

NAVIGATING THE METAVERSE: UNDERSTANDING INTELLECTUAL PROPERTY RIGHTS CHALLENGES

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Abstract

The article discusses the emergence and growth of the metaverse, an online virtual world consisting of interconnected three-dimensional spaces. It traces the historical roots of the metaverse concept and its recent explosion, and the article emphasizes the importance of Intellectual Property Rights (IPR) in safeguarding the creations and innovations within this digital realm. The role of IPR in the metaverse is examined, particularly regarding patents, trademarks, and copyrights. Copyright issues are explored, especially in open metaverse platforms, where determining ownership and infringement can be complex. The article also discusses legal statutes and implications applicable in the metaverse, law enforcement strategies, and the need for IP protection in the metaverse, along with opportunities and challenges for IP owners.

Keywords: Metaverse, Intellectual Property Rights, Trademark, Patents, Copyright.

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1. INTRODUCTION

The American filmmaker Morton Heilig patented Sensorama, a machine that replicated the experience of riding a motorcycle through New York City in a virtual world. Sensorama, patented in 1962, was one of the earliest pre-metaverse virtual world patents. Since then, the metaverse world has undergone a massive change and is currently regarded as the fourth industrial revolution. Metaverse is an online virtual world with a series of three-dimensional connected spaces called ‘Metaverse World.’ Metaverse allows individuals around the globe to interact with each other, attend concerts, deal in real estate, and conduct various businesses. Metaverse uses immersive online technology such as Augmented Reality and Virtual Reality to make the virtual experience a simulation of the actual world.

Intellectual Property Rights (IPR) are intangible creations of human intellect and creativity. Various forms of IPR, such as patents, copyrights, trade secrets, and trademarks, safeguard these properties of the human mind. IPR restricts producers from copying goods guarded by IPR; this enables owners of IPR to receive economic incentives for a specific time. With the advent of the metaverse, the scope of software and equipment development has increased exponentially, leading producers to produce cheaper and more durable devices to enhance customers’ experience. It directly correlates with the IPR, as more patentable inventions would emerge.

1. History of the metaverse

Metaverse has gained significant popularity and growth in the last two decades; however, the metaverse concept is familiar and dates back to the 19th century. It started with scientist Sir Charles Wheatstone outlining the concept of binocular vision, which combines two images (one from each eye) to make a single 3D image. It transcends into the development of stereoscopes, a technology responsible for developing modern V.R. headsets. Stevenson first used the word ‘metaverse’ in 1982; his novel Snow Crash transported characters to a virtual place to escape the dreary reality of the actual world. The novel sparked public interest, leading to the wide-scale commercial release of V.R. headsets in the 1990s. After that, there was a slight dip in the popularity of the metaverse until Palmer Luckey, an 18-year-old entrepreneur,

created a prototype of the Oculus Rift VR headset in 2010 that used a 90-degree field of vision and computer processing power.

The gaming sensation and craze amongst teenagers led to the speedy popularity of the metaverse. Sensing the popularity of the metaverse, Facebook acquired Oculus in 2014 in a \$2 billion deal. Facebook founder Mark Zuckerberg aimed to integrate Facebook and Oculus to develop the Oculus platform to support more games. 2014 was a busy year in the metaverse segment as many famous companies like Google and Samsung developed their own V.R. headsets. 2016 further evolved metaverse technology by the amalgamation of V.R. and A.R. (Augmented Reality), which resulted in the concept of Microsoft's Hololens that uses Mixed Reality (merger of V.R. and A.R.) to create a holographic image that puts in the real world by manipulating augmented reality. Augmented Reality gathered immense popularity in 2016 through the Pokemon Go game, a game based on Augmented Reality that asked people to catch Pokemon to win the game.¹

Apart from gaming, the concept of metaverse gathered significance when it allowed people comfort in their daily lifestyle through the introduction of apps such as 'Place app,' which enables users to select a piece of furniture, which then makes use of the technology to provide the customer a sense of view of what the table would look like in home. Tech giants such as Apple introduced Light Detection and Ranging (LIDAR) in 2020, which ²creates better depth scanning for better photos and A.R. that paves the way for mixed reality headsets in the future. Facebook changing its name to Meta in 2021 has created the most buzz in the sphere of the metaverse, indicating a potential shape-up of the world in the form of the metaverse.³

2. Role of IPR in the metaverse

Finance, entertainment, education, and gaming will significantly contribute to the metaverse sphere. Economic predictions regarding the metaverse economy have been made, predicting it to reach a \$5 trillion economy by 2030. In the era of Web 3.0, we are already witnessing a

¹ Oluwademilade Afolabi, 'Constructing the Metaverse The Technologies that Power the Virtual World', (Make Use Of, September 15, 2022) <<https://www.makeuseof.com/constructing-the-metaverse-technologies-that-power-the-virtual-world/>> November 16, 2022.

