INTELLECTUAL PROPERTY RIGHTS IN THE ERA OF AI MODEL DISTILLATION

Shristi Sharma*

ABSTRACT

Artificial Intelligence knowledge distillation—the transfer of capabilities from complex models to simpler, more efficient ones —presents unprecedented challenges for international intellectual property law. As AI systems become more sophisticated, existing copyright, patent, and trade secret frameworks struggle to address questions of ownership, authorship, and permissible use. This paper examines AI knowledge distillation through the lens of international agreements, including TRIPS, WIPO treaties, and emerging case law, with particular attention to recent disputes such as OpenAI's claims against DeepSeek. The analysis reveals significant gaps in current legal frameworks. It explores how the international community is attempting to address these challenges through forums like the Paris AI Action Summit 2025 and diverse national regulatory approaches. Through examination of relevant legal precedents, this work seeks to illuminate the evolving intellectual property landscape in artificial intelligence. The paper concludes with recommendations for future international governance structures that could better balance innovation incentives, competitive dynamics, and intellectual property protection in an era of AI-driven knowledge transfer.

Keywords: AI Knowledge Distillation, Intellectual Property Law, International Legal Frameworks.

INTRODUCTION

Artificial Intelligence is no longer confined to academic theory- it now underpins major advances across diverse fields such as healthcare, law, and finance. Among the most significant developments in AI is “Knowledge Distillation”, which is basically when a smaller and simpler

*BA LLB, FIRST YEAR, RAJIV GANDHI NATIONAL UNIVERSITY OF LAW, PATIALA.

AI model is trained by learning from a much larger and more advanced one.[1] This technique enables the creation of AI systems that maintain much of their performance while requiring fewer computational resources, making advanced AI more accessible and practical for widespread deployment.

However, this technological advancement has raised complex legal questions that existing intellectual property frameworks struggle to address. When a smaller model learns from a larger one, does this constitute copyright infringement? Can organisations claim patent protection for distilled models? How do trade secret protections apply when AI systems learn from other AI systems? These are not merely technical questions; they strike at the foundation of intellectual property (IP) law, which has historically been grounded in the creativity and agency of human authors.

Current international intellectual property law operates primarily through frameworks like the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement and various World Intellectual Property Organisation (WIPO) treaties. TRIPS, which came into effect in 1994, was created to protect different types of intellectual property like copyrights, patents, and trade secrets across countries that signed it. Yet this agreement predates the current AI revolution, leaving substantial ambiguity about whether AI-generated outputs fall within established IP categories. Similarly, the WIPO Copyright Treaty (WCT) strengthens digital copyright protections but remains unclear about the status of AI models themselves.[2]

Patent law faces similar challenges—while TRIPS Article 27 grants patent rights for inventions demonstrating novelty, inventive step, and industrial application, questions persist about whether AI models derived through distillation constitute patentable innovations or merely represent existing knowledge in new forms.[3]

THE OPENAI-DEEPSEEK CONTROVERSY

Recent allegations by OpenAI against DeepSeek illustrate the practical implications of these legal uncertainties. In late 2024, OpenAI accused Chinese AI developer DeepSeek of infringing

[1] Geoffrey Hinton, Oriol Vinyals, and Jeffrey Dean, 'Distilling the Knowledge in a Neural Network' (2015) arXiv:1503.02531 < https://arxiv.org/abs/1503.02531 > accessed 17 June 2025
[2] World Intellectual Property Organization, 'WIPO Technology Trends 2019: Artificial Intelligence' (WIPO 2019) < https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf >accessed 17 June 2025
[3] Agreement on Trade-Related Aspects of Intellectual Property Rights (adopted 15 April 1994, entered into force 1 January 1995) 1869 UNTS 299, art 27 < https://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm>accessed 19 June 2025

its rights by employing distillation to create rival AI systems. Reports from Microsoft's cybersecurity team linked DeepSeek to unauthorised data access via OpenAI developer credentials.[4] According to public statements by senior officials, OpenAI possesses evidence suggesting that DeepSeek, a Chinese AI company, employed distillation techniques to create competing models.[5]

