

Risk Assessment and Legal Countermeasures for Copyright Infringement in the Cultural Industry under the Background of Digital Age

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Abstract: *Digital technology has promoted the innovative development of the cultural industry, and new forms of copyright carriers have emerged, giving rise to the new concept of digital copyright. However, it has also increased the risk of copyright infringement. This article analyzes the main impact of digitization on copyright, explores the current problems faced in legal norms and technical management regulations, and proposes targeted legal countermeasures and management suggestions to address the complex situation of copyright protection in the digital age.*

Keywords: Digital age; Digital copyright; Copyright; Copyright protection; Digital Copyright Governance.

1. INTRODUCTION

The rapid development of the digital age has injected strong impetus into the cultural industry. The widespread application of digital technology has made the creation and dissemination of cultural products more convenient and efficient. However, the widespread dissemination of digital cultural products has also reduced the cost of infringement and increased the risk. How to effectively protect copyright in the digital context has become an urgent legal problem that needs to be solved. This article aims to explore in depth the main risks faced by copyright in the digital age, improve the theoretical system of risk management in the cultural industry, and provide theoretical support from a legal protection perspective for the development of the cultural industry. Song (2024) optimized warehouse management systems through automatic speech recognition technology, enhancing human-computer interaction efficiency [1]. Cloud computing innovations were explored by Wu (2024), who investigated large-scale parallel computing infrastructure for genetic disease research [2], while Chen (2025) proposed a quantized framework to ensure data quality in gig economy platforms [3]. Legal aspects of technology were addressed by Wang (2024), examining the balance between prior rights and enterprise naming rights [4]. In the physical sciences, Lin et al. (2025) applied transfer learning to improve modeling of complex nanostructures, advancing optical device design [5]. Business applications included Gong et al.'s (2024) ensemble machine learning approach for enterprise risk decision support systems [6]. Healthcare research showed notable progress, with Lin et al. (2025) demonstrating how intelligent exercise monitoring improves executive function in ADHD children [7], and Peng et al. (2025) studying the impact of aerobic exercise intensity on cognitive performance [8]. Medical imaging saw advancements through Tian et al.'s (2024) improved brain tumor segmentation using attention mechanisms [9], while Shen et al. (2025) developed an LSTM-based AI system for precise anesthetic dosing in cancer surgery [10]. Cybersecurity research by Xu et al. (2025) analyzed adversarial machine learning attacks and defenses [11]. Cross-industry applications were explored in autonomous driving technology's FinTech applications by Wang et al. (2025) [12], and AI-powered robo-advisors for wealth management by Shen et al. (2025) [13]. Financial technology innovations continued with Chew et al.'s (2025) work on AI-optimized accounting data integration for e-commerce platforms [14]. Finally, Liu et al. (2025) developed a privacy-preserving ensemble model for network anomaly detection, balancing security and data protection [15]. These studies collectively showcase AI's transformative potential across industrial, scientific, healthcare, and financial domains while addressing critical challenges in data privacy and system security.

2. THE IMPACT OF THE DIGITAL AGE ON COPYRIGHT

2.1 The role of digital technology in promoting copyright

Digitalization refers to the process of transforming and optimizing traditional things, activities, processes, and information through digital technology, mainly including:



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2.1.1 Digitization of Information:

Transforming information such as text, sound, images, and videos into digital forms that can be stored, processed, and transmitted through digital technology (e.g. scanning paper books into electronic book PDFs).

2.1.2 Digitization of Infrastructure:

Efficient transmission and sharing of information is realized through Internet, cloud computing, Internet of Things and other technologies. The article summarizes several types of digitization in the cultural industry:

- (1) E-books, digital newspapers, and digital news dissemination.
- (2) Streaming platforms (such as Netflix), digital effects, and virtual filming.
- (3) Cloud gaming, immersive entertainment [virtual reality (VR) and augmented reality (AR)].
- (4) Digital museums and virtual exhibitions.
- (5) Streaming music services, virtual musicians.

