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Statutory Sovereignty in the Age of Code: Blockchain and Indian Intellectual Property Law

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Blockchain technology, with its attributes of decentralised control, immutable storage and programmable smart contracts, has emerged as a potential game changer in terms of underlying infrastructure for the administration of intellectual property (IP). This paper investigates the potential legal integration of blockchain within the Indian IP regime, as established by the Copyright Act 1957, the Patents Act 1970 and the Trade Mark Act 1999. In addition to engaging in descriptive legal analysis, the authors examine the doctrinal compatibility of blockchain with respect to Indian evidence law, Indian contract law and data protection principles. Furthermore, through a comparative analysis of developments in the United States of America, the European Union and China, the authors argue that while blockchain has no capacity to replace existing statutory registration systems for IP, it can nevertheless provide a legally recognised evidentiary and transactional layer for IP. The author recommends specific legislative amendments, evidence guidelines and institutional pilot programmes to facilitate structured integration of blockchain into the constitutional and regulatory framework of India.

Keywords: *blockchain, governance regime, digital evidence, smart contract enforcement.*

INTRODUCTION

Intellectual property is defined as a creation of the intellect that can be classified in three general categories: literary and artistic works; inventions; and designs, symbols, names and

images used in commerce. Unlike tangible property, intellectual property (IP) consists of intangible rights that are protected by law through statutes. These rights are not solely based on a natural right to own something; they rely on legislation to be enforced. Therefore, the current IP system is primarily institutional in nature. Historically, the systems used to protect intellectual property were designed to meet two competing goals: encouraging innovation and providing the public with access to knowledge. Patent systems were created to promote inventiveness by giving inventors monopolies for limited periods of time in return for publicly disclosing their inventions.¹ Copyright systems were created to protect the rights of authors over their works while allowing for the dissemination of those works. Trade mark protection was implemented to prevent consumers from being confused by different brands and to preserve goodwill for businesses. Over time, these substantive protections have become formalised through the establishment of central government registry offices and courts. In India, the Constitution provides the basis for the regulation of intellectual property by providing an enumerated power to the Parliament under the Union List², which grants powers to pass legislation regarding the establishment of patents, copyrights and trademarks. The Copyright Act 1957,³ The Patents Act, 1970,⁴ and the Trade Marks Act, 1999⁵ provide the state with a structure for the recognition, registration and enforcement of IP rights through a statutory system of recording and maintaining IP rights. The legitimacy of these rights is derived not merely from creation or invention, but from compliance with statutory procedures.

As a result, the increased digitisation of the economy has created new challenges for this traditional system of rules. Digital works can now be copied without limits across different countries. More of the licensing agreements are now being done with automated web portals. Ownership disputes are now much more likely to be about electronic records, metadata, and dates of files than about paper-based documents. These issues are exposing weaknesses in the traditional registration-based system, especially in regard to issues like transparency, traceability, and evidentiary reliability.

¹ Agreement on Trade-Related Aspects of Intellectual Property Rights 1994

² Constitution of India 1950, sch VII

³ Copyright Act 1957

⁴ Patents Act 1970

⁵ Trade Marks Act 1999

As a result of these issues, there has been an increase in the use of blockchain technology as a distributed electronic ledger for tracking transactions and keeping records. While it began as a technology for use in virtual money (cryptocurrency), the idea has expanded into a variety of uses for government and businesses. Supporters say that decentralisation, cryptographic security, immutability, and programmability of blockchain may help solve long-standing problems with intellectual property administration.

The introduction of blockchain technology into the governance of intellectual property raises important legal questions. Can a distributed technology-based system work together with a centrally based statutory registration system? Can cryptographically-immutable record-keeping systems satisfy the evidentiary requirements under India's law? Can smart contracts satisfy all of the required elements of a valid contract? Can the tokenisation of property interests change the nature of property rights defined in law? These questions do not only have a technical aspect; they also relate to the relationship between government power and technological infrastructure.

This research paper will examine India's intellectual property regime and the compatibility of that regime with blockchain technology using both an analytical approach and a doctrinal approach. The purpose of this research is three-fold; first, to examine the statutory framework of Indian IP law to determine where technological advancements can be integrated into this legal framework; second, to evaluate the legal implications of blockchain records, smart contracts, and tokenized assets under existing legal statutes; and, third, to propose a regulatory reform model that allows for the preservation of statutory authority and the use of new technological advancements.

