

Generative Artificial Intelligence and Copyright Law: Rethinking Intellectual Property Protection in the Digital Era

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Abstract: The rapid advancement of generative artificial intelligence (GenAI) has fundamentally transformed the creation, dissemination, and commercialization of creative works, posing unprecedented challenges to traditional copyright law. Generative AI systems are capable of producing text, images, music, software code, and audiovisual content that closely resemble human-authored works, thereby raising complex legal questions concerning authorship, ownership, originality, infringement, and liability. This article examines the implications of generative AI for copyright protection through a normative juridical approach employing doctrinal and comparative legal analysis. The study evaluates existing copyright principles alongside emerging regulatory frameworks, including international intellectual property standards and recent legislative developments concerning artificial intelligence. The findings indicate that conventional copyright doctrines, which are predominantly based on human creativity and identifiable authorship, are increasingly inadequate for addressing AI-generated content and algorithm-assisted creativity. Furthermore, the widespread use of copyrighted works for training generative AI models raises unresolved issues relating to fair use, licensing, transparency, and the rights of creators. This study argues that future copyright governance should move beyond a purely author-centric paradigm toward a balanced, innovation-oriented framework integrating human creativity, technological development, and public interest. It proposes a Human-Centered AI Copyright Framework that incorporates transparency, accountability, licensing mechanisms, fair remuneration, and human authorship principles to ensure sustainable intellectual property protection while fostering responsible AI innovation in the digital era.



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INTRODUCTION

The rapid development of generative artificial intelligence (GenAI) has fundamentally transformed the landscape of creativity, innovation, and intellectual production in the digital era.¹ Unlike conventional artificial intelligence systems designed primarily for prediction or data analysis, generative AI is capable of autonomously producing original-looking text, images, music, software code, videos, and other creative outputs through advanced machine learning models trained on massive datasets. Applications such as large language models, image generation systems, and multimodal AI platforms have significantly expanded the capacity of both individuals and organizations to create digital content efficiently and at an unprecedented scale. While these technological advancements promise substantial economic and social benefits, they simultaneously challenge the legal foundations upon which modern copyright law has traditionally been constructed.

Copyright law has historically been premised on the assumption that creative works originate from identifiable human authors whose intellectual labor deserves legal protection and economic recognition. Fundamental copyright principles—including originality, authorship, ownership, moral rights, and exclusive economic rights—have evolved to safeguard human creativity while promoting scientific, literary, and artistic development. However, the emergence of generative AI has blurred the distinction between human and machine-generated creativity. AI systems can now produce sophisticated works that closely resemble human-authored creations, thereby raising fundamental questions concerning whether AI-generated content qualifies for copyright protection, who should be regarded as the legal author, and how ownership should be allocated among users, developers, and AI providers.

One of the most controversial issues concerns the concept of authorship. Traditional copyright regimes generally recognize only natural persons as authors because copyright protection is closely linked to human intellectual creativity and personal expression. Generative AI, however, creates content through algorithmic processes without possessing legal personality, consciousness, or creative intent in the human sense. Consequently, legal systems face increasing uncertainty regarding whether copyright should be attributed exclusively to human users who provide prompts, to software developers who design AI systems, or whether certain AI-generated outputs should remain outside the scope of copyright protection altogether. This uncertainty demonstrates that existing copyright doctrines require substantial reinterpretation in response to technological innovation.

Another significant legal challenge arises from the datasets used to train generative AI models. Contemporary AI systems rely upon billions of digital texts, artistic works, photographs, musical compositions, audiovisual materials, and software repositories collected from publicly available and licensed sources. Many of these materials remain protected by copyright, yet their incorporation into AI training datasets frequently occurs without explicit authorization from rights holders. This practice has generated extensive legal disputes concerning copyright infringement, fair use, text and data mining exceptions, licensing obligations, and compensation for creators. As generative AI becomes increasingly integrated into creative industries, balancing technological innovation with the protection of authors' rights has become one of the most pressing issues in contemporary intellectual property law.

The commercialization of AI-generated content further complicates the operation of copyright law. Businesses increasingly employ generative AI to produce marketing materials, digital illustrations, journalism, educational resources, software applications, and entertainment content. Although AI-assisted production substantially reduces production costs

¹ Christopher T Zirpoli, "Generative Artificial Intelligence and Copyright Law," 2023.

and increases efficiency, it also raises concerns regarding unfair market competition, economic displacement of human creators, and unauthorized reproduction of protected works. These developments require policymakers to reconsider whether existing copyright regimes adequately preserve incentives for human creativity while simultaneously encouraging responsible technological innovation within digital economies.

