



LAWFOYER INTERNATIONAL JOURNAL OF DOCTRINAL LEGAL RESEARCH

[ISSN: 2583-7753]

Volume 4 | Issue 3

2026

DOI: <https://doi.org/10.70183/lijdlr.2026.v04.315>

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TRACING THE RELEVANCE OF BLOCKCHAIN IN THE FIELD OF COPYRIGHT: BY ANALYTICALLY EXAMINING THE JOURNEY OF CONCEPT OF COPYRIGHT LAW, ROLE OF BLOCKCHAIN IN REGULATING MUSIC INDUSTRY, LICENSING, OUTPUT DEVELOPED USING ARTIFICIAL INTELLIGENCE, OWNERSHIP CLAIMS, DIGITAL RIGHTS MANAGEMENT SYSTEMS - INTERNATIONALLY AND NATIONALLY, PROBLEMS FACED DURING ENFORCEMENT AND ITS IMPRESSION ON SOCIAL JUSTICE IN INDIA

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I. ABSTRACT

The intellectual property sector is undergoing through significant changes due to the rapid growth in the technology. This paper traces the history of the intellectual property with national and international frameworks from Statute of Anne to the World Intellectual Property Organization and emerging technologies, explores the relevance of blockchain technology in the field of copyright, concept of related terms like Digital Rights Management Systems, licensing, ownership claims and AI-generated contents and how this technology has affected music industry so far. This paper also highlights the enforcement issues faced in India and how this technology aids in serving justice. The methodology used in this research paper is primarily analytical and doctrinal in nature. It uses an analytical approach to underline the history of the intellectual property. The study counts on primary sources, which includes The Copyright Act, 1957, The Digital Personal Data Protection Act, 2023 and judicial decisions of courts of India. The secondary sources used in this paper are WIPO reports, The National Blockchain Frameworks and international case laws. The key findings of this paper point out on how the core features of blockchain technology, that is, immutability, timestamping, decentralized ledger, etc will bring revolution in the IP sector (particularly in the music industry), help in serving justice to the creators in cases of ownership claims, AI-generated contents, etc., and also the shortcomings which might be faced by the world in the use of this technology. Finally,

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this paper concludes that while blockchain technology is a boon for creators and innovators, but its success depends on legislative harmonization as well.

II. KEYWORDS

Blockchain, Copyright, Intellectual Property, Artificial Intelligence, Smart Contracts.

III. INTRODUCTION

The term of property has expanded its scope from just physical property to an intellectual property. Intellectual property is an intangible type of property and can be defined as work created using one's own intellect which includes Patent, Trademark, Copyright, Geographical Indication, etc. These properties are protected by law, and the creators of these properties can also earn financial gains like earning royalties, out of these properties.

Among all these intellectual properties, copyright is primarily for protecting rights over literary, artistic, music works, etc. Nevertheless, protecting these rights in today's contemporary world has become a challenge for the world. Due to the emergence of internet and artificial intelligence, the works can be imitated, shared or stolen easily which leaves the creators with no credit and profits. Hence, to win these battles, blockchain technology was introduced.

The structure of blockchain technology is a decentralized, distributed ledger system without any central authority and that has characteristics like timestamping, immutability, self-executing smart contracts that ensures protection of rights of creators in case of disputes and also serve as evidence in ownership claims as well. The blockchain technology also has its own flaws and thus it needs to be used with proper care and guidelines.

A. Research Objectives

The present research paper seeks to examine the relevance of blockchain technology in the field of copyright law, particularly in relation to digital rights management, licensing, ownership claims, AI-generated content, and the music industry. It further aims to analyse the legal and practical challenges involved in enforcing intellectual property rights in a blockchain-based environment, with specific reference to India,

and to assess whether blockchain technology can contribute to greater transparency, accountability, and social justice for creators and rights holders.

B. Research Questions

1. How has the concept of copyright law evolved in response to technological developments such as blockchain and artificial intelligence?
2. What role can blockchain technology play in strengthening digital rights management, licensing, and ownership claims in copyright-protected works?
3. How can blockchain-based mechanisms assist creators, particularly in the music industry, in securing royalties and preventing unauthorised use of their works?
4. What legal, evidentiary, jurisdictional, and regulatory challenges arise in enforcing intellectual property rights through blockchain technology in India?
5. To what extent can blockchain technology promote social justice by protecting the interests of creators, authors, artists, and other intellectual property holders?

