

The Positioning and Governance Logic of Digital RMB Smart Contracts in Digital Copyright Protection

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Abstract. While the iteration of digital technology encourages mass creation, it also poses challenges to the protection of digital copyright, such as difficult rights confirmation, unfair distribution, and high costs of rights protection. Traditional governance technologies represented by DRM and cloud computing are poorly integrated with legal norms, while emerging blockchain smart contracts face high technical barriers and institutional adaptation difficulties. Based on this, the digital RMB smart contract, which is positioned as an "institutional technical tool", inherits the programmability advantage of blockchain smart contracts, has the dual endorsement of central bank technology and credit, and can also achieve wide reach through the operation of commercial banks. It is expected to bridge the gap between technology and ordinary users and solve the problem of the connection between technology and law. Based on the specific practice of the Yuan Guanjia module built into the digital RMB smart contract, the technology is expected to improve the traditional subscription model, guarantee the stepwise release of crowdfunding publishing, realize the "per-use settlement" of prepaid authorization, and build a return mechanism for the interruption of serialized works, thereby promoting the full-chain governance of digital copyright.

Keywords: digital RMB Smart Contract, digital copyright, blockchain smart contracts, Yuan Guanjia

1. Introduction

The Outline for Building a Strong Intellectual Property Nation (2021-2035) (hereinafter referred to as the Outline) states that to build an intellectual property system oriented towards socialist modernization, it is necessary to improve the intellectual property protection rules for new technologies, new industries, new business forms and new models. The Outline emphasizes this because the way works are created, disseminated and used in the digital environment has undergone fundamental changes, presenting new challenges to copyright protection. Therefore, it is imperative to build a new copyright protection system that adapts to the digital age.

Most scholars believe that digital copyright governance is a systemic issue involving technology, law, economy, etc. In other words, it is facing problems such as lagging technology, high costs of rights protection [1], and difficulties in monetizing the value of creators [2].

To address this problem, the academic community has begun to actively seek technology-driven governance approaches. The "technology governance" approach, represented by blockchain smart contracts, was once considered promising, but in practice it has exposed problems such as performance bottlenecks, legal connection obstacles and insufficient social acceptance, making it difficult to truly implement. China's Digital Yuan (e-CNY) smart contract, with its institutional advantages such as legal tender status, controllable anonymity, and centralized management, offers another possibility for digital rights governance. This article will start with the limitations of traditional governance solutions and introduce the "institutional technical tool" of the digital RMB smart contract to explore its unique position in the protection of digital copyright. Based on the existing practical experience of the digital RMB smart contract, it will further analyze how it can improve the operation model of mainstream subscription-based digital works and provide new possibilities for promoting the business model of emerging digital works.

2. Governance dilemmas of digital rights protection

In contemporary China, the iteration and upgrading of digital technology have led to an increasing diversity of creative subjects, an increasing fragmentation of dissemination channels, and an increasing fragmentation of usage scenarios. This transformation, while stimulating mass creative innovation and promoting the construction of new forms of digital industry, brings new challenges to the governance of digital rights. The traditional governance model, which centers on post-event relief and official registration agencies, struggles to cope with the new forms of infringement and the complex distribution of benefits.

First, at the confirmation stage, the number of digital works has soared, but the services provided by traditional registration agencies are cumbersome, time-consuming and costly, making it difficult to meet the confirmation requirements of the rapidly produced digital works. As a result, the rights granted by law are suspended at the "confirmation" stage, deviating from the purpose of copyright law to encourage creation.

Second, in terms of revenue distribution, as the market is flooded with a vast number of digital works, to a large extent, for a single work to gain high traffic, it requires both centralized platforms to gather users and platform algorithms to recommend traffic diversion. However, while the algorithmic recommendation technology mastered by the platform provides the necessary channels to reach users, it also holds the dominance of traffic distribution and the pricing power of revenue sharing. On an unequal status basis, creators, who are the true producers of content, can only receive compressed income, while platforms, as the presenters of content, can reap huge profits. This distribution imbalance has severely dampened the enthusiasm of creators.