Recognizing these challenges, international organizations and national governments have initiated efforts to develop legal and policy frameworks governing artificial intelligence and intellectual property. The World Intellectual Property Organization (WIPO) has facilitated global discussions concerning AI-generated works, copyright ownership, and data governance, while the European Union has adopted comprehensive regulatory initiatives, including the Artificial Intelligence Act and evolving copyright rules affecting text and data mining. Likewise, several jurisdictions—including the United States, the United Kingdom, Japan, and Singapore—have begun reassessing copyright legislation to address the legal implications of machine-generated creativity. These developments demonstrate an emerging international consensus that conventional copyright doctrines require adaptation to accommodate rapidly evolving AI technologies.

Indonesia has likewise experienced rapid growth in the adoption of generative AI across education, journalism, software development, business, and creative industries. Digital transformation policies and expanding access to AI technologies have accelerated the production of AI-assisted creative content by individuals, private enterprises, and public institutions. Nevertheless, Indonesia's legal framework remains largely grounded in Law Number 28 of 2014 concerning Copyright, which was enacted before the widespread emergence of generative AI. Although the Copyright Law comprehensively regulates authorship, ownership, moral rights, and economic rights, it does not specifically address legal issues relating to AI-generated works, algorithmic creativity, training datasets, or liability for copyright infringement arising from automated content generation. Consequently, significant regulatory uncertainty remains regarding the application of existing copyright principles to emerging AI technologies.

These developments reveal a growing normative gap between technological innovation and copyright regulation. Existing copyright doctrines were primarily developed to regulate creative activities performed by human authors operating within conventional artistic and commercial environments. The emergence of generative AI fundamentally alters this paradigm by introducing autonomous computational systems capable of producing economically valuable creative outputs with minimal human intervention. As technological capabilities evolve more rapidly than legislative reform, legal uncertainty increases concerning originality, authorship, infringement, licensing, fair remuneration, and accountability. Without comprehensive legal adaptation, copyright law risks becoming increasingly ineffective in balancing innovation with the protection of creators' legitimate interests.

Although scholarly attention toward artificial intelligence and copyright has expanded considerably, several important research gaps remain. Existing studies predominantly examine isolated issues such as authorship, fair use, or AI ethics without integrating broader principles of intellectual property law, digital governance, constitutional values, and innovation policy into a coherent analytical framework. Moreover, comparative legal studies often focus exclusively on particular jurisdictions while overlooking the broader normative implications of AI-generated creativity for global copyright governance. Consequently, there remains a need for a comprehensive legal analysis capable of reconciling copyright protection with the realities of algorithmic creativity and rapidly evolving digital ecosystems.

This study addresses these gaps by examining the legal implications of generative artificial intelligence for copyright protection through a normative juridical approach

supported by comparative legal analysis. It analyzes the interaction between copyright law, artificial intelligence regulation, intellectual property principles, and emerging international governance standards to evaluate the adequacy of existing legal frameworks in responding to AI-generated creative works. Building upon this analysis, the study proposes a Human-Centered AI Copyright Framework that integrates human authorship, transparency, accountability, licensing mechanisms, fair remuneration, and public interest considerations into a coherent model of copyright governance. The proposed framework argues that effective copyright protection in the digital era should neither inhibit technological innovation nor diminish the value of human creativity but instead establish a balanced legal architecture capable of fostering responsible AI development while preserving the fundamental objectives of intellectual property law.

RESEARCH METHODS

This study employs a normative juridical research design using doctrinal and comparative legal approaches to examine the legal implications of generative artificial intelligence (GenAI) for copyright protection in the digital era.² A normative legal methodology is appropriate because the research focuses on analyzing legal norms, copyright doctrines, intellectual property principles, statutory regulations, judicial interpretations, and emerging AI governance frameworks relevant to AI-generated creative works. The doctrinal approach is used to examine the fundamental concepts of authorship, originality, ownership, moral rights, economic rights, copyright infringement, licensing, and fair remuneration within contemporary copyright law. Meanwhile, the comparative legal approach evaluates how different jurisdictions have responded to the challenges posed by generative AI, particularly regarding AI-generated content, text and data mining, copyright exceptions, and liability. Primary legal materials include international legal instruments such as the Berne Convention for the Protection of Literary and Artistic Works, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), the WIPO Copyright Treaty (WCT), the European Union Artificial Intelligence Act, the General Data Protection Regulation (GDPR) where relevant, the EU Copyright in the Digital Single Market Directive, Indonesia's Law Number 28 of 2014 concerning Copyright, and other applicable national regulations and judicial decisions concerning copyright and artificial intelligence. Secondary legal materials consist of scholarly books, peer-reviewed journal articles, official reports, policy papers, and academic commentaries discussing intellectual property law, AI governance, digital innovation, and copyright reform.

