

Social Governance

Copyright protection on NFT digital works in the Metaverse

Yupeng Dong¹ and Chunhui Wang^{2,*}

¹ School of Media and Law, NingboTech University, Ningbo 315100, China

² School of Cyber Science and Technology, Zhejiang University, Hangzhou 310058, China

Received: 8 November 2022 / Revised: 20 April 2023 / Accepted: 30 April 2023 / Published online: 30 June 2023

Abstract Non-fungible token (NFT) emerges with the marvelous explosion of the metaverse. NFT digital works are profoundly impacting the existing copyright system, which needs to be amended and responded to in time. There is a possibility that it will completely change the distribution pattern of rights and interests in the field of copyright law. Currently, the legal nature of the casting and trading of NFT digital works remains controversial. The liability of NFT digital works creators, as well as service platforms, is required to be further identified. This article starts with an analysis of the right attributes of NFT digital works based on intellectual property law. Subsequently, the related legal issues and countermeasures are discussed, including the exhaustion of the right-holders, the duty of platform management, and the assumption of tort liability arising from the transaction. It is suggested that the NFT digital works should be treated with considerable caution and the legal system of NFT digital works should be constructed in the near future.

Keywords Metaverse, non-fungible token digital works, copyright, legal protection

Citation Dong YP and Wang CH. Copyright protection on NFT digital works in the Metaverse. *Security and Safety* 2023; **2**: 2023013. <https://doi.org/10.1051/sands/2023013>

1 Introduction

After the release of Bitcoin White Paper 2008, web3.0 came into being [1]. Being user-centered, web3.0 works to be a set of inclusive protocols, which replicates the decentralized infrastructure of web1.0 and combines the interactive experience of web2.0, while using blockchain distributed ledger technology. The rise of non-fungible token (NFT) is just a compelling innovation of web3.0. NFT can not only be applied to mark metadata on the blockchain of specific digital content, which has unique and eternal directivity with digital files stored somewhere in the network, but also be mapped to some specific assets, including digital assets such as game skins, equipment, virtual plots, and even physical assets. According to the current technology and market environment, the most suitable object for issuance and trading through NFT is digital artwork. Non-fungible token records the data characteristics of digital works, which is also associated with the smart contract on the blockchain for the purpose of recording the information of the initial issuer, releasing date, and each circulation, having a unique binding relationship with digital works. The immutability and identifiability of NFT make it a provable rarity and a value carrier on the basis of unique identity authentication. Non-fungible token itself cannot be directly transformed into perceptible forms such as pictures or songs. Nonetheless, when a copy of a digital work exists on the trading platform in the form of NFT, it can be designated as a specific “digital commodity”, demonstrating specific investment and collection value attributes.

* Corresponding authors (email: cctvlaw@163.com)

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

© The Author(s) 2023. Published by EDP Sciences and China Science Publishing & Media Ltd.

At present, the NFT has been applied to domains of music, game, video, picture, etc. In the course of these applications, infringements of others' copyrights often occur due to casting and selling NFT. Banksy, Lois van Baarle and other artists either had their names impersonated or had their works "stolen" and cast as NFT for sale on the famous trading platform Opensea. Quentin Tarantino and Miramax Films engaged in a lawsuit over a disagreement: whether the "scripts right" included the distribution of NFT digital works. Ma Qianli, a cartoonist whose work "a fat tiger gets vaccinated" was cast and uploaded without authorization to the Bigverse. Some digital platforms sold digital collections appropriating famous painter Xu Beihong's name [2]. Similar disputes occur from time to time. The legal rules of NFTs thus become the most important property law in the metaverse [3]. We believe that the problems discussed and the countermeasures proposed in this article can provide a relatively perfect solution for the ownership and protection of copyright in the metaverse.

This article mainly discusses the legal issues related to NFT digital copyright. First of all, this article lists the concept of the metaverse and the copyright issues of digital works and analyzes the legal risks of intellectual property rights. Then, the impact of NFT digital works on the existing copyright order is elaborated, and the particularity, high technology, and diversification characteristics of NFT digital works are analyzed. Therefore, it is very necessary to incorporate NFT digital works into the property protection rule system and systematically optimize them according to their characteristics. Next, this article discusses the legal nature of NFT digital works casting and trading. The latest case of the Chinese court points out the status and role of the right of information network communication in the metaverse and mentions the continuous traceability of the chain of rights brought about by the high-tech characteristics of NFT digital works. Of course, the decentralized and distributed infrastructure of the metaverse inevitably transmits and closely relates the rights and interests of NFT digital works to intermediary service agencies, that is, various service platforms, so the legal status and responsibility identification of NFT digital works service platform is an extremely complex problem. In this regard, this article attempts to discuss the important role of platforms in the metaverse, to analyze the obligations and possible responsibilities of the platform in order to ensure the smooth progress of the transaction and maintain the market order in the circulation and trading of NFT digital works. Finally, this article summarizes the key points of legal governance of NFT digital works in the metaverse and proposes the path for future governance. The framework structure of this article is shown in Figure 1:

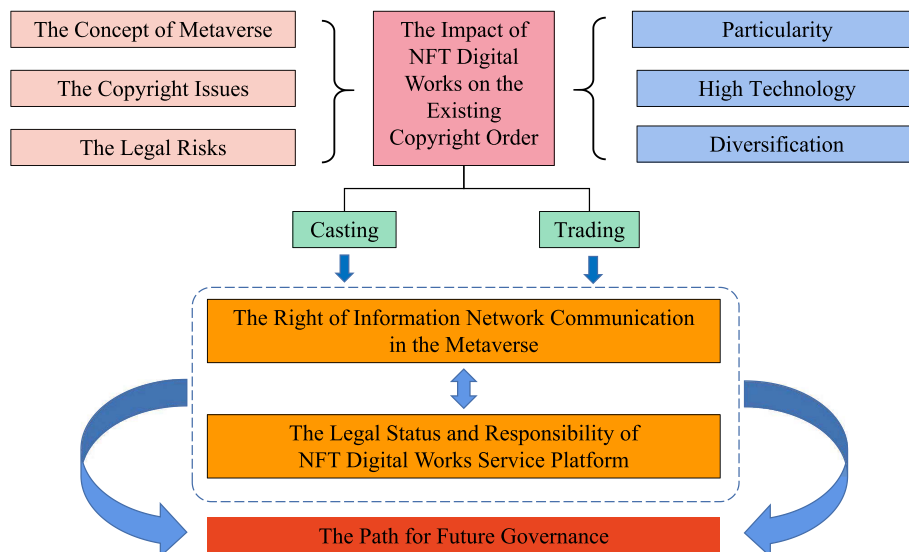


Figure 1. The framework of the article.

