

Research on the “Binary Structure” of Digital Collectibles: Supervision and Protection from the Dual Perspective of NFT Digital Assets and Intellectual Property Rights in China

Yuanziyan Zhang^{1, a}, Xiaolong Li^{2, b, *}

¹Chongqing University of Technology, Economics and Finance faculty, Chongqing 400054, China

²School of Modern Post, Beijing University of Posts and Telecommunications, Beijing 100132, China

a. zyzyd982@163.com, b. xiaolongli@bupt.edu.cn

*corresponding author

Abstract: China's NFT digital collectibles are a new type of digital asset with Chinese characteristics based on policies, technologies, platforms, and consumer demands. The transaction process involves a large amount of intellectual property rights and interests transfer content. Based on reading and sorting out archives and the intellectual property law, this paper draws the “binary structure” characteristics of digital collectibles, with a view to making more accurate judgments on the legal attributes of digital collectibles, to maximize the legal protection regarding different intellectual property rights of authors and buyers under different links and contract provisions of digital collectible transactions. At the same time, it aims to contribute to the regulatory compliance and judicial practice of the NFT commerce, promote the development of the digital economy, stimulate the digital collectible market, enhance cultural identity, etc., and eventually providing reference for relevant research on digital collectibles.

Keywords: intellectual property, digital collectibles, binary structure, regulation and protection

1. Introduction

In June 2017, Matt Hall and John Watson, founders of Larva Labs, a software company in New York, developed a program called “Crypto-punk”, which is now considered the world's first NFT digital collectible project. Based on blockchain technology and hash algorithms, a string of hash values corresponds to a unique source content that cannot be tampered with. Then, a public chain in the blockchain is selected for smart contract development, and the contract is programmed and linked through code to decentralize and store the ID [1].

This paper argues that in the transaction process of digital collectibles, the buyer purchases two unique metadata strings of token URL and ID, while the original work is still stored in the blockchain [2]. The metadata is also associated with smart contracts on the blockchain, recording every flow of information about the work [3]. From a legal perspective, the intangibility of digital collectibles is an important legal feature, but it does not mean that the value of digital collectibles cannot be measured, it is to distinguish them from the form of traditional tangible property [4]. After sorting out the asset

and legal attributes of digital collectibles, this article concludes that they are a combination of “smart contracts and contract IDs” that can be classified as a part of digital assets. And in the process of circulation, it is closely related to the intellectual property ownership of copyright owners and digital collectibles investors. Therefore, this article believes that digital collectibles have the characteristic of a “binary structure”, which a certain digital collectible has both property rights and intellectual property rights (the personal rights of the creators of digital collectibles that naturally exist, and some of the copyright content that buyers are usually granted, such as the right to network information dissemination).

2. The Circulation, Application and Governance Dilemma

2.1. Circulation Platform

The platform first clarifies the media for creating digital collectibles starting from files. Secondly, choosing coin minting platforms (such as Infi-NFT digital collectibles, Cargo, Open Sea) is almost always an open approach, allowing users to freely choose personalized coin minting methods. Then link with the corresponding Ethereum wallet, upload files, and describe and explain the assets. In this process, you can draw up the quantity to be issued, the content to be unlocked, and the royalty ratio, and finally pay a certain amount of Ethereum Gas.

Considering repeated sky-high auction records of NFTs and other events, including the sale of Jay Chou’s hacked “Boring-Ape” digital avatar have all proved the high value of the asset and the risk in its transaction and circulation. At the same time, the trading of digital collectibles is also breaking through the boundaries of the platform, gradually expanding from online to offline [5]. This article summarizes the basic application of digital collectibles circulation platforms (Figure 1).

