
INNOVATING WITH PROTECTION: BLOCKCHAIN APPLICATIONS AND SOFTWARE PATENT CHALLENGES

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ABSTRACT

Blockchain technology is a decentralized and secure ledger expected to significantly influence and shape future industries with rapid technological advancements. Its core attributes such as operational efficiency, transparency, cost-effectiveness, and data security have propelled its adoption across diverse sectors such as finance, healthcare, logistics, governance, and education. In today's highly competitive environment, it is essential to protect new innovations through patent registration to prevent their unauthorized use or exploitation.

The Patents (Amendment) Act, 2002 introduced the term "*per se*" into Section 3(k) of the Patents Act, 1970, which excludes certain types of inventions from patentability. The provision specifies that "a mathematical or business method or a computer program *per se* or algorithms" shall not be regarded as inventions. It has been contended that blockchain related innovations should fall outside the scope of patentability, as they are fundamentally rooted in algorithms and computer programs based on mathematical concepts. The amendment primarily aims to prevent the misuse of patents and the creation of unnecessary monopolies over software, while at the same time encouraging the development and application of foundational technological ideas.

This paper critically examines the intersection of software patents and blockchain technology in the Indian context. It explores how judicial precedents, legislative reforms, and administrative guidelines have collectively shaped the contours of patent eligibility for blockchain-based inventions. Through an analysis of statutory provisions, case law, and policy evolution, the study highlights India's cautious yet adaptive approach toward fostering innovation while maintaining a balance between technological progress and public interest.

Keywords - Blockchain Technology, Software Patents, Computer Related Inventions, Intellectual Property Rights, Technological Innovation.

1. INTRODUCTION

In an era characterized by rapid digital transformation, innovation in information technology and computer sciences has become a driving force of economic growth and industrial development. Among the most disruptive technologies of the 21st century, blockchain stands out as a decentralized, tamper-proof digital ledger that has revolutionized how transactions and data are stored, verified, and transmitted¹. Since its inception in 2008, blockchain technology has transcended beyond its original framework and application in cryptocurrency to sectors including finance, logistics, healthcare, education, and public administration². Its ability to ensure transparency, data integrity, and security without reliance on centralized authorities has made it a key enabler of digital trust and technological development.

As blockchain technology is progressively advancing, questions regarding the protection of intellectual property (IP) in blockchain-based innovations have gained prominence³. In particular, the scope of patent protection for software and computer-implemented inventions remains a contentious area of debate in India and worldwide. Patents within the framework of intellectual property rights, play a significant role in encouraging innovation by conferring time-bound exclusive rights upon inventors over their creations, thereby preventing unauthorized commercial use⁴.

However, in India, the patentability of software-based inventions—especially those dependent on algorithms or computer programs—has been restricted by Section 3(k) of the Patents Act, 1970⁵. This provision excludes “a mathematical or business method or a computer program per se or algorithms” from the definition of inventions eligible for patent protection, posing a legal barrier to many blockchain-related inventions.

The introduction of the term “per se” through the Patents (Amendment) Act, 2002, sought to strike a balance between encouraging innovation and preventing monopolization of abstract ideas⁶. However, this amendment led to interpretative challenges and ambiguities regarding the

¹European Union Blockchain Observatory & Forum, *Blockchain Innovation in Europe: 2024 Report* (European Commission 2024).

² Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008).

³ World Intellectual Property Organization, *Blockchain and Intellectual Property Rights: A Policy Perspective* (2022).

⁴ Indian Patent Office, *Manual of Patent Office Practice and Procedure* (2021).

⁵ The Patents Act, 1970, § 3(k) (India).

⁶ The Patents (Amendment) Act, 2002 (India).

scope of software patentability. Over time, Indian jurisprudence has attempted to clarify this ambiguity through judicial interpretation.

The landmark case *Ferid Allani v. Union of India* (2020) marked a significant evolution in judicial reasoning, as the Delhi High Court recognized that genuine technological advancements utilizing computer programs could be patentable if they demonstrated a “technical effect” or “technical contribution.”⁷ This decision aligned India’s approach with international practices, such as those of the European Patent Office (EPO), which emphasize assessing the technical character of an invention rather than its mere implementation through software.