2 The copyright problems caused by the Metaverse

2.1 How to treat the copyright of NFT works in the Metaverse

The copyright industry of the metaverse is developing rapidly. Although the craze has dissipated, in terms of scale, the number of virtual worlds that make up the metaverse grows rapidly. Up to now, there are over 1000 metaverse platforms and over 3000 virtual worlds worldwide, of which more than 50% are created by Chinese developers. Globally, the number of metaverse users has reached 650 million, with over 80% of users coming from the Asia Pacific region. The relevant industrial chain of the metaverse has gradually taken shape. More and more enterprises are beginning to pay attention to the development of the metaverse industry chain and actively explore relevant business models. By the end of 2021, the NFT market had exceeded \$10 billion. In the next few years, the NFT market will maintain rapid growth, and the market size is expected to exceed \$30 billion [4]. The global NFT market size is projected to rise from \$1553.6 million in 2021 to \$7390.8 million in 2028, at a CAGR of 24.4% during 2021–2028 [5].

As a novel concept of Internet application form and social organization, the metaverse has broken the temporal and spatial limitations and realized the mapping of money, environment, time, and other information in different heterogeneous spaces. If we understand it literally, the metaverse can be seen as a different time and space of the physical world beyond our real life [6]. In the interaction between the virtual world and the real world, the value exchange of digital assets becomes a necessity. The value-added development of the metaverse primarily comes from the whole process of digital asset ownership, circulation, and transaction. In this process, the economic value ecology and operation system constructed by NFT can realize the economic exchange value of different spaces. Synchronously, through the currency conversion and value trading system of “token-NFT-capital”, while improving digital asset management, the closed-loop economic operation of virtual and real interaction has been completed to a certain extent.

The goal of the metaverse is a systematic and complex digital world based on a variety of digital technologies, in which the data is most likely to be authenticated, priced, traded, and empowered. The metaverse is objective, open-source, dynamically evolving, and user-oriented, which is also a great significance of the token economy. The physical essence of NFT is a set of machine-generated data, and such widely used machine-generated data is essentially a bundle of rights, not a single property right, intellectual property, or a new type of property, but a collection of rights involving multiple subjects [7]. The significance of NFT digital works can only be proved in the field of the metaverse. Otherwise, they can only be electronic works. The extension of the version can be realized by expanding the interpretation of the current law of electronic works, which, however, conflicts with the technical characteristics of NFT digital works. In the foreseeable future, all valuable artworks in the metaverse will be NFT digital works based on blockchain technology.

Network law provides a perspective and functions independent of traditional legal regulation, and code technology regulation has unique advantages [8]. At the same time, the necessity of amending the law in a special new way can not be ignored. NFT digital works can be regarded as the starting point of the industrial development of the metaverse. Under the current legal framework, all transactions in the metaverse scenario are uniformly classified as information network communication behaviors, which means that the buyer’s secondary sales behavior in the metaverse is still under the control of the exclusive rights of copyright owners. For such behavior in the metaverse, it is believed that it should be solved by implied license, yet considering the characteristics of intellectual property rights with express license as the principle and implied license as the exception, whether and how to apply implied license needs further discussion.

2.2 The legal risk and control of NFT digital works intellectual property

A large number of NFT digital works are traded in the market through competitive auctions. The phenomenon of counterfeiting works and asymmetric information in market pricing mechanisms have triggered a large number of disputes over the governance of market transactions. Speculative capital flows and purchasing and selling transactions will not only induce fraud cases but also cause a bubble crisis in the NFT market, which would have a negative impact on the value concept of the future market. Globally, it is difficult to define the physical commodity attributes of NFT. NFT commodities, as the underlying support of the future metaverse, are also difficult to define, since there is an absence of a

unified consensus of the whole society at the economic level. The protection of virtual assets in China is mainly reflected in Article 127 of the civil code, but this article does not have substantive binding content and does not establish the right attribute and transaction rules for virtual assets. At the theoretical level, there are different views on the protection of virtual property. Some scholars argue that virtual property is the object in civil law, and should be treated through the rules of property protection; Some scholars argue that virtual property cannot be protected by the rules of real right protection, but should be protected by the rules of creditor's rights; Some scholars argue that some virtual properties can apply the protection rules of intellectual property rights. In a word, the absence of existing legal governance leads to the lack of corresponding rules for digital asset transactions in the metaverse, which cannot meet the development needs of the digital market in the metaverse. A preliminary judgment can be made that the legal risks and governance challenges induced by NFT need to be addressed through the rule of law.

The cornerstone of the healthy development of NFT is consensus, and the issuance, use, as well as transaction of NFT, rely on the framework of digital law. The necessary differentiation and diversion still need to be explored, which can be conducive to the precise supervision or governance of NFT [9]. Moreover, the public attention and academic discussion triggered by the NFT boom have provided common development expectations for different blockchain ecosystems. At first, the NFT trading of Ethereum provided a standard paradigm for the industry and triggered many related technology projects. While market transactions are developing towards other digital assets in the same field and category, deriving multiple blockchain ecosystems based on the same technical mechanism. Different from the traditional art transaction, even though NFT artworks have the possibility of full traceability, there are some cases where the works are separately cast by a third party and the rights and interests of NFT and the works are infringed after division. Under the social consensus of sustainable economic development, the key point of the sustainable development of NFT is how to realize the overall ecosystem of NFT's operation, to restrict the unrestricted free market and encourage encryption artists and collectors to participate.

Since there is no special legislation for the NFT trading platform at present, the current business model needs to be re-examined. NFT trading platforms should remind buyers that the collection transaction involves the transfer or license of intellectual property rights, namely, the nature of digital collection transactions is limited to the transfer of property rights of digital goods. If the platform wants to reach a copyright transaction related to digital collections between buyers and publishers, it needs to make an explicit agreement on platform rules, transaction rules, etc., or sign a copyright transfer or license agreement separately. NFT trading platforms should prompt and clarify the restrictions on the use of collections. To reduce disputes between the platform and users, the platform should remind users of the transaction risks of the digital collections in advance by employing user agreements, platform rules, and other means.