C. Research Methodology

The methodology adopted in this research paper is primarily doctrinal and analytical in nature. The paper relies on statutory materials, judicial decisions, policy frameworks, and secondary literature to examine the relationship between blockchain technology and copyright law. The doctrinal method is used to analyse the existing legal framework governing copyright, intellectual property rights, electronic evidence, data protection, and digital transactions in India.

The analytical method is used to evaluate the relevance of blockchain features such as immutability, timestamping, decentralised ledgers, and smart contracts in addressing issues relating to licensing, ownership claims, digital rights management, AI-generated content, and copyright enforcement. The study relies on primary sources such as the Copyright Act, 1957, the Information Technology Act, 2000, the Digital Personal Data Protection Act, 2023, the Bharatiya Sakshya Adhiniyam, 2023, and

relevant judicial decisions. It also refers to secondary sources such as WIPO materials, the National Blockchain Framework, journal articles, reports, and international developments concerning blockchain and intellectual property law.

IV. THE STORY OF INTRODUCTION OF BLOCKCHAIN TECHNOLOGY INTO INTELLECTUAL PROPERTY LAW

The notion of property holds a significant position in the lives of people and especially in legal systems across jurisdictions. In law, the term property is not only a physical or tangible object owned by a person or an entity, but also a bundle of rights that come along with the property, like the right to use/destroy/transfer, or even to earn income. Gradually, this term of property has broadened its horizon by including intangible interests known as intellectual property, which is the result of one's own intellect and holds both economic and social value.

This emerging kind of property was not protected in ancient times. People, then, created poems, artworks, tools, and medicines, but lacked ownership and exclusive rights over their ideas - this led to the innovations getting copied easily and no incentive to invent was provided. Thus, in earlier times, creativity existed, but the legal concept of intellectual property and rights over it was missing.

This created the need for protection. The idea of Intellectual Property was first developed in Europe. Venetian Patent Statute or The Venice Patent system of 1474 was the foundational patent law in the world under which the inventors were given exclusive rights for a limited time. After the invention of the printing press, the demand for protection of literary works was unfolded, due to which the first copyright law, that is, Statute of Anne 1710 was introduced in England. This gave authors exclusive rights to print their books but for a limited period.

This statute is considered as the basis for the modern copyright law. Due to industrializations, inventions increased, brands and symbols became important, and designs needed protection and the inventors felt the need to protect their works through patent, trademarks, etc. This need led to first international handshakes, in the sector of intellectual property, through The Paris Convention in 1883 and The Berne

Convention in 1886. These conventions covered patents, trademarks, industrial designs, literary and artistic works and were based on key principle of national treatment. This provided the authors automatic copyright protection, and no formal registration was required for the same.

Then with the passage of time, UN established a specialised agency, named, World Intellectual Property Organisation (WIPO). This agency promotes the protection of Intellectual Property globally, administers Intellectual Property treaties and harmonizes the Intellectual Property law.

Relocating the focus to the Indian context - India's history of laws related to Intellectual Property is inextricably connected with the British law. The first legislative attempt was made through the Act VI of 1856, to protect Patent and grant "exclusive privileges" to inventors for 14 years. This Act was based on the British Patent Act of 1852. Then in 1911 all the previous laws were replaced by the comprehensive system for patents and designs under the British reign, which was named as The Indian Patents and Designs Act, 1911. During 1914, Indian Copyright Act, 1914, was enforced in India which was fundamentally an extension of the British Copyright Act, 1911. Post independence, India witnessed a great shift in Intellectual Property laws as India realized that the British laws did not suit a developing nation like India.

We needed laws that could help our local industries, especially for the medicines, thus came the Patent Revolution in 1970, during which the government appointed the Justice Rajagopala Ayyangar Committee. As a result, India had The Patents Act, 1970. This Act was famous as it denied product patents for food and medicines rather only allowed process patents, this meant Indian companies could make the same medicines but by using a different process or method. This move made the life-saving drugs affordable for the economically weaker sections of the society as well. Moving away from the umbra of the 1914 colonial era, we also needed to protect our booming film and literary industry and so we legislated the first major Intellectual Property Rights law of Independent India, that is, The Copyright Act of 1957.