² Ashish Deshmukh, 'Intellectual Property Rights in the Metaverse', (Indian Journal of Corporate Law and Policy, September 11, 2022) <<https://ijclp.com/intellectual-property-rights-in-the-metaverse/>> November 15, 2022.

³ Linda Tucci, 'What is the metaverse? An explanation and in-depth guide', (WhatIs.com, November 18, 2022) <<https://www.techtarget.com/whatis/feature/The-metaverse-explained-Everything-you-need-to-know.>> November 15, 2022.

humongous amount of transactions occurring in the metaverse through cryptocurrency (virtual currency based on blockchain technology). The volume of transactions in cryptocurrency will increase manifold in the future. With the emergence of the dominance of the metaverse as a technological clout, owners need to preserve their work of the intellect. This is where Intellectual Property Rights step in and assure the owners that others would not copy their work.

The challenging question before IPR is whether it will effectively regulate activities in the metaverse. The past few decades have seen the Internet taking over all aspects of human life, such as e-commerce and other activities. Although the Internet has made life easy, it is prone to various cybercrimes, frauds, and other criminal activities involving technology usage. Countries with solid Internet presence have established strong digital regulations to deal with such issues. IP law is also one of the findings of the Internet age that ensures the protection of the work of original owners. While civil legislation concerns the ownership of tangible objects, IP law deals with intangible things like the metaverse. IP law in the metaverse upholds the rights of inventors, owners, and designers, which consequently empowers the rightsholders to prosecute a party for infringing their rights granted by IP law.

The era of **Web 3.0** has been a revelation in terms of technological inventions; with the metaverse dominating the **Web 3.0 revolution**, stories in the areas of Augmented Reality and Virtual Reality have grown exponentially and will continue to grow in the future. IPR will play an active role in establishing a virtual trademark domain; the software will be distinguished from each other in the form of sound marks and moving image marks as far as the trademark is concerned. Metaverse brings with it a whole new set of challenges. The phase of the metaverse will involve the establishment of a new category of goods and services, such as downloadable virtual goods, online entertainment facilities, and retail store services for virtual goods. In the present virtual world, users cannot easily switch from one platform to another; the metaverse differs significantly from the current virtual world scenario as it allows users seamless platform-switching. The imbroglio can be solved by redefining the present licensing structure of the IPR to solve issues of licensing, authorization, territoriality, and infractions. A

new modified licensing design will enable the clear-cut distinction of territory and licensing scope of an entity.⁴

3. Trademark in the metaverse

Trademarks are a symbol that distinguishes the goods and services of one enterprise or company from another. Intellectual Property Rights protect trademarks; in the real world, companies enjoy their autonomy protected by IP law, and the same shall be experienced in the metaverse world. Trademarks provide for effective branding and promotion of a company by allowing customers to identify a particular good or service in association with a company. In *Nandhini Deluxe v. Karnataka Co-Operative Milk Producers Federation Ltd.*⁵, the court ruled that trademark registration in legal services in the virtual world and footwear is permitted under Class 42 of the Fourth Schedule of Trademark Rules, 2002⁶.

Expansion of the metaverse has already led some prominent business corporations, such as Nike and Converse, who have contemplated selling virtual goods, to file for trademarks under the United States Patents and Trademark Office. Entertainment, fashion, and cosmetics companies are filing applications in enormous numbers to establish their foothold. The companies are filing applications in the segments of downloadable virtual goods, retail store services concerning virtual goods, financial services, and other such sectors. The active participation of leading companies will ensure the standardization of the entire trademark process, which will later serve as a general procedure in the metaverse world, thus marking the territory and interoperability of an entity.⁷

There are specific issues associated with Trademarks in the metaverse:

3.1 Jurisdiction

If a company in a foreign country infringes an Indian trademark, whether the principle of '**Long Arm Jurisdiction**' applies in the metaverse world as observed in *Swami Ramdev vs.*

⁴ Shawaiz Nisar, 'Metaverse is a virtual reality world', (Khurana & Khurana Advocates and IP Attorneys, March 17, 2022), <<https://www.khuranaandkhurana.com/2022/03/17/ip-protection-metaverse-is-a-virtual-reality-world/>> November 16, 2022.