This article will attempt to situate the development of blockchain technology within the context of the historical changes of Indian Intellectual Property law as a means of moving beyond mere optimism about the potential of this technology and creating a comprehensive analysis of its viability as an alternative source of evidence and transaction mechanism without compromising the centralised structure which has built Indian Intellectual Property law.

STATUTORY CENTRALIZATION IN INDIAN INTELLECTUAL PROPERTY LAW

India's intellectual property (IP) law structure is predominantly statute-driven and centralised. Unlike informal/cultural protection systems, Indian IP rights' enforceability rests on codified legislation passed by Parliament, and is enforced by relevant government authorities. Thus, while IP rights may also possess legitimacy through private certification or technology, here they derive it primarily through statutory recognition. According to the Supreme Court decision in the *Entertainment Network (India) Ltd. v Super Cassette Industries Ltd.*,⁶ statutory laws determine both the extent and limitations of all intellectual property rights.

Constitutional Basis of Intellectual Property Administration: The Constitutional basis for IP law in India can be found in the Union List in the Seventh Schedule. It describes Parliament's competence to legislate with respect to patents, inventions, designs, copyrights and trademarks. Thus, the national characteristic of how IP is protected is reflected in Parliament's centralised legislative powers. As such, IP rights have a scope that often crosses state lines, and thus treaty-based international obligations like TRIPS require that there be consistency of regulation.⁷ Thereby, IP administration in India is achieved via centralised authorities, comprising the Office of the Controller General of Patents, Designs and Trade Marks and the Copyright Office. Both offices create and maintain official registries, review applications, issue rights, transfer rights, etc. The authority granted by these registries is statutory, as is the presumption of prima facie legal status of the registries' contents.

Copyright: Automatic Protection with Evidentiary Registration: Copyright automatically comes into existence under the Copyright Act 1957 as soon as the original work in literary, artistic, musical or dramatic form is created. To have copyright, it is not necessary to register the work; however, registration provides an important function in establishing evidence in any legal proceeding where the original copyright was created. According to the Indian Supreme Court's ruling in *Eastern Book Company v D. B. Modak*,⁸ it is established that once an original work is created, it is automatically protected by copyright, but Copyright only exists if the created work meets the required level of originality set forth by statute.

⁶ *M/S Entertainment Network (India) Ltd v M/S Super Cassette Industries Ltd* (2008) 13 SCC 30

⁷ Agreement on Trade-Related Aspects of Intellectual Property Rights 1994

⁸ *Eastern Book Company Ors v D B Modak & Anr* (2008) 1 SCC 1

This model is a hybrid; while copyright is created when the work is created, the evidence of copyright ownership is given greater certainty through a centralised copyright registry entry. Consequently, the state retains control over determining disputes regarding copyright ownership as opposed to relying solely on the administrative review of the copyright.

Patents: Grant-Based Statutory Exclusivity: On the other hand, patent rights as defined by the Patents Act 1970 are created only after an examination is completed, which involves assessing the novelty and usefulness of the invention and issuing a patent by the Patent Office. The patent register of the Patent Office serves as the sole source of ownership. The Indian Supreme Court ruled that patent law is entirely a product of statute, and as such, it is impossible to create legal protections for patents beyond what is contained in those statutes in *Novartis AG v Union of India*.⁹ In addition, patents cannot be assigned, licensed or otherwise transferred unless the assignment, licence or transfer is registered with the Patent Office, to have any legal effect against third parties. This patent system gives a high level of administrative oversight and supports the view that patent rights are created by law, not just as a result of fact.

Trade Marks: Registration and Commercial Identity: The Trade Marks Act 1999 asserts that registration is the basis of exclusive ownership that can be enforced. It is possible to bring passing-off actions to protect an unregistered trademark; however, registration grants the trademark owner statutory protection. The Trade Marks Registry keeps official records of ownership, assignments and uses of trademarks. In the case of *S. Syed Mohideen v P. Sulochana Bai*,¹⁰ the Supreme Court explained that although a trademark registration creates statutory rights, the common law principle of passing off continues to apply to protect prior 'uses' of that trademark. As a result, the American legal system recognises both statutory rights given by registered trademarks and common law rights given by prior users of that trademark within the context of Indian trademark law. A registry-based model provides a clear title to trademark owners and eliminates the risk of multiple claims; the central repository serves as the primary source for establishing priority and ownership.

