
BLOCKCHAIN INTEGRATION AND TRADEMARK PROTECTION IN THE INDIAN METAVERSE: BRIDGING LAW AND TECHNOLOGY

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ABSTRACT

The metaverse reflects a new frontier where ownership, identity, and commerce are increasingly defined through blockchain technology. This paper identifies how the existing trademark framework in India-hinged on the Trade Marks Act, 1999-fails to address questions of ownership and infringement within decentralized, virtual ecosystems. Although blockchain provides transparency and verifiable proof of digital assets, Indian law is based on territorial notions of "use" and "jurisdiction," thus making enforcement difficult. The study thus identifies this gap and provides a hybrid legal-technological model incorporating blockchain into India's trademark system to allow for legally enforceable and technologically verifiable protection of virtual assets. Based on doctrinal and analytical methodology, this paper analyzes how blockchain records could form the basis of admissible evidence, smart contracts could accelerate licensing, and what statutory reforms are required to revamp the existing Indian IP regime. It further proposes the establishment of a Blockchain-Enabled Trademark Registry and policy coordination between NITI Aayog, MeitY, and private innovators. It submits, lastly, that India's future preparedness in digital governance will ensue from harmonization of law and technology-the building of a trademark regime capable of protecting intellectual property in the times of the metaverse.

Keywords: Metaverse, Blockchain, Trademark Law, Digital Ownership, Intellectual Property Rights, India

1. Introduction

The metaverse signifies a transformational shift in how the concepts of ownership, identity, and value are being conceptualized in the digital era. It refers to a common virtual ecosystem built on such technologies as augmented reality, virtual reality, and blockchain, wherein users can interact, trade, and own digital assets through virtual representations. NFTs here have established the base for owning digitally, which allows a user to verify the authenticity and uniqueness of the virtual goods in this connected space. In the rapid expansion of such blockchain-based economies, the creation, exchange, and attributing of values in online environments have been reimaged. This, on the other hand, has rewritten the traditional legal concepts pertaining to ownership and intellectual property rights.

But with the rise of these virtual currencies also come some very confusing questions of trademark protection and legal title. Traditional intellectual property systems were developed for physical products within clearly defined commercial transactions. These systems rely heavily on geographic jurisdictions, physical use, and clear market boundaries—all disrupted by decentralized digital ecosystems. Thus, transactions occurring across borders and cloaked in anonymity, the enforcement of trademark rights or the determination of ownership in a metaverse becomes an overwhelming task. This will require a continuing evolution with regards to how the legal systems think about and administer intellectual property in a digital-first economy.

In the Indian context, the Trade Marks Act, 1999 lays down the principal statutory regime for protection against infringement of brand identity. However, this statute was a product of an era which relied upon tangible trade and thereby does not clearly relate to the concepts of virtual goods and blockchain-verified goods. Concepts such as "use in trade," "distinctiveness," and "territorial protection" are hard to apply in environments that are decentralized and bereft of any physical presence with functional jurisdictional boundaries. Hence, the legal regime of India suffers from an interpretive gap—the consequences of which are that digital trademarks and assets are bereft of protection in the nascent virtual spaces. This research identifies a pressing lacuna within the prevailing scholarship and policy discourse in India: while blockchain and intellectual property are debated separately, few works have explored how these two areas can be integrated into one

legal framework. This paper thus contends that integration of blockchain within the Indian trademark system will provide a workable and forward-looking solution. By marrying blockchain's ability for transparent, tamper-proof verification with the legal authority of the Trade Marks Act, India can create a hybrid legal-technological architecture that guarantees both legal legitimacy and technological verifiability of digital ownership in the metaverse.

2. Background and Context

The IP system in India has transformed much over the last two decades, yet its conceptual base is still stuck in a physical-world-of-goods and physical-trade paradigm.¹ The Trade Marks Act, 1999, the principal legislation governing the protection of trademarks in India, was enacted for protecting brand identity and averting consumer confusion and unfair competition.² The definition of a trademark under the Act goes thus: "a mark capable of being represented graphically, which is capable of distinguishing goods or services of one person from those of another." This, in itself, intrinsically presupposes physical trade and physical territorial jurisdiction, where infringement occurs through visible imitation or misuse in some form in a defined marketplace.³ However, all this has been largely challenged with the emergence of the metaverse and the digital asset economy.