3 The impact of NFT digital works infringement on the existing copyright order

3.1 Impact of NFT digital works on the existing copyright system

NFT, as an emerging application scenario of blockchain technology, not only solves the liquidity and scarcity of digital works as commodities, but also addresses the trust and security issues between trading subjects, and constructs a novel trading integrity system. The emergence of the token mode is capable of providing strong proof for artists to advocate the identity and creation time of creators, which can inhibit plagiarism to a certain extent [10]. The development of the market potential of blockchain technology [11], has exerted a revolutionary impact on copyright in the digital environment, enabling copyright owners to have greater initiative, convenience, and sustainability in realizing the economic value of works. However, some scholars have pointed out that the emergence of NFT has also triggered legal issues related to copyright, including who has the right to NFT pre-existing copyrighted works, how to implement copyright protection, and to what extent these rights can be transferred [12].

First of all, the legal issues of NFT digital works involve the ownership of rights. Plagiarism in the field of NFT is divided into two steps: the first step is to upload digital works to a platform without authorization, and the second step is to cast "plagiarized" works into NFT and distribute them. If the process of casting NFT digital works is the process of generating the certificate of rights and "drafting" the trading contract in technical form, then casting an infringing work into NFT digital works is essentially

the process of generating a certificate of rights with “defects” and drafting a “contract” with “defects” in technical form. Therefore, if the copyright owners of the original works find that their work has been distributed in the form of NFT without authorization, the way of claiming rights should also be carried out in two ways: first, for the information network transmission of the works, they request to delete the relevant infringing links; At the same time, the infringing works should also be required to “destroy” the flawed “certificate of title” and “transaction contract” to avoid further expansion of the infringement damage. Nevertheless, the destruction of NFT digital works may lead to another consequence, that is, the NFT purchased by the buyer has been destroyed, which will result in the legitimacy problem of the ownership of virtual property.

Secondly, NFT digital works trading is highly technical with a wide range of interests. Blockchain and smart contract technologies are applied in NFT digital works trading. NFT, as an emerging application scenario of blockchain technology, not only solves the liquidity and scarcity (non-homogeneity) of digital works as commodities, but also solves the lack of trust and security concerns among trading subjects, and constructs a brand-new online trading integrity system. As the carrier of the agreement between both parties, each transaction on the NFT China platform will be automatically triggered by the “automatic execution” code embedded in the smart contract. Therefore, if the rights of NFT digital works are defective, it will not only destroy the trust mechanism established between the trading subject and the NFT trading platform but also seriously damage the certainty of the trading order, the legitimate rights and interests of the transaction counterpart and the legitimate rights and interests of copyright owners. Meanwhile, due to the whole transaction being automatically executed by the code utilizing the smart contract, the transaction quantity will go out of the legal person’s control. Once NFT digital works constitute infringement, they will commonly damage the legitimate interests of multiple counterparties, cause frequent disputes between both parties and shake the trust ecology under the NFT business model.

Thirdly, the legal liability of NFT digital works service platforms is particularly noteworthy. On the surface, the business process of the NFT service platform has its own particularity. It has a particularly close service relationship with the served and subsequent consumers. Although the classification of blockchain technologies used by different NFT service platforms is different, the binding of NFT digital works and smart contracts and the related legal interest correlation are similar and have minor changes. This binding and continuous association with multiple interests of the NFT service platform determines that the duty of care of the platform should be kept at a certain high level. If the copyright infringement of NFT digital works occurs, there is sufficient reason to bear the legal liability for infringement, regardless of the proportion of liability. The service platform of the universe can provide an auxiliary service for participants to generate their own digital works with one click, so whether the AI-generated content that may contain the personal characteristics of participants can become the creations of participants remains controversial [13]. This is a relatively large legal risk laid by the service provider. In terms of risk prevention, foreign platforms have gradually set the threshold for NFT casting and distribution, and have launched functions such as copyright detection, striving to judge and prevent infringement risks before NFT digital works are chained.

3.2 The necessity of copyright system reform

This part discusses whether digital works should be included in the property protection rule system. The digital assets in the metaverse are derived from specific encryption technologies and have the characteristics of uniqueness and scarcity. This is a typical performance of property rights. Moreover, the innovation of digital works and the cultivation of the digital works market also need stronger protection of property law [14]. The digital asset certificate is a key element of the metaverse ecology. As its concrete manifestation, NFT can become a manifestation of digital asset certificates in the metaverse and will evolve gradually with the development of the metaverse [15].

If the technological variation is dramatic and transformative, and affects any field of social life, then it also includes the impact on the law. The established legal framework cannot guarantee sustainability. When there is a disconnect between law and technology, the challenges faced by the law are more complex [16]. The ability of existing laws to respond to damage or disputes caused by technology has become particularly important. The spirit of balance is the inherent requirement of the dual orientation of the legal value of intellectual property. In the 1990s, American scholars Patterson and Lindberg described

copyright law as “a balanced law to coordinate the rights of creators, communicators and users” in their works [17]. The information Internet era based on big data and machine intelligence is an awesome era, but “secret computing system” and blockchain derivatives will construct a new architecture for the future of mankind [18]. As aforementioned, technological innovation has exerted a huge impact on the rights and interests of current copyright owners, service platforms, and the public, therefore the law needs to respond to the relevant impacts.

From the perspective of regulation and governance, “disruptive” technological innovation has triggered the destruction of law and regulatory order, posing a challenge to law, regulation, and the creation of an appropriate regulatory environment for disruptive technologies. The physical essence of NFT is a set of machine-generated data, and such widely used machine-generated data is essentially a bundle of rights, which is not a simple property right, intellectual property, or a new type of property right, but a collection of rights involving multiple subjects [19]. In the foreseeable future, life will be meta-cosmic. All works in the metaverse field are NFT digital works based on blockchain technology. In the era of web3.0, the relevant core system of copyright law should be adjusted. At the same time, the necessity of amending the law in a special new way can not be ignored.

