AI Act and IPR Enforcement

The European Regulatory Framework and Practical Challenges

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Abstract

The EU's Artificial Intelligence Act seeks to strike a delicate balance between fostering innovation and establishing robust safeguards for legal compliance, including the effective enforcement of IPRs. This study delves into the intricate intersection of the AI Act and IPR, with a focus on the multifaceted challenges related to copyright, patents, data protection, and trade secrets. It examines the implications of the emerging regulations on AI-generated content and the practical difficulties encountered in IPR enforcement within the EU's legal framework. By analyzing the regulatory landscape and its potential shortcomings, this study offers insights into how AI regulation may evolve to better protect intellectual property while nurturing innovation. Furthermore, the study incorporates comparative perspectives, contrasting the EU's approach with those of other significant jurisdictions, and concludes with actionable policy recommendations aimed at harmonizing AI regulation with intellectual property law.

Keywords: Artificial Intelligence, intellectual property rights, IPR Enforcement, AI Act, Digital Single Market

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1. Introduction

The swift advancement of artificial intelligence technologies has heralded a new era brimming with both unprecedented opportunities and intricate legal challenges pertaining to intellectual property rights (hereinafter: IPR). The integration of AI technologies into a wide array of sectors, including healthcare, finance, security, and creative industries, has become increasingly pervasive.[1] Generative AI models, exemplified by OpenAI's GPT-4 and DALL·E, have demonstrated the capacity to produce texts, images, and music that closely emulate human-created works.[2] Similarly, AI-assisted design tools are instrumental in fostering novel inventions and technological breakthroughs.[3] These developments precipitate fundamental inquiries regarding authorship, ownership, and inventorship, thereby challenging the conventional IPR frameworks that were not initially designed to accommodate non-human creators.[4]

The EU's Artificial Intelligence Act (hereinafter: AI Act), initially proposed in 2021, is a pioneering effort to regulate AI within a structured legal framework. This regulation seeks to strike a balance between incentivizing innovation and safeguarding fundamental rights, with a focus on safety, transparency, and accountability.[5] However, the protection of IPRs in AI-generated works or inventions presents unprecedented challenges, particularly when defining ownership, originality, and inventorship.[6] Traditional IP frameworks were not designed to accommodate non-human creators, leading to legal uncertainties and requiring a re-evaluation of existing legal norms.[7]

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1 Artificial Intelligence, 'Opportunities and Challenges for the internal market and consumer protection', Briefing, *European Parliament,* 2020, p. 2, at https://www.europarl.europa.eu/thinktank/en/document/IPOL_BRI(2020)642352.

2 GPT-4 Technical Report, *OpenAI,* 2023, pp. 10–12, at https://cdn.openai.com/papers/gpt-4.pdf.

3 Spotlight on skills in the age of AI. The impact of emerging technology on skills, training and talent, Report, Autodeks, 2022, pp. 3–4, at https://damassets.autodesk.net/content/dam/autodesk/www/pdfs/adk-24122-skills-in-the-age-of-ai-report-final-012425.pdf.

4 Ryan Benjamin Abbott, 'I Think, Therefore I Invent: Creative Computers and the Future of Patent Law', *Boston College Law Review,* Vol. 57, Issue 4, 2016, pp. 1080–1083.

5 Proposal for a Regulation Laying Down Harmonised Rules on Artificial Intelligence, *European Commission,* 2021, COM(2021) 206 final.

6 Daniel J. Gervais, 'The Machine As Author', *Iowa Law Review,* Vol. 105, 2019, pp. 2053–2106.

7 Josef Drexl *et al.,* 'Artificial Intelligence and Intellectual Property Law – Position Statement of the Max Planck Institute for Innovation and Competition of 9 April 2021 on the Current

The advent of AI technologies necessitates a re-evaluation of the traditional concepts underpinning IPR law. The rise of AI-generated content and AI-assisted inventions has blurred the lines of authorship and inventorship, raising complex questions about who should be entitled to the economic benefits derived from these creations. The AI Act seeks to address some of these concerns, but its effectiveness hinges on the development of clear guidelines and robust enforcement mechanisms that can adapt to the rapidly evolving landscape of AI technology.