Therefore, the metaverse constitutes a self-defined, boundary-less virtual reality where these digital assets are created for trading purposes, with the latter being backed by a blockchain-validated ownership position. Such assets are NFTs, which carry infinite value in their economic or cultural significance. However, unlike other goods, these digital assets would entirely operate in virtual reality platforms or could be traded on a global network without any possession in the physical sense. This further complicates the difficult application of the concepts of "use," "ownership," or "infringement" related to an intellectual property right like trademarking in Indian law⁴. For example, the need for a trademark to be "used in trade" or "in the Indian territory" would

¹ Shamnad Basheer, *Intellectual Property Law in India* (2d ed. 2019).

² Trade Marks Act, No. 47 of 1999 (India).

³ *Cadila Healthcare Ltd. v. Cadila Pharm. Ltd.*, (2001) 5 SCC 73 (India).

⁴ *Christian Louboutin SAS v. Nakul Bajaj*, 2018 SCC OnLine Del 12215 (India).

start becoming contentious with the global trade being carried out through a boundary-less global blockchain network.⁵

Besides this, the decentralized nature of blockchain indicates that the ownership information is recorded in distributed ledgers, whereby no single authority exercises control. While that has added to the aspect of transparency, it has simultaneously brought into question several legal and procedural issues, such as: To what extent would blockchain records be admissible as evidence of ownership under Indian law? How would Indian authorities be able to enforce rights when the infringers are operating through anonymous identities created on blockchains? These issues are showing a big gap between the technological capability and legal enforceability under IPR law in India.

The Indian administration and courts of justice have only now awakened to recognize the power of blockchain in governance and evidence their role. Certain reports, such as "Blockchain: The India Strategy" by NITI Aayog 2022, have iterated their benefits in ensuring transparency and reducing fraud. Yet the integration of such technologies within IP protection remains underdeveloped. Therefore, Indian trademark law rests on conventional documentation and centralized registries; it is hence not in a position to deal with digital trademarks or even NFT-based assets. This context underlines the need for a hybrid framework-a framework that carries within it the legal safeguards of the Trade Marks Act and the verification and traceability mechanisms of blockchain. This integration modernizes not just India's trademark regime but also secures creators and businesses in a more digital and decentralized world.

3. Literature Review: Integrating Blockchain with Indian Trademark Law

Due to the developing digital economy and the development of the metaverse, researchers are trying to investigate the importance of existing intellectual property laws. Currently, in India, the topic of trademark protection in cyberspace remains in its initial stages. Most scholarly works in India cover either intellectual property law development or advancements in technology but not

⁵ World Intellectual Property Organization (WIPO), *Blockchain and Intellectual Property* (2019).

both. This shows that research nowadays is missing an important aspect: it is no longer sufficient to talk about intellectual property law or technology without covering both topics simultaneously.

From a legal perspective, various research works by Indian scholars Narayan (2022)⁶ and Bhatia (2023)⁷ discuss the limitations of the Trade Marks Act, 1999 with respect to issues that arise in digital or virtual environments. These research works state that “The Indian trade mark law is decidedly framed within a physical-market mindset that assumes physical products, hard-to-identify wrongdoers, and geographically limited reach.” Narayan states that even though the Act safeguards the distinctiveness of brands, it does not, by current interpretation of “use in trade,” provide for virtual trade. Again, Bhatia states that digital copies of trade marks like NFTs of logos or trade mark designs lie in a “legal grey area since they do not fall under the goods/services dichotomy of the Act.”

On the technological front, authors such as Saxena (2023)⁸ and Patel (2022)⁹ discuss the usefulness of blockchain as a trust infrastructure that is capable of authenticating authenticity, timing, as well as establishing irrefutable proof of ownership. These authors point out that since it is a decentralized, open network, the authenticity issues of counterfeiting, as well as proof of ownership, could be alleviated through the use of blockchain technology. At the same time, these authors accept that the usefulness of blockchain is contingent upon it being recognized by law as part of the judicial formalism of intellectual property enforcement.

Connecting these two areas, Bhattacharya (2024)¹⁰ proposes the concept of a hybrid IP protection framework, pointing out that “blockchain should not replace or override existing laws but work alongside it.” This author’s contribution confirms that including blockchain technology into current legislation could provide a better, more effective, and clear system for digital rights protection. Yet, it is still a theoretical area of study in the Indian context with no models or legislation in place. Therefore, the literature clearly shows that there is a research gap between the

⁶ Narayan, *Trademark Law in India and Its Limitations in Digital Environments* (2022).