NFT digital works can be regarded as the focus of attention in the early stage of the development of the metaverse. Under the current legal framework, due to the lack of tangible carriers, all transactions in the metaverse scenario will be uniformly classified as information network communication behavior, meaning that the buyer’s secondary sales behavior in the metaverse is still under the control of the exclusive rights of copyright owners. This is somewhat different from the “the metaverse is the mind of virtual reality” that the industry is attempting to cultivate at present, and it is also greatly different from the real trading environment that users have been accustomed to. For such kind of behavior in the metaverse, the author believes that it may need to be solved by implied license. However, considering the characteristics of intellectual property rights, such as the principle of express license and the exception of implied license, whether and how to apply implied license need further discussion. Therefore, we will discuss the attributes of NFT digital works and the responsibility of infringers. We hope to preliminarily understand the outline of the problem of copyright infringement of NFT digital works in the metaverse.

4 Legal nature of NFT digital works casting and trading

4.1 The author of NFT digital works has the right of information network dissemination

The digital market in the metaverse exchanges pure digital works [20]. This is different from the digital economy transaction mode we understood before (as shown in Figure 2 below). The traditional transaction mode is still inseparable from the flow of goods or services. The essence of NFT technology is token technology based on blockchain. People have fixed the uniqueness of the content of NFT works by taking advantage of the characteristics of the non-comparability of blockchain data and the traceability of transactions. At the same time, NFT creators can ensure the scarcity of NFT works by setting the number of NFT works, to provide a valuable basis for the transaction of pure digital assets and the formation of related digital markets.

An important point about copyright law is that although part of its purpose is to protect authors, its control over creation is never perfect [21]. The purpose of copyright law is not to explicitly grant “control rights”, but to provide creators with a series of rights to use intellectual achievements [22]. Since the birth of the Internet, theoretical and practical circles have been trying to solve the problem of the scope and mode of intellectual property rights protection in the digital world [23]. NFT digital works trading involves the creation, casting, display, sale, and other links [24], including the reproduction, sale, and information network dissemination of the digital works [25].

The copyright incentive mechanism is mainly used for works produced and distributed in batches [26]. The scarcity caused by blockchain mainly aims at works of art, which are typical works, and focuses on meeting people’s economic and emotional needs for the uniqueness and scarcity of goods [27]. This requires the copyright owners of NFT digital works to correctly exercise their right of information network transmission, which is more conducive to the realization of mutual benefits and balance of rights and interests.

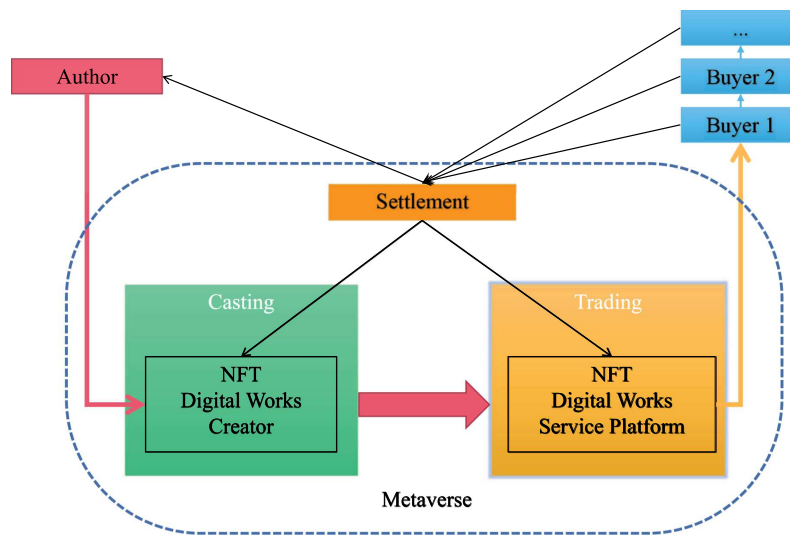


Figure 2. The casting and trading process of digital works in the Metaverse.

4.2 The principle of exhaustion of rights does not apply to the copyright of NFT digital works

The right to information dissemination on the Internet is different from the right to distribution in the traditional copyright system. The key to the difference between these two rights lies in whether the intellectual property rights are exhausted. The principle of exhaustion of rights in intellectual property law is the golden rule to solve the conflict between intellectual property rights and property rights on the same object, aiming at preventing the exercise of exclusive rights of intellectual property rights from affecting the legitimate exercise of property rights [28]. In the field of copyright, the principle of exhaustion of rights is mainly applicable to the restriction of distribution rights, which is called “the principle of one-time exhaustion of distribution rights” or “the principle of first sale”. The main purpose of this principle is to prevent others from selling illegal copies of works, rather than restricting the right to use and dispose of the originals or copies of legally sold works. When the original or copy of a work is sold to the public for the first time with the permission of the copyright owner, the copyright owner has no right to control the resale of a specific original or copy. There is no dispute when this principle applies to works in the form of tangible carriers because the application basis of the principle of “exhaustion of rights” is the inseparability between works and tangible carriers, which is of practical significance to regulate the right to use tangible carriers of works. The fundamental difference between this process and the traditional means of transmission is that it will not lead to the physical transfer of the tangible carrier of the work.

The judgment of the Hangzhou Internet Court is consistent with the judgment of the European Court on whether the intellectual property rights of e-books are exhausted. In EU law, the offer for the sale of an NFT attached to a work does not belong to the scope of the distribution right [29], with the consequence that such right can not be exhausted by the virtual sale either [30]. In the Tom Kabinet case [31] in 2019, the European Court of Justice held that the act of downloading and providing e-books (digital music works, audiobooks, and other digital works) online belongs to the “dissemination to the public”, rather than the “distribution” act of transferring the ownership of works, and does not apply to the “exhaustion of rights” system. The Tom Kabinet case determined that selling e-books in the secondary market without the prior consent of the copyright owner constituted infringement. The influence of the judgment was not only reflected in digital books but also touched on the dissemination of copyright objects such as music, games, and movies in the digital form.

In fact, after the judgment of the European Court of Justice on the Tom Kabinet case, even if NFT itself is the representative of digital works, it is difficult to put forward the argument of the digital exhaustion doctrine. This is because, in addition to the specific subject matter of the software, EU distribution rights seem to apply only to tangible goods. However, Article 3 of the info SOC Directive “the right to communicate to the public” applies to the online dissemination of protected content. Considering that NFT is metadata pointing to works, the argument of digital exhaustion doctrine seems untenable.