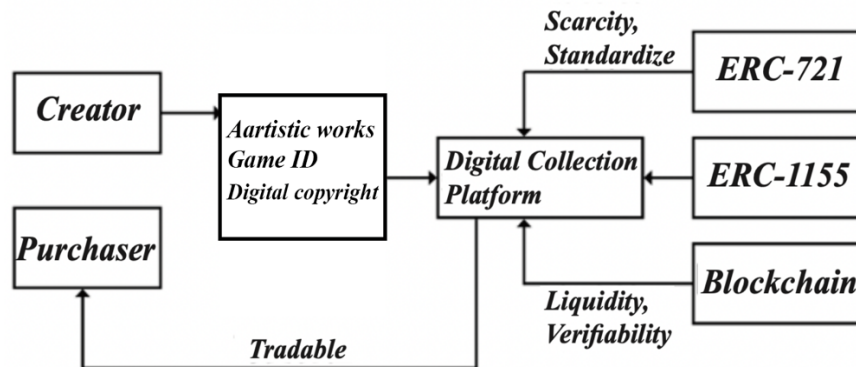


Figure 1: Platform Application of Digital Collectibles.

2.2. Application Fields Exploration

Based on the advantages of safety, convenience, and high liquidity, NFTs are applied to physical assets such as real estate and automobiles on the chain, serving as an identification of asset ownership to achieve rapid asset circulation and reduce transaction costs [6]. For example, recording land contract transfers, ownership certificates, etc. in the real estate industry. In the medical field, NFT can be used to store medical records, issue encrypted digital birth certificates for newborns, quickly create password strings associated with certificates on the blockchain and perform subsequent verification. In the field of supply chain, NFT is attached to products through blockchain technology, tracking every step that enters the market. Companies and customers enjoy high transparency in tracking their product production, transportation, and delivery processes [7]. In copyright trading, it effectively solves the problem of property rights confirmation and achieves decentralized trading [8].

In the field of intellectual property, digital collectibles assume the ownership carrier identity of users and can differentiate the types of intellectual property rights involved, which has advantaged that traditional intellectual property tools (such as trademarks and copyrights) do not have, such as a clear timeline of intellectual property history. Furthermore, digital collectibles have built a bridge between online and real-world communication, serving as carriers of virtual assets for identity authentication [9], possessing the dual attributes of digital assets and intellectual property. In practice, NFT digital collectibles are often used as a new carrier for the commercialization of intellectual achievements by intellectual property owners [10].

Digital collectibles kicked off relatively late in the Chinese market under strict policy restrictions. Although some industries have made breakthroughs, there are still differences in the operation and regulatory mechanisms compared to markets with relatively long development history and mature systems in developed countries. It is necessary to pay special attention to factors such as the nature of behavior in the issuance and trading process of digital collectibles in China, and to comprehensively determine the purpose, frequency, quantity, and other factors in the issuance and trading process. For example, transaction frequency and quantity are important criteria for determining whether it has a financial nature. For situations with high transaction frequency and large quantity, the likelihood of participating in speculative behavior significantly increases, and the regulatory level and pre risk warning level should be correspondingly increased [5].

2.3. Difficulties and Risks

Because NFT digital collectibles are not generated based on national credit, their weak centrality, user anonymity, and system autonomy can easily lead to regulatory difficulties [11]. Digital collectibles can serve as a collateral to lend out other assets, the collateral and investment manipulation functions they carry can easily lead to risks such as illegal fundraising and lending. If the underlying commodities of digital collectibles contain financial assets such as securities, credit, and insurance, it is easy to conduct token issuance and financing ICO (Initial Coin Offering, originating from the concept of IPO in the stock market, is the first issue of tokens for blockchain projects, and the collectibles of bitcoins, Ethereum and other common digital currencies) in a disguised form, which endangers the state financial management order.

The specific risks publicly recognized by academia and the industry generally include difficulty in value recognition, high risk of financial crime related to transactions, poor network information security [12], technical loopholes and personal misconduct [13]. Therefore, it is necessary to further introduce legal means, refine the allocation of rights, obligations, and responsibilities, internalize the external costs of individual behavior, to correctly induce the behavior of individuals and related groups [14]. According to the binary nature of digital collectibles, supervision and protection are carried out in terms of the ownership of digital assets and the classification of intellectual property rights of creators and buyers of digital collectibles. The key content of this article focuses on the phenomenon of intellectual property infringement in digital collectibles trading, as well as the relief and subsidy measures for the infringed. Based on the Intangibility of the object of intellectual property, most of its objects are attached to a material carrier [15]. When the ownership of digital collectibles is transferred with the transaction, the personal rights and some of the property rights of the works do not transfer, and the copyright owner can continue to copy and distribute “new” works on the same work and sell them, which also increases the risk of intellectual property infringement on the investor side to a certain extent. Although theoretically an object can generate multiple digital collectibles or be sold on multiple public chains, it can be quite challenging for buyers if each issuer claims to be the only source. In addition, if digital collectibles that have not been granted corresponding copyright rights are used for rental, exhibition, or production of replicas after purchase, it may continue to cause intellectual property infringement disputes.