This study focuses on analyzing the key provisions of the AI Act related to IPR enforcement, identifying challenges in applying existing intellectual property frameworks to AI-generated outputs, and evaluating its impact on copyright, patent, and trade secret protection. Finally, the study aims to provide policy recommendations for harmonizing AI regulation with intellectual property law to foster innovation while ensuring the protection of IPRs.

The lack of clarity in current legal frameworks risks stifling AI-driven creativity and investment. Without adequate regulation, AI-generated works could either be left unprotected, leading to economic inefficiencies, or improperly assigned, resulting in unfair monopolies.[8] This study will explore how the AI Act, alongside existing IPR regimes, can better address these emerging challenges. Furthermore, it will contribute to the ongoing debate on AI governance and provide practical recommendations for policymakers seeking to navigate the complex intersection of AI and IPRs.

2. Key Provisions of the AI Act Relevant to IPRs

The AI Act adopts a risk-based approach, classifying AI systems into four categories: unacceptable risk, high risk, limited-risk, and minimal-risk systems.[9] High-risk systems must comply with stringent transparency and accountability requirements. This classification significantly impacts how AI systems are regulated and the level of scrutiny they face, which in turn affects IPR enforcement. While the AI Act primarily aims to ensure safety,

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Debate', *Max Planck Institute for Innovation & Competition Research Paper,* No. 21-10, 2021, pp. 21–25.

8 Peter K. Yu, 'Artificial Intelligence, Intellectual Property, and Sustainable Development', *in* Christophe Geiger (ed.), *Intellectual property, ethical innovation and sustainability: towards a new social contract for the digital economy?,* Edward Elgar, Cheltenham, 2026 (forthcoming), pp. 7–10, at https://ssrn.com/Abstract=5098200.

9 Primarily Articles 5–6 of the Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 on Artificial Intelligence (AI Act).

transparency, and fundamental rights protection, it has significant implications for IPRs, particularly regarding copyright, patents, and trade secrets.

2.1. Risk-Based Classification and Its Impact on IPRs (Articles 5–6)

The AI Act defines AI systems under Article 3(1) as a machine based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, logic- and knowledge-based approaches, which can generate outputs influencing physical or virtual environments.[10] This broad definition covers generative AI models that produce text, images, or inventions, directly affecting copyright and patent law. The risk classification mechanism raises several concerns regarding IPR enforcement.

Article 5 outlines AI practices that are prohibited due to their unacceptable risk, including manipulative AI techniques. Although these prohibitions are mainly driven by ethical considerations, they may also affect AI applications involved in generating counterfeit or infringing content. Article 6 specifies that AI systems categorized as high-risk under Annex III must adhere to stricter compliance requirements. This applies to AI used in biometric identification, critical infrastructure, and automated decision-making, but it could also encompass AI-generated works and inventions that necessitate IPR enforcement.

The AI Act does not explicitly classify AI systems that generate copyrighted or patentable material as high-risk, creating regulatory gaps and potentially insufficient oversight. Additionally, the lack of direct provisions on IPR enforcement may hinder rights holders' ability to address AI-driven infringement, as the Act primarily focuses on safety and fundamental rights without specific mechanisms for handling IPR violations.

The absence of explicit IPR provisions in the risk classification framework underscores the need for supplementary regulations or guidelines to address the unique challenges posed by AI-generated content and inventions. It also highlights the importance of ongoing monitoring and assessment to ensure that the AI Act remains effective in protecting IPRs in the face of rapidly evolving AI technology.

10 Article 3(1) of the AI Act.

2.2. Transparency and Data Governance (Articles 10–15, 53)

Article 13 of the AI Act mandates transparency for high-risk AI systems, requiring providers to ensure interpretable decision-making.[11] These measures create significant tensions between copyright enforcement and trade secret protection.