As mentioned above, NFT sellers can also set their own license agreements for tokenized works based on collection or planning, which frequently occurs in the market. However, from the perspective of copyright, the relevance of these agreements in the exhaustion of distribution rights is limited. It is precisely because the legal nature of casting and trading of NFT digital works has been clearly defined, the following discussion on infringement of rights and interests related to NFT digital works has a legal basis.

4.3 The originator of NFT digital works is entitled to the resale proceeds

The casting of NFT digital works is the process in which the corresponding “non homogeneity certificate” of digital works is generated through technological transformation and then deployed to the blockchain to trade with buyers. A key link involved in this process is the deployment of smart contracts in NFT. In the past, in traditional copyright trading, once the author sold his works, he immediately lost control of the subsequent circulation process of the works. If the price of the work increased in the process of several transfers later, it had nothing to do with the creator, resulting in the creator only trying to increase the price in the first transaction. Artworks need the “consensus” of the market. There is a lag time in the formation of consensus. However, NFT smart contract solves this problem. No matter how many times the digital works are traded after being sold, the copyright owners can make profits from the transaction, which is automatically completed by the smart contracts, and the copyright owners do not need to spend extra costs for monitoring and tracking. Therefore, the creators are likely to have a high degree of participation and enthusiasm in this mode of trading and are more willing to create high-quality works. It can be said that NFT is the aggregation of “voucher of rights + smart contract” in law. The process of casting NFT is one of generating vouchers of rights and “drafting” transaction contracts in a technical way.

Different from the previous point-to-point technologies, NFT technology enables copies of creative works to be widely disseminated [32]. NFT and blockchain make scarce digital goods possible [33]. The choice of spreading original works mainly depends on the copyright owner [34]. In the case of *Leatherman tool group, v. Cooper Industries, Inc.* [35], the U.S. Court of Appeals for the Ninth Circuit pointed out that even though public policies were conducive to information entering the public domain, they did not create the public’s right to obtain private information. Similarly, the decision to disseminate creative works as NFTs or restrict their access to the digital domain depends on the copyright owners. As a social norm, this decision-making power and related profits from the works should belong to the artists. If copyright protection does not extend to such use, anyone who wants to take advantage of the NFT gold rush can copy the artists’ works and sell them at high prices. Moreover, the demand for scarce digital NFT may lead infringers to deprive creators of future profit opportunities [36].

5 Legal status and responsibility identification of NFT digital works service platform

5.1 NFT service platform should be accurately qualitative

In the metaverse, NFT breaks the cumbersome rules on rights, copyrights, and so on under the traditional economic paradigm through blockchains, which is conducive to fully utilizing the potential of knowledge elements, and can also avoid the monopoly of Internet platforms to a certain extent. However, the legal risk issues related to the platform are still prominent. The biggest challenge posed by the concept of the metaverse to the law is the change in the content of the existing rights and obligations system and the change in the interpretation of some legal concepts, of which “the conflict between the centralized supervision of the operation qualification of the platform subject and the decentralization of the technology implementation mode” is particularly worth paying attention to [37]. In the Internet environment, network platform operators and service objects (including secondary operators and consumers on the platform) as Internet service providers ostensibly have equal civil rights and obligations, but the actual situation is not so. The real situation is that the Internet platform has a full share in the discourse of rights because the network has the amplification effect of technical advantages. The control of the platform on the facilities and contents of different levels, such as technology, information, and data, has made the

gap between cognition and control in the real world, which has directly evolved into the network digital divide [38].

NFT trading platform is similar to an e-commerce trading platform in appearance, yet there are still some differences in business processes. This further expands the discourse of the NFT platform. For example, in the process of casting NFT, the platform will charge a gas fee. Even though this fee is considered the “fuel fee” required to maintain the uplink transaction, the pricing of each platform is different, and the blockchain used is different as well. Whether this fee is a necessary technical expenditure or a profit of the platform, it needs to be paid attention to in transaction cases, because it affects the platform’s duty of supervision and may even constitute joint infringement. Another is that the platform may charge transaction commissions through smart contracts or website terms, and the commission proportion of some platforms is not low. If it is obviously beyond the scope of technical service fees, it may also become the reason for taking responsibility, especially in the case of multiple transactions in the secondary market, where the platform may charge commissions many times.

Therefore, our suggestions are as follows. Regarding risk prevention, foreign platforms have gradually set the threshold for NFT casting and distribution, and have launched functions such as copyright detection, striving to judge and prevent infringement risks before NFT digital works are chained. Some domestic platforms are also doing this, but the operation is not systematic. Especially for the trading platform under the UGC mode, the threshold for the issuer’s access is low. In case of plagiarism, it is likely that the joint and several liabilities will be borne if the work on access and duty of care (safe haven) is not in place. Especially considering that NFT is difficult to destroy and recycle once it is linked, and more and more platforms support NFT to be transferred to overseas secondary markets. Through an e-wallet, the infringement will be more difficult to be controlled, and the court will likely require the NFT platform to assume a higher duty of care in advance based on the above differences from traditional platforms. What is more worth mentioning is the fault that has been known and ought to know. Undeniably, some platforms have some hype problems. If the platform does not intervene in time, through some incentive measures, the infringing NFT will be widely spread through the hype, which may also become a negative factor for the platform if the right holder has evidence.

5.2 Substantive review obligations of NFT service platform

The provisions on intellectual property rights in the platform service agreement involved in China’s “fat tiger case” are as follows III. intellectual property 5. The nftcn platform does not undertake the obligation to review whether the content uploaded by users has copyright or the authorization of copyright owners. If a third party objects to the copyright, the nftcn platform has the right to delete the relevant content according to the actual situation and has the right to investigate the legal liability of users 6. If any third party infringes the relevant rights of users of the nftcn platform, the nftcn platform has the right, but not the obligation, to review the content published by users, and to handle the infringement information [39].