Due to the lack of clear provisions on the principle of one-time exhaustion of distribution rights in China's copyright law [16], it may lead to conflicts of interest between copyright owners and buyers [17]. Currently, copyright infringement disputes arising from the unauthorized casting or forging of works with forged signatures and related transactions without the permission of others can be broadly classified as acts prohibited by Article 53 of the Copyright Law, such as unauthorized reproduction and distribution, as well as infringement of the production and sale of works with counterfeit signatures. However, due to the immutable nature of blockchain, it has added more technical difficulties. At the same time, smart contracts cannot replace traditional civil contract legal rules [18]. For smart contracts written entirely in code, courts will face challenges in determining whether there are illegal situations, liability for contract negligence, and breach of contract. The above should be taken seriously in future practice and judgments.

3. Analysis of the “Binary Structure” of Digital Collectibles

At present, although the virtual economy is considered rapidly growing in the big picture, digital collectibles cannot be used for payment or equivalent exchange at this stage, and their circulation and transaction process contain a large amount of intellectual property and ownership content and details. Therefore, to facilitate mutual recognition and orderly circulation, it is necessary to record this process through smart contracts and blockchain technology [19]. Digital collectibles, as a type of digital encryption asset generated through blockchain technology, can be classified as a part of digital assets, and are closely related to the intellectual property ownership transfer of copyright owners and investment buyers during the transfer process. Therefore, this article believes that digital collectibles have both the binary attributes of property rights and copyright in terms of nature definition. The property rights and copyright attributes of digital collectibles should be protected under subsequent regulation and law correspondingly. At the same time, digital collectibles are more stable compared to virtual currencies that lack actual value anchors [20], which can serve as an equity voucher pointing to specific objects with transaction value [3].

Taking PFP (profile picture NFT) as an example, its applications outside of blockchain environments only have the attributes of their images, meaning the content can be copied and used arbitrarily. Therefore, in the legal regulation of digital collectibles, a clear distinction should be made between on-chain and off-chain, and their creators or holders have no right to pursue the use of off-chain activities. When regulating the partial attributes of copyright on-chain, it should be placed in the protection system of the Copyright Law and the Implementation Regulations to distinguish different application scenarios [21]. Based on the previous description of NFT digital collectibles from its origin, circulation platform transactions and application aspects, digital collectibles are defined as a type of digital NFT product that obtains the core of intellectual property attributes (such as the author's personal rights, etc.) since its initiation, which also derives its asset characteristics in the follow up circulation, based on “smart contracts and IDs” generated on blockchain digital trading platforms as the network carrier. On the one hand, digital collectibles have its intellectual property attributes as the initial core, and on the other hand, its ownership and intellectual property content are constantly expanding and varying in circulation. In conclusion, digital collectibles have a “binary” attribute structure (Figure 2).

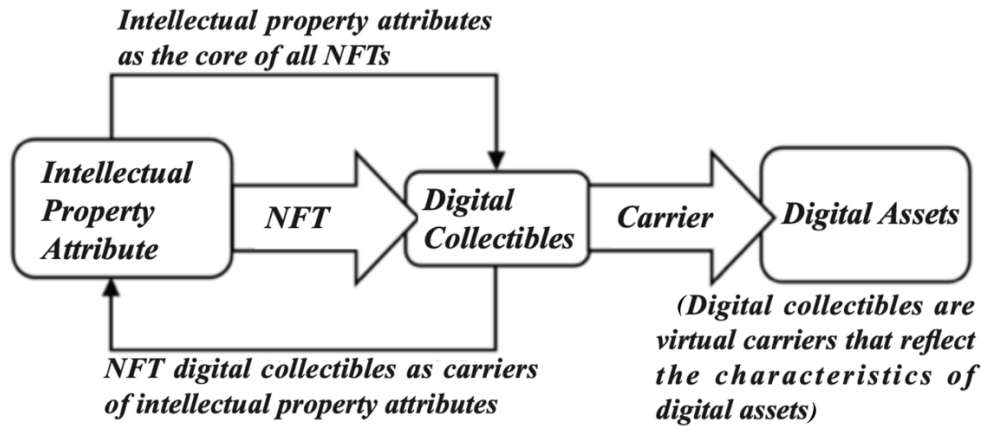


Figure 2: Binary Structure of Digital Collectibles.