For copyright, the Act fails to require explicit disclosure of copyrighted training content. Article 13(3)(vi)'s ambiguous data provenance rules and Article 53(1)'s dataset summaries prove insufficient for infringement verification. Rights holders lack work-by-work audit capabilities, relying on private litigation due to the AI Office's limited oversight[12] [Preamble, Recitals (104)–(109)]. Regulatory exemptions for SMEs/researchers further enable loopholes.

Regarding trade secrets, transparency obligations clash with Directive (EU) 2016/943.[13] While Recitals 88/107/167 and Articles 25(5)/52(6)/53(1)(b)/55(3)/78(1) acknowledge confidentiality needs, they offer no resolution. Supply-chain disclosures [Article 25(5)] and continuous documentation updates [Article 53(1)(b)] risk exposing proprietary data. Cross-border regulatory exchanges under Article 78 lack safeguards for jurisdictions with weak trade secret enforcement, compounded by absent challenge mechanisms.

Ultimately, while the AI Act aims to enhance transparency and accountability in AI development, its framework does not sufficiently safeguard IPRs. The broad disclosure requirements and ambiguous confidentiality protections could discourage innovation and investment in proprietary AI models, particularly for companies relying on exclusive datasets and algorithms as competitive assets. Unless stronger safeguards are implemented, the regulation risks creating an environment where businesses must choose between compliance and the protection of their intellectual property. Balancing transparency with trade secret protection remains a fundamental challenge

11 For discussion emphasizing the importance of a proactive stance, *see White & Case EU AI Act Handbook,* 2025, pp. 43–87, at https://www.whitecase.com/sites/default/files/2025-06/wc-eu-ai-act-handbook.pdf.

12 On the considerable practical obstacles to effective monitoring, detection, and enforcement of IPRs in complex AI environments, *see* Bird & Bird, *Study on the AI Act,* 2025, pp. 49–63, at https://www.twobirds.com/-/media/new-website-content/pdfs/capabilities/artificial-intelligence/european-union-artificial-intelligence-act-guide.pdf.

13 Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure.

that must be addressed to ensure that AI regulation fosters both innovation and legal certainty.

2.3. Copyright and AI-Generated Content (Articles 50)

Article 50(2) of the AI Act mandates explicit identification of AI-generated texts, images, audio, and video to prevent unauthorized commercial exploitation of protected content. Despite this transparency measure, critical legal uncertainties persist. *(i)* First, it remains unclear whether labelling alone satisfies copyright obligations or requires supplementary licensing. The AI Act provides no explicit guidance, delegating interpretation to national courts. This risks divergent treatments across EU member states, potentially creating regulatory fragmentation. *(ii)* Second, the Act fails to address rights holders' recourse when their works are used in AI training without authorization. Without a clear framework for claiming infringement or compensation, rights holders face significant enforcement gaps. The absence of harmonized IPR enforcement mechanisms exacerbates these issues,[14] fostering legal uncertainty for creators and developers alike. This underscores the urgent need for legislative clarification to balance copyright protection, innovation incentives, and public access to AI-driven outputs.

2.4. Authorship and Inventorship Challenges

Patent law mandates human inventorship, as affirmed by the European Patent Office. The AI Act's silence on AI-generated inventions creates legal uncertainty regarding patentability and developers' rights. This omission necessitates legislative or judicial clarification to resolve questions about AI's role in inventorship.

Without harmonized guidance, inconsistent jurisdictional approaches may emerge. Requiring the disclosure of AI's contribution to inventions and proof of patentability criteria (novelty, inventive step, industrial applicability) could mitigate risks. However, unaddressed inventorship issues threa-

14 For further analysis highlighting the need for standardization, awareness-raising, and a harmonized framework for implementation and enforcement, *see* the EUIPO study on the development of generative artificial intelligence from a copyright perspective, 2025, pp. 63–64, and 262–263, at https://www.euipo.europa.eu/en/news/euipo-releases-study-on-generative-artificial-intelligence-and-copyright.

ten innovation: unpatentable AI-assisted inventions may deter R&D investment, while patentable AI outputs risk monopolization and fairness concerns. Policymakers must balance innovation incentives with patent system integrity.

