For example, after a party submits an appeal petition and pays the appeal fee, the system will automatically transmit the electronic file of the court of first instance to the court of second instance. Some local courts are exploring the construction of an integrated litigation platform based on the Internet. Blockchain has incomparable advantages over the Internet. It is suggested that under the unified deployment of the Supreme Court, the internal system of smart court in the chain should be built, which is based on the interconnection of intelligent litigation systems of all courts in China. When conditions are mature, it can be expanded to form a

blockchain integrated business processing platform with arbitration, administrative law enforcement and mediation, and insurance claims.

3.3 Using Blockchain to Build a Smart Judicial System Centered on Trial

China's intelligent prosecution and intelligent policing services are also under active construction. The interconnection of smart court with intelligent prosecution and intelligent policing systems is an inevitable trend, thus forming a full-process smart judicial system with smart court as the core node. How to link to form a smart judicial system faces two choices, namely the Internet and the blockchain (the Internet of Things can be linked to the Internet or the blockchain). Compared with the blockchain, the construction cost of the Internet is lower, and the construction difficulty is also less. The current application of blockchain is not widespread, but it has special advantages. The whole process and integrated litigation system based on the blockchain helps to place the entire litigation process in the technical guarantee of the information transparency, the data unchanged, and the credible evidence of the blockchain, especially helping to solve the problem of evidence collection. The stage of tampering, damage and concealment. At present, investigative agencies, prosecutive agencies, and judicial agencies are actively exploring and trying to apply blockchain to solve some judicial problems. There are no obstacles in policies, technologies, systems, etc., in the use of blockchain to build a smart judicial system centered on trials. Therefore, the use of blockchain to build a full-process and integrated judicial system centered on trials can begin preparations.

3.4 Using Blockchain to Build a Smart International Judicial Cooperation System

On February 1, 2018, the European Commission announced the launch of a new mechanism aimed at promoting the development of blockchain technology in Europe and helping Europe benefit from it. This mechanism has the functions of collecting information related to blockchain, monitoring and analyzing related trends, exploring the socio-economic potential of blockchain technology, and coping with related challenges. According to the European Commission, blockchain technology can make online transactions have high traceability and security, which is regarded as a major technological breakthrough. This technology will affect digital services and change the modes in the fields of medical care, insurance, finance, energy, logistics, and government services [6]. Some countries or regions have started to build smart court or electronic courts, and the construction of smart court of people's courts will also strengthen the smart judicial cooperation function with overseas smart court or electronic courts in international judicial assistance and other work, thus building a smart international judicial cooperation system. Limited by external conditions, it is difficult to build a smart international judicial cooperation system. The possible mode is to connect with the smart court system of individual countries on a pilot basis, and then sum up experience based on the pilot and gradually advance.

4 The Judicial Practice Function and Significance of Using Blockchain to Promote the Construction of Smart Court

4.1 Using Blockchain to Promote the Construction of Smart Court Is Conducive to Ensuring Judicial Justice

In order to unify the judgment criteria and prevent “the different verdict in the same kind case” and “unjust and wrong cases”, the Supreme People’s Court has created a mechanism for searching similar cases and correlated cases. In the trial of a case, a judge handling the case shall, on the case handling platform, file system, China Judgments Online, www.faxin.cn, the Intelligent Trial System, etc., comprehensively search the similar cases and correlated cases closed concluded or under trial and develop a report on the searching of similar cases and correlated cases. Where upon research, similar cases and correlated cases fall under the following circumstances, a judge handling the case shall handle the case as needed under the following provisions: (a) Where new adjudication criteria will be formed for the judgment intended to be rendered in the handling of a new-type case, they shall be submitted to the professional judge meeting for discussion and shall be submitted to the judicial committee for discussion upon decision or suggestion of the president or the chief judge of the court. (b) Where significant differences in the adjudication criteria for similar effective cases of the court are found, the trial management office shall be notified after a request is submitted to the chief judge for research, and the trial management office shall submit a report to the president and submit it to the judicial committee for discussion after cooperating with the relevant trial business tribunal for reviewing the issues on the application of law. This mechanism and the “four major public platforms” (especially the platforms for the publication of judgment documents) have a significant effect on solving legal application errors in the judgment process, effectively curbing obvious legal errors and fraud in the judgment documents. However, these measures cannot completely solve this problem. Blockchain smart contracts can reduce manual intervention during the execution of the agreement. When applied to the construction of smart court, the opinions or grounds of litigation participants will be automatically imported into the judgment document, thereby preventing the phenomenon of selective quotation of opinions or grounds.

“Take facts as the basis and laws as the yardstick” is one of the basic principles of law application, and it is also the basic guarantee of judicial justice. Measures such as searching similar cases and correlated cases, reporting differences between higher courts and the “four major public platforms” can solve the problem of error in fact determination, but they cannot completely solve this problem from the source of evidence. Therefore, the distributed ledger of the blockchain, data traceability, immutability, information transparency and information symmetry, as well as the time stamp function, can effectively prevent the phenomenon of tampering or concealing evidence. From the source of evidence, it can effectively prevent the phenomenon of “different verdict in the same kind case” and “unjust and wrong cases”.