It can be seen that the content of the agreement is beneficial to the platform because the rights that the platform enjoys are more than the obligations, which is obviously unfair to the users. The court cannot turn a blind eye to this. After the work “a fat tiger gets vaccinated” was cast, the microblog watermark of “Uncle Bu’er Ma” appeared in the lower right corner. Internet users can judge that the work is directly copied from “Uncle Bu’er Ma” microblog, which formally indicates the copyright source of the original work. If it is not authorized by the original copyright owner, it must be an infringement. In this regard, the platform should pay more attention to such incidents. Specifically, the platform should conduct a consistency survey on whether the uploader of the work and the copyright owner of the original copy have identity consistency or whether they have been authorized. Therefore, the accused platform should be aware of the facts of the alleged infringement subjectively and should be liable for its fault. In judicial practice, it is a reasonable judgment to exert greater pressure on the platform, limit and interpret the agreement between the platform and the service object, and extend its liability boundary to the protection of the rights and interests of the counterpart. NFT digital works trading is an innovation of cyberspace digital goods trading mode derived from the development of Internet technology and the combination of blockchain as well as smart contract technology [40]. It means a new business model, which will bring unprecedented opportunities to creators and collectors by using digital technology in the web3.0 era [41].

The platform shall establish an effective intellectual property review mechanism to conduct a preliminary review of the copyright of NFT digital works traded on the platform, such as whether the users applying for NFT casting have provided preliminary evidence involving copyright manuscripts, originals, legal publications, copyright registration certificates, certificates issued by the certification authority and other preliminary evidence to prove that they are the owners of copyright and copyright-related rights and interests. There is no doubt that such a review should be based on the obligations of good managers of network service providers, which should be given certain independent decision-making power and review space. Within the framework of the law, such review needs to include types of intellectual property rights, industrial development, and other factors, and at the same time, specify and refine the specific requirements. From the perspective of judgment standards, the “general possibility” standard should be adopted. That is to say, the preliminary evidence should exclude the possibility that the evidence that obviously cannot prove to be the copyright owner makes the general rational person believe that there is a right. In order to prevent and reduce the occurrence of infringement, registering with a real name and providing guarantees are effective methods. This not only allows infringers to have concerns but also reduces certain losses for the NFT trading platform if an infringement of copyright occurs.

5.3 NFT service platform responsibility boundary determination

NFT digital works trading is an innovation in the trading mode of “digital goods” in cyberspace derived from the development of Internet technology and the combination of blockchain and smart contract technology. It is a new business model. For the network platform that provides NFT digital works trading service, the criteria for judging the responsibility boundary of the NFT trading platform should be established from three aspects, that are, NFT digital works trading mode, platform control ability, and profit-making mode. The foundry (seller) of NFT digital works should not only be the owner of copies of works, but also the copyright owner or authorized person of the digital works, otherwise it will infringe upon others’ copyright.

According to the judgment of the responsibility boundary of the NFT trading platform, if it fails to fulfill the corresponding duty of care, the court will not support the defense of invoking the “safe harbor principle”. “Neutrality”, as a prerequisite for “safe haven”, has been intensively discussed in the signing of the copyright treaty of the World Intellectual Property Organization. At the level of domestic law, each contracting state has made clear provisions on the “neutrality” element and has formed specific rules through the interpretation of judicial precedents, regardless of the principled provisions in the e-commerce directive to reconcile the domestic legislation of Member States. It is also the rule gradually established by a case in the Digital Millennium Copyright Act of the United States. According to EU E-commerce Directive Recital 42, the safe harbor defense is applicable only when the activities of the platform are “purely technical, automatic and passive” [42]. Articles 20–23 of China’s Regulations on the Protection of Information Network Communication Right also stipulate the precondition of “neutrality”. NFT trading platform needs to establish a complete set of intellectual property review mechanisms. Review the copyright of NFT works traded on the platform, such as whether the users applying for NFT casting have provided preliminary evidence related to a copyrighted manuscript, an original copy, legal publication, copyright registration certificate, certificate issued by the certification authority and other evidence to prove that they are the owners of copyright and copyright-related rights. This kind of review should be based on the evaluation of the obligations of good managers of the network service providers, and the network service providers should be given certain independent decision-making power and review space.

Within the framework of legal provisions, specific requirements can be defined and refined according to factors such as their own needs, types of intellectual property rights, industrial development, and other factors. Although there is no technical neutrality clause in China’s civil code of e-commerce law, it can be found that the European Union’s jurisprudence and China’s regulations on the protection of the right to information network dissemination, and infer that the service providers who maintain technology neutrality do not have the possibility of “knowing” infringement through judicial interpretation.

5.4 NFT service platform responsibility type determination

Since responsibility cannot be exempted, it should be determined what responsibility is. In terms of the types of infringement, NFT digital works trading platform belongs to helping infringement. According to

paragraph 3 of Article 7 of the Provisions of the Supreme People's Court on Several Issues Concerning the Application of Laws in the Trial of Civil Disputes over Infringement of Information Network Communication Right, an Internet service provider who knows or should know that Internet users infringe the right to information network dissemination by using Internet services, fails to take necessary measures such as deleting, blocking, disconnecting links, or providing technical support, The court shall determine that it constitutes an infringement of aid. Where a third person acts improperly against the original's work, the accused platform failed to fulfill the review obligation. It was subjectively at fault and should bear the corresponding responsibility for helping infringement.

There are sporadic provisions on "indirect infringement" in China, such as Article 30 of the Regulations on the Protection of Computer Software, "if the holders of a copy of the software do not know and have no reasonable reason to know that the software is an infringing copy, they shall not be liable for compensation; However, the infringing copies should be stopped and destroyed"; But no system has been formed, which is also rarely mentioned in judicial practice. According to the distribution of indirect infringement liability in American copyright law, the rule of "alternative liability" is widely adopted, which requires indirect infringers to "have the ability to monitor the infringement" and "directly obtain economic benefits from the infringement". This principle was formally established by the Shapiro case [43] in 1963. The judge of the case held that Green Company could supervise the records sold in its stores and the behavior of its employees; Moreover, Green Company had received a certain amount of remuneration from the lessee's total income from the sale of pirated records. The Green Company and the lessee's behavior have direct economic interests, so they should bear the responsibility. The relevant principles were later applied to the indirect tort liability of the network service providers in the Napster case [44]. The court held that Napster should bear alternative liability for the users' tort based on Napster's ability to supervise the file directory and monitor the infringement, and Napster could profit from advertising. The judgment of the European Court of Justice on the YouTube and Cyando case [45] is most relevant to the platform liability. In the court's judgment, the court held that service providers such as YouTube should not be directly responsible for copyright infringement caused by users' uploading in principle. The key to the analysis is the requirement of "communication behavior", especially the behavior of "intentional intervention". If the platform operator has general or constructive knowledge of the illegal content provided through its platform but fails to take appropriate technical measures to deal with such infringement reliably and effectively, there is intentional intervention [46]. Based on the experience of the above cases, we suggest that the NFT service platform should not only bear responsibility for network information security but also bear related economic and financial responsibilities [47]. At the same time, it is necessary to clarify the regulatory body in order to achieve orderly management and achieve efficient management order.