⁹ *Novartis Ag v Union of India & Ors* (2013) 6 SCC 1

¹⁰ *S Syed Mohideen v P Sulochana Bai* (2016) 2 SCC 683

CENTRALISATION AND ITS STRUCTURAL IMPLICATIONS

The common elements across these statutes are that they each give authority to a centralised government agency for the issuance of registrations and for the maintenance of the registration record. In India, the protection of intellectual property is not simply a technological right, but a legally established right via statutory provisions. The centralised structure fosters consistency, predictability and regulatory oversight; however, it requires an extensive degree of administrative efficiency and accurate record-keeping. As the economy continues to digitise and develop new technologies, there will be delays in the maintenance of registrations, as well as issues with international transactions and complex licensing agreements that will impact the centralised model.

The lack of explicit statutory authority for decentralised digital ledgers creates a structural gap in the legal system. While Indian IP law does not specifically restrict the use of additional technology tools, there is no current recognition that blockchain records are equivalent to records maintained in an official registry. Thus, any innovation in the use of technology will need to function within the existing statutory framework and will not function outside the statutory framework. Understanding this centralised foundation is essential before examining whether blockchain technology can be integrated into the system without undermining legislative authority. The next section, therefore, evaluates the doctrinal compatibility of blockchain mechanisms with existing legal principles.

BLOCKCHAIN AS EVIDENCE UNDER INDIAN LAW

The growing trend of using digital records in both commercial and creative transactions has created a new evidential landscape for resolving disputes over intellectual property. Instead of relying on paper documentation for determining issues concerning authorship, priority, assignment and licensing, these types of issues often depend on the use of electronic records to determine the available evidence. Within this framework, blockchain technology has been proposed as a solution to help strengthen the evidential certainty of the electronic record because it is an immutable record that provides timestamped documentation on an ongoing basis. The validity of this form of documentation within the context of India's Legal Framework for Evidence is still an area that requires analysis.

ELECTRONIC RECORDS UNDER THE BHARATIYA SAKSHYA ADHINIYAM 2023

The Bharatiya Sakshya Adhiniyam 2023¹¹ governs the admissibility of electronic evidence in India. This law replaces the earlier Indian Evidence Act 1872 and adopts the same principle with respect to electronic records that apply to paper records by providing that electronic records may be admitted into evidence if certain procedural requirements regarding authenticity and certification are satisfied. Courts will require confirmations regarding the integrity of the electronic system used to create the electronic record; assurance of the reliability of the process used to create the record; and the identity of any person who was responsible for creating the electronic record. Courts have long stressed the importance of following all required procedures when certifying electronically stored information. In 2012, the Supreme Court ruled in *Anvar P.V. v P.K. Basheer*¹² that electronic records can only be admitted into evidence if there are sufficient procedural safeguards to ensure they are authentic and certified. This ruling was again affirmed by the Court in 2014 in *Arjun Panditrao Khotkar v Kailash Kushanrao Gorantyal*.¹³ The Court ruled that certification must be fulfilled prior to electronically storing evidence and reinforced the judiciary's need for technical reliability with regard to electronically stored information.

Blockchain is a suitable example of an electronic record for the Bharatiya Sakshya Adhiniyam 2023. The blockchain's hash, timestamp and transaction record are capable of demonstrating that a particular digital file existed as of a specific time period and therefore, has not changed since it first came into existence. However, while the lack of change is relevant in this regard, it does not mean that all entries in the blockchain will automatically be admissible in court. The law requires a certification of the proper creation of the record and proof of the proper and legitimate creation of the record by the person making the record.

IMMUTABILITY AND THE QUESTION OF AUTHENTICITY

Resistant to tampering is one of the major positive attributes associated with blockchain. Once data is entered into a distributed ledger, it cannot typically be changed without a consensus among all members of the network. While this one trait increases a data source's credibility in the eyes of a judge, it does not provide definitive proof of ownership or legality

¹¹ Bharatiya Sakshya Adhiniyam 2023

¹² *Anvar P V v P K Basheer & Ors* (2014) 10 SCC 473

¹³ *Arjun Panditrao Khotkar v Kailash Kushanrao Gorantyal* (2020) 7 SCC 1

of the entry. For example, a blockchain record may show that a digital asset was created at an instant in time. But it will not show that whoever created it is the legal owner or that the creation constitutes an infringement of someone else's right. As a result, blockchain increases the evidentiary weight of the evidence itself, but does not eliminate the requirement for a judge to examine all other aspects of the situation.