India became the founding member of the World Trade Organization in 1955 after which the Trade - Related Aspects of Intellectual Property Rights or The TRIPS

Agreement was ratified by India on 1st January 1995. This agreement demanded that all the member nations must have a minimum standard of Intellectual Property Rights protection. This demand led to the following amendments in India's Intellectual Property law:

1. The Trademark Act of 1958 was replaced by The Trademark Act in 1999. This act included service marks and provided stronger protection for some popular brands.
2. The Patents Act has been amended thrice: in 1999, in 2002 and in 2005 as India was forced to bring back the concept of product patent and replace it with process patent.

From then till today the Intellectual Property sector is one of the most flourishing sectors whether be it in India or at global level. The owners or the authors of the intellectual property are still encountering substantial challenges to protect their creations, due to the rapid growth of the technology and the advent of the artificial intelligence.

In this time where people have massively shifted from investing in tangible properties to intangible properties, that is, intellectual property, the traditional method to protect the ideas is very difficult as the traditional method to protect the ideas by filing the application, getting your ideas registered, etc is a very time taking and costly process. People using different artificial intelligence apps or technology are faking their ownership over the ideas of the real creators.

Thus, the bar set is very high. But the introduction of blockchain technology is currently a boon for the existing as well as upcoming creators. This technology is making every fictional plan of getting the ideas registered into a factual reality, for the innovators.

Blockchain technology was first developed by Stuart Haber and W. Scott Stornetta in 1991 as the concept of cryptographically linked blocks for timestamping of documents and prevent them from being tampered. This development was then further conceptualized by Satoshi Nakamoto in 2008, in his paper named "A Peer - to - Peer

Electronic Cash System”, wherein he gave the detailed idea of the functioning the Blockchain as a distributed ledger for decentralized currency.

This was implemented from 2009 with the launch of bitcoins. In blockchain technology, every transaction is grouped into different blocks which then is verified by connection points through consensus mechanisms, here each block is linked to the previous block by using the cryptography method and this ensures immutability and timestamping. The blockchain technology was primarily made to serve for transactions taking place in bitcoin sector and this technology has travelled from here to managing intellectual property in the Web3 ecosystem.

During late 2000s the foundational nature of blockchain technology, (that it was immutable and timestamping), was taken into consideration by the creators which led them to register the timestamp of their works. This record served as a proof of the authenticity of their authorship. Later, the early platforms like Ascribe and Monegraph launched the concept of tokenization of digital art, this establishes the permanent link between the creator and its creation.

Tokenization is the creation of a digital representation of the real asset, whether it be a physical asset like gold or a digital asset like intellectual property, and this digital version of asset is called a token. In simple words, tokenization is the process of converting ownership rights over assets into digital tokens on a decentralized ledger. This enables fractional ownership or trading of the tokens, making investments accessible to more people. One of the most popular examples of this is the Pablo Picasso’s painting “Fillette au beret”, which was tokenised in 2021. With the pioneering of tokenization, smart – contracts also came into light. Smart – contracts reduced the use of intermediaries for registration in blockchain as it automatically executed licensing the agreements and the artists started to receive automatic royalties for the secondary sales of their work.

Along with this the emergence of Non – Fungible Tokens or NFTs was also witnessed on platforms like OpenSea. The NFTs is a digital certificate which are unique and proves ownership of the assets. The platforms like Audius uses blockchain which allows artists to display and distribute their works directly to their audience.

Currently the blockchain technology is into Web3 and is focusing more on making the licensing and tracking of intellectual properties easy for the owners.

The blockchain technology is provenly been acting useful for the owners claiming their copyright over their own creation, as it is easy for them to register their work into a system where it is immutable and securely preserved at the same time visible to their fans. For instance, any lyricist might register his lyrics and get the token or NFT for the same, which will ensure that his work is in the public and safe from any kind of foreign changes which may hamper his rights over his work.

V. CONCEPT OF DIGITAL RIGHTS MANAGEMENT SYSTEMS, LICENSING, AND OWNERSHIP CLAIMS UNDER BLOCKCHAIN TECHNOLOGY

The concept of digital rights management systems or DRM systems, licensing, and ownership claims, falls under the umbrella of blockchain technology and hence are interconnected and speak of each other in itself. Understanding it like a tale: one can easily register their own creation in a block and get license for the same, of which he now has an ownership, now the DRM systems will control and monitor all the transactions conducted thereafter in each and every block. Further all these three concepts and how is this adds value in the IP sector is briefly explained.