Building upon such judicial guidance, the Indian Patent Office published the 2025 *Guidelines for Examination of Computer Related Inventions* (CRIs), representing a major policy evolution. For the first time, the guidelines explicitly refer to blockchain technology, clarifying the standards for assessing blockchain-related inventions and outlining the conditions under which they may qualify for patent protection⁸. This reflects India’s growing recognition of the need to foster technological development while ensuring that patent laws remain adaptive to emerging digital technologies.

2. LITERATURE REVIEW

1. A. Rai & R. Fleming⁹, in their paper “Comparative Approaches to Software Patentability,” discussed that Comparative studies demonstrate whether a jurisdiction focuses on “novel technical contribution,” “inventive step,” or “abstract idea” exclusion materially affects outcomes for software and blockchain inventions.
2. R. Narayanan¹⁰, in his paper “Section 3(k) and Indian Patent Policy,” has traced how Section 3(k) of the Patents Act, 1970 has been interpreted since the 2002 insertion of the word “per se,” which excludes “a mathematical or business method or a computer program per se or algorithms” from patentable subject matter. Early commentators argued the amendment reflected a policy preference to keep core software innovations

⁷ *Ferid Allani v. Union of India*, 2020 SCC OnLine Del 2482 (India).

⁸ Indian Patent Office, *Guidelines for Examination of Computer Related Inventions* (2025).

⁹ A. Rai & R. Fleming, *Comparative Approaches to Software Patentability*, 22 IP L. Rev. 55 (2017).

¹⁰ R. Narayanan, *Section 3(k) and Indian Patent Policy*, 2 Ind. J. L. & Tech. 45 (2004).

outside monopoly protection, aligning with access-friendly objectives of Indian patent policy.

3. P. Kaur¹¹, in his paper titled “Reinterpreting Per Se: Judicial Responses to Software Patents,” warned that a literalistic reading of “per se” risked over-broad exclusions that would deny protection to bona fide technical advances implemented through software. The literature points to key judicial interventions—most notably *Ferid Allani v. Union of India*—where courts endorsed a purposive interpretation permitting patentability when a computer program produces a demonstrable technical effect or solves a technical problem.⁷ Commentators view such judgments as corrective, aligning India more closely with international practice while still safeguarding against patenting of pure business methods.
4. L. Chen & K. Patel¹², in his paper titled “Blockchain Technical Overview and Patentability Issues,” discussed The literature identifies recurring themes: (a) whether consensus mechanisms or cryptographic optimizations amount to patentable technical solutions; (b) how smart contracts—essentially code that executes agreements—fit within the patent/copyright divide; and (c) the tension between patent exclusivity and blockchain’s open, collaborative ethos.

3. RESEARCH METHODOLOGY

The present study employs a doctrinal legal research methodology, supplemented by a qualitative analysis of policy documents and judicial pronouncements, to examine the intersection of software patents and blockchain technology within the Indian context. The methodology is designed to analyze statutory provisions, interpretative case law, and administrative guidelines, thereby assessing how India’s legal framework accommodates blockchain-based innovations.

Some of the primary sources include- The Patents Act, 1970, § 3(k) (India), The Patents (Amendment) Act, 2002, No. 38 of 2002 (India), Indian Patent Office, Guidelines for Examination of Computer-Related Inventions, 2025, TRIPS Agreement, etc.,

¹¹ P. Kaur, *Reinterpreting Per Se: Judicial Responses to Software Patents*, Legal Studies (2021).

¹² L. Chen & K. Patel, *Blockchain Technical Overview and Patentability Issues*, Computer L. & Security Rev. (2019).

Secondary sources including, WIPO, *Blockchain and IP Law: A Global Perspective*, World Intellectual Property Organization Report (2023), *WIPO Technology Trends 2019*, *National IPR Policy* (2016) etc.,

4. SOFTWARE PATENTS IN INDIA

Software patents protect inventions implemented through computer programs, conferring inventors with time-bound exclusive rights over their creations¹³. In India, the primary statutory provision governing patentability is Section 3(k) of the Patents Act, 1970, which excludes “a mathematical or business method or a computer program per se or algorithms” from patentable eligibility. The amendment introduced by the Patents (Amendment) Act, 2002, which included the term “per se,” was intended to prevent patents on abstract software ideas and mathematical algorithms, thus maintaining the balance between encouraging technological innovation and avoiding monopolies over foundational software knowledge.