⁵ *Nandhini Deluxe v Karnataka Coop Milk Producers Federation Ltd* (2018) 9 SCC 183.

⁶ Trade Mark Rules, 2001.

⁷ Kathryn Park, 'Trademarks in the metaverse', (World Intellectual Property Organisation Magazine, March 2022), <https://www.wipo.int/wipo_magazine/en/2022/01/article_0006.html> November 13, 2022.

Facebook. In *World Wrestling Entertainment vs. Reshma Collection*⁸, the Delhi High Court held that the court might have jurisdiction over where the party resides. However, the conundrum lies in whether it will be universally applicable.

3.2 Use of licensing

The pertinent question is whether the trademark application in the real world will be applicable in the metaverse. In *Tata Sons Limited vs. Greenpeace International*⁹, the court held that the unauthorized use of a trademark within a game to criticize the defendant was merely a parody and would not amount to trademark infringement. Such decisions leave ambiguity in determining how a brand would be protected in the metaverse world.

3.3 Unauthorized usage of trademark

Trademarks in the metaverse are more susceptible to misrepresentation; for instance, an avatar might be wearing trademarked footwear of Converse, whether such usage in the virtual world is a trademark infringement or not. Determination of the extent of use of a trademark is an exciting question before a court.

Although trademarks in the metaverse are a new concept, certain cases have appeared before the court regarding infringing a trademark in the metaverse.

In *Arm Ltd. v. Privacy Service Provided by Withheld for Privacy*¹⁰, the defendant used the trademark associated with a famous company, reasoning that he used the brand for personal use as the metaverse concept became famous in 2021, and he was unaware of the trademark already being used. The court ruled in favor of the petitioner, ordering the disputed domain to be transferred in the petitioner's name.

In *Meta Platforms, Inc. v. MaxLike Net*¹¹, the petitioner was Meta Platforms, a social technology company based in the US; they filed a petition stating that the defendant is using a domain name similar to the one the Meta company is using. The court ruled that the petitioner is the domain name's rightful owner and is entitled to their claims.

⁸ *World Wrestling Entertainment Inc v Reshma Collection* (2016) SCC OnLine Del 6011.

⁹ *Tata Sons Limited v Greenpeace International* (2011) SCC OnLine Del 466.

¹⁰ *Arm Ltd. v Privacy Service Provided by Withheld for Privacy ehf* (2022) SCC OnLine WIPO 587.

¹¹ *Meta Platforms Inc v MaxLike Net* (2022) SCC OnLine WIPO 575.

4. Patents in the metaverse

The renowned tech companies have filed many patent applications to protect technologies they developed in the metaverse. The developments in Augmented Reality and Virtual Reality (making the user experience more realistic) and blockchain technology have urged tech companies to file for more patents. A technology tracking the users' eye movements and facial expressions in the metaverse has garnered more attention from tech companies in filing patents.

Patents in the metaverse are dealt with under three vertical heads:

- Firstly, the metaverse technology's patent is further divided into software and hardware components. Regarding hardware, a patent is essentially sought for Augmented Reality and Virtual Reality objects. If a software-based invention has a technical application or implementation, that software component can be considered for a patent.
- Secondly, patented technology already exists in the real world; if it is used in the metaverse in virtual form (Virtualization of patents), it will lead to infringement.
- The third and final head is intriguing as it deals with the patents created by the avatars in the metaverse. Recently, Bhargav Sri Prakash, an Indian entrepreneur, was awarded a patent by the U.S. for the first 'Digital Vaccine' he invented and tested in the metaverse sphere.

Some of the companies that have filed for patents in the metaverse are:

4.1 Apple

Apple filed for a patent before the USPTO (United States Patent and Trademark Office) in 2021 for a technical solution developed to block an avatar on the metaverse platform to prevent users from violating the rules of interaction.

4.2 Meta (Facebook)

Facebook changing its name to Meta took the internet by storm as discussions regarding the expansion of the metaverse world took place in large numbers. Meta filed a patent for a technology aimed at enhancing user engagement. The technology allows the customization of

locations and objects in the metaverse, making the interaction between users and the virtual world more engaging.¹²

5. Copyright in the metaverse

There are two types of metaverse on which the extent of creativity and ownership of a copyrighted work depends.