Digital Rights Management Systems are the curated technologies that is used to protect digital assets, digital contents and all the rights associated with them. These systems control and limit the accessibility of the content by using encryption method, which can only be decrypted by its authorized owners, making it almost impossible for the foreign parties to invade into them, which helps in mitigating the risk of getting the works of artists pirated.

This system when used along with blockchain technology, enhances trust among its users as the basic structure of blockchain technology, that is, timestamping and immutability, makes sure that every transaction, granted access and license is tracked down and recorded in blocks in such a way that every unwanted activity done with mala fide intention in any of the blocks is detected by the DRM systems. SecureRights

is one of the blockchains – based DRM frameworks which authenticates the data through timestamping and watermarking and aids in protecting rights associated with one's intellectual property.

Licensing under blockchain technology, in simpler terms is an e-contract or a smart contract between the copyright owner and the user, which lays down the extent of usage of the copyrighted work by the user. This technology replaces all the traditional methods of getting a license through paper-based agreements, opaque in nature with digital modern solutions which is transparent, automated, and immutable smart contracts stored in a decentralized ledger wherein every license is represented using a token or NFT which is always unique and different from one another, is secure and ensure transferrable ownership.

Therefore, this entire process of licensing is conducted solely via a smart contract. These smart contracts automatically checks whether or not the person trying to get an access of the work stored in blocks in the token holder of that work or not, makes royalty payments to the owner in case their work is sold, used or accessed, without the interference of any human intermediary and every transaction carried out is transparently displayed in the public domain and public can have authorize access to it whether by purchasing the tokens, investing in the work of the artists, etc.

With time, this technology has evolved and now even allows some flexible schemes of rental subscription and pay – per – use, so that even those can get authorize access who are unable to get authorize access to premium data stored in the blockchains and can reach out to their favourite artist's artwork, because they cost a lot of money. This kind of architecture of licensing under blockchain offers a redeveloped model for managing digital rights of artists and users. KODAKOne, Pixsy, Payperchain are some of the legal platforms who are currently using this technology and allowing creators to register, get license, monetize their work on blockchain ledger.

Lastly, ownership over the digital asset can be claimed by availing the unique numbers mentioned in the tokens, under blockchain technology. Every token in the blockchain symbolizes a unique digital asset and every token is recorded immutably

in the blocks in such a way that the ledger is updated after every transaction wherein the ownership is being transferred.

As a result, these records create an irrefutable chain of blocks of titles and then the chain plays an essential role in legal disputes where the ownership is in question. In respect with the IP sector, this can be favourable as, if once the ownership is registered in the blockchain, it can neither be fraudulently occupied by anybody else nor can anyone alter the details of the owner, thus the judiciary and the society itself can rely on it as the conclusive evidence of the ownership of the intellectual property. Internationally, courts like Hangzhou Internet Court of China in the case of *Hangzhou Huatai Yimei Culture Medica Co, Ltd. vs. Shenzhen Daotong Technology Development Co., Ltd.*², first time accepted evidence stored in blockchain in order to prove copyright infringement of an article.

VI. ROLE OF BLOCKCHAIN TECHNOLOGY IN THE MUSIC INDUSTRY

As mentioned above the blockchain technology has provenly been effective for the artists and creators. The traditional statues could not address the issues faced by the creators in the music industry. Despite the laws being enforced the rights of the artists were still infringed in large numbers, half of which was also because of the growing technology. Some of the significant issues faced in the music industry are:

1. The production of music at one end is extremely expensive and at the other end, big chunks out of the earning of the artists is taken by the intermediaries, rewarding artists with very less amount. Because of this artist in certain situations also have to surrender their creative control over their music which leaves them with not realizing their full potential.
2. The networks responsible for the peer – to – peer transactions are deficient in protecting the work of the artists from piracy and promoted the unauthorized use of music resulting in copyright infringement. For instance, some

² Hangzhou Huatai Yimei Culture Media Co., Ltd. v. Shenzhen Daotong Technology Development Co., Ltd., (2018) Zhe 0192 Civil Case, First Court No. 81 (Hangzhou Internet Court, June 27, 2018).

advertisements and Television programs often use the music without proper authorization, against which the artists can take an action but again that would also cost him with lot of time and resources.