Third, in terms of rights protection, the easy replicability and dissemination of digital works result in extremely low costs of infringement, while rights protection is extremely difficult. Rights holders either have to choose expensive endorsements from the copyright office or have to prove the creation process and the time of the first release themselves. In addition, cases of platform infringement are more difficult. Evidence of infringement is often concealed and easily tampered with. Platforms may use their technological superiority to hide key clues, making it difficult for ordinary users to obtain key authentication data and putting them in a passive position in litigation.

Fourth, at the enforcement stage, the fragmented and high-frequency dissemination characteristics of digital works (such as single paid reading and single music listening) require the revenue distribution mechanism to have the refined ability of small amounts and high frequencies. But the traditional contract model, which involves "one-on-one negotiation, face-to-face signing of books, and manual performance," is too costly, making it difficult to implement refined distribution.

In essence, the core dilemma of digital rights protection is a systemic problem involving the centralized reliance on the rights confirmation mechanism, the lack of transparency in value circulation, the credibility crisis of rights protection evidence, and the flaws in contract enforcement. There is an urgent need to seek breakthroughs at the level of underlying technical architecture and trading rules.

3. Limitations of the existing copyright protection model based on the technology governance paradigm

3.1. Institutional dilemmas of traditional cloud computing and DRM solutions

The core logic of traditional technology solutions represented by cloud computing and DRM is to strengthen control over access and use of works through technical means to curb infringement risks from the source. However, this control-oriented governance logic is in deep conflict with the laws governing the dissemination of digital works and the institutional balance of copyright law.

Firstly, the strengthening of access control measures by cloud computing makes it difficult for users to access copies of works, resulting in the suspension of public interest balance mechanisms such as fair use and statutory licensing. Secondly, the principle of exhaustion of distribution rights is fundamentally challenged in the cloud computing environment: users only obtain the service of using the work rather than copies, there is no traditional act of "original or copy distribution with the author's consent", distribution rights cannot be exhausted, and the control of copyright holders over the dissemination of the work is infinitely extended [3]. Finally, there are technical obstacles to the determination of indirect infringement by cloud service providers: The confidentiality of cloud computing makes it difficult for service providers to "know" that users infringe, big data and complexity make the criteria for determining "should have known" ambiguous, and the technical difficulty of information detection further increases the difficulty of fault determination [4].

Digital Rights Management (DRM) technology faces similar predicaments. DRM attempts to achieve fine control over the way works are used through techniques such as encryption, digital watermarking, and access control. However, the rigid structure of DRM is difficult to adapt to the fragmented and high-frequency dissemination of digital works, and its strict control mechanism often hinders legitimate secondary creation and fair use, being criticized as "technology replacing law" [5]. More importantly, DRM has never been able to solve the problem of unfair revenue distribution between creators and platforms - platforms hold DRM keys and metering data, while creators remain in a vulnerable position of information asymmetry.

It is worth noting that DRM and cloud computing share common limitations in the field of copyright protection for digital works. Formally, their centralized architectures are at risk of being attacked in a concentrated manner; Functionally, both can only achieve front-end prevention of infringement, but not confirmation of rights and automatic small income distribution; In terms of validity, the evidential force of both depends on the technical endowment and credit of the centralized platform; In terms of institutional adaptation, DRM may impede the fair use of works, and cloud computing may leave distribution rights unexhausted.

3.2. Inherent limitations of existing blockchain smart contract solutions

Unlike the control-oriented technical solutions mentioned above, decentralized smart contracts represented by public chains are seen as more revolutionary solutions. It is not only expected to automate and decentralize rights confirmation and protection, but also to flexibly set up flexible

charging models based on smart contracts, which helps to refine the operation of digital rights and achieve more full extraction of copyright revenue [6].

In fact, blockchain technology has achieved certain results in copyright governance. The DCI (Digital Copyright Unique Identifier) system is a specific application of blockchain technology in the field of rights confirmation, which significantly improves the efficiency of rights confirmation by having the platform bear the cost for creators and achieving second-level rights confirmation [7].