2.5. Enforcement and Compliance (Articles 72–74, 99)

Articles 72–74 of the AI Act focus on ensuring regulatory compliance, not on directly addressing IPR violations. Article 99 sets significant penalties for non-compliance – imposing fines of up to €35 million or 7% of annual global turnover for severe breaches – these are aimed at safety and the ethical use of AI, not at safeguarding IPRs. This leaves a gap in the Act's ability to combat AI-driven infringements such as unauthorized data scraping or content generation. Rightsholders lack clear legal avenues under the AI Act to challenge these practices and must often rely on private litigation or the traditional mechanisms of Directive 2004/48/EC (IPRED),[15] which may not be well-suited to the complexities of AI-generated content and its enforcement.

3. Copyright Issues in AI-Generated Content

As stated above, the question of originality and authorship is central to copyright law, yet AI-generated works challenge traditional concepts.[16] While copyright law generally requires human authorship, AI-generated content raises issues concerning ownership and protection. Moreover, the use of copyrighted material in training datasets raises further legal concerns.[17] These challenges require a re-evaluation of the fundamental principles of copyright law and the development of new legal frameworks that can address the unique characteristics of AI-generated content.

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15 Directive (EU) 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the Enforcement of IPRs.

16 Jane C. Ginsburg & Luke A. Budiardjo, 'Authors and Machines', *Berkeley Technology Law Journal,* Vol. 34, Issue 2, 2020, pp. 366–445.

17 Jenny Quang, 'Does training AI violate copyright law?', *Berkeley Technology Law Journal,* Vol. 36, Issue 4, 2022, pp. 1408–1435.

3.1. Originality and Authorship

Copyright law protects original works of authorship, which typically requires human creativity and intellectual effort. AI-generated content challenges this principle because it's unclear whether such creations qualify for copyright protection.[18] The level of human intervention required to qualify an AI-generated work for copyright protection remains a contentious issue. For example, if an AI generates a musical piece with minimal human input, it is debatable whether that piece qualifies as an original work under copyright law. The lack of a clear definition of originality in the context of AI-generated content creates uncertainty for creators, users, and those responsible for IPR enforcement.

The concept of authorship is also challenged by AI-generated content. Traditional copyright law assumes that a human author is responsible for the creation of a work, but AI systems can generate content autonomously, without direct human intervention. This raises questions about who should be considered the author of an AI-generated work and who should be entitled to the economic benefits derived from it.

The debate over originality and authorship in AI-generated content has sparked a wide range of opinions among legal scholars, policymakers, and industry stakeholders. Some argue that AI-generated content should not be protected by copyright because it lacks the necessary human creativity and intellectual effort. Others contend that AI-generated content should be protected to incentivize investment in AI technology and promote innovation. Still others propose a *sui generis* system of protection for AI-generated works, which would provide a tailored approach to addressing the unique challenges posed by these creations.[19]

3.2. Training Data and Copyright Infringement

AI models often rely on vast amounts of pre-existing data, raising concerns about potential copyright infringement during the training process.[20] If co-

18 James Grimmelmann, 'Copyright for Literate Robots', *Iowa Law Review,* Vol. 101, Issue 2, 2016, pp. 669–670.

19 Ryan Benjamin Abbott & Elizabeth Rothman, 'Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence', *Florida Law Review,* Vol. 75, Issue 6, 2023, pp. 1195–1200.