3. The customary contracts can be manipulated which puts the artist at a situation where they have no legal knowledge and thus, they are left with no option but to negotiate with their legal rights.
4. The declining physical sales of the music, the whole industry is shifting towards the online sales of the same and the music streaming platforms do not pay the artists enough.

In such a scenario, blockchain technology is getting all the attention and is seen as a trustable tool to combat these issues. When a song is registered or put in a blockchain's block a unique number or a unique token is given to its owner. This helps it in getting distinguished easily, from the other, makes the data immutable (nobody except the owner can alter the data) and protecting it from frauds and illegal downloads at the same time. Once the token is generated, this technology validates peer-to-peer transactions through smart contracts or digital currency, which ensures artists and creators are getting money directly either through their fans or from businesses and also automates royalties and licensing.

This feature especially helps the artist during disputes as everything is recorded in the blockchain and is timestamped, thus during disputes one can rely on it as evidence. Even the blockchain based digital rights management systems or DRM systems simplify the process of administering intellectual property rights more effectively. The truancy of the linkman or the intermediaries makes it easy for the artists to earn more against their creations. This feature is acting as a new revenue source for the existing as well as upcoming artists who have an established fanbase as they can directly sell their work through blockchain without getting any linkman involved.

Marzio Schena, co-founder and CEO of ANote Music, a Luxembourg-based music royalty investment platform, has explained that the platform provides artists, record labels, publishers, and songwriters with access to funding through the sale of music rights, while allowing users to invest in music royalties and trade such rights on a

secondary market. In this context, Schena stated that “our goal is to unlock the hidden value in music for both investors and artists by creating a stock-exchange platform for music investments.”

These kinds of new decentralized incentives generative applications or platforms is beneficial for both artists and their fans and shall motivate the use of blockchain in the music industry going forward. Apart from this technology also helps in decreasing the production cost significantly, powers up crowdfunding, even some of blockchain-based platforms like Viberate also provide verifiable analysis through which artists can learn more about their target audience. The existing challenges in the music industry might seem haunting but the usage of blockchain technology can reduce almost half of them and can be advantageous for both the artists and their target audience.

VII. ARTIFICIAL INTELLIGENCE AND BLOCKCHAIN TECHNOLOGY

The sphere of intellectual property law is continuously undergoing changes, driven by the emerging technology of blockchain and Artificial Intelligence. Where in one hand blockchain is considered as a boon to manage the rights of the intellectual property holders, on the other hand, if Artificial intelligence, not used wisely, exploits the creator. AI tools, like OpenAI and Anthropic working of which centric of the already existing databases or creations, are used by many to get access to the protected works of the artists without any authorization and this leads to copyright infringement of the artists.

Recently, Anthropic has been involved in copyright litigation brought by music publishers including Universal Music Publishing Group, Concord, and ABKCO. In the earlier proceedings, originally filed in October 2023 and later proceeding as *Concord Music Group, Inc. v. Anthropic PBC*, Case No. 5:24-cv-03811, the publishers alleged that Anthropic used copyrighted song lyrics to train Claude and that Claude could reproduce lyrics from more than 500 songs without authorisation. The plaintiffs sought injunctive relief and monetary remedies, but this case should not be described as a three-billion-dollar claim.

Since, every coin has two sides, AI also has the other side. One of the most crucial roles played by AI in IP sector is detection and enforcement. Old ways to detect the infringements is comparatively slow and demands a lot of labour work, which can be effectively done by AI tools like CopyLeaks and RedPoints within no time. AI tools like these rapidly scan the internet, databases and all the digital platforms to identify unauthorized use of copyrighted works and even potential trademark violations.

These self-operating AI tools ensure that the searches are conducted comprehensively and covering a larger scope than any manual searches. Blockchain technology serves as the platform based on which these AI tools can conduct their searches and identify the infringements and violations, to do brand monitoring taking place across the globe as the data stored in blockchain is timestamped and immutable. Platforms like Pixsy and Copytrack are some of the most effective platforms through which one can detect copyright infringement. Thus, the use of AI in blockchain technology has made it easier for the creators to protect their works from any unauthorized use.