OpenAI has claimed that DeepSeek's new model is too similar to theirs, especially in how it works and makes decisions. They believe this copying happened because DeepSeek used distillation to train its system. The company further asserts that its models are protected as trade secrets, and their indirect use via distillation amounts to misappropriation.[6]

DeepSeek has countered that knowledge distillation differs fundamentally from direct copying. Rather than replicating source code or architectural elements, distillation involves a learning process where new models develop their own parameters and weight distributions. DeepSeek characterises this as a transformative innovation that aligns with fair use principles in copyright law and represents legitimate development in patent law.[7]

Further complicating matters is OpenAI's contractual framework. Its terms of service prohibit using model outputs to train competitors.[8] This introduces another question: how enforceable are private contractual limits when set against global IP principles?

This controversy also reflects the fragmented nature of IP standards across countries. While U.S. laws protect software and model weights under copyright, it is less explicit about AI-generated content. The EU offers more robust digital rights frameworks, but doesn't specify about AI- focused legislation. China has its own AI regulatory framework with different IP standards, creating a situation where the same distillation technique might be legal in one jurisdiction while violating IP rights in another. The diverse legal landscape enables forum

[4] Newsweek, "OpenAI Warns DeepSeek 'Distilled' Its AI Models, Reports" (January 29, 2025) <https://www.newsweek.com/openai-warns-DeepSeek-distilled-ai-models-reports-2022802>accessed 20 June 2025

[5] Fortune, "DeepSeek used OpenAI's model to train its competitor using 'distillation,' White House AI czar says" (January 29, 2025) < https://fortune.com/2025/01/29/DeepSeek-openais-what-is-distillation-david-sacks/>accessed 20 June 2025

[6] The Hill, "OpenAI investigating whether DeepSeek improperly obtained data" (January 29, 2025) <https://thehill.com/policy/technology/5113470-openai-DeepSeek-data-theft/>accessed 21 June 2025

[7] eWEEK, "OpenAI Accuses DeepSeek of Knowledge Distillation: 'Substantial Evidence'" (January 30, 2025) <https://www.eweek.com/news/openai-accuses-DeepSeek/ >accessed 21 June 2025

[8] Axios, "OpenAI says DeepSeek may have 'inappropriately' used its models' output" (January 30, 2025) https://www.axios.com/2025/01/29/openai-DeepSeek-ai-models-data-training >accessed 22 June 2025

shopping and inconsistent enforcement, providing fertile ground for companies to escape liability and choose jurisdictions with favourable IP laws.

LEGAL FRAMEWORK CHALLENGES: SQUARE PEGS IN ROUND HOLES

Trying to apply our current IP laws to AI knowledge distillation reveals fundamental mismatches between legal concepts developed for human creators and the realities of machine learning. Each major area of IP law- copyright, patents, and trade secrets- faces distinct challenges when confronted with AI-to-AI knowledge transfer.

Copyright Law: The Authorship Problem: The Berne Convention's insistence on human authorship creates an immediate problem for AI distillation cases. The Berne Convention protects original literary and artistic works but does not explicitly extend to AI-generated content.[9] So, when DeepSeek's model learned from OpenAI's outputs, who was the author being protected? Is it the engineers who designed the original model, the users who generated the training data or perhaps the AI system per se? Article 6 of the WIPO Copyright Treaty gives authors control over their creative works.[10] But it doesn't talk about content created by AI, which leaves a big question when it comes to AI distillation.

Even more complicated is determining whether AI knowledge distillation produces derivative works or falls in the realm of fair use exceptions. Derivative works typically require permission from the copyright holder, while fair use permits limited reproduction for transformative purposes. Since distillation involves knowledge extraction rather than direct copying, companies like DeepSeek argue that their distilled models represent transformative innovation rather than copyright violation.

The Google LLC v Oracle America Inc. case (2021) offers valuable precedent for understanding fair use in software contexts, but its application to AI remains unclear.[11] Oracle sued Google for copying Java APIs during Android development, while Google argued that APIs should not be subject to copyright due to their essential role in software interoperability.

