

Metaverse and Civil Liability Arising from Intellectual Property Infringement

1. Tahereh Sefidian¹: Department of Private Law, UAE.C., Islamic Azad University, Dubai, UAE

2. Mahshidosadat Tabaei²: Department of Private Law, CT.C., Islamic Azad University, Tehran, Iran

*Correspondence: tabaei@iau.ac.ir

Abstract

The metaverse, as a three-dimensional and interactive virtual environment, has created a remarkable transformation in digital technologies and provided a platform for economic, social, and cultural activities. With the expansion of this space, the issue of intellectual property rights and the civil liability arising from their infringement has become one of the major legal challenges. This article examines the foundations of civil liability in the metaverse and compares them with existing legal principles to analyze how intellectual property laws and compensation mechanisms can be applied within this environment. The findings of the study indicate that the decentralized, transnational, and anonymous nature of users in the metaverse makes it difficult to pursue intellectual property violations. Intellectual property rights in the metaverse encompass copyright, trademarks, patents, and industrial designs, all of which can be easily infringed due to the rapid copyability and modifiability of digital content. The main challenges in this regard include a lack of legal transparency, difficulty in identifying offenders, determining judicial jurisdiction in cross-border contexts, and the liability of hosting platforms. To address these challenges, several solutions are proposed, including the development of specific metaverse regulations, the use of blockchain technology for registering ownership of digital works, the establishment of artificial intelligence-based monitoring systems, and user education programs.

Keywords: Metaverse, Civil Liability, Intellectual Property, Digital Rights, Blockchain Technology.

Received: 11 July 2025

Revised: 21 October 2025

Accepted: 28 October 2025

Initial Publish: 29 October 2025

Final Publish: 01 April 2026



Copyright: © 2026 by the authors. Published under the terms and conditions of Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

Citation: Sefidian, T., & Tabaei, M. (2026). Metaverse and Civil Liability Arising from Intellectual Property Infringement. *Legal Studies in Digital Age*, 5(2), 1-8.

1. Introduction

The metaverse, as one of the innovations in information and communication technology, represents an interactive virtual space in which users can engage in diverse activities within three-dimensional environments. As a comprehensive virtual world, the metaverse enables user interaction through avatars and the creation of digital assets. However, its decentralized and multi-platform nature has generated new legal challenges regarding intellectual property rights and civil liability. Intellectual property (IP) within the metaverse encompasses the rights of creators of digital works, industrial designs, trademarks, and personal data, all of which may be infringed upon by users or hosting platforms. This environment—a fusion of virtual reality (VR), augmented reality (AR), and the Internet of Things (IoT)—creates both opportunities and challenges across various domains,

particularly in intellectual property law (Riemann, 2022; Russell, 2022). One of the most critical of these challenges is the violation of intellectual property rights in the metaverse and the resulting civil liability. This article examines this issue in detail.

2. The Metaverse and Intellectual Property Rights

Intellectual property rights consist of legal protections granted to creators of artistic, scientific, and literary works to prevent unauthorized use by others (Jafari Langarudi, 1999; Safaei & Rahimi, 2012). With the emergence of the metaverse, these rights face novel challenges. In this space, users can reproduce, alter, or even register digital content under their own names, resulting in infringements of intellectual property rights (Daryabari, 2003). A prominent example of such infringements is the unauthorized use of artistic or musical works within metaverse environments—for instance, users sharing music or images in virtual worlds without the creator’s permission, an issue that necessitates legal scrutiny (Bastani Boroumand, 2007).

As an advanced virtual environment, the metaverse brings numerous opportunities and challenges in the realm of intellectual property protection. Within it, users can create, purchase, and sell digital assets such as artworks, music, designs, and even virtual characters, thereby transforming intellectual property into a newly contested domain in the digital world (Fernandez & Hui, 2022; Zart & Lindsay, 2010).

2.1. Definition of the Metaverse

The metaverse is a shared virtual environment formed through the integration of virtual reality (VR), augmented reality (AR), and the internet (Russell, 2022). This space enables the buying and selling of digital assets, hosting of events, and even the establishment of virtual enterprises (Paskat Dun, 2021).

2.2. Intellectual Property in the Metaverse

Intellectual property rights aim to protect creative, artistic, and innovative outputs. In the metaverse, these rights extend to digital assets, avatars, virtual environments, and even software codes (Hasanzadeh, 2022). However, the decentralized nature of the metaverse and the application of blockchain technology introduce complex issues regarding the protection of these rights (Abasi, 2018; Drescher, 2019).