However, rights confirmation is only the starting point of copyright governance. Even after the works have been confirmed, deeper governance problems remain, such as unfair revenue distribution, difficulty in providing evidence for rights protection, and high costs of contract enforcement. When blockchain smart contracts are attempted to be applied to these more complex scenarios, their inherent limitations are gradually exposed.

One is at the technical level. First, decentralized smart contracts represented by public chains have consensus mechanisms represented by Proof of Work (PoW) and Proof of Stake (PoS) to put data on the chain and form blocks. The former relies on high computing power and is prone to resource waste and high costs, while the latter requires token collateral and poses implementation difficulties. Furthermore, although the distributed ledger approach has extremely high transparency, on the other hand, the high transparency brings potential privacy risks. Finally, the frequent technical vulnerabilities of smart contracts themselves pose a huge challenge to the technical capabilities of template providers [8].

The second is at the legal level. According to the Online Litigation Rules of the People's Courts, if a party uses blockchain to provide evidence, when the other party in the lawsuit raises a question, the court needs to determine its "technical neutrality" and "compliance of the evidence storage platform qualifications" [9]. In judicial practice, this burden of proof depends on a certain understanding of the technology, which still falls short of the original intention of blockchain technology to promise "one-click proof" and "easy rights protection".

Third, at the social level. The concepts of private key management, Gas fee mechanisms, wallet addresses, etc., constitute significant cognitive thresholds - once a private key is lost, rights are de facto lost, and there is no customer service or institution to help retrieve it. Such strict rules exclude the vast majority of non-technical creators.

It is notable that even in the relatively mature blockchain application scenario of rights confirmation, the "free" model may actually be a cost transfer - the DCI rights confirmation fees paid by the platform for creators may eventually be indirectly borne by the creators through measures such as increasing the commission rate and adjusting the traffic distribution. The reduction in the cost of rights confirmation does not change the weak position of creators in the revenue distribution pattern.

In short, looking at the existing solutions, whether traditional cloud computing or DRM solutions, or the highly anticipated blockchain smart contracts, they are all constrained by high technical barriers and the dilemma of being disconnected from legal norms. This reveals that new governance tools need to have both low entry barriers and institutionalized features. The smart contract of the digital yuan, through "institutional embedding", inherits the advantages of blockchain technology while responding to core shortcomings such as trust, relief and cost with its legal tender nature and centralized management, and becomes an "institutional technical tool" that deeply integrates technical logic and legal order.

4. Justification for the introduction of smart contracts for the digital RMB

As mentioned above, both the centralized technology control logic represented by cloud computing and DRM and the decentralized technology autonomy path practiced by blockchain smart contracts are trapped in the dilemma of technology and law deembedding. When governance tools deviate from governance goals, there is a need for a new type of infrastructure that can both leverage technological advantages and be embedded in the existing legal framework. The legal digital currency attributes of the digital RMB smart contract offer the possibility of breaking the deadlock. It inherits the advantages of blockchain smart contracts, is backed by national credit, characterized by controllable anonymity, and carried by programmability, opening up a new justification path for reconstructing the revenue distribution mechanism of digital rights.

4.1. Definition and characteristics of digital RMB smart contracts

A smart contract is an automatically executed protocol deployed on the blockchain in the form of digital code. The concept was proposed by cryptographer Nick Szabo in the 1990s, but it was not widely implemented until blockchain technology matured [10]. It works by converting the terms of a contract into a computer program and deploying it in a distributed ledger; When preset conditions (such as time, events) are triggered, the contract automatically performs corresponding operations (such as asset transfer, data notarization), with consensus mechanisms ensuring consistency, transparency, and immutability of execution without the intervention of a third-party intermediary. A digital RMB smart contract is a programmable protocol loaded on top of the digital RMB, which is conditional triggered and automatically executed without affecting the basic functions of the currency. It inherits the automatic execution and transparent traceability features of smart contracts at the technical level, and at the institutional level, it uses the digital RMB issued by the central bank as the medium of payment and has national credit endorsement and legal tender effect. In short, the smart contract of the digital RMB has both the attribute of "payment as settlement" and the fine-grained control of the flow of funds through code rules. The specific features are as follows.