The 14th Five Year Plan proposes to implement a digital strategy for the cultural industry, and calls for accelerating the development of new cultural enterprises, cultural formats, and cultural consumption models. In order to protect the rights of digital network copyright, digital copyright has emerged. Digital copyright mainly refers to the rights that copyright owners legally enjoy over their digital works in the digital environment, including the rights to copy, disseminate, modify, display, and authorize works. It can be seen that digital copyright is an extension and expansion of traditional copyright in the context of digital technology. Compared to the original non materiality, replicability, and territoriality of copyright, digital copyright has formed some unique characteristics:

- (1) Easy to replicate and spread.
- (2) Cross regional.
- (3) Technological dependence (the protection and management of digital copyright highly rely on technological means such as encryption, blockchain, etc.).

According to statistics, the scale of China's digital economy has reached 50.2 trillion yuan in 2022, with a nominal growth rate of 10.3% year-on-year, accounting for 41.5% of the gross domestic product, and ranking second in the world in terms of total volume.

2.2 Convenience of dissemination and replication and the increase of copyright infringement

Traditional copyright protection mechanisms often rely on the physical existence of works (such as books). In the digital context, works exist in the form of digital files, and copying and dissemination almost do not require physical media, with low cost and extremely fast speed. This efficient and widespread dissemination greatly reduces the control of copyright owners over their works, making it difficult to detect and stop infringement in a timely manner, especially in cross-border infringement, which is often difficult to track and hold accountable. Finding a balance between promoting innovation and protecting originality will be the key to copyright protection and sustainable development of the digital cultural industry in the future. In order to implement the deployment of the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China on "implementing the digitalization strategy of cultural industries", the "14th Five Year Plan Outline" points out: "Seize the opportunity of the new round of technological revolution and industrial transformation, promote the deep integration of digitalization with economic development and industrial upgrading." From the perspective of national strategy, China attaches great importance to the digital economy and will continue to promote its vigorous development; In terms of copyright protection, China has gradually established a copyright protection system.

2.3 Challenges of Emerging Creative Forms to Traditional Copyright



The digital age not only changes the way works are disseminated, but also promotes the emergence of new creative subjects, especially in the context of artificial intelligence, user generated content (UGC), and multi platform creation, where digital creative forms continue to emerge. For example, the concepts of "originality" and "creator" in traditional copyright law face challenges for machine generated works such as music, art works, and literary creations based on artificial intelligence, as well as automatically written press releases. Because traditional copyright law requires works to be created by "natural persons", the issue of copyright ownership of works generated by artificial intelligence, as well as the identification of "copyright owners" arising from this, needs to be clearly defined by law. Secondly, user generated content (UGC) and collective creation, on social media, short video, and live streaming platforms, users upload a large number of original works in various forms. The copyright ownership of such creative entities is unclear, especially when the platform fails to actively fulfill its copyright protection obligations, which can easily lead to copyright disputes and infringement.

2.4 Social and Economic Impact of Copyright Infringement in the Cultural Industry

Why strengthen copyright protection? Firstly, infringement can lead to certain economic losses, while piracy and infringement can result in a decrease in cultural industry revenue, especially for small creators and startups, which are more severely impacted. The China Copyright Association also released the "2021 Report on the Protection and Development of Chinese Online Literature Copyright" (hereinafter referred to as the "Report") in 2022, which pointed out that while online literature is developing rapidly, it also faces the "three mountains" of piracy and infringement - piracy platforms, search engines, and application markets. In 2021, the scale of losses from online literature piracy in China was 6.2 billion yuan, an increase of 2.8% year-on-year, and it is conservatively estimated that it has already occupied 17.3% of the market share of the online literature industry. Among them, nearly 70% of online literature platforms and nearly 80% of writers believe that search engines are the main means of disseminating pirated content in online literature. Secondly, infringement is an obstacle to cultural innovation, and the rights and interests of rights holders cannot be effectively protected, which may inhibit the driving force of innovation and affect the long-term development of the cultural industry. At the same time, creators face unfair competition and a damaged creative environment due to rampant piracy. Again, infringement is a disruption to social order, and the public's awareness of copyright is weak. Infringement may be seen as "reasonable" or even "default" behavior, forming a negative social atmosphere. The platform economy promotes the spread of infringement and indirectly encourages illegal behavior.