Intellectual property in the metaverse includes:

- **Copyrights:** Protection of digital creations such as music, avatar designs, and virtual environments (Jafari Langarudi, 1999).
- **Trademarks:** Unauthorized use of brands and logos within virtual worlds (Safaei & Rahimi, 2012).
- **Patents and Industrial Designs:** Including algorithms and technological systems employed within the metaverse (Bakhtiar, 2017).

However, the decentralized structure of the metaverse and the use of blockchain complicate ownership verification and the pursuit of infringements (Daryabari, 2003; Zwart & Lindsay, 2010).

2.3. Challenges

Intellectual property challenges in the metaverse, as an emerging topic within information and communication technology law, require comprehensive analysis. The metaverse, being a vast and interactive digital space, facilitates the creation and exchange of content directly tied to IP rights. One primary challenge is determining ownership of content produced in this environment. Due to the decentralized nature of the metaverse and the adoption of technologies such as blockchain, identifying the original content owner and enforcing their rights becomes increasingly complex (Abasi, 2018; Drescher, 2019).

Additionally, copyright and intellectual property violations are heightened by the ease of copying and distributing digital content illegally (Bakhtiar, 2017). The use of avatars and virtual identities further raises questions regarding digital identity

and associated rights (Zwart & Lindsay, 2010). Another significant issue concerns determining judicial jurisdiction in cases of IP infringement within the metaverse. Given its transnational character, identifying the applicable legal system to handle disputes is challenging (Safaei & Rahimi, 2012).

Furthermore, emerging concepts such as Non-Fungible Tokens (NFTs), which are used as tools to verify digital ownership, necessitate revising existing laws to align with these new technologies (Fernandez & Hui, 2022; Hofstetter et al., 2022). Ethical and social concerns are also evident—for example, the unauthorized use of cultural or artistic works belonging to indigenous communities within the metaverse can result in violations of cultural rights (Forrest, 2019). Thus, developing comprehensive legal frameworks to safeguard intellectual property in the metaverse is imperative.

The main intellectual property challenges in the metaverse can be summarized as follows:

1. **Infringement of Intellectual Property Rights:** Copying and unauthorized use of digital works is a major issue due to the ease of duplication and distribution in virtual environments (Jafari Langarudi, 1999).
2. **Lack of Legal Transparency:** IP laws for the metaverse remain underdeveloped, making enforcement complex and inconsistent (Bakhtiar, 2017).
3. **Platform Liability:** The responsibility of metaverse service providers in monitoring and protecting intellectual property remains contested—whether they must oversee user-generated content is still debated (Sadeghi, 2010).

2.4. Solutions

The emergence of the metaverse has introduced new and intricate challenges to intellectual property protection, demanding innovative and comprehensive legal solutions. One key issue is IP infringement through unauthorized use of works, designs, or digital assets within the metaverse. Due to the decentralized and transnational nature of this space, identifying and prosecuting offenders—especially across jurisdictions—is difficult (Riemann, 2022; Safaei & Rahimi, 2012).

To address these challenges, several strategies have been proposed. One is the development of harmonized international legislation to protect intellectual property in the metaverse. Such laws could mandate the registration of digital assets in recognized systems and employ blockchain technology to verify ownership and track transactions. Blockchain's immutable ledger makes it an effective tool for tracing and protecting intellectual rights (Abasi, 2018; Drescher, 2019; Paskat Dun, 2021).

Another essential approach is the development of AI-based regulatory and legal monitoring platforms within the metaverse to automatically detect violations and initiate legal procedures. Such platforms, relying on artificial intelligence, can analyze large volumes of data to identify potential infringements (Hasanzadeh, 2022).

Equally important is public awareness and user education about intellectual property rights. Educational programs should inform users of relevant laws and the legal consequences of violations (Bakhtiar, 2017).

Lastly, international cooperation among nations to create joint frameworks and multilateral agreements on intellectual property protection in the metaverse is crucial. This cooperation can minimize legal disputes and promote a safer environment for economic and cultural engagement (Richard, 2012; Zart & Lindsay, 2010).

In this regard, the following measures can significantly enhance IP protection in the metaverse:

1. **Establishing Comprehensive Legal Frameworks:** Formulating international laws governing IP protection in the metaverse, including detailed procedures for registering and safeguarding digital assets (Safaei & Rahimi, 2012).
2. **Utilizing Blockchain Technology:** Employing blockchain as an effective mechanism for recording and authenticating digital ownership, facilitating traceability and authenticity verification (Abasi, 2018; Drescher, 2019).
3. **User Education:** Raising user awareness about the importance of intellectual property rights and the legal ramifications of infringement.