However, this restrictive language initially resulted in ambiguity, as it was unclear which computer-implemented inventions could be patented. Many blockchain-based innovations, which rely heavily on cryptographic algorithms and software logic, appeared to fall within this exclusion¹⁴. It was contended that the literal reading of Section 3(k) would, in effect, bar almost all software-based innovations from patentability, potentially discouraging investment in high-tech R&D within India¹⁵.

4.1 Judicial Interpretation and “Per Se” Doctrine

Indian courts have gradually adopted a purposive approach to Section 3(k). In *Ferid Allani v. Union of India* (2020), the Delhi High Court clarified that the term “per se” should not be interpreted in isolation. Instead, inventions implemented through computer programs that provide a technical effect or solve a technical problem could qualify for patent protection¹⁶. This marked a significant shift from a purely literal reading to a functional approach, aligning Indian law with international standards like the EPO “technical effect” test¹⁷.

¹³ R. Narayanan, *Software Patents in India: Challenges and Opportunities*, 16 *J. Intell. Prop. Rts.* (2011).

¹⁴ N. S. Gopalakrishnan, *Software Patents and Innovation in India*, *J. Tech. L.* (2012).

¹⁵ S. Menon, *The “Per Se” Problem: Software Patents in India*, *J. Intell. Prop. Rts.* (2012).

¹⁶ *Ferid Allani v. Union of India*, 2020 SCC OnLine Del 2482.

¹⁷ European Patent Office, *Guidelines for Examination of Computer Related Inventions* (2025).

The court emphasized that while algorithms and abstract software are excluded, software innovations that result in tangible improvements in system performance, cryptography, or data management may still be patentable¹⁸. This interpretation has paved the way for blockchain-based inventions—provided they demonstrate a concrete technical contribution rather than merely automating a business process or executing a standard algorithm¹⁹.

5. BLOCKCHAIN: TECHNICAL AND LEGAL CONSIDERATIONS

Blockchain is a decentralized ledger framework that ensures data security, transparency, and immutability in maintaining records. Its foundational components include:

- **Distributed Ledger:** A database maintained across multiple nodes, ensuring redundancy and data integrity.
- **Consensus Mechanisms:** Consensus mechanisms such as Proof-of-Work (PoW) or Proof-of-Stake (PoS) facilitate network-wide consensus on the legitimacy of transactions.
- **Smart Contracts:** Self-executing code that automates transactions based on predefined conditions.
- **Cryptography:** Ensures security, authentication, and immutability of data on the blockchain.

These features make blockchain a promising platform for innovations in finance, supply chain management, healthcare, governance, and other sectors²⁰.

5.1 Blockchain and Software Patent Challenges

The technical nature of blockchain presents both opportunities and challenges in the patent context. Some of the challenges are:-

1. **Algorithmic Dependency:** Blockchain innovations often rely on complex algorithms, cryptographic protocols, and distributed consensus mechanisms, which are traditionally

¹⁸P. Kaur, Reinterpreting *Per Se*: Judicial Responses to Software Patents, *Legal Stud.* (2021).

¹⁹L. Chen & K. Patel, Blockchain Technical Overview and Patentability Issues, *Comp. L. & Sec. Rev.* (2019).

²⁰European Union Blockchain Observatory & Forum, *Blockchain Innovation Report* (2024).

excluded under Section 3(k)²¹.

2. **Abstract Nature:** Many blockchain solutions focus on improving business processes or transaction efficiency, which risks being categorized as “per se” software or mathematical methods²².
3. **Hybrid Technical Features:** Some blockchain applications involve hardware-software integration (e.g., IoT-enabled blockchains), raising the question of whether such combinations constitute a technical effect sufficient for patentability²³.

It was suggested that courts and examiners should distinguish between abstract algorithmic methods and technical solutions implemented via blockchain that produce real-world effects²⁴.

6. PATENTABILITY OF BLOCKCHAIN INNOVATIONS IN INDIA

To secure a patent in India, a blockchain-related invention must fulfill fundamental standards of patent eligibility under the Patents Act, 1970:

1. **Novelty (Section 2(1)(j)):** The invention must demonstrate novelty and remain undisclosed in the existing body of prior art, publication or public use²⁵.
2. **Inventive Step (Section 2(1)(ja)):** The invention must involve an inventive step and should not be obvious to a skilled person in the field.
3. **Industrial Applicability (Section 2(1)(ac)):** The invention must have practical utility and be capable of application in an industry.
4. **Exclusion under Section 3(k):** The invention must not be a “computer program per se” unless it produces a technical effect.