In India, courts have traditionally considered both procedural and substantive facts when evaluating an issue. Thus, there is a good possibility that blockchain records will be treated as corroborative evidence as opposed to conclusive evidence of ownership.

CERTIFICATION REQUIREMENTS AND PROCEDURAL COMPLIANCE

The Bharatiya Sakshya Adhinyam specifies certification requirements for electronic records to ensure that they provide reliable evidence. For example, if a party is going to rely on blockchain evidence, then it must show how the record was created, what technical processes were used in creating it, and what safeguards were in place to ensure the accuracy of the information contained within it. This creates an institutional aspect to the requirement. If blockchain systems are operated privately and without any regulatory oversight, courts will be hesitant to give them strong evidentiary weight. On the other hand, if the quality of the blockchain infrastructures is overseen or confirmed by governmental authorities, then those types of systems may receive a greater degree of acceptance by the judiciary.

One possible way to reform would be to create a statute that clearly defines the way in which a blockchain entry created through a regulator-approved node or a government-integrated system will be treated as prima facie evidence of its date and integrity. This type of framework would help streamline the litigation process while still retaining the judicial discretion of the courts to make their own judgments.

Evidentiary Value in Intellectual Property Disputes: In IP litigation, evidentiary disputes are often related to the priority of creation, originality, date of disclosure, and chain of assignment. Blockchain technology can assist in providing a means of documenting these facts and events through the creation of a transparent and chronological record. However, it is important to note that intellectual property rights in India are created by statute. A blockchain record cannot replace the need for a mandatory patent filing when that is

required, nor can it take the place of a statutorily required registration. The blockchain record is only auxiliary to the statutory bases for the creation of legal rights.

Accordingly, blockchain should be viewed as a technological enhancement to evidentiary documentation rather than an autonomous source of legal rights. The integration of such evidence must occur within the procedural safeguards established by Indian law.

Smart Contracts and the Indian Contract Act 1872: The advancement of blockchain technology has led to the creation of smart contracts, defined as self-executing contracts with terms of the agreement between buyer and seller directly written into lines of computer code. Such contracts will carry out contractual obligations once the agreed-upon conditions are met, as they are digital protocols which execute such obligations automatically. Smart contracts are being proposed as potential options for royalty distribution, automated licensing, conditional transfers and subscription-based access models in relation to intellectual property protection. However, it is important to consider whether or not these types of contracts will be enforceable in India by examining the provisions of the Indian Contract Act 1872.

Essential Elements of a Valid Contract: Accordingly, based on the criteria found in Section 10,¹⁴ four elements must be present for a contract to be considered valid:

1. Free Consent of Competent Parties;
2. A Lawful Consideration;
3. A Lawful Object; and
4. An Intention to Create Legal Relations.

Further, there is no requirement for contracts to be in any particular form unless specified by law; hence, contracts may be oral or written (or formed by conduct) according to the parties' desire.

From a legal perspective, not having a written or oral contract does not mean it cannot be a valid agreement. When the parties have willingly and voluntarily agreed to be bound by automated execution of the contract and the other three elements of Section 10 have been

¹⁴ Indian Contract Act 1872, s 10

fulfilled, the smart contract can be enforceable in accordance with the Indian Contract Act 1872.

Consent and Intention in Automated Systems: The formation of consent in digital settings is a key issue. Contracts with physical signatures (known as traditional contracts) have terms that are agreed to or accepted explicitly or after negotiations. In contrast, smart contracts execute automatically, i.e., as soon as the code meets the elements of the contract that have been programmed into the code. Because of this difference, we must consider whether the parties understand, consent to, and agree on the algorithm used in the contract.

Indian contract law requires free and informed consent. In principle, if the parties knowingly agree to an arrangement that has been coded (based on a digital interface that sets out the terms clearly), then the requirement for consent will have been satisfied. However, ambiguity can result from a lack of access to complex or contradictory code; therefore, in such cases, it may be that courts will look more at the parties' clear intent at the time of the agreement than they will to the coding.

CODE VERSUS TEXT: CONFLICT AND INTERPRETATION

A practical challenge can arise if there is a difference between the coding and the writing when both the coded and written versions are intended to achieve similar results. For instance, a smart contract may automatically transfer a royalty payment to one party based on certain criteria without regard to other conditions outlined in the written contract.