[9] Sam Ricketson, The Berne Convention for the Protection of Literary and Artistic works: 1886-1986 (OUP 1987) 79.
[10] WIPO Copyright Treaty(adopted 20 December 1996, entered into force 6 March 2002) 2186 UNTS 121, art 6 < https://www.wipo.int/treaties/en/ip/wct >accessed 3 July 2025
[11]Google LLC v Oracle America Inc 593 US___(2021) 12-24 <https://www.supremecourt.gov/opinions/20pdf/18-956_d18f.pdf> accessed 4 July 2025.

The US Supreme Court ultimately ruled in favour of Google, applying a four-factor fair use analysis-

Purpose and character: Google's use was transformative, creating a new platform (Android).

Nature of copyrighted work: APIs are mostly functional tools, not creative content, which means they might not get the same copyright protection as other kinds of software.

Amount and substantiality: Google used only the necessary elements for functionality.

Market effect: Oracle's market position was not significantly harmed.

Applying this framework to AI distillation raises critical questions: Is distillation transformative if it creates new parameters while replicating functionality? How do we measure the "amount" of knowledge extracted? What constitutes market harm when the derivative model competes directly with the original one?

The international nature of AI complicates this question further. While common law jurisdictions might apply fair reasoning to AI cases, civil law systems in the European Union interpret copyright differently. This adds to the complexity of multinational AI companies trying to navigate consistent legal strategies across jurisdictions.

Patent Law: The inventor's problem: The Thaler v. Vidal case already established that AI can't be an inventor.[12] But what about the grey area where human engineers use distillation techniques to create new models? Does compressing a massive language model into a smaller version that performs nearly equally constitute genuine innovation, or is it simply repackaging existing knowledge? Article 27 of TRIPS doesn't offer clear answers, leaving patent offices to make inconsistent decisions.

The inventorship requirement creates a particular problem for AI distillation. Traditional patent law assumes human inventors who can describe their inventions and explain the inventive process. However, distillation often involves automated optimisation techniques that discover novel compression methods without explicit human direction. When the most innovative

[12] Thaler v Vidal 43 F 4th 1207 (Fed Cir 2022)< https://cafc.uscourts.gov/opinions-orders/21-2347.OPINION.8-5-2022_1988142.pdf> accessed 4 July,2025

aspects of distilled models emerge from machine learning processes rather than human insight, the patent system struggles to assign credit or assess novelty.

Trade Secret: The Disclosure Problem: Many AI companies rely on trade secrets rather than patents to protect their models, avoiding disclosure requirements associated with patent applications. However, trade secret laws under WIPO are not well-adapted to AI-generated knowledge protection. Article 39 of TRIPS mentions protection against unauthorised disclosure, but proving misappropriation becomes complex when information is obtained through legitimate reverse engineering.

Some jurisdictions lack robust frameworks for preventing industrial espionage or cyber theft. Additionally, proving trade secret misappropriation is complex under TRIPS Articles 42 and 43, which require fair legal procedures and adequate evidence. Companies must demonstrate unlawful access, which becomes challenging when information is obtained through hacking or employee disclosures. The Waymo v. Uber case illustrates these difficulties.[13] Although the case was settled before the final judgment, the legal proceedings and discovery revealed crucial insights into AI-related trade secret enforcement. While Waymo accused Uber of stealing AL technology through a former employee, establishing clear evidence of trade secret theft proved challenging. Since the data was part of a trained AI system and mostly based on algorithms, it was hard to prove whether it was copied directly or just developed independently by Uber. It is even more difficult to prove trade secret theft in an AI model because the learning process can extract valuable information without accessing original trade secrets directly. If a distilled model can replicate the functionality of a proprietary system without revealing its internal architecture, has any trade secret been misappropriated? The answer depends on how broadly we define the protected information and whether we consider learned behaviours to be derivations of the original trade secrets.