The collected legal materials were analyzed through qualitative doctrinal analysis supported by functional comparative legal methods. The doctrinal analysis evaluates the adequacy of existing copyright principles in addressing legal issues arising from AI-generated works, including questions of authorship, originality, ownership, infringement, accountability, and licensing. Subsequently, the comparative analysis examines regulatory developments and judicial approaches across multiple jurisdictions to identify emerging legal trends, institutional challenges, and best practices in governing generative AI. The findings are interpreted through the theoretical perspectives of intellectual property law, innovation policy, and human-centered AI governance to assess whether current copyright regimes remain capable of balancing technological innovation with the protection of creators' rights. Based on this analysis, the study develops a Human-Centered AI Copyright Framework that integrates the principles of human authorship, transparency, accountability, licensing mechanisms, fair remuneration, public interest, and responsible AI innovation into a coherent normative model for copyright governance. This framework is intended to provide conceptual guidance for

² John Creswell and J David Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Sage publications, 2017).

future legislative reform while ensuring that copyright law continues to protect human creativity without inhibiting technological progress in the digital era.

ANALYSIS AND DISCUSSION

Legal Foundations of Generative Artificial Intelligence and Copyright Protection

The emergence of Generative Artificial Intelligence (GenAI) represents one of the most transformative technological developments of the Fourth Industrial Revolution.³ Unlike conventional artificial intelligence systems designed primarily for classification, prediction, or decision support, generative AI possesses the capability to create new content that closely resembles human creativity. Through sophisticated computational architectures and advanced neural networks, GenAI can generate text, images, music, software code, videos, and other forms of digital expression with remarkable speed and quality. Consequently, generative AI has reshaped the production of intellectual works across education, journalism, entertainment, software engineering, scientific research, and creative industries, creating unprecedented opportunities while simultaneously challenging the traditional foundations of copyright law.

The technological evolution of generative AI has been driven by rapid advances in machine learning, particularly deep learning techniques capable of identifying complex patterns within massive datasets. Early machine learning models were limited to predictive tasks, whereas contemporary systems employ transformer-based architectures that learn semantic relationships through extensive computational training. These developments have enabled AI systems to produce coherent, context-sensitive, and increasingly sophisticated creative outputs. As computational capabilities continue to improve, the distinction between human-generated and machine-generated content becomes progressively more difficult to identify, thereby raising fundamental legal questions regarding creativity, authorship, and intellectual property protection.⁴

Recent progress in foundation models has further accelerated the capabilities of generative AI. Foundation models are large-scale neural networks trained on extensive and diverse datasets capable of performing multiple downstream tasks without requiring substantial retraining. Rather than being designed for a single application, these models serve as adaptable computational platforms supporting various creative functions across multiple domains. Building upon this architecture, Large Language Models (LLMs) have demonstrated exceptional capabilities in generating natural language texts, summarizing documents, translating languages, producing academic writing, and assisting software development. At the same time, multimodal AI integrates text, images, audio, and video processing within unified systems, enabling increasingly sophisticated interactions that blur conventional distinctions between different categories of creative works.⁵

The rapid development of these technologies has transformed creative production from an exclusively human-centered activity into a collaborative process involving both human intelligence and computational systems. Unlike traditional digital tools that merely facilitate human creativity, generative AI actively participates in content generation by producing original-looking outputs based on user prompts and learned statistical patterns. This transformation challenges long-established legal assumptions concerning the nature of

³ Marcelo Pasetti et al., "Technical, Legal, and Ethical Challenges of Generative Artificial Intelligence: An Analysis of the Governance of Training Data and Copyrights," *Discover Artificial Intelligence* 5, no. 1 (July 31, 2025): 193, <https://doi.org/10.1007/s44163-025-00379-6>.