4.2 Using Blockchain to Promote the Construction of Smart Court Will Help Improve Judicial Efficiency

“Difficulty in enforcement” is one of the problems that the People’s Court at all levels have been trying to solve in recent years, and the implementation of online investigation and control and online enforcement through the Internet are important results among them. The Supreme People’s Court has established an online inspection and control system, which can query 16 categories of 25 items of information (real estate, deposits, online funds, etc.) of the enforced nationwide. It can basically realize the effective coverage of the main property forms and related information of the person subject to execution. However, the Internet cannot completely solve the phenomenon of executives delaying execution within the execution deadline. Although the use of the Internet for online investigation and control and online enforcement has brought great convenience, whether or not to take enforcement measures still depends on the initiative of the enforcement judge and the external constraints of the system.

The automatic execution of the smart contract of the blockchain can solve this problem, using blockchain technology to establish Consortium Blockchain with banks and other institutions. As long as there is property available for execution, execution measures such as freezing and transfer can be automatically completed in accordance with the consensus mechanism of the blockchain and smart contracts, which not only improves execution efficiency, but also effectively solves the phenomenon of long-term delay. Specifically, after the applicant applies for enforcement, the blockchain system will intelligently review whether it meets the conditions for applying for enforcement. If the conditions are met, the system will automatically initiate network checks, transfers, punishments and other measures of the bank account of the person subject to enforcement, without the intervention of the enforcement judge, thereby improving judicial effectiveness. Blockchain smart contracts are not only embodied in automatic enforcement without human intervention, but also can automatically complete tasks such as case filing, court formation, and trial process management. However, this is only the function of the smart contract in the blockchain. The use of the blockchain for electronic data storage can pre-verify the electronic data evidence, which can also improve the judicial efficiency in the aspect of proof, cross-examination, and identification of evidence. It is foreseeable that with the in-depth application of blockchain in the construction of smart court, it will greatly improve judicial efficiency in judicial litigation, judicial services, and judicial management.

4.3 Using Blockchain to Promote the Construction of Smart Court Will Help Improve Judicial Credibility

Blockchain technology fundamentally changes the traditional centralized credit establishment model. It uses a set of mathematical algorithms based on a collective consensus reached in advance agreement, replaces dependence on centralized institutions with data blocks, and establishes credit through machine technology endorsements rather than signatures of centralized institutions. The credit supported by blockchain technology is a purely mathematical method to establish a trust relationship between all parties. The use of all nodes to book accounts through the entire network can quickly establish global

credit, and it can also automatically eliminate false and fraudulent information [7]. Different from the traditional manual credit evaluation system, there is no credit evaluation and credit verification institution in blockchain, but distributed account books are used to ensure the immutability and transparency of block data, thus establishing a credit evaluation system with technology as an endorsement. In other words, each user's transaction will form credit data or constitute the basis for credit evaluation, thereby establishing a unique credit system. Unlike the traditional manual credit evaluation system, the blockchain does not have a credit evaluation and credit verification agency, but uses a distributed ledger to ensure the immutability and transparency of block data, thereby establishing a credit evaluation system with technology as an endorsement. In other words, each user's transaction will form the basis of credit data or credit evaluation, thereby establishing a unique credit system.

In the blockchain area, it is smart contracts that completely dispel the worries of transaction parties about transaction risks. Moreover, this trust can also be passed on to third parties on the chain. According to the *2018 China Blockchain Industry White Paper* of the Ministry of Industry and Information Technology, the use of blockchain to realize information sharing can achieve "trust transfer" or "trust spillover."

From the perspective of consensus, law is the result of social consensus. The law also promotes and guarantees the stability of social consensus through the adjustment of social relations. It is generally believed that the difficulty of social consensus lies mainly in the diversification of values. In the market environment, the scarcity of resources and the normalized zero-sum game make it more difficult to reach a consensus. The technology credit, trust transmission and consensus mechanism of the blockchain has created a unique way to provide a novel solution for the formation of social consensus. Blockchain can credibly promote social governance innovation in terms of traceability, voting, rights registration, transfer, decision-making and supervision.

In the blockchain, it is smart contracts that completely dispel the worries of transaction parties about transaction risks. Smart contract with its automatic execution mechanism eliminates both parties' concerns about contract performance risks. It is the unique credit evaluation system of blockchain and the automatic execution mechanism of smart contracts that provide a new trust model. If the function of the Internet is mainly information transmission and information interaction, the characteristic function of the blockchain is to form value transmission. From the perspective of the construction of smart court, the technical credit of blockchain (to establish a credit foundation from a technical level through a consistent technical agreement or specification), consensus mechanism, and information transparency can also help prevent the formation and spread of rumors, thereby effectively improving justice Credibility.

5 Conclusion

China's smart court have established a model with the most comprehensive network coverage, the largest data stock, the strongest openness, the widest scope of collaboration, and the latest smart services in the world. In the future, we will promote the development of smart court from initial formation to comprehensive construction. Looking back on the history of the informatization construction of the people's courts, the development

of information technology has provided strong support for the people's courts to ensure judicial fairness and improve the quality of trials. The informatization construction of the people's courts has made great achievements, and we look forward to the new type of smart court to continue to promote judicial reform, advance the modernization of judicial capabilities and judicial systems, and set a model for the construction of smart court in countries around the world.

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