3. Civil Liability in the Metaverse

Civil liability refers to an individual's legal obligation to compensate for harm caused to another. In the metaverse, attributing civil liability for intellectual property (IP) infringement presents challenges due to the environment's complexity. One such challenge is identifying the responsible party. In many cases, metaverse users may be anonymous or use fictitious identities, which makes legal pursuit difficult (Forrest, 2019; Zwart & Lindsay, 2010).

Moreover, the role of metaverse service providers is also significant in allocating civil liability. Should these providers be held accountable for users' IP infringements? Some theories argue that metaverse service providers must take preventive measures to avert violations. However, limiting their liability is also necessary to allow them to continue operating (Sadeghi, 2010; Zart & Lindsay, 2010).

Civil liability in the metaverse entails defining the legal duties and obligations of individuals or entities in this virtual space that may arise from violations of others' rights—particularly in the domain of intellectual property. As a sophisticated digital environment that simulates social, economic, and legal interactions, the metaverse introduces novel challenges for civil law (Riemann, 2022; Russell, 2022; Safaei & Rahimi, 2012).

One salient issue is IP infringement. In the metaverse, users may create or use content such as images, music, and digital artwork. If such content is used without the permission of the original owner, civil liability for IP infringement arises (Bakhtiar, 2017; Safaei & Rahimi, 2012).

Another major concern is user identification. Because of anonymity or the use of virtual identities, identifying the responsible party in rights-violation cases becomes difficult. This can complicate law enforcement and compensation processes (Forrest, 2019; Zwart & Lindsay, 2010).

Metaverse service providers may also be held liable for the unlawful activities of their users. Such liability may include monitoring content or preventing violations of others' rights (Sadeghi, 2010).

To address these challenges, new rules and regulations must be designed that align with the metaverse's distinctive features. Likewise, raising awareness among users and service providers about their legal rights and obligations can help reduce violations (Fernandez & Hui, 2022; Richard, 2012).

4. Civil Liability in the Metaverse and Intellectual Property Infringement

4.1. Foundations of Civil Liability in Cyberspace

Civil liability in the metaverse is grounded in the general rules of civil liability (e.g., foundational principles analogous to Article 1 of the Civil Liability Act) and the legal principles governing cyberspace. In cases of IP infringement, liability may be attributed to the following parties:

1. **Metaverse users:** where works are copied or distributed without authorization.
2. **Hosting platforms:** where they fail to adequately supervise user content (Sadeghi, 2010).
3. **Software developers:** where they create tools that facilitate IP violations (Bastani Boroumand, 2007).

4.2. Challenges of Applying Civil Liability in the Metaverse

Applying civil liability in the metaverse is a complex and debated issue in information technology law due to the space's distinctive features and technical–legal intricacies. As a virtual environment where social, economic, and legal interactions occur digitally, the metaverse raises numerous issues involving intellectual property, privacy, and user rights. A core challenge is assigning civil liability in cases of IP infringement. For example, unauthorized use of artistic works or digital content in the metaverse can undermine creators' rights. However, identifying the infringer and enforcing existing laws in a decentralized and transnational space is difficult (Bakhtiar, 2017; Zwart & Lindsay, 2010).

Another significant challenge is defining the legal bounds and frameworks for user and corporate activities in the metaverse. Because of its cross-border nature, domestic laws may have limited applicability or may conflict with the laws of other countries

(Richard, 2012; Zart & Lindsay, 2010). Additionally, issues of digital identity and user anonymity add to the complexity of applying civil liability, since accurately identifying individuals requires more advanced tools (Zwart & Lindsay, 2010).

The absence of clear frameworks for supervising economic and financial activities in the metaverse—such as buying and selling digital assets or Non-Fungible Tokens (NFTs)—can increase fraud and rights violations (Riemann, 2022). Conversely, blockchain, a core metaverse infrastructure, due to its immutability and transparency, can both reduce abuse and raise privacy concerns for users (Abasi, 2018; Drescher, 2019).

To confront these challenges, there is a need for harmonized international legislation and enhanced legal literacy regarding emerging technologies. Cooperation among governments, international organizations, and technology companies can help create effective regulatory frameworks for the metaverse. Likewise, using advanced technologies such as artificial intelligence to detect violations and protect user rights can play a significant role (Fernandez & Hui, 2022).

1. **Determining judicial jurisdiction:** The metaverse's transnational nature complicates identifying the competent forum (Zart & Lindsay, 2010).
2. **Identifying offenders:** Anonymous avatars make it difficult to trace real-world users (Forrest, 2019; Zwart & Lindsay, 2010).
3. **Compensation of harm:** Valuing digital assets and quantifying damages is challenging (Bastani Boroumand, 2007).