6.1 Judicial Approach to Blockchain

Indian courts have applied the “technical effect” test to software patents, which is applicable

²¹ T. Verma, Smart Contracts: Copyright, Patent, and Regulatory Interfaces, *Law & Tech. Rev.* (2020).

²² Ibid

²³ Deepa Kachroo Tikku, “Patentability of Blockchain Innovations under Indian Patent Law,” *Indian Journal of Law and Technology*, Vol. 17 (2025).

²⁴ Ibid.

²⁵ The Patents Act, 1970, § 2(1)(j) (India).

to blockchain innovations as well. Examples include:

- Consensus Protocols: Blockchain consensus mechanisms can be patented if they improve network efficiency or security, demonstrating a technical contribution²⁶.
- Smart Contract Automation: Smart contracts may be patentable if they provide enhanced data validation or transaction verification mechanisms rather than merely automating business logic.
- Data Security Mechanisms: Cryptographic innovations or hashing methods integrated into blockchain may qualify for patent protection if they provide measurable improvements over prior art.

6.2 CRI Guidelines 2025: Explicit Reference to Blockchain

The 2025 Guidelines for Examination of Computer Related Inventions (CRI) explicitly acknowledge blockchain inventions and provide a framework for their evaluation²⁷. Key points include:

- Examination focuses on technical features rather than form or abstraction.
- Blockchain inventions demonstrating improved efficiency, security, or technical integration may be eligible for patent protection.
- Mere implementation of business processes on blockchain without a novel technical effect remains unpatentable.
- Claim drafting must clearly disclose technical contributions to meet examiner requirements²⁸.

These guidelines mark a milestone, bridging the gap between legislative ambiguity and judicial interpretation. They signal India's readiness to accommodate blockchain innovation while maintaining public interest safeguards.

²⁶ L. Chen & K. Patel, *supra* note 12.

²⁷ Indian Patent Office, *Guidelines for Examination of Computer Related Inventions* (2025).

²⁸ *Ibid.*

7. COMPARATIVE PERSPECTIVES ON BLOCKCHAIN PATENTS

7.1 United States

In the United States, the protection of blockchain-related inventions is governed primarily by Title 35 of the United States Code, which outlines the statutory requirements for patentability — namely novelty (35 U.S.C. § 102), non-obviousness (35 U.S.C. § 103), and subject matter eligibility (35 U.S.C. § 101). Blockchain patents are typically granted for technological innovations that offer a technical improvement in computer functionality, such as enhanced data security, consensus mechanisms, or transaction verification processes.

However, patent eligibility for blockchain inventions faces scrutiny under *Alice Corp. v. CLS Bank Int’l*²⁹, where the Supreme Court held that abstract ideas implemented using generic computers are not patentable unless they contain an “inventive concept.” Subsequent decisions, clarified that software-based inventions improving computer functionality can qualify for patent protection³⁰. The U.S. Patent and Trademark Office (USPTO) has also issued guidelines emphasizing that blockchain applications must demonstrate a concrete technological contribution beyond abstract data management.

Thus, while blockchain patents in the U.S. enjoy protection under existing patent statutes, applicants must carefully frame claims to highlight technical innovation, ensuring compliance with the post-*Alice* eligibility framework.

7.2 European Union

The European Patent Office applies the “technical effect” standard. Blockchain claims must demonstrate technical contribution beyond business or mathematical abstractions³¹. For instance, blockchain systems enhancing network scalability or transaction security are patentable, whereas pure business automation is excluded.

7.3 China

China’s patent office permits blockchain patents if the invention improves information

²⁹ *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208 (2014).

³⁰ *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016).

³¹ European Patent Office, *Guidelines for Examination* (2025).

processing, system efficiency, or security³². The office has a high volume of blockchain patent filings, often related to fintech and supply chain solutions.