Cross-border enforcement provides parallel challenges. Different jurisdictions maintain varying standards for trade secret protection, and international cooperation remains limited. The global nature of AI development means that trade secret theft can occur across multiple jurisdictions, making enforcement complex and inconsistent.

[13]Waymo LLC v Uber Technologies Inc No 3:17-cv-00939 (ND Cal 2017) < https://casetext.com/case/waymo-llc-v-uber-techs-inc-1> accessed 6 July 2025

INTERNATIONAL RESPONSES: THE PARIS AI ACTION SUMMIT AND BEYOND

The Paris AI Action Summit 2025 flags both the urgency and limitations of current international AI governance efforts. When Prime Minister Modi pointed out how fast AI is growing and said that countries need to work together to make sure it's managed properly,[14] he captures the fundamental challenge: the struggles of our legal and regulatory systems to keep up with technological development.

The summit also revealed how different national approaches to AI regulation create obstacles to coordinated governance. President Macron's emphasis on reducing regulatory barriers to foster European AI innovation directly conflicts with calls for stronger IP protection from companies like OpenAI. Meanwhile, Vice President Vance's warning against "excessive regulation" reflects a broader US preference for industry self-regulation over comprehensive legal frameworks.[15]

These divergent views reflect deeper philosophical differences about innovation, control, and the role of government in emerging technologies. The EU's comprehensive AI Act prioritises transparency and ethical considerations, potentially limiting the development of black-box AI models that rely on trade secret protection. The US approach emphasises market-driven innovation but provides limited guidance for resolving IP disputes. China's led strategy enables rapid innovation but generates international suspicion about IP theft and unfair competition.

The summit's failure to produce concrete agreements on AI IP protection reflects the legal difficulty of achieving international consensus on rapidly evolving technologies. While participants acknowledged the need for coordinated governance, they offered few specifics about how to harmonise different national approaches or resolve cross-border disputes.

NATIONAL REGULATORY APPROACHES

The divergent national responses reveal not just different philosophies, but fundamental disagreements about how to balance innovation incentives with competitive fairness.

[14] Prime minister co-chairs AI Action Summit in Paris (11 February 2025)< https://mea.gov.in/press-releases.htm?dtl/39023 >accessed 28 June 2025

[15] US, UK decline to sign Paris AI summit declaration DW (11 February 2025)< https://www.dw.com/en/us-uk-decline-to-sign-paris-ai-summit-declaration/a-71575536 >accessed 28 June,2025

United States: The US employs a dual strategy for AI protection: patents for AI-driven innovations and trade secrets for proprietary models. The US Patent and Trademark Office (USPTO) permits AI-generated patents but does not recognise AI as an inventor.[16] The Thaler v Vidal case involved the rejection of the Device for the Autonomous Bootstrapping of Unified Sentience (DABUS) as an inventor, where Dr. Stephen Thaler argued that his AI system invented a neural activity-mimicking light and a fractal beverage container. USPTO's refusal to recognise DABUS as an inventor, citing Patent Act limitations to natural persons, creates ambiguity for AI-distilled models that may not qualify for independent patent protection.

The Defend Trade Secrets Act (DTSA) of 2016 provides robust protection against unauthorised AI knowledge distillation.[17] However, cross-border IP theft, particularly involving Chinese AI firms, remains a significant enforcement challenge.

European Union: The EU prioritises transparency and ethical AI development, establishing itself as a leader in AI governance. The European Union passed the AI Act in 2024, which is one of the first big attempts to regulate AI. It focuses a lot on making AI systems safe, fair, and transparent. Article 6 classifies AI systems into risk categories, requiring high-risk models in sectors like finance and healthcare to be explainable and accountable. If distilled models are deployed in these high-risk areas, they must meet strict compliance requirements, making black-box AI models more difficult to commercialise.

Article 10's transparency mandates may limit AI model development when proprietary algorithms are involved.[18] The EU Copyright Directive (2019) provides strong author protections, but text and data mining exemptions under Article 3 permit limited training without infringement.[19] The EU Trade Secrets Directive (2016) ensures cross-border enforcement, though implementation varies among member states.