First, legal tender status and controllable anonymity mechanism. The digital yuan is legal tender issued by the People's Bank of China, with legal tender status and high credit endorsement under the central bank's centralized management, ensuring traceability of technical safeguards and relief channels. The controllable anonymity design of "small amounts anonymous, large amounts traceable by law" protects the privacy of daily transactions and enables traceability of large amounts of transactions; It also supports account loss reporting and recovery mechanisms to prevent the loss of rights due to the loss of private keys, providing copyright holders with relief rights protection.

Second, payment-as-settlement and programmability. "Pay-as-settlement" enables funds to be transferred and cleared simultaneously without the need for a third party intermediary, laying the efficiency foundation for small, high-frequency transactions of digital rights. Loadable smart contracts support conditional payments and automatic execution, enabling a fine distribution of copyright proceeds and providing programmable technical possibilities.

Third, low cost with a two-tier operation model. The digital RMB adheres to the principle of low cost in issuance and circulation, does not charge individuals for redemption fees, and lowers the threshold for creators to participate. At the same time, the "central bank - commercial bank" two-tier operation model, leveraging the extensive reach of commercial banks, effectively resolves the popularization predicament of blockchain technology, which is difficult for users to get started with and has high infrastructure costs.

4.2. The position of digital RMB smart contracts in the governance of digital copyright

The positioning of digital RMB smart contracts in the governance of digital copyright can be summarized as "institutional technical tools". It is not merely a new type of payment tool centered on technocentrism, nor is it a simple improvement of blockchain smart contracts. Instead, it is a new type of governance device that operates legal norms through coding on the institutional track backed by national credit. In essence, it constitutes an institutional interface that connects legal norms with technical enforcement.

On the one hand, it is different from governance through traditional technologies. Compared with traditional payments that merely complete the transfer of funds, digital RMB smart contracts are programmable, allowing copyright distribution rules (such as pay-per-use and proportionate sharing) to be directly written into transaction logic, achieving "transaction as distribution" and converting the substantive norms of copyright law into automatically executed code instructions. In contrast to blockchain smart contracts, which also automate execution, their decentralized architecture leads to disconnection from rights protection (loss of private key means loss of rights), from institutions (code replaces law), and from society (technical barriers exclude ordinary creators). The digital RMB smart contract, based on the central bank's centralized management, retains the advantage of automatic execution while embedding the smart contract into the fiat money system and regulatory framework, achieving the integration of technical trust and institutional trust.

To put it simply, the digital RMB smart contract is positioned as a bridge connecting technology and credit. The digital RMB adopts a hybrid model of centralized processing and distributed evidence storage in its technical architecture. The transaction layer is managed uniformly by the central bank, achieving efficient processing of payment as settlement and second-level confirmation; [11] Reconciliation and data backup are carried out among institutions through distributed ledger technology, preserving the advantages of blockchain that data cannot be tampered with and is maintained by multiple parties. This design discards the energy-consuming decentralized consensus and introduces the wide reach of commercial banks through a two-tier operational system. The central bank does not charge the operating institutions exchange circulation service fees, and the operating institutions do not charge individuals exchange and return fees. The low-cost principle effectively lowers the threshold for creators to participate and resolves the popularization predicament of blockchain technology being difficult for users to get started with and having high infrastructure costs. In essence, the innovation of the technical architecture makes the smart contract of the digital RMB not only an efficient payment tool, but also a programmable infrastructure that carries institutional rules.

On the other hand, it is different from mere legal regulation. The latter relies on post-event remedies and is difficult and costly to prove in the fragmented, high-frequency transactions of digital works. The controllable anonymous architecture of the digital RMB smart contract can review the subject qualification in advance, trace suspicious transactions in the process, and reduce the cost of fixed evidence in the process, expanding copyright governance from the passive response of "post-event relief" to the full-chain governance of "pre-event prevention - in-event control - post-event traceability".