4.3. *Legal Approaches to Resolving the Challenges*

To address IP infringement in the metaverse and allocate civil liability, various approaches have been proposed. One approach is to enact metaverse-specific legislation. Such rules may include provisions to protect IP rights and define the responsibilities of users and service providers (Safaei & Rahimi, 2012; Zart & Lindsay, 2010).

Another approach is to use emerging technologies such as blockchain to record and track digital works. By employing blockchain, ownership information can be recorded transparently and immutably to deter misuse (Abasi, 2018; Drescher, 2019; Paskat Dun, 2021).

As an advanced virtual environment, the metaverse presents numerous challenges regarding IP infringement and civil liability. These difficulties stem from its unique characteristics, including decentralization, virtual identities, and complex user interactions. To confront these issues, a variety of legal approaches have been suggested, discussed below (Riemann, 2022; Russell, 2022).

4.3.1. *Intellectual Property in the Metaverse*

Intellectual property comprises rights that protect intellectual creations such as literary and artistic works, inventions, and trademarks. In the metaverse, because content can be rapidly reproduced and modified, the concept becomes more intricate (Jafari Langarudi, 1999).

4.3.2. *Legal Challenges in the Metaverse*

– **Virtual identity:** Individuals use virtual identities in the metaverse, and verifying their real-world identity may be difficult. This can create problems in assigning civil liability for IP infringement (Daryabari, 2003).

– **IP infringement:** Unauthorized reproduction of artworks or the use of trademarks is easily achievable in the metaverse, necessitating more precise rules to protect rightsholders (Bakhtiar, 2017).

– **Decentralized architecture:** The metaverse's decentralized structure makes it difficult to delineate geographic boundaries and judicial competence (Zart & Lindsay, 2010).

4.3.3. *Allocating Civil Liability*

- **User liability:** Metaverse users must be accountable for their activities, and civil liability rests with them when they infringe IP rights (Safaei & Rahimi, 2012).
- **Platform liability:** Service-provider platforms must furnish tools to prevent IP infringements and may be held liable if they fail to do so (Sadeghi, 2010).

5. **Legal Strategies to Protect Intellectual Property in the Metaverse**

To protect IP in the metaverse—a complex virtual and digital environment—multiple legal strategies should be comprehensively examined and implemented. Distinct challenges arise, including IP infringement, unauthorized access to digital content, and unlawful use of creative works. Key strategies include:

5.1. *Enacting Metaverse-Specific Laws*

Given the metaverse's emergent nature, it is essential to adopt rules and regulations that directly address this space's legal issues. Such rules should provide precise definitions of IP rights in virtual environments and the mechanisms for their enforcement (Safaei & Rahimi, 2012).

5.2. *Creating Systems for Identifying and Registering Digital Works*

A practical measure for IP protection is to create digital identification and registration systems. These systems can employ blockchain to permanently and immutably record information related to works (Abasi, 2018).

5.3. *Using Smart Contracts*

Blockchain-based smart contracts can ensure that IP rights are executed automatically without intermediaries. Such contracts may embed terms of use, licenses, and payments (Abasi, 2018; Daryabari, 2003).

5.4. *Strengthening Supervisory and Enforcement Tools*

To combat IP infringement in the metaverse, it is necessary to develop advanced monitoring tools and foster international cooperation among legal institutions. These tools must be capable of identifying violations and taking appropriate legal action (Fernandez & Hui, 2022).

5.5. *User Awareness and Education*

Educating users about IP rights and the importance of compliance in virtual environments can play an effective role in reducing violations (Jahangir, 2012).

5.6. *Developing Protective Technologies*

Technologies such as advanced encryption and digital watermarking can help protect creative works in the metaverse by reducing unauthorized copying and facilitating identification of the rightful owner (Russell, 2022).

5.7. *International Cooperation*

Given the metaverse's global nature, cooperation among countries to craft common legal frameworks and to enforce international norms is essential; such cooperation can be supported through international organizations like WIPO (Hofstetter et al., 2022; Zart & Lindsay, 2010).

5.8. *Developing New Judicial Precedents*

Courts should develop new procedural approaches to metaverse-related disputes, grounded in a robust understanding of emerging technologies. These approaches must be flexible enough to keep pace with rapid technological change (Lastowka & Hunter, 2004).

6. Conclusion

The metaverse, as an emerging digital ecosystem, offers unparalleled opportunities for creativity and innovation. However, to fully harness these opportunities and prevent misuse, the establishment of comprehensive legal frameworks and the adoption of advanced technologies are essential. Protecting intellectual property rights benefits not only content creators but also ensures the sustainable development of the metaverse as a whole.