VIII. ISSUES FACED WHILE ENFORCING INTELLECTUAL PROPERTY RIGHTS IN THE BLOCKCHAIN ECOSYSTEM AND ITS IMPLICATIONS FOR SOCIAL JUSTICE IN INDIA

While the blockchain technology promises to protect the rights of the creators and owners of intellectual property, enforcing it in the society is still difficult. Some of the major enforcement issues faced are following:

1. The regulatory frameworks of blockchain technology, such as timestamps, licensing based on smart contracts, etc, are still not recognized in Indian jurisdiction. This factor limits the enforcement of this technology in India as without any statutory guidelines, the blockchain still not holds any evidentiary value.
2. Blockchain is operated on a global scale and has no central authority ruling it, and due to this fact, it is till date not adapted by many countries including India. Different intellectual property rights are governed by different statutes, like we have different law book for trademark and for copyright and adding blockchain into these already-complex law becomes more difficult.

3. The point that data stored blockchain technology is immutable, when once inserted, in nature is advantageous but at the same time it becomes challenging for the users to modify the incorrect data they might have put it in mistakenly or to remove the fraudulent claims. This also creates a problem during ownership claims over fake data immutably stored in blocks and is contrast with “Right to be Forgotten” of the Digital Personal Data Protection, 2023.
4. There are also economic and technical challenges associated with blockchain technology. The cost of developing, maintaining, and accessing blockchain-based systems may be difficult for small organisations, independent creators, and economically weaker rights holders. Unless affordable public or low-cost institutional platforms are developed, blockchain may deepen the digital divide rather than promote equal access to copyright protection. With this, the organizations will also need experts to run such applications and get relevant and useful information out of it.
5. The dynamic nature of technology also is a drawback. The technology is one of those sectors which is continuously changing with time and in such an era no one is ready to rely on it whether be it technically or legally. The organizations carrying out activities related to this technology will have to bear the cost every time the technology is updates itself and demotivates them and similarly many amendments will have to be made eventually in the statutes, which can be tiring for the lawmakers of the country as well.

Due to these shortcomings, blockchain technology continues to face legal, jurisdictional, evidentiary, and accessibility-related challenges, which may hamper its effective enforcement in the intellectual property sector unless supported by clear legal standards and inclusive technological infrastructure. The junction between justice and blockchain technology in Intellectual Property Rights exclusively focuses only on replacing all the traditional methods used to register, create an IP with the modern technology of blockchain which will bring more efficiency and reduce the litigations related to it.

In 2024, the Ministry of Electronics and Information Technology launched the National Blockchain Framework and the Vishvasya Blockchain Technology Stack to support Blockchain-as-a-Service through geographically distributed infrastructure. The framework aims to promote secure, transparent, trusted, and citizen-centric digital service delivery. Although it is not limited to intellectual property law, its model can be significant for copyright enforcement if adapted to provide affordable blockchain-based tools for authorship verification, licensing, royalty tracking, and dispute-related evidence.

Certain key components like Praamaanik, (which establishes a verification system, tamper proof and timestamping in nature, helping in identifying false or fake apps: useful for software developers), Vishvasya Blockchain Stack (supports smart contracts), etc of NBF can add value in the working of IP sector of India. This framework is also parallel with the existing laws of Digital Personal Data Protection act, 2023.

Even the former Chief Justice of India, Dr. D.Y. Chandrachud has accepted that integrating technology and blockchain into our legal frameworks will help increase the arbitration potential and lead to judicial openness. The undermentioned demonstrates how the blockchain technology will help in meeting the ends of the justice system in the segment of Intellectual Property Rights in India:

1. Blockchain technology, as discussed above, provides secure, immutable and timestamped ledger which shall serve as strong digital evidence in Indian courts in cases of copyright, trademark, patents, etc. Electronic or digital records, including blockchain-based records, may be admissible before Indian courts when they satisfy the requirements prescribed for electronic evidence under Section 63 of the Bharatiya Sakshya Adhiniyam, 2023. Section 79A of the Information Technology Act, 2000 should not be cited as the substantive provision for admissibility, as it only empowers the Central Government to notify Examiners of Electronic Evidence for the purpose of expert opinion. Therefore, blockchain records may have evidentiary relevance only when produced and proved in accordance with the applicable

rules governing electronic records. In *Shafhi Mohammad v. State of Himachal Pradesh*, the Supreme Court did not lay down a broad rule that electronic evidence is admissible whenever general authenticity criteria are met. Rather, the Court clarified that the certificate requirement under Section 65B(4) of the Indian Evidence Act, 1872 is procedural and may not be insisted upon where the party producing the electronic record is not in possession or control of the device from which the record was generated. In such circumstances, the requirement may be relaxed by the court in the interest of justice.