Specifically, from the perspective of legal regulation, the digital RMB smart contract technology is positioned as a full-chain regulation of rights confirmation, rights protection and rights preservation. First, in the rights confirmation stage, the programmable feature enables the copyright ownership and usage rules to be directly written into the transaction conditions, achieving "transaction as rights confirmation". Second, in terms of rights protection, the central bank's credit endorsement significantly reduces the difficulty of proving the authenticity of evidence and the

compliance of the platform. After an infringement occurs, the identity of the infringer and the transaction information can be directly traced, effectively reducing the cost of fixing evidence. In addition, the account loss reporting and recovery mechanism under centralized management avoids the blockchain dilemma where the loss of private keys leads to the loss of rights, which is more in line with the regular habits and rights protection expectations of ordinary users. Thirdly, in terms of rights protection, the controllable anonymity system not only implements privacy protection through institutional arrangements such as dedicated management, business isolation, and hierarchical authorization, but also locks suspicious transaction behaviors during the process, providing technical support for the prevention and detection of infringement [12].

In summary, the digital RMB smart contract, which is positioned as an "institutional technical tool", by using legally recognized fiat currency as the medium and relying on the payment system regulated by the central bank, ensures the balance between law and technology, Bridges the gap between technology and ordinary users, and is expected to encode copyright rules into automatically executable transaction logic, Open up new institutional space for the protection of digital copyright.

5. The path of smart contract governance for the digital RMB unfolds

The Yuan Guanjia function is currently the most accessible and relatively mature module for ordinary users in digital RMB smart contracts, with the highest accessibility and the most practical experience. Based on the existing practice of this module, this article will analyze its empowerment in the field of digital copyright.

The core of the module is that the prepaid consumption funds will be managed by the operating agency in the form of digital RMB, and the agreed remuneration will be transferred to the merchant through a smart contract after the actual consumption is completed. The technical architecture ensures the security of consumers' funds, prevents the risk of merchants misappropriating or running away, and enables the release of funds on demand, enhancing transaction transparency. In the field of digital copyright protection, the existing mechanism of Yuanguanjia not only helps to improve the governance of the most mainstream subscription-based digital works, but also has the potential to promote the vigorous development of emerging commercial forms of digital works.

(1) Improve regular digital works subscriptions

In the conventional digital works subscription scenario, consumers pay monthly or annually for continuous access, while creators rely on platforms to settle their earnings regularly. This model has long been plagued by problems such as long platform settlement cycles, opaque data, and difficulty for users to protect their rights. The introduction of the digital RMB smart contract can encode the core terms of the subscription contract - price, period, renewal rules, exit mechanism - into an automatically executed program, and at the same time leverage its institutional endowment to achieve multiple empowerments.

First, institutionalize the credit base. Subscription funds go into a payment system regulated by the central bank, and transaction records are directly generated by the central bank system. In the event of a dispute, users can retrieve credible transaction records as evidence without the need for additional proof of the qualifications of the evidence storage platform. Secondly, the legal connection is more convenient. The automatic execution of smart contracts is not "code replacing law", but "code assisting law" : users can access the contract execution trajectory with one click through the digital RMB APP and connect to the online litigation platform of the Internet court, significantly reducing the cost of rights protection. Furthermore, relief is accessible. Accounts can be reported lost and retrieved, and operating institutions can set up dispute resolution Windows to make advance compensation for minor disputes, forming a multi-level relief channel of "technical -

operational - judicial". In addition, inclusive value is made accessible. Zero-fee designs and standard templates enable long-tail creators to earn in real time without incurring high fees and technical barriers. Finally, regulatory compliance embeddings. Regulatory requirements such as anti-money laundering and protection of minors can be directly encoded as contractual terms (such as transaction limits, guardian confirmation), reducing platform compliance costs while enhancing regulatory effectiveness.

This governance logic suggests that digital RMB smart contracts have evolved beyond mere payment tools in regular subscription scenarios into "institutional interfaces" connecting creators, users, platforms and regulators.