To address the challenges of intellectual property infringement in this environment, a coordinated and systematic legal approach is required. Traditional models of civil liability must be updated to accommodate the unique characteristics of the metaverse. The use of innovative technologies such as blockchain and the enactment of metaverse-specific regulations can substantially reduce the frequency of intellectual property violations.

As a complex and dynamic digital sphere, the metaverse simultaneously presents opportunities and risks in the realm of intellectual property law. Violations of these rights can have serious consequences for creators, underscoring the importance of legal reform and proactive protection mechanisms. Developing appropriate legislation, implementing modern technological tools, and promoting public awareness of intellectual property rights are crucial steps toward mitigating these issues.

Moreover, civil liability in the metaverse—due to its distinctive nature—requires a re-evaluation of conventional legal principles. Clarifying the responsibilities of users, platforms, and software developers in cases of intellectual property infringement remains a key concern. International collaboration to create shared legal frameworks, alongside the advancement of protective technologies such as smart contracts and digital watermarking, will be vital in fostering a trustworthy and equitable virtual ecosystem.

Ultimately, the article emphasizes that protecting intellectual property rights in the metaverse is not only in the interest of creators but also essential for the long-term stability and sustainability of this digital realm. Comprehensive legislation, the integration of cutting-edge technologies, and user education can together help minimize infringements and create a secure environment for digital innovation and participation.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

Acknowledgments

Authors thank all who helped us through this study.

Conflict of Interest

The authors report no conflict of interest.

Funding/Financial Support

According to the authors, this article has no financial support.

References

- Abasi, J. (2018). *Blockchain: An Introduction to Fundamental Concepts*. Mehrebaan Publishing Institute.
- Bakhtiar, A. (2017). *Civil Liability from a Comparative Perspective*. Mizan Publishing.
- Bastani Boroumand, M. (2007). Computer and Internet Crimes: A Novel Manifestation of Criminality.
- Daryabari, Z. (2003). Fundamentals of E-Commerce Responsibilities. *New World Insurance*.
- Drescher, D. (2019). *Fundamentals of Blockchain Translated by Bahram Pashaei and Mohammad Reza Samadzadeh*. Ailar Publishing.

- Fernandez, C. B., & Hui, P. (2022). Life, the Metaverse, and Everything: An Overview of Privacy, Ethics, and Governance in Metaverse. [No Journal Name Provided]. <https://doi.org/10.1109/ICDCSW56584.2022.00058>
- Forrest, K. B. (2019). Virtual Justice: New Technologies, New Challenges. *New York Law Journal*, 262(2), 1.
- Hasanzadeh, M. (2022). Metaverse and the Destiny of Information Systems. *Journal of Information Management Sciences*, 8(1).
- Hofstetter, et al., Lamberton, C., Reibstein, D., & Zhang, J. Z. (2022). Crypto-marketing: how non-fungible tokens (NFTs) challenge traditional marketing. *Marketing Letters*, 33(4), 705-711. <https://doi.org/10.1007/s11002-022-09639-2>
- Jafari Langarudi, M. J. (1999). *Legal Terminology*. Ganj Danesh.
- Jahangir, E. (2012). *Shi'ism in Cyberspace: A Social Approach*. Imam Khomeini Educational and Research Institute Publishing.
- Lastowka, F. G., & Hunter, D. (2004). The Law of the Virtual Worlds. *California Law Review*, 92(1), 57-66. <https://doi.org/10.2307/3481444>
- Paskat Dun, A. (2021). *The Blockchain Revolution Translated by Mazyar Motamed*. Rahpardakht.
- Richard, K. M. (2012). *Democracy and Cyberspace Translated by Abdolreza Zakout Roshendell*. Media.
- Riemann, M. (2022). *Entering the Metaverse: How the Immersive Internet Will Unlock a Trillion-Dollar Social Economy*. Wiley.
- Russell, J. (2022). *Metaverse: A Guide to Entering the Amazing World of the Metaverse Translated by Kamal Ali Taghavi*. Rahpardakht.
- Sadeghi, H. (2010). Civil Liability of Intermediaries and Providers of Electronic Communication Services. *Quarterly Journal of Law*, 41(2).
- Safaei, S. H., & Rahimi, H. (2012). *Civil Liability*. Samt Publishing.
- Zart, M. D., & Lindsay, D. (2010). *Governance and the Global Metaverse*. BRILL.
- Zwart, M. D., & Lindsay, D. (2010). *Governance and the Global Metaverse Emerging Practices in Cyberculture and Social Networking*. https://doi.org/10.1163/9789042030831_005