Specifically, in the dimension of digital assets, digital collectibles are both tools and carriers for handling digital assets, included in the digital asset system of the rights holder, and subordinate to the digital asset framework. In the dimension of intellectual property, the virtuality of digital collectibles corresponds to the Intangibility of intellectual property objects, which is more convenient for digital transformation [22]. The following will also detail the intellectual property content that may be involved in digital collectibles and correspond in subsequent supervision and recommendations. Its non-homogeneous characteristics also highly align with the value pursuit in the intellectual property system, improving credibility and security during the transaction process.

It is even more noteworthy that when an individual purchases a digital collectible on a trading platform, the purchaser cannot obtain authorization to modify the work and protect the integrity of the work. At the same time, individual buyers are not allowed to modify the original work and link it on this trading platform or other trading platforms or use it for any other commercial purposes without additional authorization from the smart contract. For example, privately reselling or applying it to commercial activities such as market promotion and value-added of enterprises. Correspondingly, if individual buyers are granted licenses for certain types of intellectual property rights during the process of signing smart contracts, they must clarify which types of intellectual property rights they have obtained (such as reproduction rights, distribution rights, exhibition rights, production rights, deduction rights, etc.), to avoid infringement and disputes caused by ignorance.

4. Law and Regulation

4.1. Digital Collectibles and Intellectual Property Law

First, the emergence and circulation of digital collectibles have provided a new solution for the management and allocation of digital assets, promoted the transformation of Fiat money into digital assets, and strengthened the flow of tangible assets to digital assets in the real world. Its uniqueness and indivisibility are different from digital currencies, which rely on smart contracts to operate. It is an encrypted asset belonging to distributed ledger or blockchain technology [23]. Second, the key points and focus of intellectual property trial cases related to digital collectibles lie in the identification of rights, and the basis for judging infringement comes from the study of the intellectual property rights system [24].

This article argues that digital collectibles have the attribute of a “binary structure” and have been based on the intellectual property attributes of copyright owners as a necessary core of existence since their inception. Research suggests that the transfer of ownership of digital collectibles on market

trading platforms is based on the premise that the owner obtains the information network dissemination right in the copyright property rights. The reason is that the process of viewing, purchasing, and trading digital collectibles on the trading platform involves network information dissemination behavior, which requires the permission of the copyright owner, that is, when the copyright owner and the platform sign a contract to sell their works on the chain, The authorization of the default cashier information network dissemination rights is based on the platform and platform users. In addition, if secondary creation is based on certain works, it is firstly necessary to obtain a rights license from the original creator to obtain the right to reproduce. For example, NBA basketball player LeBron James made his dunk video into a limited-edition digital collectible for fans to purchase, but the final interpretation copyright of the work still belongs to the NBA. If you want to copy and sell it, you will still be bound by the license terms of the NBA.

The intellectual property law system and its environment form a comprehensive system of Dynamic equilibrium under the constraints and coordination of interaction [25]. Among them, due to the involvement of ownership in multiple fields such as literature, art, and science, its industrial operation has a broad market foundation and social consensus and has developed its own unique ecosystem. Taking the investment in digital collectibles as an example, the buyer in the transaction obtains ownership of the digital asset, that is, the right to possess, use, benefit from, and dispose of the asset, which reflects the asset side attribute of the “binary structure” of digital collectibles. If, under the authorization of the original author, the buyer is explicitly granted the intellectual property rights in the copyright, in addition to the necessary network information dissemination rights (Table 1), this reflects the intellectual property attributes in the “binary structure” of digital collectibles. In judicial practice, specific rulings should also be made based on the intellectual property legal system.

Table 1: Intellectual property content framework involved in digital collectibles.