[16] United States Patent and Trademark Office, Inventorship Guidance for AI-Assisted Inventions(13 Feb 2024) 4, 12-13< https://www.uspto.gov/sites/default/files/documents/inventorship-guidance-for-ai-assisted-inventions.pdf> accessed 2 July 2025

[17] Defend Trade Secrets Act of 2016, 18 USC § 1836< https://www.congress.gov/bill/114th-congress/senate-bill/1890/text>accessed 2 July 2025.

[18] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonized rules on artificial intelligence (AI Act) [2024] OJ L1689, art 6, 10 < https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R1689 >accessed 2 July 2025

[19] Directive 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market [2019] OJ L130/92, art 3< https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019L0790>accessed 3 July 2025.

China: China follows a state-led AI strategy, balancing rapid innovation with controlled intellectual property policies. China's AI patent filings exceed those of the US and EU, but enforcement remains inconsistent.[20] The Anti-Unfair Competition Law (2017) protects trade secrets but is weakly enforced against domestic firms, leading to accusations of IP theft and model replication.

China's AI Governance Regulations (2023) require AI models, including distilled ones, to align with state-approved guidelines.[21] However, restrictions on AI training using foreign datasets complicate international AI collaboration. State intervention in AI regulation could potentially limit open-source AI innovation.

India: India emphasises open innovation, skill development, and ethical AI governance rather than strict IP protections. The National AI Strategy (NITI Aayog, 2018) encourages AI adoption in public sectors but lacks clear IP guidelines.[22] India's Copyright Act (1957) does not explicitly address AI-generated works, leaving ambiguity for AI knowledge distillation. Patent laws do not yet recognise AI as an inventor, similar to the US and EU positions.[23]

India's promotion of open AI models rather than restrictive IP regimes makes knowledge distillation more accessible. However, this approach may create challenges for cross-border collaborations with stricter IP regimes in the US and EU.

THE FRAGMENTATION PROBLEM

What's particularly striking about these different approaches is how they create perverse incentives rather than promoting genuine innovation. EU companies might avoid developing cutting-edge AI models if they're required to make them explainable, while US companies can hide behind trade secrets even when their models exhibit problematic behavior, China's approach allows for fast iteration but generates suspicion that undermines legitimate

[20] Anti-Unfair Competition Law of the People's Republic of China (adopted 2 September 1993, amended 23 2019), art 9 < https://www.cecc.gov/resources/legal-provisions/prc-unfair-competition-law-english-and-chinese-text > accessed 3 July 2025.
[21] Reuters, US scrutinize Chinese AI for ideological bias (4 July 2025) <https://www.reuters.com/world/china/us-scrutinizes-chinese-ai-ideological-bias-memo-shows-2025-07-09/>accessed 10 July,2025
[22] .NITI Aayog's National Strategy for Artificial Intelligence:#AIForAll (Discussion Paper, June 2018) 22,45 <https://indiaai.gov.in/research-reports/national-strategy-for-artificial-intelligence/>accessed 8 July,2025
[23] Copyright Act 1957 (India) s 2(o), s 17<https://copyright.gov.in/documents/copyrightrules1957.pdf >accessed 6 July 2025.

innovations. While AI companies in India receive bureaucratic support cross border challenges still persist.

This fragmentation enables forum shopping and inconsistent enforcement. Companies can strategically choose jurisdictions with favourable IP laws for registration and litigation, while the global nature of AI development makes it difficult to define which legal framework applies. The result is a system where legal outcomes depend as much on geography as on the underlying technology or business practices.

Addressing the crisis: Beyond incremental reform: The legal uncertainties surrounding AI can't be addressed by mere incremental amendments to existing frameworks. We need fundamentally new approaches that can balance innovation incentives with competitive fairness in an age of AI-driven transfer of knowledge.

TRIPS currently lacks explicit provisions for AI-generated content and model protection. Amendments should recognise AI models as intellectual property, expanding protection coverage to ensure that distilled AI models respect the original model owners' rights. The international community should consider inserting a dedicated section in TRIPS addressing AI model distillation, including clear definitions of AI knowledge distillation and model ownership, licensing frameworks for AI models similar to patent pooling arrangements, and global dispute resolution mechanisms for AI-related conflicts.