- **Open metaverse:** An open metaverse is a decentralized platform where users can build new elements. Open metaverse requires a license to introduce new features and for community users to use the added detail. Decentraland is an example of an open metaverse.
- **Closed metaverse:** Unlike an open metaverse, a closed metaverse is a centralized platform. In a closed metaverse, users cannot build new elements; the ownership of the forum and its features are entrusted to the owner. The video game Fortnite is an example of a closed metaverse.

From the definition of the open and closed metaverse, it is evident that most issues about copyright are associated with an open metaverse as it becomes challenging to determine whether the owner or the users in the metaverse are the rightful owners of the work.

In India, the issues of copyright are governed by the **Indian Copyright Act, 1957**¹³, as per the Act; unless there is any contract to the contrary, including any terms of usage of the platform, the author of the works would be the owner of the copyright of such works. Copyright issues in the metaverse are also governed by this act, which states that the natural person responsible for creation is the work's original owner.¹⁴

6. Copyright Infringement Issues

¹² Ryan N. Phelan, 'United States: Exploring the Metaverse and Patent Related Topics', (Mondaq, July 4, 2022), <<https://www.mondaq.com/unitedstates/patent/1208378/exploring-the-metaverse-and-patent-related-topics>> November 16, 2022.

¹³ The Copyright (Amendment) Act, 1957.

¹⁴ Marshal Gerstein, 'United States: Exploring the Metaverse and Patent Related Topics', (Mondaq July 4, 2022), <<https://www.mondaq.com/unitedstates/patent/1208378/exploring-the-metaverse-and-patent-related-topics>> November 16, 2022.

These are the issues associated with copyright infringement in the metaverse world:

1. Most of the copyright issues about the software involved the creation of the metaverse. For instance, if a music concert is in the metaverse, different licensing, such as public performance license and license for reproduction of the work, must be acquired separately, making it challenging to identify the rightful owner of the job due to overlapping rights.
2. The work of the virtual world can infringe on the copyrighted work of the physical world and vice-versa. For instance, the Hermes brand sued an artist for producing the copyrighted work of the brand in the virtual world.
3. Detection of copyright infringement and copyright infringement is the fundamental issue. It is challenging to look for the infringer on platforms like Decentraland and Sandbox as they are blockchain technology, making tracing tricky. In the future, there is a need to develop advanced technologies to detect such infringement.

7. Legal statutes and its implications

Metaverse is in the developing stages; therefore, the legal framework regarding it is close to nothing. However, the future growth prospects of the metaverse show a need for an exhaustive and efficient legal structure. Although the metaverse does not have a unique set of laws, there are specific laws to consider in case of legal disputes.

7.1 Contract Law

Contract laws in the real world establish a legal relationship between two or more parties. The same rules are applicable in the metaverse involving renting and selling virtual goods and services. Likewise, in the real world, a breach of contract makes a party liable in the metaverse.

7.2 Copyright Law

The act of propagating real-world work of a copyright owner in the metaverse by a person as his own is liable under Copyright law. Even if the work is similar and not the same, it would still fall under a breach of copyright law.

The court can stop any avatar created in the metaverse from impersonating any brand, organization, or entity. The court grants monetary remuneration to the party whose rights have been infringed.

7.3 Tort Law

Tort law applies in the real world in civil cases such as trespassing, personal injury, etc. The law's applicability will remain the same in the virtual world, and the offender will be liable for damages, such as property damages, personal injuries, etc.

7.4 Defamation Laws

Defamation laws are prevalent to stop another person from injuring a person's reputation in front of a third party. The rules are treated homogenously in the metaverse, where an individual can be held liable for damaging the reputation of another person in the virtual world. Any remark made by an individual aimed at hampering another person's standing in the metaverse will have the same implications as in the real world.

7.5 Berne Convention

The Berne Convention was adopted in 1886 to protect literary and artistic work. Berne Convention provides artists, authors, musicians, poets, etc., a means to control their artwork by defining who can access their work and terms regarding the same. Currently, 181 countries have ratified the convention that grants exclusive rights to the owners of the artwork to preserve their work, regardless of the type and form of expression.