(2) Guaranteeing the stepwise release of crowdfunding publishing

Small and medium-sized independent creators may have highly commercially valuable ideas, but they may struggle to advance their works due to insufficient start-up capital and unstable cash flow. For this reason, the crowdfunding publishing model has emerged. Creators can first complete a part of their work, showcase the highlights in cyberspace, and attract viewers who love the work to obtain start-up funds or stable cash flow through a kind of reward method. However, Ren Xiang perceives that traditional publishing thinking has hindered the healthy development of emerging, community-friendly crowdfunding models, causing publishers to view crowdfunding as a marketing and financing tool rather than truly serving the general public. Crowdfunding publishing has become a new marketing tool, distribution channel and arbitrage model for books [13].

For the regulation of the use of crowdfunding pools, the smart contract of the digital RMB can provide a new answer. With the help of the digital RMB smart contract, a stepwise release mechanism for crowdfunding publication can be built. When creators initiate a crowdfunding campaign, they break down the project into multiple explicit creative milestones, such as outline completion, first draft delivery, revision and finalization, and official publication, each stage corresponding to a certain proportion of release conditions. The funds prepaid by readers or contributors are all locked in the smart contract account in the form of digital RMB, which is managed by the operating agency. When a creator completes a stage task and submits the results (such as the sample chapter), the smart contract automatically transfers the corresponding proportion of funds to the creator's account based on community consensus or third-party review results to support the next stage of creation. If the creator fails to complete the milestone within the agreed time, the smart contract will suspend the release of funds and the funders will vote to decide whether to continue the support or activate the refund mechanism to return the remaining funds along the original route.

This mechanism not only provides creators with a stable, transparent start-up capital and cash flow, encouraging them to keep producing quality content, but also avoids the problem of publishers distorting crowdfunding into a mere marketing tool, bringing crowdfunding back to its essence of "community co-creation and benefit sharing", and ensuring the security and right to know of funders' funds. It has driven the digital publishing industry to shift from "financing-oriented" to "user-oriented". This mechanism brings crowdfunding back to the essence of "community co-creation and benefit sharing", ensures the safety of funders' funds, and encourages creators to keep producing.

(3) Realize the "per-use settlement" of prepaid authorization

For the "pay-per-use" mechanism of prepaid authorization, digital RMB smart contracts can construct a value matching model of "prepaid locking and on-demand release". In the field of digital content licensing such as music, pictures, and video materials, small and medium-sized creators often face a dilemma: if they adopt the buyout system, they cannot share the long-term value of their

works later on; If a one-time payment is adopted, corporate users face cumbersome settlement processes and uncontrollable budgets. The smart contract can be designed as a hybrid authorization model of "prepayment + release per transaction" - the enterprise user precharges a certain amount, and the funds are locked in the smart contract account of the operating institution in the form of digital RMB to form an exclusive authorization wallet. When the enterprise actually downloads or uses the material each time, the smart contract automatically triggers the transfer of the single authorization fee, releasing the corresponding funds from the locked account to the creator. When the prepaid amount is exhausted, the system will automatically remind you to recharge or suspend access in accordance with the license agreement.

Drawing on the logic of "Yuanguanjia" - "prepaid funds freeze + one-time release", it provides enterprise users with a compliant authorization channel with a clear budget and automated process, and truly links the value of creators' works to the actual usage frequency, achieving a transformation from "one-time buyout" to "continuous income", effectively avoiding the loss of value for small and medium-sized creators under the traditional authorization model, Drive digital rights trading towards a fairer and more transparent direction. Drawing on the "Yuan Guanjia" pay-per-use logic, it provides enterprises with a clear budget compliance channel and links creators' earnings to actual usage frequency, achieving a shift from "one-time purchase" to "continuous income".

(4) Build a no-update return mechanism for serialized works

For digital works such as webtoons, novels, short dramas, and audiobooks, many consumers may choose to subscribe for a limited period, purchase access to the works, or buy platform membership services in order to have access to specific serials. Consumers who choose these products and services are not paying for the completed part of the work, but rather a "prepayment" based on trust in the creator and anticipation of the future plot of the work. However, there are two major pain points in the industry at present: the damage to consumers' rights due to creators' discontinuation and unfinished works, and the sense of unfairness that consumers still have to pay the full price after the works are completed.