⁴ Nicola Lucchi, "ChatGPT: A Case Study on Copyright Challenges for Generative Artificial Intelligence Systems," *European Journal of Risk Regulation* 15, no. 3 (September 29, 2024): 602–24, <https://doi.org/10.1017/err.2023.59>.

⁵ Carol Mullins Hayes, "Generative Artificial Intelligence and Copyright: Both Sides of the Black Box," *SSRN Electronic Journal*, 2023, <https://doi.org/10.2139/ssrn.4517799>.

creativity because the resulting works may display originality, aesthetic quality, and commercial value despite being generated through algorithmic processes rather than direct human intellectual labor. Consequently, copyright law faces increasing pressure to redefine the legal boundaries of protected creativity within the digital era.⁶

Traditionally, copyright law has been constructed upon several fundamental principles, including originality, authorship, ownership, moral rights, and economic rights. The principle of originality requires that a protected work originate from the author's own intellectual creation, reflecting a sufficient degree of creativity and independent expression. Authorship has likewise been understood as an exclusively human characteristic because copyright protection is historically linked to the personal intellectual effort of natural persons. Ownership subsequently derives from authorship, granting creators exclusive authority to exploit, reproduce, distribute, adapt, and communicate their works to the public. Moral rights further protect the personal relationship between authors and their creations, while economic rights provide financial incentives encouraging continued artistic and scientific innovation.⁷

The emergence of generative AI fundamentally challenges these foundational copyright doctrines. AI systems can independently generate outputs that satisfy many conventional indicators of originality despite lacking legal personality, consciousness, intention, or independent creative judgment. Consequently, significant uncertainty arises regarding whether AI-generated works should qualify for copyright protection and, if so, who should be recognized as the lawful rights holder. Existing copyright regimes generally presume identifiable human authors, yet algorithmically generated works frequently involve multiple participants, including software developers, AI providers, users supplying prompts, and owners of training datasets. This multidimensional creative process complicates the application of traditional concepts of authorship and ownership.⁸

The practical implications of these legal uncertainties are particularly evident in the growing diversity of AI-generated works. Contemporary generative AI systems are capable of producing highly sophisticated textual content, including academic articles, journalistic reports, legal documents, literary works, and commercial advertising. Image generation models create digital illustrations, photographs, paintings, architectural designs, and graphic art with increasing realism and artistic quality. Similarly, AI technologies now compose original musical works, generate source code for software applications, produce audiovisual content, and develop interactive multimedia experiences. These outputs increasingly possess independent commercial value, demonstrating that AI-generated content has become an economically significant component of the digital creative economy.⁹

Despite these technological achievements, AI-generated works continue to generate significant legal controversies regarding copyright protection. Questions remain concerning whether algorithmically generated content satisfies originality requirements, whether users exercising creative control through prompting should be regarded as authors, and whether developers retain proprietary interests arising from the design of generative models. Additional legal concerns involve derivative works, substantial similarity, copyright infringement, and the unauthorized reproduction of protected materials embedded within AI-

⁶ Roberto Vasconcelos Novaes and Francesca Flávio Ferraz, "Protection of Copyrights in the Era of Generative Artificial Intelligence," 2025, 332–43, https://doi.org/10.1007/978-3-031-73497-7_27.

⁷ Si Wu, "Research on the Liability for Copyright Infringement of Generative Artificial Intelligence," *Law and Humanities* 1, no. 2 (June 18, 2025): 42, <https://doi.org/10.63313/LH.9014>.

⁸ Saliltorn Thongmeensuk, "Rethinking Copyright Exceptions in the Era of Generative AI: Balancing Innovation and Intellectual Property Protection," *The Journal of World Intellectual Property* 27, no. 2 (July 19, 2024): 278–95, <https://doi.org/10.1111/jwip.12301>.

⁹ Ryan Abbott and Elizabeth Rothman, "Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence," *Fla. L. Rev.* 75 (2023): 1141.

generated outputs. Consequently, the legal status of AI-generated works remains one of the most debated issues in contemporary intellectual property scholarship.¹⁰

At the international level, copyright protection continues to be governed primarily by established multilateral agreements, including the Berne Convention for the Protection of Literary and Artistic Works, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), and the WIPO Copyright Treaty (WCT). These international instruments establish minimum standards concerning copyright protection, exclusive rights, limitations and exceptions, and international enforcement. However, they were drafted during periods in which autonomous artificial intelligence did not exist and therefore do not explicitly regulate AI-generated creativity, algorithmic authorship, or machine-assisted intellectual production. Consequently, their application to generative AI requires substantial legal interpretation and doctrinal adaptation.¹¹