5.5 NFT service platform responsibility bearing mode

For the relief of copyright infringement of NFT digital works, the methods of deletion and shielding from the trading platform can be adopted. NFT digital works are intangible and belong to intellectual achievements, which can only be expressed through carriers, such as electronic displays. The result of casting through the NFT trading platform is the formation of NFT digital works, so NFT digital works can also be regarded as one of the display methods of NFT digital works. In regard to the facts of the case ascertained by the court, in the "nftcn platform service agreement", the "rules for the use of the platform" are stated as follows: if users discover that the works exist in the process of purchase, including but not limited to infringement, pornography, politics, inconsistent physical description, and brand fraud, they should feed back and require the platform to remove these works from the shelf. If they still purchase the works knowing that there are problems, the platform does not have to assist in handling them [48]. This is unreasonable because every NFT is unique. One NFT cannot be exchanged with another NFT, and one NFT cannot be divided into several subunits. This is the connotation of "non homogeneity" of NFT. NFT transaction is essentially the transfer of property rights of "digital works". Furthermore, the court tends to believe its judgment that the relevant data of NFT digital works and their transactions are stored on the blockchain server.

However, this form of responsibility is questionable. As the subject of rights owns complete property rights over NFT digital works, the nature of the subject of rights' purchasing and holding of unauthorized NFT digital works is the same as that of purchasing and holding pirated books. As is known to all,

the reason why the blockchain system based on NFT cannot be tampered with is precise because of the decentralized design of blockchain technology, that is, any manager with higher authority cannot arbitrarily change the relevant data recorded in the blockchain. If the NFT digital works have been sold to many buyers, the blockchain platform is unable to break all the NFT involved into the black hole address technically and logically. To achieve such an effect, it needs the cooperation of all buyers, and a simple buyer is likely to be difficult to be identified as an infringer. Only when the buyer sells its NFT digital works can it constitute infringement. Therefore, it is difficult to decompose all NFTs involved into the black hole address.

6 Conclusion

The integration of the metaverse and the token economy can promote the better development of the economy and society. How to prevent the potential risks of the development of the licensing economy in the metaverse and establish a licensing economic law that conforms to the combination of digital identity and digital property is the key to whether the licensing economy in the metaverse can stimulate new development momentum [49]. Therefore, the relevant legal system must be established as soon as possible in China.

The NFT trading service platform should establish a set of detailed intellectual property compliance review mechanisms as soon as possible. The platform should conduct a substantive review of the sources of NFT digital works traded on the platform. Additionally, it is also necessary for the NFT trading platform to build a corresponding infringement prevention mechanism. An effective screening system should be formed to prevent infringement from the source and prevent defects in NFT digital works to the greatest extent.

In addition, from the perspective of global economic integration and sustainable development, it is necessary for legislative and regulatory authorities to set built-in compliance and safety standards for NFT digital works and actively promote their implementation, so as to ensure that NFT digital works, as commodities, comply with the global legal framework, so as to protect the rights and interests of creators, service providers, and consumers

Conflict of Interest

The authors declare no conflict of interest.

Data Availability

No data are associated with this article.

Authors' Contributions

Chunhui Wang contributed to the theoretical development and the topic design. Yupeng Dong contributed to the theoretical development, data sorting, and manuscript drafting. The two authors jointly designed the whole frame of the paper and revised the content of the manuscript.

Acknowledgements

Thanks to Yuanyuan Liu and the anonymous reviewers for their helpful comments and suggestions.

Funding

This work was supported by the major project of the National Social Science Foundation "Research on the Social Impact and Governance Path of Internet Platforms" (21&ZD195).

References

- [1] Satoshi N. Bitcoin: A peer-to-peer electronic cash system, Feb. 2008, <https://bitcoin.org/bitcoin.pdf>
- [2] Li WJ, Hou G and Zhang X. A Study of the Legal Aspects of Digital Collections (NFT): Exploring the direction of copyright protection, <http://www.liu-shen.com/Content-3193.html>
- [3] Xu K. The property law of the metaverse: Exploring NFT rules, <https://sghexport.shobserver.com/html/baijiahao/2022/09/04/844001.html>
- [4] Pedro H. 2021 Dapp Industry Report. 17 Dec 2021, <https://dappradar.com/blog/2021-dapp-industry-report>
- [5] Valuates Reports. Global Non-Fungible Token (NFT) Market Research Report 2022. 2022-01-05, <https://reports.valuates.com/market-reports/QYRE-Auto-22P7708/global-non-fungible-token-nft>