Berne Convention is supplemented with international agreements, such as the WIPO Copyright Treaty, adopted in 1996, which extends the territory of artwork to the digital arena, such as the metaverse. **Article 1(4)** of the WIPO Copyright Treaty¹⁵ allows storing artwork in digital forms in an electronic medium, such as an NFT, whose content is displayed in the metaverse. **Article 1(4)** states that storage of the work created in the real world in the virtual world is a reproduction of the work, and prior permission of the owner should be taken to prevent copyright infringement.

¹⁵ WIPO Copyright Treaty (1996), art 1(4).

8. Law enforcement strategies in the metaverse

Metaverse is a global market where various business competitors from all over the world compete with each other; such hardcore competition might lead individuals or businesses to use unfair means. Adopting a proactive approach to curb copyright and trademark infringement is pertinent to resorting to more advanced investigation methods. Along with regular monitoring, virtual investigators (automated systems, artificial intelligence, and individuals) must be deployed to thoroughly investigate IP infringement.

A host server outside the IPR holder's country can pose challenges to online enforcement, so laws in each country may have to be individually analyzed to assess local notice-and-takedown procedures and website-blocking mechanisms. IP enforcement tends to occur through administrative procedures, whereas court injunctions in countries with more mature IP practices are more common and accessible. Regardless, collecting infringing evidence is a crucial preliminary step, and it may be most effective to focus on comprehensive trademark and patent prosecutions in countries with large numbers of users.¹⁶

9. Need for IP protection in the metaverse

Metaverse is an ever-expanding domain at the center of the **Web 3.0** revolution. *Metaverse* is a universe that allows a phenomenal growth opportunity for people in business and individuals for their growth. The following are the reasons for IP protection:

- IP protection is instrumental as it maximizes potential return on investment in the metaverse.
- Metaverse is prone to copyright and trademark infringement, leading to dilution of return on the investment. Therefore, it is necessary to have IP protection for virtual goods and services.
- Metaverse offers a global platform for users to carry out their trades and businesses, but without IP protection, the users can become vulnerable to lawsuits from other competitors.

¹⁶ Tilleke & Gibbins, 'Thailand, Immersing Intellectual Property Rights in the Metaverse', (Mondaq, February 1, 2022), <<https://www.mondaq.com/trademark/1156298/immersing-intellectual-property-rights-in-the-metaverse>> November 18, 2022.

- Nowadays, investors look for the potential IP valuation of the company before investing. A firm IP valuation indicates the business's potential in the higher spectrum.

10. IPR protection in the metaverse

With the expansion of technological innovations, a significant chunk of investment and business in the metaverse will take over the company in the real world; therefore, protecting IP in the metaverse becomes essential. The following methods should be followed to preserve IPR:

1. Filing patents, copyrights, and trademarks in massive numbers is one of the best ways to protect an owner's intellectual property. Patents, copyrights, and trademarks confer legal rights upon the owners and protect the product from being infringed by others.
2. A thorough analysis of intellectual property makes an owner aware of already registered patents, thus preventing infringement of IP
3. Secrecy is paramount for protecting IP; therefore, privacy policies and agreements are essential for protecting data. Strong passwords and robust security measures prevent unauthorized access to IP
4. It is pertinent to keep track of the IP portfolio to ensure the accountability of assets, preventing any infringement of IP

11. Opportunities for IPR owners in the metaverse

Metaverse is an emerging field in technological innovations that allows owners to experiment. It has led to the emergence of the latest A.R. and V.R. devices to enhance user experience and give them a user-friendly experience. A blend of V.R. and A.R. is the focal point of innovation, giving birth to the concept of Mixed Reality (technology for combining virtual and physical worlds).

The development of new technologies widens the scope of intellectual property, leading to an increased filing in software-related technologies. Non-traditional trademarks (moving images, sound marks) are likely to be used to provide an immersive experience in the metaverse. Moreover, it will be imperative for IP owners to consider the proper classification of these new trademarks since they will be used with new types of goods and services. The inception of new

online platforms provides an opportunity to introduce the latest patentable technologies and copyright protection for software-related inventions and games, including patents for blockchain-related technologies and cryptocurrencies.

12. Future of IPR in the metaverse

IPR has an exciting and promising future in the metaverse owing to rapid expansion and technological advancements; technologies like A.R. and V.R. will dominate the virtual world. IP laws in today's scenario work fine, but the same is not a certainty in the metaverse globe. The shift to virtual reality may also create additional issues related to maintaining the confidentiality of trade secrets. As establishing appropriate measures to maintain secrecy is one of the fundamental legal requirements for protecting trade secrets, the virtual landscape will require new methods to keep this secrecy beyond the orthodox techniques of signing nondisclosure agreements or limiting access to biometric technology.