When interpreting contracts, Indian courts consider one or more of the following: the intention of the parties, the surrounding circumstances, and the principles of equity. Therefore, if the parties have entered into an agreement and the courts interpret it in such a way that is contrary to the use of the code as an exclusive means of determining their rights, the court will treat the code as a means of performing their obligations under the agreement(s), and the code will not exclusively determine their rights under the agreements. Legislative clarification recognising 'hybrid smart contracts' – where natural language and code operate together – would reduce uncertainty and enhance commercial confidence.

REMEDIES, MISTAKES, AND UNFORESEEN CIRCUMSTANCES

Mistakes, misrepresentations, coercions, and frustrations are all recognised in the Indian Contract Law as legal doctrines. Smart contracts can execute a transaction on an automated basis, which may result in the completion of a transaction even if the parties intended to suspend/renege the contract. This could create concern regarding what kind of remedy may be available for the parties impacted by the costly mistake of automatically executing a transaction for intellectual property or royalties. If a coding error caused a company to unintentionally transfer an item of intellectual property or cause a party to pay royalties, the parties affected could rely on traditional contract remedies. Courts will likely handle all disputes similarly to cases involving clerical error/defective performance. Automation does not remove the authority of the court.

APPLICATION IN INTELLECTUAL PROPERTY TRANSACTIONS

Smart contracts in the area of intellectual property licenses create potential for improved efficiency, particularly with respect to periodic payments and cross-border electronic transactions. The automatic distribution of royalties may assist with transparency and decrease the cost of third parties providing similar services. However, in the absence of a statute authorising smart contracts, these contracts would be subject to the general principles of contract law. Thus, although smart contracts are not inherently inconsistent with the provisions of the Indian Contract Act 1872, an enforceable smart contract will depend on compliance with the established doctrinal requirements. Smart contracts should not be construed as revolutionary alternatives to traditional agreements; instead, they should be viewed as advanced technological tools which act within the existing legal system.

TOKENISATION AND THE NATURE OF INTELLECTUAL PROPERTY RIGHTS

There is also the growth of blockchain-based tokenisation, particularly through the use of non-fungible tokens (NFTs), new issues are arising regarding the nature and concept of ownership of intellectual property rights, both from a legal point of view as well as from a conceptual standpoint. Tokenisation, in this context, refers to the act of converting rights or assets into their digital form on the blockchain, with each token being a unique, recordable item that is stored on a distributed ledger. In relation to intellectual property rights, the growth of digital tokens associated with intellectual property manufacturing or

commercialisation (patents, copyright, etc.) has continued, with intellectual property rights being associated with digital tokens for licensing purposes, investment purposes, and commercialisation. However, the legal implications associated with the tokenisation of intellectual property through NFTs in India must be examined within the framework of the statute that governs the IP Rights in India.

INTELLECTUAL PROPERTY AS A STATUTORY RIGHT

In India, intellectual property rights (IPR) are created through laws. Therefore, unlike tangible property, which can be created by simply taking possession or by transferring it under the general principles of property law, IPRs cannot exist unless they have been created by legislation. Each legislative statute related to IPRs: The Patent Act 1970; The Copyright Act 1957, and The Trade Mark Act 1999, prescribes a specific process for obtaining, transferring or applying/enforcing IPRs.

The fact that the IPRs are created by statute is crucial in order to properly understand tokenisation. You cannot, by way of technological representation only, transfer a patent or copyright. The validity of any assignment or licensing agreement will depend on compliance with statutory formalities, namely, with respect to whether the agreement is written and whether it complies with the necessary registration requirements as set out in the relevant statutes. Therefore, simply having a digital token which represents an IPR will not constitute a legal transfer of the title or rights that will flow from the digital token. According to the courts of India, enforceable commercial agreements depend on conforming to legal and contractual requirements. The Delhi High Court reaffirmed this principle when it held in *M/s. Pine Labs Pvt. Ltd. v Gemalto Terminals India Pvt. Ltd.*¹⁵, that legal validity derives from established contractual obligations and not merely from the transactional form. Accordingly, a blockchain token by itself does not independently transfer rights to intellectual property, such as copyright; it must first be assigned or licensed legally.