20 Samantha Fink Hedrick, 'I "THINK," THEREFORE I CREATE: Claiming Copyright in the Outputs of Algorithms', *NYU Journal of Intellectual Property & Entertainment Law,* Vol. 8, Issue 2, 2019, pp. 46–50.

pyrighted material is used without permission to train AI models, it could constitute copyright infringement. This issue is particularly relevant for large language models and image-generation models that rely on extensive datasets scraped from the internet. The legal doctrine of fair use or fair dealing may provide some defense, but its application to AI training data is not yet well-defined.[21]

The use of copyrighted material in AI training datasets raises complex legal and ethical questions. On the one hand, AI developers need access to large datasets to train their models effectively. On the other hand, copyright holders have a legitimate interest in protecting their IPRs and controlling the use of their works.

The application of fair use or fair dealing to AI training data is a complex legal issue that has not yet been fully resolved by courts. Some argue that the use of copyrighted material in AI training datasets should be considered fair use because it is transformative and does not directly compete with the original works. Others contend that the use of copyrighted material in AI training datasets should not be considered fair use because it is commercial and could harm the market for the original works.

The lack of clear guidance on this issue creates uncertainty for AI developers and copyright holders alike. It also underscores the need for further discussion and analysis to determine the appropriate legal framework for addressing the use of copyrighted material in AI training datasets.

In the EU context, the issue is further complicated by the interplay between the AI Act and the text and data mining (TDM) exceptions under the Copyright in the Digital Single Market (CDSM) Directive.[22] While the AI Act does not directly regulate copyright matters, recital 105 of the AI Act's preamble explicitly acknowledges the relevance of these exceptions by stating that the use of copyrighted materials in the training of AI systems should comply with applicable copyright laws, including limitations and exception for TDM. Under Article 3 and 4 of the CDSM Directive, text and data mining is permitted for research and, under certain conditions for commercial uses, provided that rights holders have not expressly reserved their rights. This means, that in principle, AI developers operating in the EU may rely on the TDM exception – especially for commercial training – only if the rightsholders have not opted out, for instance through machine-readable

21 Pamela Samuelson, 'How to Think About Possible Remedies in the Generative AI Copyright Cases', *Communications of the ACM,* Vol. 67, Issue 7, 2024, pp. 27–30.

22 Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on Copyright and Related Rights in the Digital Single Market.

means. However, the enforcement, and awareness of these opt-outs remain inconsistent in practice, and the AI Act does not create new powers in this regard. This gap reinforces the need for closer coordination between sectoral legislation and copyright frameworks, as well as for further guidance on how to operationalize TDM exceptions in the context of AI development.

3.3. Legal Uncertainty and Potential Solutions

The legal uncertainty surrounding copyright in AI-generated content creates challenges for both creators and users of AI technology. Potential solutions include the development of licensing mechanisms for training data, the establishment of clear guidelines for determining originality and authorship in AI-generated works, and the implementation of effective enforcement mechanisms to address copyright infringement.[23] Some scholars suggest a *sui generis* system of protection for AI-generated works, which would provide a tailored approach to addressing the unique challenges posed by these creations.[24]

Licensing mechanisms for training data could provide a way for copyright holders to be compensated for the use of their works in AI training datasets. These mechanisms could also help clarify the legal rights and obligations of AI developers and copyright holders, reducing uncertainty and promoting innovation.

Clear guidelines for determining originality and authorship in AI-generated works could help address the challenges posed by these creations to traditional copyright law. These guidelines could clarify the level of human intervention required for copyright protection and provide guidance on how to determine the author of an AI-generated work.[25]

Effective enforcement mechanisms are essential for protecting copyright in the age of AI. These mechanisms should be able to address AI-driven copyright infringement, including unauthorized data scraping and the use of AI tools to generate infringing content.

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23 Ariel Katz, 'Debunking the Fair Use vs. Fair Dealing Myth: Have We Had Fair Use All Along?', *in* Shyamkrishna Balganesh *et al.* (eds.), *The Cambridge Handbook of Copyright Limitations and Exceptions,* Cambridge University Press, Cambridge, 2021, pp. 111–139.