⁷ Bhatia, *NFTs and Trademark Law: Emerging Legal Challenges in India* (2023).

⁸ Saxena, *Blockchain and Intellectual Property Rights in India* (2023).

⁹ Patel, *Trademark Protection in the Digital Age: Challenges and Reforms* (2022).

¹⁰ Bhattacharya, *Blockchain and Intellectual Property: Towards a Hybrid Protection Framework* (2024).

availability of research on digital trademark law in India, as well as research related to the application of blockchain technology, while there is little research that connects both concepts together. This research would like to fill that research gap by developing a concept where the verification processes of blockchain technology could be linked with trademark registration in India. This could become a basis for a new type of trademark law in the metaverse that is both legal and technological.

4. Research Objectives and Guiding Questions

This transition from a physical to a digital economy demands a re-think of legal systems on the best means of protecting ownership or identity online globally. This is especially important for India with its need to balance the demands of its developing digital economy with its current legal framework that is still rooted in traditional concepts. This development of blockchain technology in metaverse is new and it challenges the the framework of trademark law in India. Currently, the law that is relevant is governed by the Trade Marks Act of 1999, which is relevant for material goods/services, with no clarity on how it is to be applied for digital goods, NFTs, or any other type of blockchain assets. It is with this context that the thesis focuses on the application of blockchain for India's trademark law related to digital ownership.

This paper, therefore, aims to provide a hybrid legal-technological model that seeks to connect the evidentiary value of blockchain with the legal authority of trademark law in India¹¹. This study hopes to establish that a block chain could act as a verification mechanism that would support, but not substitute, current models of law. This study is also counting on the “fact that whereas the rule of law confers legitimacy or legal authority, it is no less true that technology confers precision, traceability, and visibility—which are precisely what is called for in governing intellectual property in decentralized electronic systems.¹²” It seeks to combine these elements to provide a “future-ready solution that would provide a solution to the issues of violation of virtual trademark, ownership, as well as unauthorized use of digital assets.”

¹¹ Trade Marks Act, No. 47 of 1999 (India).

¹² Primavera De Filippi & Aaron Wright, *Blockchain and the Law: The Rule of Code 3–5* (Harv. Univ. Press 2018).

This research is shaped by certain key research questions that form the intellectual foundation of this study. In what ways or manner could the trademark laws of India be developed to encompass ownership or use of marks that are recorded on the blockchain? In what way does the given blockchain work as valid evidence in an Indian legal system¹³ to establish authorship, authenticity, and prior use of a certain trademark? What legal or institutional reforms would be imperative to incorporate the use of blockchain technology in the Indian intellectual property system with regard to registration or enforcement? Lastly, in what way could this incorporation ensure legal accountability while accepting the decentralization of digital trade? Answering these questions should fill the existing gap between law and technology with respect to the IP framework of the Indian ecosystem by placing the role of blockchain technology not as an enabler of technology but as an enabler of law for the Metaverse, where ownership in cyberspace is clearly established.

5. Methodology

This is a qualitative analysis that takes place in the legal framework of the application of blockchain technology to complement the existing trademark law in India to safeguard ownership in the Metaverse. This research paper does not employ empirical research but is more of a concept study that is dependent on statutory analysis, judicial opinions, policy papers, and scholarly opinions that evaluate the position of the current state of trademark protection in India in the context of integrating it with digital advancements.

The approach that is adopted in this research study is essentially a doctrinal one. In other words, this research paper seeks to make a detailed analysis of the Trade Marks Act of 1999, judicial interpretation, as well as official practices in order to establish the current judicial horizon of trademarking in India. This is followed by identifying the fallacies that emerge from applying these classic tenets with digital products and online markets. This paper seeks to establish the legal foundation of the jurisprudence of “use in trade,” “distinctiveness,” and “infringement” with the aim of establishing the limitations that lie with the current legislation governing digital assets that are verified by blockchains.

¹³ Indian Evidence Act, No. 1 of 1872, §§ 65A–65B.

Complementing this, the study uses analytical and comparative reasoning. Although the focal point is on India, there are selective references to the global frameworks and case developments—such as trademark disputes concerning NFTs and blockchain-based IP experiments occurring in other jurisdictions—but only to illustrate practical relevance and possible lessons for India. This comparative element provides illumination not to broadly contrast legal systems but rather to demarcate how India can adapt its framework to incorporate blockchain as a legally recognized evidence mechanism.