TOKENISATION AS REPRESENTATION VERSUS LEGAL OWNERSHIP

Tokens created on blockchain technology could act like certificates, a mark of proof or a claim to rights over something like royalties. But just because you transfer a token from one person

¹⁵ *Pine Labs Pvt Ltd v Gemalto Terminals India Pvt Ltd & Ors* (2011) 48 PTC 248 (Del)

to another does not mean that the rights associated with that token will also transfer unless there is an Assignment Agreement executed in accordance with the statutory requirements of Indian Law. For instance, if you buy an NFT representing an artwork protected by copyright, that would give you ownership of the NFT but not give you ownership of the copyright in the artwork unless there is an express Assignment of Copyright from the author to you that complies with the Copyright Act. Similarly, if you buy a token representing a patent, you would not gain rights to the patent simply because you hold a token representing that patent, since only the Controller is authorised by law to maintain an Official Patent Register.¹⁶ There is a very clear distinction between the technological representation of property or goods and the legal ownership of that property or those goods. Tokenisation may provide more transparency and traceability for commercial transactions, but it does not take away the legislature's authority.

COMMERCIALISATION AND FRACTIONALISATION OF IP ASSETS

Tokenisation is often regarded as a means of unlocking fractional ownership of an asset and, ultimately, creating liquidity through the fractional ownership of an asset. Traditionally, intellectual property assets have been illiquid and difficult to transfer, with fractional ownership potentially allowing intellectual property assets to be divided into smaller digital units that represent the economic interest in those assets. These mechanisms for fractional interest will also help make more innovative investments accessible to a larger number of investors. Unfortunately, the notion of fractionalization creates a host of regulatory issues. Many token holders may have a contractual interest or a beneficial interest, as opposed to a proprietary title. Consequently, disputes could arise as to governance rights, enforcement authority, and the right to royalties for token holders. For that reason, regulators need to provide regulatory clarity in order to minimise the potential for misrepresentation of tokens and to prevent speculative misuse.

REGULATORY IMPLICATIONS AND NEED FOR CLARIFICATION

There is a lack of clear statutory provisions within Indian law regarding tokenisation. It is possible that the existing laws related to contracts will address economic arrangements

¹⁶ Patents Act 1970

related to tokens. Still, the proprietary nature of intellectual property rights is determined by statutory registries.

Regulators should create a framework that defines:

- (i) tokens that represent contractual rights or rights to share revenue and
- (ii) legally recognised transfers of intellectual property.

This clarification should state that the legal transfer of a token will occur only upon compliance with applicable statutory requirements governing the assignment of intellectual property. Thus, while the development of technology continues, the integrity of centralised registries will be preserved, and the expansion of technology will be accomplished in a legally valid manner.

Data Protection and Immutability: There is a need to evaluate how blockchain technology will fit into the context of the existing and evolving data protection laws in India and thus determine how these core features of blockchain (immutability and tamper-resistance) create a doctrinal tension with certain statutory rights, including the right to correct, to delete, and to minimise the amount of data being gathered or held. The relationship between permanent digital ledgers (such as those maintained on a blockchain) and privacy regulation creates both constitutional issues and regulatory issues.

Immutability as a Technological Attribute: The term 'immutability' refers to the technological design of blockchain systems whereby the data that has been recorded may not typically be altered or modified without producing a disruption to the data integrity of the entire chain. Each time a transaction is created or executed on a blockchain, that transaction will produce a cryptographically linked record to all transactions that preceded it, thus creating a verifiable, permanent, and tamper-resistant ledger of all transactions executed on the blockchain. Therefore, if a dispute arises relating to intellectual property, the creation of a permanent record on an unalterable ledger may provide a certain amount of evidentiary integrity regarding records of authorship, assignment, and licensing.

However, the combination of immutability and permanence will also create issues of rigidity in that corrections or deletions of personal data associated with a single transaction (for example, the name of an author, an inventor, or an assignee) that is embedded directly onto

the blockchain are likely to create a technological burden on the entity that wishes to make such corrections or deletions. Consequently, erroneous, unlawful, and obsolete personal data associated with a particular transaction may remain readily accessible for a period extending indefinitely, potentially creating a direct conflict with the statutory guarantees of data protection.

The Digital Personal Data Protection Act 2023: The Digital Personal Data Protection Act¹⁷ establishes a framework regulating lawful processing, purpose limits and data minimisation relating to the collection and use of personal data by government and private sector organisations. As part of this framework, individuals have the right to request corrective action to be taken in respect of inaccurate personal data, as well as to request the deletion of their personal data in certain situations. These rights are representative of broader constitutional principles around informational privacy and proportionality in both the public and private sectors when it comes to processing and use of personal data. In the Supreme Court's decision in *Justice KS Puttaswamy (Retd) v Union of India*,¹⁸ the Supreme Court, it was established that privacy is a fundamental right pursuant to Article 21 of the Constitution of India and that there is a direct relationship between information self-determination and individual dignity. As such, an assessment of the proportionality of any technological infrastructure providing for permanent immutability of personal data will be based upon the proportionality standards articulated in this decision.