24 Bingbin Lu, 'A Theory of 'Authorship Transfer' and Its Application to the Context of Artificial Intelligence Creations', *Queen Mary Journal of Intellectual Property,* Vol. 11, Issue 1, 2021, pp. 4–23.

25 Abbott & Rothman 2023, pp. 1161–1169.

A *sui generis* system of protection for AI-generated works could provide a tailored approach to addressing the unique challenges posed by these creations. This system could be designed to balance the interests of creators, users, and the public, promoting innovation while protecting IPRs.

4. Patent Law and AI-Generated Inventions

The issue of AI-generated inventions has sparked legal debates, particularly regarding inventorship.[26] Patent law requires an identifiable human inventor, which was challenged in cases such as the DABUS dispute, where an AI system was listed as the inventor.[27] These debates have focused on whether AI systems should be recognized as inventors, the role of AI in the inventive process, and the policy implications of different approaches to AI-generated inventions.

4.1. The DABUS Case

The *DABUS* case involved patent applications in multiple jurisdictions listing an AI system as the inventor.[28] Patent offices and courts in the US, Europe, and the UK rejected these applications, reaffirming the requirement of human inventorship.[29] The case highlights the challenges of applying traditional patent law to AI-generated inventions. The legal reasoning behind the rejection typically centers on the definition of an inventor as a natural person. The *DABUS* case has been widely discussed and analyzed by legal scholars and policymakers. Some argue that the rejection of the DABUS patent applications was the correct decision because AI systems are not capable of possessing the necessary legal and moral attributes of an inventor.[30]

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26 Timothy Richard Holbrook, 'The Supreme Court's Quiet Revolution in Induced Patent Infringement', *Notre Dame Law Review,* Vol. 91, Issue 3, 2016, pp. 1027–1035.

27 European Patent Office (Legal Board of Appeal), Cases J 8/20 and J 9/20, 21 December 2021.

28 *Thaler v Hirshfeld,* 558 F.Supp.3d 238 (E.D.Va. 2021).

29 Ryan Benjamin Abbott, 'I Think, Therefore I Invent: Creative Computers and the Future of Patent Law', *Boston College Law Review,* Vol. 57, Issue 4, 2016, pp. 1079–1083.

30 Lital Helman & Gideon Parchomovsky, 'Artificial Inventorship', *University of Pennsylvania, Institute for Law & Economics Research Paper,* No. 24-19, 2024, pp. 11–15.

4.2. Inventorship and AI Assistance

While AI cannot be listed as an inventor, AI tools can assist human inventors in the invention process. The extent to which AI can contribute to an invention without disqualifying it from patent protection remains a complex issue.[31] Clear guidelines are needed to determine the level of human intervention required for an invention to be patentable. This includes determining the degree of human involvement necessary for the invention to be considered a product of human ingenuity rather than solely a result of AI processing.

One potential approach is to consider AI as a sophisticated tool that assists human inventors, similar to a computer or a laboratory instrument. In this view, the human inventor would still be the primary driver of the inventive process, using AI to perform tasks such as data analysis, simulation, and optimization. As long as the human inventor contributes a significant inventive step, the invention could be patentable, even if AI played a substantial role in its development. However, this approach raises questions about how to assess the significance of human contribution. What level of human intervention is sufficient to qualify an invention as patentable? How should patent offices and courts evaluate the relative contributions of humans and AI in the inventive process? These are complex questions that require further analysis and clarification.

Another approach is to focus on the technical contribution of AI to the invention. In this view, if AI performs a task that would otherwise require significant human skill and effort, the invention might not be patentable because it lacks an inventive step. This approach could be particularly relevant in cases where AI is used to automate routine tasks or to generate obvious variations of existing technologies.