Recognizing these challenges, the World Intellectual Property Organization (WIPO) has initiated extensive discussions through the WIPO Conversations on Intellectual Property and Artificial Intelligence, examining issues including AI-generated works, copyright ownership, licensing, training datasets, transparency, and creator remuneration. Meanwhile, the European Union Copyright in the Digital Single Market Directive introduces provisions concerning text and data mining, digital licensing, and online platform responsibilities that significantly influence the development of AI governance. Although these regulatory initiatives do not yet establish comprehensive legal solutions for generative AI, they demonstrate an emerging international consensus that copyright law must evolve to address the realities of algorithmic creativity while preserving incentives for human innovation.

Indonesia has likewise begun adapting its legal system to the challenges presented by digital transformation. The principal legal framework governing copyright remains Law Number 28 of 2014 concerning Copyright, which comprehensively regulates protected works, authorship, ownership, moral rights, economic rights, licensing, and copyright enforcement. Constitutional recognition of intellectual property is further supported through the protection of property rights and legal certainty under the 1945 Constitution. Government initiatives promoting digital transformation and the creative economy, together with the National Artificial Intelligence Strategy, reflect Indonesia's commitment to fostering technological innovation while strengthening the national digital ecosystem. Nevertheless, these regulatory instruments do not yet specifically address AI-generated works, training datasets, algorithmic authorship, or liability arising from generative AI technologies.

The foregoing analysis demonstrates that generative artificial intelligence has fundamentally transformed the nature of creativity and intellectual production, thereby exposing significant limitations within traditional copyright law. Existing copyright doctrines remain predominantly grounded in a human-authorship paradigm that assumes identifiable natural persons as the exclusive creators of protected works. However, the emergence of foundation models, large language models, and multimodal AI has introduced increasingly autonomous forms of algorithmic creativity that challenge established concepts of originality, authorship, ownership, and infringement. Consequently, legal development has not progressed at the same pace as technological innovation. This normative gap underscores the urgent need to rethink copyright protection by developing a legal framework capable of balancing human creativity, technological advancement, innovation incentives, and the broader public interest within the rapidly evolving digital era.

¹⁰ Faye F Wang, "Copyright Protection for AI-Generated Works: Solutions to Further Challenges from Generative AI," *Amicus Curiae* 5 (2023): 88.

¹¹ Sanatjon Ergashev, "COPYRIGHT AND ARTIFICIAL INTELLIGENCE: LEGAL ISSUES AND REGULATORY RESPONSES IN THE ERA OF GENERATIVE TECHNOLOGIES," *Science* 4, no. 1 (2026).

Comparative Analysis of Copyright Challenges in the Era of Generative Artificial Intelligence

The rapid expansion of generative artificial intelligence has created unprecedented challenges for copyright law by disrupting traditional assumptions concerning creativity, authorship, ownership, and legal responsibility.¹² Although many jurisdictions recognize the transformative potential of AI in promoting innovation and economic growth, legal systems differ significantly in their responses to AI-generated content. Indonesia continues to rely primarily on conventional copyright doctrines developed before the emergence of generative AI, whereas international regulatory developments increasingly seek to adapt copyright principles to the realities of machine-assisted creativity. This comparative analysis highlights both the normative gaps within Indonesia's copyright framework and the evolving international approaches that may inform future legal reform.

The first area of comparison concerns the concept of authorship, which represents the cornerstone of copyright protection. Indonesian copyright law adopts a traditional human authorship doctrine under which copyright originates from the intellectual creativity of a natural person. The Copyright Law implicitly assumes that every protected work is produced by an identifiable human author who possesses both moral and economic rights over the resulting creation. Consequently, current legislation provides no explicit legal recognition for works generated autonomously by artificial intelligence. Where AI is employed merely as a creative tool under substantial human control, copyright protection remains attributable to the human creator rather than the technological system itself.¹³

International developments largely reinforce this human-centered approach. Courts, copyright offices, and policy institutions in jurisdictions such as the United States, the European Union, the United Kingdom, Australia, and Japan have consistently maintained that artificial intelligence cannot be recognized as a legal author because it lacks legal personality, consciousness, intention, and independent creative capacity. Recent administrative decisions by the United States Copyright Office, for example, emphasize that copyright protection requires meaningful human creative contribution. Thus, although AI may significantly assist the creative process, international practice continues to reject the recognition of AI itself as an author while focusing instead on the extent of human intellectual involvement.¹⁴