WIPO should establish a dedicated AI regulatory treaty under the international copyright law framework, which should clearly define ownership rights in AI distillation processes, emphasise transparency requirements in AI models to prevent IP theft, and standardise global AI licensing practices to minimise forum shopping.

Harmonising AI regulation across jurisdictions is equally important. The EU AI Act, UK AI Framework, and US AI Executive Order present inconsistent legal approaches, creating ambiguity. Establishing an international AI regulatory board could ensure consistency by developing cross-border compliance guidelines for AI developers, setting standards for AI explainability and liability frameworks, and providing legal mechanisms for international AI disputes.

Let's break these suggested reforms into sections and analyse them.

Rethinking Intellectual Property for AI: Most older IP laws are written for human creators and don't know how to deal with machine-made models or unclear lines between original and copied content. When machines learn from other machines, the resulting model exists in the grey area between original innovation and derivative copying that current law cannot adequately address.

Rather than forcing AI distillation into existing copyright categories, we need new frameworks that recognise the unique nature of machine-to-machine knowledge transfer. This might involve creating specific protections for AI models that balance the interests of original developers with the benefits of knowledge sharing. Such protections could include compulsory licensing schemes similar to those used in pharmaceutical patents, where competitors can access essential technologies through reasonable royalty payments.

The patent system requires a similar reconceptualisation. Instead of focusing on human inventors, we need frameworks that can assess the novelty and inventiveness of AI-generated innovations. This might involve new examination procedures that evaluate the contribution of human oversight versus automated optimisation in AI development. Such approaches could protect genuine innovations while preventing the patenting of obvious or trivial modifications.

Strengthening trade secret protections is equally important, as AI models often rely on proprietary architectures and datasets. Governments should mandate Non-Disclosure Agreements (NDAs) for AI distillation processes and implement criminal penalties for unauthorised AI model replication.

Addressing Liability Issues: Legal ambiguity in liability allocation represents a major concern in AI distillation. Clarifying responsibility for AI-related harm is critical. AI liability should be assigned based on: the original model creator (if distillation led to infringement), the entity conducting distillation (if unauthorised use occurred), and the end user (if AI was misused for illegal purposes).

AI companies should be required to maintain liability insurance covering IP infringement cases and harm caused by AI-generated decisions. Establishing international AI arbitration panels could resolve IP disputes over AI distillation, cross-border liability issues, and ethical concerns surrounding AI-generated content.

International Coordination: Beyond National Approaches: Since countries have very different IP laws, it becomes easy for companies to shift between them and avoid strict rules, which makes solving IP problems harder. We need coordinated international frameworks that can provide consistent treatment of AI distillation across jurisdictions while respecting different national approaches to innovation and competition.

Instead of just relying on IP bodies like WIPO, we should also involve trade groups and those working on AI safety and fair competition. The complex nature of AI distillation requires expertise from multiple domains, and effective governance will require collaborations across traditional institutional boundaries.

International agreements should focus on establishing minimum standards for AI IP protection rather than attempting to harmonise all national approaches. This could include common definitions of AI distillation, standardised procedures for cross-border dispute resolution, and shared principles for balancing innovation incentives with competitive fairness.

Addressing gaps in national laws is essential for eliminating uncertainty. Governments and private companies should collaborate to establish industry standards for AI distillation. Technology companies should: Self-regulate AI distillation techniques, establish voluntary compliance programs, and develop best practices for AI ethics. Governments should also invest in AI safety research to prevent misuse of AI distillation and to develop secure AI architectures.

By implementing comprehensive solutions addressing legal, ethical, and technical challenges, policymakers can ensure that AI distillation aligns with innovation goals while preventing misuse.

Technical Solutions: Complementing Legal Frameworks: Legal reforms alone cannot address the challenges posed by AI distillation. We also need technical approaches that can complement legal protections and provide practical tools for identifying and preventing unauthorised knowledge transfer.