5. Enforcement Challenges in the Context of the AI Act

The enforcement of IPRs in the context of artificial intelligence presents unique challenges, particularly given the cross-border nature of AI-generated content. The ability of AI systems to produce and disseminate content instantaneously across jurisdictions complicates the application of national

31 Adam B. Jaffe & Josh Lerner, *Innovation and Its Discontents: How Our Broken Patent System Is Endangering Innovation and Progress, and What to Do About It,* Princeton University Press, Princeton, 2006, pp. 27–65.

and international enforcement mechanisms. Moreover, the AI Act's transparency requirements, while designed to promote accountability, may conflict with proprietary interests, creating further obstacles for IPR enforcement. Addressing these complexities requires a multifaceted approach that considers the technical, legal, and policy dimensions of AI governance.

5.1. Cross-Border Infringement

AI-generated content transcends national borders, making traditional enforcement mechanisms less effective in addressing IPR violations. The ease with which AI can generate and distribute infringing material across multiple jurisdictions underscores the need for enhanced international cooperation. Effective enforcement in this context requires harmonization of legal standards, information-sharing frameworks, and coordinated enforcement actions of national authorities.[32]

One approach to mitigating cross-border infringement is the development of international agreements that specifically address the legal complexities associated with AI-generated content. Such agreements could establish uniform standards for copyright protection, patentability, and trademark enforcement, thereby facilitating more consistent enforcement across jurisdictions. Additionally, fostering closer collaboration between law enforcement agencies across different countries could improve enforcement efforts. This could involve intelligence-sharing mechanisms that enable authorities to track and target AI-driven IPR violations more effectively. Establishing dedicated task forces to investigate AI-related infringement could also strengthen international enforcement capabilities.

Technological solutions may further support enforcement efforts. AI-powered detection tools can assist in identifying infringing content, while automated takedown mechanisms could be deployed to remove unauthorized AI-generated works. Additionally, access control technologies, such as geofencing and content filtering, could be employed to restrict the cross-border dissemination of infringing material.

32 Gaétan de Rassenfosse *et al.,* 'AI-Generated Inventions: Implications for the Patent System', *Southern California Law Review,* Vol. 96, Issue 6, 2024, pp. 1476–1478.

5.2. Transparency versus Proprietary Interests

The AI Act's emphasis on transparency is intended to promote accountability in AI deployment. However, these requirements may come into tension with the protection of trade secrets and proprietary technologies. Striking a balance between transparency and the preservation of confidential business information is a critical challenge in AI regulation.

One potential solution is the implementation of mechanisms that allow for selective disclosure of AI-related information. For example, AI developers could be required to disclose relevant operational details to regulatory authorities or designated third-party auditors while safeguarding sensitive commercial information from public exposure.[33] This approach would ensure compliance with transparency mandates without unduly compromising competitive interests. Another possibility is limiting transparency obligations to information that is strictly necessary for accountability and public understanding. Disclosure requirements could be confined to key aspects such as training data sources, decision-making algorithms, and risk mitigation strategies, ensuring that stakeholders have access to essential information without jeopardizing proprietary innovations.

A further strategy involves creating incentives for voluntary disclosure. Governments could offer financial or regulatory benefits, such as tax incentives or expedited regulatory approvals, to encourage AI developers to adopt best practices in transparency. This approach would align regulatory objectives with industry incentives, fostering a culture of responsible disclosure while maintaining commercial competitiveness.

5.3. Technical Challenges

Enforcing IPR in the AI era is further complicated by the difficulty of identifying and tracking AI-generated content. AI systems can produce derivative works, deepfakes, and counterfeit products that are indistinguishable from human-created content, making it challenging for rightsholders and regulators to detect and prevent infringement. Addressing these technical challenges requires the adoption of advanced technological enforcement mechanisms. One promising approach is the development of AI-powered

33 Frank Pasquale, *The Black Box Society: The Secret Algorithms That Control Money and Information,* Harvard University Press, 2015, pp. 193–217.

detection tools capable of identifying AI-generated content based on distinct patterns and characteristics. These tools could employ machine learning algorithms to recognize anomalies in digital works, distinguishing AI-generated material from human-created content.