The second issue concerns the principle of originality, which determines whether a work qualifies for copyright protection. Under Indonesian copyright law, originality remains closely associated with human intellectual creation; however, no statutory provisions specifically clarify how originality should be evaluated in relation to AI-generated works. This legal ambiguity creates uncertainty regarding whether outputs produced through generative AI satisfy the threshold of originality when human intervention is limited to prompt formulation or minimal editorial modifications. Consequently, Indonesian courts currently lack explicit legal guidance for assessing originality in algorithmically generated content.¹⁵

International copyright practice generally continues to interpret originality as requiring a sufficient degree of human creativity. Jurisdictions applying the "author's own intellectual

¹² Ayman Zain et al., "The Legislative Gap for Copyright in the Era of Generative AI: Where Do We Stand in Achieving Sustainable Development Goals?," *Journal of Lifestyle and SDGs Review* 5, no. 4 (2025): e06057.

¹³ Amith Sriram KS, "Copyright Facing the Challenges of Generative Artificial Intelligence: Judicial Practice and Legislative Strategies in India, the United States and the European Union," *Journal of Digital Technologies and Law* 3, no. 4 (2025): 598–635.

¹⁴ Abbott and Rothman, "Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence."

¹⁵ Ergashev, "COPYRIGHT AND ARTIFICIAL INTELLIGENCE: LEGAL ISSUES AND REGULATORY RESPONSES IN THE ERA OF GENERATIVE TECHNOLOGIES."

creation" standard emphasize that originality derives from creative choices reflecting human judgment rather than autonomous computational processes. Accordingly, purely machine-generated outputs are generally excluded from copyright protection unless substantial human creative input can be demonstrated. Nevertheless, international scholarship increasingly recognizes that collaborative creativity between humans and AI may require more nuanced legal standards capable of distinguishing between autonomous generation and meaningful human artistic contribution.¹⁶

The third comparative issue concerns training data and copyright, which has become one of the most controversial legal questions surrounding generative AI. Contemporary AI models are trained using enormous collections of digital texts, photographs, music, audiovisual works, software code, and other copyrighted materials. Indonesian copyright legislation does not specifically regulate whether copyrighted works may lawfully be used for AI training purposes without authorization from rights holders. Consequently, legal uncertainty persists regarding whether large-scale data collection for machine learning constitutes copyright infringement, permissible use, or an activity requiring prior licensing agreements.¹⁷

By contrast, international legal systems have begun developing more sophisticated regulatory approaches to AI training datasets. Several jurisdictions recognize text and data mining (TDM) exceptions that permit computational analysis of copyrighted materials under specified conditions, while others rely upon doctrines of fair use or fair dealing to determine whether AI training constitutes lawful use. At the same time, copyright owners increasingly negotiate licensing agreements permitting AI developers to utilize protected works for model training in exchange for financial compensation. Although international approaches remain diverse, they collectively demonstrate a growing recognition that sustainable AI development requires clearer legal rules governing access to copyrighted datasets and equitable remuneration for creators.¹⁸

The fourth area of comparison concerns copyright ownership over AI-generated content. Indonesia has not yet established explicit legal provisions determining ownership where creative works are generated through substantial AI assistance. As a result, uncertainty exists regarding whether copyright should belong to the user providing prompts, the developer designing the AI model, the employer commissioning AI-assisted works, or another party. Existing copyright principles remain primarily designed for conventional human authorship and therefore provide limited guidance for allocating proprietary rights within increasingly collaborative human-AI creative processes.¹⁹

International practice demonstrates a more flexible yet still evolving approach to copyright ownership. Legal scholarship and policy discussions increasingly distinguish among several possible rights holders depending upon the factual circumstances of creation, including the human user exercising creative control, software developers providing generative systems, employers within employment relationships, and commissioning parties operating under contractual agreements. Although no universally accepted model has yet emerged, international developments increasingly favor context-specific ownership rules supported by

¹⁶ Maya Ruhtiani et al., "Generative AI and Copyright Law: A Rule of Law Comparison between Indonesia and South Korea," *Kosmik Hukum* 25, no. 3 (July 8, 2025): 428–49, <https://doi.org/10.30595/kosmikhukum.v25i3.26268>.

¹⁷ M Akram, "The Impact of Generative Artificial Intelligence on Copyright Law and Intellectual Property Protection," *Research Consortium Archive* 4, no. 2 SE-Articles (n.d.): 3462–76, <https://doi.org/10.0000/>.