Intellectual Property Rights Body				
Primary segmentation	Illustrate	Secondary segmentation	Third-level segmentation	Notes
Copyright	The rights enjoyed by copyright owners in accordance with the law over their created works, including personal rights, property rights, and other rights	Copyright-related personal rights	Publication rights, right of authorship, right of modification, right of performance, and right to protect the integrity of the work	The object of copyright is the work, which has a strong personal attachment
		property economic rights in a work	Reproduction rights, distribution rights, exhibition rights, production rights, interpretation rights, transfer rights, network information dissemination rights	
		Other economic rights	Litigation rights, renewal rights, gift rights	
Patent-Right	The rights enjoyed by the patentee in accordance with the law regarding their invention and creation	Exploit a patent right	Manufacturing rights, usage rights, sales rights, import rights	Patent rights and trademark rights are collectively referred to as industrial property rights. Their objects are technology and goods, and their carriers have strong variability and weak personal dependence
		Patent licensing rights	Exclusive license, exclusive license, ordinary license, resale license, reciprocal license	
		Patent transfer rights	Patent disposal rights	
		Patent marking rights	The patentee rights to mark patent numbers	
		Other Rights	Waiver Rights, Sue rights, right to request protection from patent management agencies	
Trademark-Rights	The rights enjoyed by the trademark owner in accordance with the law with respect to the registered trademark of the goods approved for use	Trademark transfer rights	Trademark disposal rights	
		Trademark licensing rights		
		Other Rights	Exclusive right, renewal right, and right to use registration marks	
Right to discovery, invention, and other scientific and technological achievements				

4.2. Governance Status

In the initial stage of legal interests, China generally adheres to a neutral governance attitude [26]. However, in recent years, while the country has encouraged innovation and exploration in new industries, the three associations have released the “Initiative on Preventing Financial Risks Related to NFT” [27]. Although such documents do not have legal enforcement, they represent the state’s attitude of “strictly preventing the risks of NFT illegal financial activities”. This article will analyze the reasons for extreme prohibition or indulgence based on facts and combined with the “binary structure” attribute of digital collectibles.

Firstly, there is an asynchronous relationship between “indulgence or prohibition” and the social needs of technological iteration. Extreme models cannot effectively and reasonably manage risks, and the direct result of institutional deficiencies is market disorder [28]. Secondly, blockchain technology and NFT digital collectibles are mutually exclusive [29]. Forcing a ban on them will result in technology divestment, violating the objective laws of economic development and supply and demand between the two parties. Legitimate trading demand will be forced to shift into the underground market, increasing regulatory difficulty. Thirdly, it violates the principle of propriety and restricts citizens’ legitimate rights, such as the right to trade freedom, while preventing risks. If it exceeds the necessary limit, the infringed rights should be compared with the urgency of public interest to prevent the imbalance between rights limitation and protection objectives [30]. Fourthly, it hinders technological innovation, harms legitimate investment, inhibits the competitive development of technology, and promotes shared prosperity [31]. Although illegal fundraising and disguised issuance of financial products using digital collectibles exist both domestically and internationally, the business behavior of most trading platforms is legitimate and legitimate. Prohibited policies can cause serious harm to investors’ property rights.

Based on the current regulatory situation in China, there are shortcomings at both the policy and subject levels [32]. Based on the judicial practice of intellectual property rights and starting from the binary nature of digital collectibles, it is necessary to explore the maximum and reasonable protection of the different rights and interests of creators and purchasers, as well as the transfer of some legally granted copyright rights to purchasers, in different stages of digital collectibles trading and under different contractual provisions, And further explore its legal potential with smart contracts, and further improve legal research on the development path of digital assets [33].

5. Regulation and Protection

The existing legal system is facing the “window breaking challenge” and “creative destruction” of the information revolution in the intelligent internet era [34]. Based on this, the field of digital collectibles should establish and improve the mechanism of prior review, in-process supervision, and post-processing [32]. The lack of laws regulating the digital collectibles market is not conducive to interactive demand and development, but also increases the risk of financial crime using digital collectibles [5]. After reviewing relevant literature and legal regulations, this article will propose suggestions for the compliant development of the industry from the regulatory, platform, and subject levels.