Blockchain technology also presents a potential solution for tracking the provenance of AI-generated content. By recording the creation, modification, and ownership history of digital assets on a decentralized ledger, blockchain could enhance traceability and facilitate the authentication of legitimate works. This would assist rightsholders in proving authorship and detecting unauthorized reproductions.[34]

Finally, industry-wide adoption of AI-generated content labeling standards could improve transparency and enforcement. Embedding metadata within AI-generated works to indicate their origin and authorship would enable consumers, platforms, and enforcement agencies to identify and monitor AI-generated material more effectively. Such labeling mechanisms could be mandated through regulatory frameworks or encouraged through industry self-regulation.

6. Conclusion and Recommendations

The intersection of the AI Act and IPR enforcement presents both challenges and opportunities for the EU. While the AI Act provides a comprehensive regulatory framework for AI governance, it does not directly address the complexities of IPR protection in the context of AI-generated content and inventions. The legal uncertainties surrounding authorship, inventorship, and enforcement mechanisms require further fine tuning to ensure that the regulatory framework effectively balances innovation incentives with the protection of intellectual property.

The AI Act offers a structured approach to AI regulation but lacks specific provisions on IPR enforcement, leaving critical questions unanswered. Copyright law faces significant challenges in addressing AI-generated works, particularly in determining originality and human authorship. Patent law, in turn, adheres to the requirement of human inventorship,[35] creating diffi-

34 EUIPO Strategic Plan 2025, at https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/contentPdfs/about_euipo/strategic_plan/SP2025_en.pdf.

35 A. Saravanan & M. Deva Prasad, 'AI as an Inventor Debate under the Patent Law: A Post-DABUS Comparative Analysis', *European Intellectual Property Review,* Vol. 47, Issue 1, 2025, pp. 26–39.

culties in recognizing AI-assisted innovations.[36] Furthermore, IPR enforcement in the AI landscape is complicated by the cross-border nature of AI-generated content and the potential conflict between transparency obligations and proprietary business interests.

To address these challenges, targeted legal reforms are necessary. The AI Act should be amended to include explicit provisions on IPR enforcement, ensuring that copyright, patent, and trade secret protections are effectively applied in AI-related cases. Specific guidelines on originality and authorship must be developed to clarify the extent of human intervention required for copyright protection. Additionally, a licensing framework should be established to regulate the use of copyrighted material in AI training data, ensuring that copyright holders receive appropriate compensation. Patent law should also be adapted to provide clear guidance on the role of AI in the inventive process, outlining the extent to which AI can contribute without undermining the requirement for human inventorship.

Beyond legislative amendments, enhanced international cooperation is crucial for addressing cross-border IPR infringements in the AI domain. Establishing common legal standards, facilitating cross-border enforcement mechanisms, and fostering collaboration among national authorities will be essential in preventing regulatory fragmentation. Moreover, technological advancements should be leveraged to strengthen enforcement efforts. AI-powered detection tools could play a significant role in identifying AI-generated content, tracing its origin, and monitoring potential copyright or patent violations. Transparency requirements within the AI Act should also be carefully calibrated to balance the need for accountability with the protection of trade secrets, ensuring that businesses can safeguard proprietary AI models without undermining regulatory objectives. A continuous dialogue between policymakers, legal experts, and industry stakeholders is necessary to develop best practices and maintain a legal framework that remains responsive to technological advancements.

The legal response to AI must strike a careful balance between fostering innovation and ensuring adequate protection for intellectual property. Without a coherent and adaptive regulatory approach, the rapid advancement of AI could lead to significant legal uncertainty, ultimately undermining both the integrity of the IPR system and broader AI governance objectives. Addressing these challenges through informed legal and policy interven-

36 Tim W. Dornis, 'Artificial Intelligence and Innovation: The End of Patent Law As We Know It', *Yale Journal of Law & Technology,* Vol. 23, Fall, 2020, p. 111–113.

tions will be critical in shaping an AI-driven economy that is both innovative and legally sound.