¹⁸ Giuseppe Colangelo, "A Competition Policy Analysis of Copyright Protection in Generative AI," *Singapore Journal of Legal Studies*, September 1, 2025, 271–91, <https://search.informit.org/doi/10.3316/informit.T2025103000022501448090617>.

¹⁹ Katharina de la Durantaye, "Control and Compensation. A Comparative Analysis of Copyright Exceptions for Training Generative AI," *IIC - International Review of Intellectual Property and Competition Law* 56, no. 4 (April 4, 2025): 737–70, <https://doi.org/10.1007/s40319-025-01569-6>.

contractual arrangements and clearly defined licensing mechanisms rather than blanket statutory recognition of AI-generated copyright.²⁰

A fifth issue involves liability for copyright infringement, particularly where generative AI reproduces or substantially resembles protected works without authorization. Indonesian copyright legislation has not yet clarified the allocation of legal responsibility among AI developers, digital platforms, commercial users, and end-users generating infringing content. Consequently, determining liability remains difficult because AI-generated outputs frequently involve multiple actors contributing to the creation, distribution, and commercialization of digital works. This fragmented legal landscape may weaken effective copyright enforcement while creating uncertainty for both creators and AI service providers.²¹

International regulatory developments increasingly recognize differentiated models of liability based upon the specific roles performed by each participant within the AI ecosystem. Discussions concerning platform liability, developer liability, and user liability seek to allocate legal responsibility according to the degree of control exercised over AI systems and infringing outputs. Platform operators may be required to implement copyright compliance mechanisms, developers may bear responsibility for system design and training practices, while users may remain liable for knowingly generating or distributing infringing materials. This multi-layered approach reflects the complexity of contemporary AI ecosystems and recognizes that effective copyright governance cannot rely upon a single category of responsible actor.²²

The final comparative issue concerns transparency and accountability, which are becoming increasingly important principles within AI governance.²³ Indonesian copyright law currently imposes no explicit obligation requiring AI providers or users to disclose whether creative content has been generated through artificial intelligence, identify training datasets, or explain the operation of generative models. Consequently, authors, consumers, and copyright holders often lack sufficient information to determine whether AI-generated outputs involve unauthorized use of protected works or whether appropriate licensing arrangements exist. International regulatory trends, by contrast, increasingly incorporate AI transparency obligations, disclosure requirements, documentation standards, and accountability mechanisms to strengthen public trust and facilitate copyright enforcement. These comparative findings demonstrate that while Indonesia continues to operate within a predominantly human-authorship paradigm supported by conventional copyright doctrines, international legal developments are gradually moving toward a more comprehensive governance model that integrates human creativity, responsible AI innovation, transparency, licensing, and accountability. Such developments provide valuable normative guidance for rethinking copyright protection in the era of generative artificial intelligence while preserving the fundamental objectives of intellectual property law.

Developing a Human-Centered AI Copyright Framework for Sustainable Intellectual Property Governance

The comparative analysis undertaken in the previous sections demonstrates that existing copyright regimes remain largely grounded in a human-authorship paradigm that

²⁰ Zain et al., “The Legislative Gap for Copyright in the Era of Generative AI: Where Do We Stand in Achieving Sustainable Development Goals?”

²¹ KS, “Copyright Facing the Challenges of Generative Artificial Intelligence: Judicial Practice and Legislative Strategies in India, the United States and the European Union.”

²² Abbott and Rothman, “Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence.”

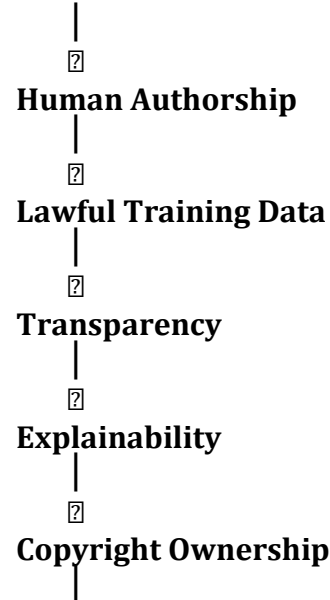
²³ Ergashev, “COPYRIGHT AND ARTIFICIAL INTELLIGENCE: LEGAL ISSUES AND REGULATORY RESPONSES IN THE ERA OF GENERATIVE TECHNOLOGIES.”

predates the emergence of generative artificial intelligence.²⁴ While international legal developments have begun to address issues such as AI-generated works, training data, and algorithmic transparency, regulatory responses remain fragmented and frequently focus on isolated legal questions rather than offering a comprehensive governance framework. Consequently, this study proposes a Human-Centered AI Copyright Framework as its principal theoretical contribution. The framework seeks to reconcile technological innovation with the fundamental objectives of copyright law by integrating intellectual property principles, human rights considerations, and responsible AI governance into a coherent normative model capable of responding to the challenges of the digital era.