AI model watermarking is one of these approaches. By inculcating ownership information directly into model parameters, developers can maintain proof of originality even when distilled models are distilled or modified. Such techniques can provide evidence in IP disputes while enabling legitimate knowledge sharing through proper attribution.

Differential privacy techniques can protect training data while enabling knowledge distillation for legitimate purposes. By adding controlled noise to model outputs, these approaches can prevent the extraction of sensitive information while preserving the utility of distilled models for their intended applications.

Explainability requirements, while challenging for some AI applications, can provide transparency about the knowledge distillation process. By documenting how distilled models relate to their source systems, these approaches can help distinguish between legitimate transformation and unauthorised copying.

CONCLUSION

AI distillation is changing the way we create and share smart systems, and it’s raising new questions about how that should be protected. While this technique enhances efficiency and accessibility in AI systems, it also exposes the fragility of existing intellectual property regimes. As AI models become increasingly sophisticated, fundamental questions about whether distilled models constitute derivative works, who holds rights to AI-generated innovations, and how trade secrets should be protected in the AI industry remain unresolved. At present, global legal frameworks- designed around human authorship and traditional notions of innovation- struggle to account for the complex realities of machine-generated learning and model-to-model extraction.

As demonstrated by the OpenAI-DeepSeek dispute, current laws under TRIPS, WIPO, and national jurisdictions do not offer clear answers on whether distilled models qualify as derivative works, who owns the resulting output, or how trade secrets can be meaningfully enforced in an AI context. These issues don't just matter in theory- they could affect how fair AI development is and who gets to control it in the future. Copyright and patent laws, in particular, must confront uncomfortable questions about originality, inventorship, and fair use in environments where human involvement is minimal or indirect. Likewise, trade secret protections must evolve to address the challenges posed by cyber intrusions, cross-border enforcement, and the difficulty of proving misuse when algorithms learn in opaque ways. Without reforms, developers and innovators risk operating in a legal grey zone that invites both exploitation and litigation.

Internationally, the regulatory responses remain uneven. Countries like the United States and China emphasise sovereignty and economic competitiveness, while the European Union

focuses on ethics and transparency. India follows a hybrid approach, though it does not yet offer a comprehensive solution to the legal and ethical uncertainties surrounding AI knowledge distillation.

In this context, it becomes imperative to establish harmonised legal standards that reflect the technological realities of the time. Policymakers must act proactively to revise international agreements like TRIPS and WIPO treaties, incorporating specific provisions on AI-generated content, derivative modelling, and liability. Furthermore, soft law instruments- such as global ethical standards, audit trails, and transparency requirements can complement legal reform by encouraging responsible innovation.

Ultimately, the legal uncertainties surrounding AI knowledge distillation aren't merely technical problems for lawyers and policymakers to solve- they represent fundamental questions about how we want AI development to proceed. What we decide now about how to protect AI models and deal with international rules will affect how AI grows in the years ahead. If we maintain the current system of fragmented national approaches and inadequate legal frameworks, we risk creating a world where big companies have an advantage an AI because they can afford to deal with confusing legal rules and the high costs of staying compliant, while smaller groups often can’t. Smaller innovators and researchers will be disadvantaged, potentially stifling the diverse ecosystem of AI development that has driven recent breakthroughs.

Conversely, if we swing too far toward restricting AI distillation and knowledge sharing, we risk slowing AI development and limiting the benefits of these technologies for societies. The democratizing potential of knowledge distillation- making advanced AI accessible to organisations that couldn't afford massive computational resources- represents a significant social benefit that shouldn’t be sacrificed for narrow commercial interests.

We must also analyse it from a philosophical aspect: how do we value knowledge created by machines? Who owns it, and under what conditions should it be shared or restricted? These are not questions that legal doctrine alone can answer, but the law must provide a framework within which these questions can be debated, tested, and resolved. As the age of AI distillation unfolds, a more nuanced, collaborative, and forward-looking approach to intellectual property is vital.