To match the pace of technological advancements in the metaverse, IP laws must proactively assess and prevent any possible cause of infringement. Though a complete overhaul of IP laws is not required in the metaverse, numerous aspects must be incorporated into the law to make it highly robust and exhaustive. As discussed earlier, it is challenging to catch infringement in the virtual world due to the strong foothold of blockchain technology; there is a dire need to bring Artificial Intelligence into use or to develop a mechanism through various technological innovations to catch any breach of IP law in the virtual world.

Non-fungible tokens, or NFTs, are called cryptographic tokens because they are based on blockchain technology. NFT separates itself from cryptocurrency because cryptocurrency is a fungible token that can be exchanged. At the same time, NFTs possess unique characteristics, making them irreplaceable and can not be interchanged. A domain name, games, digital collectible, or fashion display can be considered an NFT. NFTs are touted to be conducive to developing the landscape of IP law in the metaverse. The NFT technology embeds and establishes rights and the content associated with the goods and services. Information such as the descriptions of the relevant product, its ownership history, the scope of the appropriate rights, etc., are attached. When embedded at the point of purchase, this information clarifies the product's authorized and unauthorized uses. Furthermore, this information remains attached

to the product throughout its digital lifecycle, even when it moves from one platform to another. NFTs are considered one of the most effective ways of protecting a brand's IP.

13. Conclusion

In conclusion, as the metaverse continues to evolve and expand, it brings both tremendous opportunities and complex challenges for Intellectual Property Rights (IPR) protection. The metaverse represents a new frontier for innovation, creativity, and economic growth, but without effective IPR safeguards, it could also become a breeding ground for infringement and disputes.

To address the IPR challenges posed by the metaverse, a multifaceted approach is needed:

- **Revised Licensing Structures:** Given the unique nature of the metaverse, where users can seamlessly switch between platforms, it is crucial to adapt existing licensing structures. This adaptation should aim to clarify territoriality and licensing scope for IP entities, ensuring that creators and owners have a clear understanding of their rights and responsibilities.
- **Trademark Protection:** Trademarks play a crucial role in branding and distinguishing products and services in the metaverse. Standardization of trademark processes, driven by leading companies, can help establish a clear framework for trademark protection, ensuring that businesses can protect their identities and assets.
- **Patent Filings:** Technology companies are filing numerous patents related to the metaverse, covering both hardware and software innovations. Patent filings should continue to be a priority, as they offer legal protection and incentivize further innovation in this digital realm.
- **Copyright Considerations:** Copyright issues in the metaverse, particularly in open metaverse platforms, are complex. Copyright laws should be enforced, and digital technologies, such as NFTs, can be employed to embed and establish rights for creative works. Advanced tools should also be developed to detect and prevent copyright infringement.
- **Legal Framework:** The legal framework for the metaverse is still in its infancy, but it must evolve to address the unique challenges posed by this digital space. Existing laws, including contract, copyright, defamation, and tort laws, should be adapted to the

metaverse context. International agreements like the Berne Convention and the WIPO Copyright Treaty should be extended to cover the digital arena.

- **Law Enforcement Strategies:** Proactive approaches to enforce IPR in the metaverse are crucial. Virtual investigators, automated systems, artificial intelligence, and individuals should collaborate to investigate and curb IP infringement. Lawsuits and court injunctions, when necessary, should be pursued in countries with large metaverse user bases.
- **Privacy and Security:** Protecting intellectual property also involves safeguarding data and trade secrets. Privacy policies, agreements, strong passwords, and robust security measures are essential to prevent unauthorized access to valuable IP
- **Global Perspective:** The metaverse is a global market, and IP owners must consider global IP protection strategies. Filing patents, copyrights, and trademarks internationally can help protect IP assets in various jurisdictions.

In the future, IPR in the metaverse will continue to evolve as technological advancements reshape the digital landscape. It is imperative that IP laws keep pace with these changes, leveraging emerging technologies such as blockchain and NFTs to provide robust protection for creators and innovators. As the metaverse becomes increasingly integrated into our lives, effective IPR protection will be essential to foster innovation, creativity, and fair competition within this exciting new digital frontier.