5.1. National and Relevant Departments

Implement differentiated classification and supervision based on the attributes of different types of digital collectibles and their “binary structure”. According to the differences in the level and path of circulation, the types of underlying works and the types of intellectual property rights and blockchain types included, hierarchical and differentiated supervision and measures will be implemented for their circulation process. Establish a risk evaluation mechanism for the circulation platform and adjust the

regulatory intensity based on the platform's risk level. Diversification of regulatory entities, guiding self-discipline and supervision of the digital collectibles circulation industry to meet regulatory needs at different levels, etc. When the overall rise and fall of digital collectibles on the circulation platform chain in the short term or the premium ratio exceeds the reasonable range and reaches the hype warning red line, the price Trading curb should be started to block abnormal circulation. After investigation, it has been confirmed that it is speculation and other related activities. The platform will be temporarily banned from sale, and rectification and subsequent monitoring will be guided to strengthen supervision of similar behaviors.

While granting regulatory authority, it is also necessary to reasonably delineate monitoring boundaries. Require regulatory authorities to regularly propose suggestions and industry development plans based on the development of the circulation, exercise guidance and other powers, strengthen communication and cooperation with circulation platforms and research institutions, and analyze common risks in the circulation process and the experience of risk management interventions on various platforms through information sharing and summarization. Strive for the lowest cost to capture regulatory key points in the massive flow of data and optimize the combination of industry, academia, and research based on the "binary structure" model, to match regulatory and development needs.

Refer to the "Ka-Mei framework" in Law and economics to analyze [35], break through the path of single legal department discussion, discuss the content of property rights in works from the digital asset side and the intellectual property side, compare, and analyze the value bias and benefits in different legal rules, combine across departments and regulations, and protect the legitimate rights and interests of digital collectibles trading groups [36]. Establish appropriate security thresholds and regulatory rules, conduct market access screening in advance, and standardize the promotion of innovative development of blockchain related technologies and industries [31]. Improve the information exchange and sharing mechanism of blockchain technology, establish responsibility rules, accelerate the elimination of isolated data [31]. (Figure 3) In the supervision of digital collectibles, it can balance innovation and development with the suppression of risk spillovers, improving their applicability and reliability in the field of circulation.

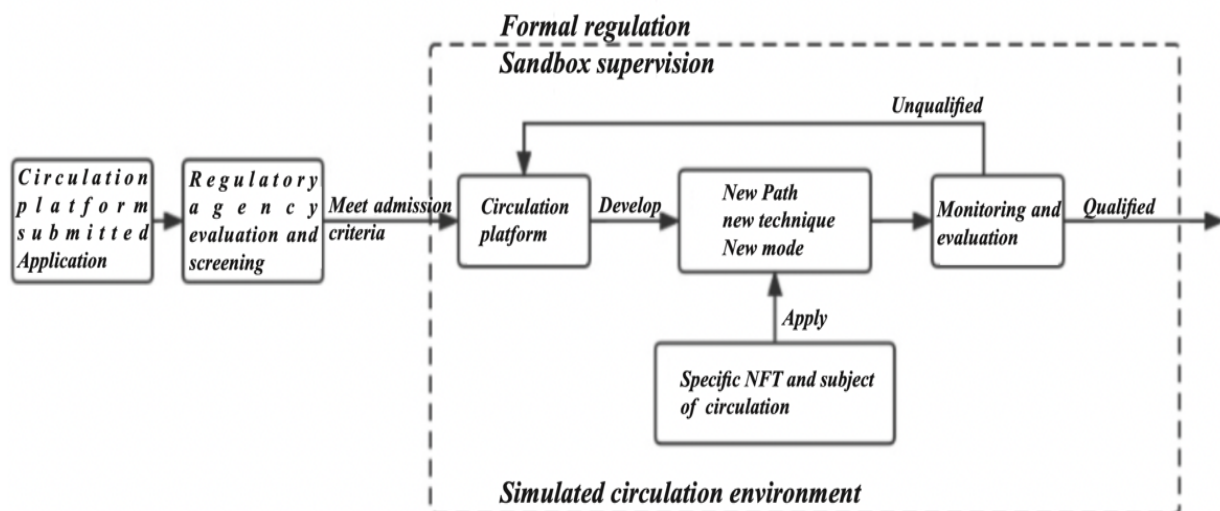


Figure 3: Sandbox Supervision Mode for Digital Collectibles Circulation.