The public and permanent nature of a blockchain may impair individuals' ability to exercise their rights if their personal data is publicly and permanently recorded on-chain without the ability to alter it or delete it. Therefore, the use of blockchain technology to administer intellectual property could expose the administering organisation to compliance risk and potential constitutional challenge.

ARCHITECTURAL RECONCILIATION: OFF-CHAIN DATA MODELS

The solution to this dilemma is not to prohibit the use of blockchain technologies in intellectual property administration, but rather to develop and use privacy-focused architectural designs. Personal data should remain off-chain, in databases that can be altered

¹⁷ Digital Personal Data Protection Act 2023

¹⁸ *Justice K S Puttaswamy (Retd) & Anr v Union of India & Ors* (2017) 10 SCC 1

and/or deleted as required by law; notwithstanding the absence of personally identifiable information ('PII') in the blockchain layer, the on-chain layer may only contain cryptographic hashes and/or verification tokens that verify the integrity of the data without revealing the underlying PII. The result of the holistic approach to technology and statutory compliance will create a separation of verification from storage, thus allowing for a symbiotic relationship between efficient technology and statutory accountability.

REGULATORY IMPLICATIONS FOR IP GOVERNANCE

The issue of data protection reveals a larger issue: constitutional and statutory mandates cannot be supplanted by the truism of immutability of technology. Any integration of blockchain technology into intellectual property systems needs to embed privacy by design, and there should be clearly defined governance standards. Providing regulatory guidance on what constitutes acceptable blockchain architecture, what encryption standards to use and how to comply with local data localisation practices will provide a mechanism to prevent unintentional violations of applicable statutes. Under this calibrated regime, immutability serves as confirmation of evidence rather than an absolute prohibition, permitting innovation to occur within the scope of Indian data protection regulations.

COMPARATIVE REGULATORY APPROACHES

United States: Market-Driven Innovation: In the US, the growth of Blockchain for Intellectual Property has mostly been through private sector experimentation and hasn't seen big statutory reforms. There have been private sector companies and startups that have created Patent documentation systems using Blockchain, Copyright Timestamping, and tokenised platforms without significant changes in the IP Federal Statutes.

Courts tend to generally use their existing evidentiary and contractual principles when evaluating various disputes in relation to Blockchain. Courts will use existing Federal Evidentiary Rules¹⁹ when assessing Electronic Records. Smart Contracts are generally interpreted using existing Contract Law principles. This demonstrates that Courts prefer Technology Neutrality and that Innovation should grow organically under existing legal frameworks.

¹⁹ Federal Rules of Evidence (US) 1975, r 901

Nevertheless, the absence of explicit legislative guidelines may result in doctrinal fragmentation. Courts may evaluate and treat Blockchain evidence differently in different jurisdictions. Additionally, there may be ongoing uncertainties regarding regulation when tokens are used in relation to Securities Law or within the context of Consumer Protection standards.

European Union: Regulatory Integration and Institutional Strategy: The European Union (EU) has a more proactive and structured regulatory framework for its blockchain development strategy, as it has developed specific legislation for digital governance and for crypto-assets. By establishing regulatory frameworks, the EU has created a form of ‘pre-emptive’ regulation,²⁰ where blockchain technology has been included as part of a wider policy framework in respect to digital governance.

Pilot projects aimed at addressing the issues of anti-counterfeiting, supply-chain transparency, and digital identity are examples of blockchain experimentation being carried out by the EU institutions in a regulatory environment through a structured process. However, all formal intellectual property registries remain controlled by states, and therefore, blockchain acts as a supplementary technological layer rather than replacing centralised administration. This regulatory approach promotes harmonisation, compliance and interoperability across borders, and is part of the EU's overall goal of having coordinated digital governance.

China: State-Centric Technological Incorporation: China has a very different approach to blockchain than the EU, as it uses a state-centric model to directly incorporate blockchain infrastructure into its judicial and administrative systems. Blockchain has been used as a form of evidence in court under specific regulatory frameworks,²¹ usually as part of a state-sponsored technology platform.

The Chinese model of blockchain is based on a centralised political structure within which decentralisation exists. In China, blockchain is used as part of the official governance structure and therefore blockchain systems operate as a component of the official state system, rather than as independent private networks. Consequently, blockchain is both

²⁰ Regulation on Markets in Crypto-assets 2023

²¹ Supreme People’s Court’s Provisions on Several Issues Related to Trial of Cases by the Internet Courts 2018

technologically advanced and institutionally controlled, where the evidentiary and administrative applications of blockchain technology receive state recognition.