3. THE MAIN RISKS FACED BY COPYRIGHT IN THE DIGITAL AGE

3.1 Concealment and Scale of Infringement Behavior

The digital development plays an increasingly important role in copyright protection, but it also brings about issues of concealment and scale of copyright infringement. Especially when digital watermarking, copyright identification, encryption protection and other technologies are cracked, although the technical means have raised the threshold for copyright protection, there is always a certain risk of cracking.

Due to the anonymity of Internet platforms and the universality of information dissemination, infringement is often difficult to track and identify. The spread of piracy and theft, secondary creation, malicious uploading, and other infringing behaviors have been repeatedly banned. Unauthorized content dissemination is also common, and the speed of dissemination is extremely fast. The rights and interests of copyright owners are not effectively protected, seriously affecting the interests of the legitimate market. The 2021 Report on Copyright Protection and Development of Chinese Online Literature points out that "online literature has always faced the dilemma of repeated piracy and infringement in its development process. According to the report, as of December 2021, the overall monthly active users of piracy platforms were 43.71 million, accounting for 14.1% of online reading users, and the monthly average number of launches was about 50 times. Most online literature platforms have over 80% of their works pirated every year; 82.6% of online writers are deeply affected by piracy, with over 40% experiencing frequent piracy.

3.2 Unclear platform responsibilities

With the popularity of digital platforms, user generated content is spreading rapidly and on a large scale. "With the development of the Internet, it is increasingly convenient for users to upload content, and a text or video is published on the Internet when their fingertips are beating". Traditional copyright management methods are difficult to cope with this mode of dissemination, and the issue of platform responsibility has become particularly



prominent. As an intermediary for information dissemination, platforms bear certain management responsibilities, but the current legal framework has not clearly defined the specific responsibilities of platforms in copyright infringement. Currently, most platforms have failed to establish effective copyright protection mechanisms and have not rigorously reviewed uploaded content. Many infringing works have long existed on the platform, and the platform has not taken effective measures to curb infringement and establish effective cooperation mechanisms with copyright holders, resulting in frequent copyright disputes.

According to current copyright laws, platforms usually evade liability through the "safe harbor principle", which means that if the platform does not actively monitor the content uploaded by users, it does not need to bear infringement liability. Therefore, most platforms consider it as just an information intermediary and do not assume direct responsibility for the content uploaded by users. However, this phenomenon of ambiguous responsibility has made the role of platforms in copyright protection unclear, lacking active regulatory actions, and thus exacerbating the risk of copyright infringement. With the expansion of the platform's user base and the dominant role of the platform in content dissemination, this liability exemption system has led to obvious loopholes in the platform's copyright management, and such liability avoidance methods are gradually becoming unreasonable.

3.3 Cross border infringement issues

The digital age has broken geographical and legal boundaries, and the dissemination of works can cover the world in a short period of time. This has also made cross-border infringement issues more prominent. However, due to differences in copyright laws among different countries, cross-border infringement has become a difficult problem in current copyright protection. This includes two major aspects: firstly, the difficulty in coordinating international copyright law. Due to differences in copyright laws among different countries and regions, there are differences in copyright recognition, calculation of damages, and fair use, which makes it difficult to handle cross-border infringement cases uniformly. The handling of cross-border infringement cases often faces many legal and practical difficulties. Secondly, the responsibility definition, compensation amount, and legal application of cross-border platforms

In the case of cross-border operation of digital platforms, the platform may face the application and jurisdiction issues of copyright laws in multiple countries.