Secondary data sources for this research include academic journals, legal commentaries, WIPO and NITI Aayog reports, government white papers on Blockchain, and Journal of Intellectual Property Rights (CSIR-NIScPR) ¹⁴recent articles. These materials provide both theoretical perspectives and policy insights on integrating technology into legal structures. Where applicable, the study also references practical blockchain applications and pilot initiatives in India's legal and governance sectors.

In this paper, an interpretive legal analysis model is followed. This discusses how the technical features of blockchain, such as immutability, transparency, and decentralized verification, align or could be aligned with Indian trademark law principles. This work will interpret these technological attributes within the meaning of existing legal doctrines and will eventually develop a hybrid framework combining technological evidence with statutory enforcement. This approach ensures a balanced combination of doctrinal inquiry and technological analysis in order to explore both the legal and technical dimensions of the problem. The result is a normative, forward-looking approach that tries to bridge the gap between traditional legal systems and digital realities concerning India's trademark protection regime.

6. Analysis: Integration of Blockchain with Indian Trademark Law

The rise of the metaverse redefined the sense of ownership and value of the digital world, forcing legal systems worldwide to redefine how they identify and protect rights. For India, where trademark regulation remains hinged on the Trade Marks Act, 1999, this transformation brings

¹⁴ Ministry of Electronics & Information Technology [MeitY], *National Strategy on Blockchain* 11 (2021).

forth a basic disjoint between the physical assumptions of law and the decentralized reality of digital trade. This section critically looks at how India's trademark law interfaces with digital goods, examines the key challenges that hold back such application in the metaverse, and blockchain integration as one structural solution for bridging the gap between the two.

6.1. Status of Digital Goods under the Indian Trademark Regime

According to the Indian legal framework, a trademark is any sign that is capable of distinguishing goods or services of one enterprise from those of another, and protection depends upon its “use in trade.” Traditionally, such use is taken to be in the form of physical, visible representation within a defined territory. On digital marketplaces, even this very concept of “use” tends to blur. If such a virtual asset—a brand symbol on an NFT, for instance—actually comes into being or gets traded on a blockchain, then that might never have a tangible form nor actually remain within Indian boundaries. Lack of clear statutory provisions regarding virtual goods suggests that such assets have been kept out of the former paradigm of classification of trademarks, thereby being more prone to misuse.

In practice, this means digital reproductions of trademarks—in the form of logos or brand symbols embedded into NFTs—can be created and sold by third parties without falling neatly within the definition of infringement. The Trade Marks Act does not have the language needed to deal with decentralized digital transactions; therefore, enforcement in such scenarios becomes tough to do. Though IPAB and courts in India have, from time to time, extended the meaning of “use” to include online representation, the metaverse would present a more complex challenge because there is no single centralized platform or physical jurisdiction to anchor the infringement.

6.2. Key Challenges: Jurisdiction, Anonymity & Enforcement

Lack of clarity over jurisdictions, anonymity of users, and poor enforcement practices are among the factors that pose significant hurdles to India's capability of effectively offering trademarking protection to the Metaverse.

To begin with, there is uncertainty about territorial jurisdictions since the nature of the blockchain transactions is Borderless and Decentralized. Traditional Indian jurisdictions would assert themselves if the wrongful act or its economic impact was closer to India. In the context of blockchain networks, for the fact that information is stored in nodes spread globally, infringers can act incognito or from other jurisdictions, rendering it impossible to track or prosecute such wrongdoers on the customary premise of territorial jurisdictions. Secondly, Anonymity is another characteristic of blockchain. All transactions are recorded lightly on the globally spread ledger, but there is anonymity about who is basically using the wallet. Hence, no processes of tracking or identifying individuals who actually commit trademark infringement in real life are possible. Thirdly, the Limitation of Enforcement is visible by noticing that the enforcement of IPs in India is still centralized and dependent on paper documentation for verification. It is a tiresome task to establish ownership or infringement in the digital era, rendering any legal remedy ineffective.

Taken together, these problems illustrate that while the Indian trademark system is strong for conventional commerce, the trademark system lacks procedural and technological flexibility when it comes to regulating decentralized, borderless environments like the metaverse.