India: Cautious Institutional Evaluation: India's current situation is rather restrained, yet the context of Blockchain is vast, due in part to the implementation of various digital governance initiatives and ongoing dialogue around Distributed Ledger Technology (DLT). However, at this time, the direct applications of blockchain within intellectual property administration in any capacity have yet to plateau.

India's cautious approach reflects both the conservatism seen throughout many governmental institutions, as well as legitimate concerns regarding issues such as regulatory complexity, compliance with data protection requirements, and the government's constitutional accountability to the people. Unlike the US (market-led experimentation) and China (state-led integration), it seems as though India is assessing its blockchain options in light of consideration for this country's statutory structure and administrative capacity.

The experience of these distinct countries and jurisdictions relative to technology and its adoption is a reminder that the adoption of technology is influenced by constitutional structure, regulatory philosophy, and institutional design. Therefore, in the case of India, any changes made must be consistent and congruent with its centralised statutory framework while also supporting measured innovation.

COUNTERARGUMENTS AND STRUCTURAL RISKS

Blockchain technology is an exciting area of development for ABC, Inc. and its intended governance capabilities; however, it is not a 'complete' answer for resolving, among other things, the associated issues inherent to the 'structure' of intellectual property. Blockchain's 'immutability' increases the reliability of evidence in cases where a party claims a right, but it does not, in any respect, alter the natural rights of an author or provide evidence of their initial authorship. Thus, if a permanent record—an error on the party's part—exists, that record will always be an error, and regardless of whether an error has occurred, or has been corrected, by technology, the element of legality cannot be inferred by such permanent records. There is also the question of what it will cost administrative agencies that are already having significant financial constraints to implement a blockchain system, for which the

implementation may cost administrative agencies significant amounts of money and infrastructure to build their blockchain system.

There may also be opportunities through excessive tokenisation and financialization to create incentives for speculative trading of intellectual property assets that are not intended to further the core public policy goals of promoting innovation, creativity, and providing the public with access to information/knowledge. Rather than further encouraging creators to create because they will be financially rewarded for their creation, the fragmentation of intellectual property rights into digitally tradable assets could shift attention from encouraging creation to rewarding those who attain short-term financial profit. Finally, decentralised entities will likely not be held accountable for their actions if the decentralised entity does not have a 'calibrated' governance structure to keep the decentralised entity accountable and to clarify its regulatory responsibility.

Regulators must thus adopt a 'calibrated' or 'evidence-based' regulatory approach to promote the encouragement of innovation through technological innovations, while still maintaining regulatory safeguards and not compromising the core values of the Constitution or applicable statutes when promoting an efficient market.

CONCLUSION

The advantages of using blockchain technology include improved traceability, chronological transparency, and the ability to automate transaction executions. As shown previously, however, Indian IP law does not derive from technological ventures; rather, it originates from legislation based on dominated sovereignty. The legal basis for these rights is provided by the legislative power to create laws, administrative authority to recognise their existence, and judicial bodies to enforce them. Thus, any technological enhancements to these processes would have to operate within the existing legal structure (Constitutional & Statutory Law) rather than supplant them.

The analysis concluded that while there is evidence of incompatibility between the use of blockchain and Indian IP law, there is no evidence that blockchain can independently create or redefine Indian IP law. The current functionality of blockchain is therefore primarily as 'supplementary' to existing IP law - i.e., blockchain can (i) strengthen documentation, (ii) increase efficiency of transactions, and (iii) reduce information asymmetry, but it cannot

change the existing method of registration for IP. Furthermore, the analysis from other countries indicates that long-term success in implementing blockchain technology will depend upon establishing regulations that clearly define what is permitted and providing adequate oversight of the institutions responsible for regulating the technology.

The governance of intellectual property in the future for India will require developing a regulated interface between the statutory body and distributed ledger technology (blockchain). By using carefully drafted legislation to clarify, evidence to provide proper recognition and regulations governing the standard of technical privacy, blockchain could form an enabling infrastructure layer (cloud-based) for conducting this governance in a regulated and constitutional manner. Therefore, technological innovation can strengthen Indian IP law by maintaining the integrity of the IP laws of India by reinforcing or enhancing their doctrinal coherence.