4. LEGAL MEASURES TO ADDRESS COPYRIGHT RISKS IN THE DIGITAL AGE

4.1 Improve the legal framework for copyright

In the context of digitalization, the current copyright law is no longer able to fully adapt to new challenges. China should revise the Copyright Law to clarify copyright protection rules in the digital environment. In response to the characteristics of the digital age, clarify the digital reproduction and dissemination behavior of works, define the scope of "reasonable use", and protect the rights and interests of creators. Firstly, it is necessary to improve the relevant laws on digital copyright, clarify the platform's responsibilities and the mechanism for protecting the rights and interests of creators. Secondly, it is necessary to improve the copyright registration and protection mechanism, establish a copyright registration system through technological means such as blockchain, ensure clear copyright ownership of works, and provide effective copyright protection.

4.2 Clarify the legal responsibilities of the platform

Platform responsibility is one of the core issues in digital copyright protection. China should further clarify the "legal responsibility" and "review obligation" of digital platforms in copyright infringement, ensuring that platforms bear certain review responsibilities for the content uploaded by their users. Strengthen platform obligations, require platforms to establish stricter content review mechanisms, and promptly identify and remove infringing content. At the same time, establish a compensation mechanism for infringement. When the platform fails to fulfill its review obligations, it should bear corresponding legal responsibilities and compensate the copyright owner. Again, the platform should proactively establish a copyright protection cooperation mechanism with copyright holders. Finally, the platform should provide effective rights protection support for copyright holders, including simplifying the complaint process for copyright disputes and providing a mechanism for tracing infringement behavior.

4.3 Promoting innovation and application of technological means



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Technological means are one of the important ways to solve the problem of copyright protection in the digital age. By embedding digital watermarks or copyright identifiers, fingerprint recognition, blockchain and other technologies in works, the transparency and immutability of copyright information can be achieved, improving the protection ability of copyright, tracking, managing and protecting works, and preventing piracy.

4.4 Strengthening international cooperation and cross-border copyright protection

In the context of globalization, cross-border copyright protection has become an unavoidable issue. China should strengthen cooperation with international organizations and other countries in copyright protection, and promote the unity and coordination of global copyright protection. Strengthen international copyright law enforcement cooperation, establish an international copyright law enforcement cooperation mechanism, and enhance the crackdown on cross-border infringement. For cross-border copyright disputes, it is possible to explore the establishment of an international copyright arbitration institution or to use the International Court of Justice to make rulings on copyright cases and resolve issues related to the application of laws in different countries.

4.5 Promoting Digital Copyright Education and Enhancing Awareness

The general public's awareness of copyright is generally weak, especially for unauthorized use of others' works, and many people fail to recognize its infringement. Therefore, it is necessary to strengthen copyright education for the public and enhance the copyright awareness of the whole society. Through school education, community activities, and media promotion, copyright knowledge can be popularized to help people understand copyright law and its importance, avoid unintentional infringement, understand the value of original works, and the importance of legal use of copyright.

5. CONCLUSION

The arrival of the digital age has brought many opportunities to the cultural industry, but it has also posed severe challenges to copyright protection. Piracy, ambiguous platform responsibilities, and cross-border infringement have become prominent issues in copyright protection in the digital age. To address these challenges, it is necessary to improve the legal framework for copyright, clarify platform responsibilities, promote technological innovation, strengthen international cooperation, and enhance public awareness of copyright. Only through the dual protection of law and technology can copyright be effectively protected and the healthy development of the digital cultural industry be promoted in the context of digitization.

PROJECT TITLE

2024 Guangxi University Young and Middle aged Teachers Research Basic Ability Enhancement Project "Research on the Path of Cultural Industry Copyright Protection under the Background of Digital Era" (Project No.: Phase achievements of 2021KY0873).

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