The digital RMB smart contract can be designed as a "release on demand, return on interruption" model for serialized works. When consumers subscribe to the serial, the prepaid funds are frozen in the smart contract account of the operating institution in the form of digital RMB instead of being directly transferred to the creator. The smart contract automatically releases the corresponding proportion of funds based on the progress of the work update: for example, if the work is scheduled to update 50 chapters, for each chapter updated, the contract transfers the corresponding share (such as 2% of the total cost) to the creator. If the creator fails to update beyond the agreed time limit, the smart contract will automatically trigger a refund mechanism to return the remaining unreleased funds to the consumer along the original route. At the same time, if the work is completed, the total amount actually paid by the consumer corresponds only to the updated chapters, avoiding the unfairness of paying the full price for unfinished works.

This mechanism not only ensures the security of consumers' advance payments, but also encourages creators to update on time, enhancing trust and transparency in digital work transactions. This mechanism not only ensures the security of consumers' advance payments, but also enhances trust and transparency in digital work transactions by providing economic incentives for creators to update on time.

The governance proposal is not only based on the technical logic of smart contracts, but also rooted in the institutional endowment of the digital yuan as a legal digital currency. Compared with smart contracts based on public chains or consortium chains such as Ethereum, the smart contracts of the digital RMB form substantial differences in the following two dimensions.

At the credit-based level, digital RMB smart contracts are based on national credit: their payment medium is legal tender issued by the central bank, transaction records are directly generated by the central bank's system, and the deployment and execution of smart contracts are incorporated into the central bank's regulatory framework. In a centralized architecture, if a right holder suffers a loss due to an objective technical construction flaw or an accident such as the loss of a private key, they can request relief from a centralized institution. In addition, the central bank's credit endorsement and technical support have significantly reduced the cost of proving the authenticity of digital RMB smart contracts, which is more in line with the institutional expectations of ordinary creators and consumers.

In terms of acceptance, the digital RMB has significantly lowered the entry threshold through its two-tier operation and low-cost design. The central bank does not charge exchange and circulation service fees, and the operating institutions do not charge individuals for exchange and return fees. Users can manage their digital RMB wallets directly through familiar commercial bank apps without the need to learn professional knowledge such as private key backup; The controllable anonymity design protects privacy while avoiding the rights protection dilemma of complete anonymity.

This "low threshold, low cost, low cognitive load" feature makes it possible for the digital RMB smart contract to truly reach a vast number of long-tail creators, rather than being confined to a niche experiment of tech elites.

6. Conclusion

The digital RMB smart contract, with its institutional endowments such as legal tender status, controllable anonymity, payment-as-settlement and centralized management, has formed a unique position as an "institutional technical tool" in the governance of digital copyright. It inherits the technical advantages of smart contracts such as automatic execution and precise allocation, and relies on national credit to solve the trust and relief problems of traditional blockchains. Compared with the structural predicament at the institutional balance level of technical paths such as cloud computing, the smart contract of the digital RMB, by embedding legal norms into the legal tender system, strengthens protection while taking into account the institutional arrangement of the public interest. It can be adapted to a variety of digital copyright transaction scenarios, including non-update return, stepwise crowdfunding, per-use settlement, regular subscription, and even copyright pledge, providing a new path for full-chain governance of pre-event prevention, in-event supervision, and post-event relief.

Of course, the digital RMB smart contract still faces legal challenges such as contract characterization and liability allocation in its application, and the connection between its technical architecture and the existing copyright system remains to be tested in judicial practice. It is foreseeable that the wide application of digital RMB smart contracts by creators will also contribute to the popularization of the digital RMB, and with the continuous improvement of the central bank's digital currency ecosystem and the iterative upgrade of smart contract technology, its application potential in emerging scenarios such as cross-border copyright transactions and the circulation of digital collectibles will also be gradually released. How to balance technological innovation with rights protection and how to build a regulatory system that is compatible with it will become an important direction for future research.

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