The core of intellectual property law is to provide protection for intellectual creation. To accelerate the construction of a regulatory and credit evaluation system for the digital collectibles industry, traditional laws should introduce technological thinking and build a new model for copyright

ecological governance. Strengthen technological breakthroughs and policy standards for digital collectibles and promote two-way empowerment between technology and intellectual property. At the macro level, it is necessary to clarify the starting point of “balancing technological development and rights protection” to promote Pareto optimality in the market. At the micro level, based on the legal interests involved in the “binary nature” of digital collectibles and the diversity of trading groups, a multi-level governance framework with a mixture of public and private laws is adopted for collaborative governance. Efforts should be made to align with the overall direction of China’s digital economy development strategy, and to achieve comprehensive optimization of the industry ecology through a more mature and complete regulatory system and regulatory model, as well as a more scientific circulation path, to assist in the high-quality development of China’s digital economy.

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5.2. Trading Platform

The circulation platform should obtain corresponding qualifications based on the nature and type of digital collectibles traded. For example, when the platform is casting digital collectibles and transferring them, it is to provide internet cultural products and services, and is engaged in commercial internet cultural activities. According to the *Interim Provisions on Internet Culture Management*, it should obtain the *Internet Culture Business License*, and according to the *Internet Information Service Management Measures*, the transfer platform should obtain the *Internet Information Service Value added Telecom Business License*, etc.

Improve the pre-transaction review mechanism, adopt the method of issuing issuance licenses to determine issuance qualifications, strictly regulate issuance behavior, and avoid some speculators setting up platforms disappear after issuance. And the issuance of digital collectibles must fully comply with the “nonhomogeneous” issuance method. If the issuer conceals the essence of ICO by “multiple issuances of one item”, which violates the “nonhomogeneous” essence^[13], then digital collectibles that do not meet the requirements of the issuance method should be prohibited from entering the market to prevent illegal issuance of financial products. Before circulation, it is necessary to review the legality and authenticity of the source of the work, confirm that the initiator has appropriate rights or licenses, and take reasonable measures to prevent intellectual property infringement. When users register platform accounts, they should explain the rules for protecting platform intellectual property rights and remind them of relevant legal risks through announcements and user agreements. For transactions with large amounts, Require the issuer to make a special commitment and assume certain guarantee responsibilities in terms of flawless rights.

The circulation platform should establish efficient channels for complaints, reports, and other forms of feedback and reward mechanisms. If there is a suspicion of infringement after preliminary verification, the circulation platform shall promptly notify the issuing or forwarding party to remove

the digital collectibles from the shelves and require the above entities to provide sufficient proof of ownership and review it within the deadline. Failure to cooperate can result in forced delisting to avoid the risk of continued expansion of the infringement. If the infringement is confirmed, the circulation platform should promptly destroy the digital collectibles at the black hole address and hold them accountable afterwards. Measures such as setting a ban on sales or casting, restricting circulation, and reducing credit ratings should be taken against the violators.

Clarify rights and responsibilities to set a calm period for transactions. Based on the binary nature of digital collectibles, it is recommended to explicitly authorize the specific content of the circulation rights in the contract content. Especially for digital collectibles with large amounts or special properties, if the circulation subject deems it necessary to supplement the provisions in the smart contract, the circulation platform can make unique provisions in accordance with the law regarding the particularity of rights and obligations, breach of contract responsibilities, modification and termination of the circulation contract, dispute resolution mechanism. And reserve a certain amount of revocable time for the irreversible risk of digital collectibles trading.

Due to the automatic execution of smart contracts in the circulation of digital collectibles, the flow information is simultaneously recorded in the blockchain and cannot be tampered with. Once the circulation is completed, the results are irreversible, posing a risk to consumer rights. Therefore, suggestions for setting a calm period are proposed. For example, for transactions, exchanges, or gifts of digital collectibles that are of great value or personal or other significant significance, the platform should allow the circulation subject to achieve immediate circulation in advance when reaching a consensus or establish an evaluation mechanism for the issuer or circulation initiator's public description of digital collectibles. For situations where necessary information is missing or unclear description, the principle of a calm period should be implemented.