Comparative analysis of the following countries highlights the importance of technical effect over mere algorithmic novelty, Detailed claim drafting emphasizing practical implementation and technical contribution and Encouraging narrow, specific patents to avoid monopolization and maintain blockchain's open ecosystem ethos³³. While blockchain patents incentivize R&D, overly broad patenting could hinder innovation, fragment standards, and reduce interoperability³⁴. Policy makers must balance exclusive rights for inventors with open-access principles inherent in blockchain networks. Clear patent guidelines enable startups and SMEs to protect technical innovations, attract investment, and avoid litigation risks³⁵. India's CRI 2025 guidelines provide the administrative clarity necessary for smaller players to navigate the patent system.

8. FINDINGS AND SUGGESTIONS

The analysis of software patents and blockchain technology in India reveals that In recent years, the judiciary has sought to address this unintended consequence by reinterpreting the term “*per se*” moving beyond its literal dictionary meaning—to allow for a more flexible and progressive understanding. This evolving interpretation aims to enable patent protection for genuine technological advancements in the field of computer programs within the Indian legal framework.

Courts now recognize that computer-implemented inventions that demonstrate a technical effect or technical contribution can be patented, thereby opening avenues for blockchain innovations to qualify for protection. The latest Guidelines for Examination of Computer Related Inventions explicitly address blockchain technology for the first time. They provide clarity on evaluating technical contributions, distinguishing patentable blockchain inventions (e.g., enhanced cryptographic security, novel consensus mechanisms, or system optimizations) from non-patentable abstract software or business method implementations. This development signals the Indian Patent Office's commitment to adapt to emerging technological trends.

³²World Intellectual Property Organization, *Blockchain Patents in China: Trends and Analysis* (2023).

³³ Deepa Kachroo Tiku, *supra* note 14.

³⁴ E. Collins, “Standards, Patents, and Open Innovation in Blockchain,” *Law & Policy* (2021).

³⁵ N. Gupta, *Administrative Practice and Patent Examination in India*, *IP Prac.* (2023).

International practices demonstrate that patent eligibility is closely tied to technical effect rather than software implementation alone. The USPTO, EPO, and Chinese patent office permit blockchain patents when they contribute to system efficiency, security, or practical utility. India's evolving legal approach aligns with this trend, although consistent administrative application remains a challenge.

Suggestions for Future Policy and Practice:

- Develop a dedicated blockchain patent framework, clearly delineating patentable technical innovations from abstract implementations.
- Promote technical disclosure and clarity in claims, emphasizing system-level improvements or cryptographic advancements.
- Introduce support programs for startups and SMEs, including advisory services, subsidized legal assistance, and training on patent filing.
- Encourage open-innovation models alongside patent protection to maintain collaboration, interoperability, and broader societal benefits.
- Monitor and review patent practices periodically to ensure they adapt to evolving blockchain technologies and international developments.

10. CONCLUSION

The intersection of software patents and blockchain technology in India represents a dynamic and evolving legal landscape. Legislative amendments, judicial interpretations, and administrative guidelines collectively reflect a careful attempt to reconcile the following objectives:

- Promoting Technological Innovation: Encouraging development and commercialization of blockchain-based solutions.
- Preventing Monopolization of Abstract Ideas: Maintaining access to fundamental software and mathematical methods.
- Aligning with Global Standards: Ensuring India remains competitive and harmonized

with international patent practices.

The introduction of the 2025 CRI Guidelines represents a significant turning point, explicitly acknowledging blockchain inventions and providing a structured approach to assess their patentability. By emphasizing technical contribution and tangible improvements, the guidelines create an environment where genuine blockchain innovations can be recognized and protected, without granting undue monopolies over abstract ideas or common algorithms.

Despite these positive developments, challenges remain. Patent examiners require adequate training in blockchain technology to ensure consistent application of the guidelines. Additionally, small and medium innovators must be supported to navigate the complex patenting process. Policymakers should also monitor the impact of blockchain patents on interoperability, standardization, and open-source innovation, preventing scenarios where patents could fragment the ecosystem.

In conclusion, India's approach to software patents and blockchain is cautious yet progressive. The legal framework, supported by CRI Guidelines 2025, provides a foundation for protecting technological innovations while safeguarding public interest. With continued refinement, capacity-building, and policy support, India can foster a vibrant blockchain innovation ecosystem, ensuring that inventors are rewarded for genuine technical contributions without compromising the open and decentralized principles fundamental to blockchain technology.