- [6] Dionisio JDN, Burns WG and Gilbert R. 3D virtual worlds and the metaverse: Current status and future possibilities. *ACM Comput Surv* 2013; **45**: 34–73.
- [7] Li X. Legal attribute of machine-generated data rights and interests under intelligent digitization. *North Law* 2021; **15**: 44–53.
- [8] Lessig L. The law of the horse: What cyberlaw might teach. *Harv Law Rev* 1999; **113**: 501–49.
- [9] Marinotti J. Tangibility as technology. *Georgia State Univ Law Rev* 2021; **37**: 678–80.
- [10] Clark B and Burtisall R. Crypto-pie in the sky? How blockchain technology is impacting intellectual property law. *Stanf J Blockchain Law Policy* 2019; **2**: 252–5.
- [11] Bodó B, Gervais D and Quintais JP. Blockchain and smart contracts: The missing link in copyright licensing? *Int J Law Inf Technol* 2018; **10**: 311–36.
- [12] Carroll R. NFTs: The latest technology challenging copyright law’s relevance within a decentralized system. *Fordham Intellect Prop Media Entertain Law J* 2022; **32**: 979–1009.
- [13] Li J. Potential risks and regulatory countermeasures for the development of token economy in metaverse. *E-Government* 2022; **3**: 54–65.
- [14] Ondrejka C. Escaping the gilded cage: User created content and building the metaverse. *N Y Law Sch Law Rev* 2004; **49**: 81–102.
- [15] China Center for Information Industry Development, Jiangsu Communication Society. The Ecological White Paper of the Metaverse Industrial Chain, 2022, 23.
- [16] Brownsword R. *Rights, Regulation and the Technological Revolution*. Oxford: Oxford University Press, 2008.
- [17] Patterson LR and Lindberg SW. *The Nature of Copyright: A Law of Users’ Rights*. Athens: University of Georgia Press, 1991.
- [18] Gilder G. *Post Google Era: The Decline of Big Data and the Rise of Blockchain*. Beijing: Modern Press, 2018, 28–57.
- [19] Li X. Legal attribute of machine-generated data rights and interests under intelligent digitization. *North Law* 2021; **15**: 44–53.
- [20] Hirschey JK. Symbiotic relationships: Pragmatic acceptance of data scraping. *Berkeley Technol Law J* 2014; **29**: 897–918.
- [21] Lessig L. *Code Version 2.0*. New York: Basic Books, 2006, 179.
- [22] Ginsburg JC. Copyright and control over new technologies of dissemination. *Columb Law Rev* 2001; **101**: 1613–9.
- [23] Adler A. Why art does not need copyright. *George Wash Law Rev* 2018; **86**: 313–75.
- [24] Conti R and Schmidt J. What is an NFT? Non-fungible tokens explained, <https://www.forbes.com/advisor/investing/cryptocurrency/nft-non-fungible-token>
- [25] Vijayakumaran A. NFTs and copyright quandary. *J Intellect Prop Inf Technol E-Commerce Law* 2021; **12**: 402–14.
- [26] Gifford DJ. Innovation and creativity in the fine arts: The relevance and irrelevance of copyright. *Cardozo Arts Entertain Law J* 2000; **18**: 569–614.
- [27] Fisher K. Once upon a time in NFT: Blockchain, copyright, and the right of first sale doctrine. *Cardozo Arts Entertain Law J* 2019; **37**: 629–34.
- [28] Perzanowski A and Schultz J. Reconciling intellectual & personal property. *Notre Dame Law Rev* 2014; **90**: 1211–64.
- [29] Info Soc Directive [Directive 2001/29 on the harmonisation of certain aspects of copyright and related rights in the information society [2001] OJ L167/10.] art.4.
- [30] Bodó B, Giannopoulou A, Quintais JP and Mezei P. The rise of NFTs: These aren’t the droids you’re looking for. *Eur Intellect Prop Rev* 2022; **44**: 265–82.
- [31] *Nederlands Uitgeversverbond v Tom Kabinet Internet BV* (C-263/18) EU:C:2019:1111; [2020] 2 C.M.L.R. 20.
- [32] Patel N. Can the law keep up with crypto? <https://www.theverge.com/22944579/crypto-bitcoin-Internet-law-nft-tiktok-dances-tonya-evans-interview> [<https://perma.cc/9NJA-HYJA>].
- [33] Evans TM. Cryptokitties, cryptography, and copyright. *AIPLA Quart J* 2019; **47**: 219–46.
- [34] Nimmer RT. Breaking barriers: The relation between contract and intellectual property law. *Berkeley Technol Law J* 1998; **13**: 827–31.
- [35] 131 F.3d 1011, 1014-15 (Fed. Cir. 1997).
- [36] Carroll R. NFTs: The latest technology challenging copyright law’s relevance within a decentralized system. *Fordham Intellect Prop Media Entertain Law J* 2022; **32**: 979–1009.
- [37] Zhao J. The legal regulation path of “metaverse” security risk: From hypothetical regulation to process risk prevention. *J Shanghai Univ (Soc Sci Edn)* 2022; **39**: 103–15.
- [38] Sun Y. On the metaverse and the adjustment of legal order in intelligent society. *Res Rule Law* 2022; **2**: 45–56.
- [39] https://www.nftcn.com.cn/pc/#/Notice_deta_user_f
- [40] Vasan K, Janosov M and Barabási AL. Quantifying NFT-driven networks in crypto art. *Sci Rep* 2022; **12**: 2769.
- [41] Evans TM. Cryptokitties, cryptography, and copyright, *AIPLA Quart J* 2019; **2**: 47.
- [42] Hoboken J. Hosting intermediary services and illegal content online: An analysis of the scope of article 14 ECD in light of developments in the online service landscape, <https://dare.uva.nl/search?identifier=db3fa078-e225-4336-95ec-5d6f25731799>
- [43] *Shapiro v. Thompson*, 394 U.S. 618 (1969).
- [44] *A&M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004, 1027 (9th Cir. 2001).
- [45] *Joined cases Peterson v Google LLC; Elsevier Inc v Cyando AG* (C-682/18; C-683/18) EU:C:2020:586; [2020] E.C.D.R. 16; EU:C:2021:503; [2021] E.C.D.R. 13.
- [46] *Peterson v Google LLC; Elsevier Inc v Cyando AG* [2020] E.C.D.R. 16; [2021] E.C.D.R. 13 at [84].
- [47] Wang Q. On the legal nature of NFT digital works trading. *Orient Law* 2023; **1**: 18–35.
- [48] https://www.nftcn.com.cn/pc/#/Notice_deta_user_f
- [49] Li J. Potential risks and regulatory countermeasures for the development of token economy in metaverse. *E-Government* 2022; **3**: 54–65.



Yupeng Dong is currently an associate professor at the School of Media and Law, NingboTech University. His research interests are intellectual property law and standardization law.



Chunhui Wang is currently a professor at the Institute of Information Industry Development Strategy of Nanjing University of Posts and Telecommunications, a professor at the School of Cyber Science and Technology, at Zhejiang University, and a professor at NingboTech University. He is also an expert on the China Working Group of ITU's International Telecommunication Rules, a member of the Information and Communication Economy Expert Committee of the Ministry of Industry and Information Technology, the director of the Research Base of Cyberspace Governance and Digital Economy Rule of Law (Yangtze River Delta), Deputy Director of the Academic Committee and Director of the Cyberspace and Data Law Research Department of the Chinese Society of Behavioral Law, and Chief Expert of the Cyberspace and Data Rule of Law Decision Advisory Team of the China Communications Society. He has published 10 monographs, and more than 160 papers, and participated in the legislative consultation and amendment of laws, regulations, and rules such as the Network Security Law, Chapter VI of the Personal Rights Code of the Civil Code, etc. His research interests include management, law, telecommunications strategy, and other cross-cutting areas of research.