5.3. Transaction Participants

The circulation subject should preliminarily review the qualifications of the circulation platform and its blockchain service providers through news media and other channels, and prioritize selecting platforms that are open, transparent, mature in operation, and have good credit to participate in the circulation. The regulation of digital collectibles is related to the core interests of the trading community. Establishing mutual supervision and online reporting mechanisms between trading communities can help achieve rapid response and handling of intellectual property infringement in the circulation of digital collectibles, avoid potential equity risks caused by qualifications or technology, and safeguard the corresponding intellectual property rights of creators and buyers. For example, being aware of transaction risks before purchasing and verifying transactions in advance.

When the circulation subject is the issuer, it should be ensured that the digital collectibles traded have flawless rights or have obtained corresponding authorization. As the initiator of secondary circulation, it should be ensured that the digital collectibles themselves have the right and conditions for re circulation to avoid the risk of infringing on the rights and interests of others. When the transfer subject is the transferee, it is necessary to fully understand the basic information of the subject matter and make cautious judgments to avoid losses in irreversible situations. The transfer subject should actively understand relevant policies and regulations, and consciously resist illegal activities such as speculation and speculation during the transfer process.

Last but not least, the most immediate and effective method for safeguarding and supervising the intellectual property rights and digital asset ownership of the trading group itself comes from the creators and purchasing investors of digital collectibles themselves. Due to the irreversibility of digital collectibles trading in a decentralized system, there is a lack of effective protection for consumer rights [37]. Establish an open online community for digital collectibles to connect virtual and real communities, establish a community system with clear division of labor and unified rights

and responsibilities, and bring the possibility of connectivity and secure transactions between virtual and real communities. Establish a mechanism for mutual supervision and online reporting among trading groups, achieve rapid response and handling of intellectual property infringement phenomena [38], and promote the formation of a good market environment.

6. Conclusion

The essence of digital collectibles trading is the process of verifying smart contract information and fulfilling rights. This article focuses on the legal aspect of intellectual property rights, explores the current popular digital collectibles, and summarizes the “binary structure” attribute of digital collectibles. By using this dual path analysis tool, the protection of intellectual property law and the interpretation of current ownership law are respectively corresponding to the protection of the rights and interests of copyright owners and buyers, balancing the rights and obligations of all parties. As the current transaction mode of digital collectibles is decentralized and data anonymization, it increases the risks in technology, transaction, and finance, resulting in difficulties in industry supervision.

In the explanatory paradigm of the intellectual property ownership system, the types and contents of rights transferred by smart contracts in different transaction scenarios are also different. We should combine technology and rights, classify, and judge the specific actions of relevant civil subjects based on their technical and legal characteristics, and promote the improvement of technology. At the same time, in the copyright law under the intellectual property legal system, the identification of infringement of digital collectibles and the protection of specific groups’ assets and intellectual property rights are refined, and a transparent, fair, and authentic digital collectibles trading ecosystem is constructed to enhance the governance effectiveness of legislation, judiciary, and enforcement at all levels. Especially regarding the occurrence of infringement, how copyright owners, digital collectible investors, and trading platforms should fulfill their responsibilities under current laws, and how to protect the rights and interests of the infringed party. This article suggests that to reduce or avoid intellectual property infringement of digital collectibles, the “default” phenomenon of some intellectual property rights in current smart contracts should be changed, and clear provisions and requirements for defining rights and interests should be strengthened, to avoid difficulties in determining infringement in judicial practice.

In summary, the judiciary can provide a clear definition and infringement determination of the types of rights in digital collectibles based on the current copyright law. From the “binary structure” of digital collectibles, we aim to protect the legitimate intellectual property and ownership rights of rights holders in terms of legal protection, copyright regulation, and platform regulation. The definition of the legal attributes of digital collectibles is not once and for all. The Chinese digital collectibles trading market will have its own development characteristics from beginning to end. There are still controversies in the academic community on issues such as original work rights confirmation, breach remedies for smart contracts, financial risk prevention, and regulatory responsibilities for third-party trading platforms, and further exploration and research are needed.

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