6.3. Blockchain as a Legal–Technological Solution

Immutability, transparency, and decentralization are some of the key characteristics of a blockchain that could, if incorporated into the legal framework, directly work to remedy many of these issues. An umbilical record of blockchains could establish irrevocable proof of ownership, recording dates of the creation, sale, or exchange of a digital good. In trademark law, it could help establish the existence of an irrefutable proof chain with respect to legitimate use and ownership of a trademark. Incorporating blockchains into the Trade Marks Registry of India could enable the registration as well as verification of digital trademarks or virtual products in real-time.

It is anticipated that “smart contracts,” or “self-executing contracts” that exist upon the blockchain, could enable the automated execution of licensing agreements and royalty fulfillment for “virtual trademark” rights to be utilized in cyberspace. This would make it possible for the trademark owner to license digital property or reproduction rights with specified terms and conditions, with the

guarantee of strict compliance therewith without the need for monitoring. However, the hypothesis that the use of “smart contracts” through the application of “virtual trademark” rights could work presupposes that the blockchain technology or system is given official legal recognition as evidence admissible under Indian law. It is suggested that judicial or legislative guidance with respect to the sufficiency of blockchain records as evidence under the Indian Evidence Act of 1872¹⁵ would enhance their acceptability in trademark matters.

6.4 The Hybrid Framework: Law and Technology Operating in Concert

A hybrid model, in which law and technology operate as complementary systems, is the most effective path ahead for India. In this framework, the law provides legitimacy, governance, and enforcement, while blockchain provides authenticity, transparency, and traceability. This model would not remove the application of the Trade Marks Act but modernize its application by another level of verification enabled in the digital space. For example, a blockchain-verified registry can coexist alongside the traditional registry where courts and authorities can instantly verify ownership and transaction records.

Secondly, security-related pilots of digital IPR registries would be undertaken in public–private collaboration between the CGPDTM and blockchain developers.¹⁶ This would consequently align with India's vision for digital governance as specifically outlined by the NITI Aayog Blockchain¹⁷ Strategy in support of decentralizing transparency within the boundaries of public administration. Ultimately, blockchain integration provides a functional route toward the resolution of the current enforcement and jurisdictional barriers to India's legal sovereignty. The hybrid approach makes sure that technological innovation and legal accountability balance each other, creating a regime where trademark protection would be both legally enforceable and technologically verifiable. This could be the alignment between law and blockchain that might redefine India's IP landscape and put it ahead in the protection of digital rights across the metaverse worldwide.

¹⁵ Indian Evidence Act, No. 1 of 1872, § 3, INDIA CODE (1872).

¹⁶ Controller Gen. of Patents, Designs & Trade Marks (CGPDTM), *Annual Report 2022–23* (2023).

¹⁷ NITI Aayog, *Blockchain: The India Strategy, Part 1—Blockchain the India Advantage* 16 (2022).

8. Conclusion

The metaverse is actually an entirely new development in terms of the evolution of ownership, identity, and creativity that is actually tending in the digital economy. Though this transition is engaged globally, including India, there is an urgent need to ensure that the trademark protection regimen in India is sufficient for the decentralization of trade that actually lacks borders in the digital economy. Though the current mechanism in India, as established by the Trade Marks Act of 1999, is actually fairly strong for the physical trade scenario, it is actually outdated for the concepts of virtual goods, NFTs, or assets via the application of blockchain technology. Traditional concepts like “use in trade” or “territorial jurisdiction” actually lack distinctiveness in a scenario where trade actually lacks any territorial or physical borders through digital ledgers that are actually decentralized.

This research work has so far revealed that the application of blockchain technology in the trademarking process of India could provide a game-changing solution for these issues. This is because the immutability, or inability to alter, of blockchain technology by its inherent property of being transparent and allowing the verification of ownership could provide the technological support that is crucial for the authentication of digital assets. If combined with the legal strength of India's IP law, it is undoubtedly possible for India to provide effective safeguarding of digital trademarks with little infringement by developing confidence in digital economies.

However, this technology adoption must be balanced with careful legislative change. These legislative changes include the recognition of blockchain-based evidence, the development of a Blockchain-Enabled Trademark Registry, or public institutions and technology innovators working together—all of which would not only ensure the effective implementation of successful execution but would also indicate a shift in the deeper transformation of the law, one that would not only react to innovation but actually partner with it. Finally, the key determining factor for India's success in developing a framework of trademark and ownership in the Metaverse would lie in its readiness for the times of commerce and creativity that lie ahead. The introduction of the blockchain “bedrock” into India's IP framework makes it poised to set the “pace for the times” of intellectual property in Virtual Reality.