2. Blockchain can act as an undeniable proof when the date of invention, lab records and notes (in regards of Patent), first use of trademark is in question in Court of law. For creator's blockchain's feature of licensing and smart contract can be used as prima facie evidence to prove authorship over their creation, in case of copyright infringement and for distribution of dispute-free (wherein the disputes are generally based on revenue sharing) royalties. The platform like Bernstein helps in proving prima facie proof of creation dates. However, smart contracts used for licensing and royalty distribution must remain consistent with the general principles of contract law and statutory compliance. Under Section 23 of the Indian Contract Act, 1872, the consideration or object of an agreement is unlawful where it is forbidden by law, defeats the provisions of law, is fraudulent, causes injury, or is regarded by the court as immoral or opposed to public policy. Therefore, blockchain-based licensing arrangements must not be treated as legally valid merely because they are automated or technologically secure; their enforceability must still depend on compliance with applicable copyright, contract, data-protection, and evidentiary laws.

IX. SUGGESTIONS AND RECOMMENDATIONS

Blockchain technology has significant potential to strengthen the intellectual property sector; however, its implementation continues to raise legal, jurisdictional, technical, and regulatory concerns. In light of the analysis undertaken in this paper, the following suggestions and recommendations are advanced to address these

challenges and to ensure the effective use of blockchain technology in copyright and intellectual property enforcement:

1. Blockchain is a decentralized platform, use of which is not border restricted or that it does not involve any central authority. As of now there is no single treaty signed between countries which states the uniform guidelines on the working of blockchain, we just have World Intellectual Property Organization's established task force working in this sector and UNCITRAL Model Law on Electronic Transferrable Records which provides a legal framework for electronic transferrable records. While The National Blockchain Framework of India regulates concerned national issues but not states anything about international disputes and developing countries like India are still trying to cope up with decentralized autonomous organization. For example, a music, which involves a person from Maharashtra whose smart contract is executed in Dubai and the person who infringed the copyright lives in England, then the aggrieved should approach which court. Thus, to avoid such cases in future countries need to make laws dealing with borderless cases of Intellectual Property.
2. Another shortcoming which shall be faced by the public in near future is that the data once inserted in blockchain becomes immutable in nature. Although this feature has its own advantages but can also be an issue in cases where maliciously AI generated data is recorded in the blockchain. This feature also does not align with Right to be Forgotten, stated under Section 12 of DPDP Act, 2023. To overcome this, we can have platforms like Bernstein.io, Allinnov Research and Development Private Limited, etc, where the actual data is stored in a deletable block but the access to it can only be granted to the person whose digital signature or fingerprint is registered in it.
3. On the other side, the addition of blockchain technology into the IP sector reflects a significant change from ex-post enforcement to ex-ante approach. The creators or innovators who are only able to take necessary legal action after the violation of their rights, due to lack of options to protect their right, can now protect their rights by using this technology prudently. They can store their

data or created work in blockchain, which will be secure, timestamped, immutable and have self-executing smart contracts as well to provide them with royalties. These features of blockchain help in making conclusive evidence for both the parties involved in the dispute and the judicial system as well.

X. CONCLUSION

Concludingly, the concept and rights associated with intellectual property has travelled a long way. From ancient period where even paper registrations felt like a blessing to the creators and innovators to an era in which creators and innovators are not able to even trust the records of technology. The decentralized blockchain technology has brought revolution with itself. It consists of many beneficial features like timestamping, immutability, licensing through smart contracts, etc which can bring transformation in the IP sector, globally.

These features are not only profiting the creators but also the other end users of these platforms as well. The Digital Rights Management Systems on the other side helps in keeping a check over the activities performed in the blocks of blockchain. AI, when used judiciously, with DRM Systems and blockchain technology, gives better outcomes to protect one's right invested in its own intellectual property. Such technologies also come to rescue in the times of disputes, ownership claims, etc. for the courts as well as the parties involved. In terms of Copyright, per se, music industries, authors and other creators are gaining out of blockchain technology.

They can use this technology to record their data securely and the same will be timestamped and immutable: aiding them during ownership claims and they will also be able to get royalties, automatically, after getting license through smart - contracts.

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