The proposed framework is founded upon the principle that generative artificial intelligence should not be regarded as an autonomous legal creator but as an advanced technological instrument that supports and enhances human creativity. Copyright law has historically been designed to encourage human intellectual production while simultaneously promoting scientific and cultural development for the public benefit. Therefore, future legal reform should preserve the central role of human creativity while acknowledging the increasing significance of AI-assisted creative processes. Rather than replacing existing copyright principles, the proposed model modernizes them by introducing legal safeguards specifically designed for collaborative human–AI creativity.²⁵

To operationalize this approach, the study develops an integrated governance model consisting of interconnected legal components that collectively regulate the life cycle of AI-assisted creative production.²⁶ Each component functions as a normative safeguard intended to balance technological innovation, creators' rights, commercial interests, and public access to knowledge. The proposed framework is illustrated as follows:

Creative Process



²⁴ Mohsin Ali Farhad and Muhammad Hamza Zakir, “Adapting Legal Horizons in Reshaping Intellectual Property Law for the Artificial Intelligence Revolution,” *AI and Ethics* 5, no. 3 (June 28, 2025): 2307–21, <https://doi.org/10.1007/s43681-024-00555-x>.

²⁵ Brent Winslow et al., “Revisiting the Six Human-Centered Artificial Intelligence Grand Challenges in the Age of Generative AI,” *International Journal of Human–Computer Interaction* 42, no. 7 (April 3, 2026): 4697–4738, <https://doi.org/10.1080/10447318.2026.2641703>.

²⁶ Tanmoy Hazra et al., *Building Human-Centered Generative AI* (Cham: Springer Nature Switzerland, 2026), <https://doi.org/10.1007/978-3-032-21412-6>.



The first component is human authorship, which remains the normative foundation of copyright protection. The framework affirms that human beings should continue to occupy the central position within the creative process because copyright exists to reward human intellectual effort, imagination, and artistic expression. Under this model, generative AI functions as an assistive technology rather than an independent legal author. Copyright protection should therefore depend upon the existence of meaningful human creative contribution, including conceptual design, prompt engineering, editorial judgment, selection, arrangement, or substantial modification of AI-generated outputs. This approach preserves the philosophical foundations of copyright while accommodating technological innovation.²⁷

The second component concerns lawful training data, which addresses one of the most controversial issues in contemporary AI governance. The legitimacy of generative AI depends substantially upon the legality of the datasets used during model development. Accordingly, AI developers should ensure that copyrighted works are incorporated into training datasets only through legally recognized mechanisms, including the consent of rights holders, contractual licensing agreements, statutory text and data mining exceptions, or materials that have entered the public domain. Establishing lawful training practices strengthens legal certainty, reduces copyright disputes, and promotes responsible AI innovation while respecting the legitimate interests of creators.²⁸

The third component is transparency, which enhances trust and accountability throughout the AI creative ecosystem. Transparency requires AI providers and commercial users to disclose when creative outputs have been generated or substantially assisted by artificial intelligence. In addition, developers should provide appropriate information concerning the categories and sources of datasets used to train generative models, subject to the protection of legitimate trade secrets and confidential business information. Dataset transparency enables copyright holders to assess whether protected works have been lawfully utilized and facilitates effective copyright enforcement without unnecessarily hindering technological development.²⁹

Closely connected to transparency is the fourth component, explainability. Explainability requires that AI systems provide meaningful information regarding the

²⁷ Christophe Geiger, "Designing an Ethical and Sustainable Intellectual Property System: An Introduction," 2025, <https://doi.org/10.2139/ssrn.5395641>.

²⁸ Ama Oduma Annan, "Intellectual Property Ownership and Authorship in AI-Generated Works," 2023.

²⁹ Kolawole Afuwape, "Ethical Implications of Using Artificial Intelligence in Intellectual Property Creation: Authorship, Ownership and Responsibility Issues," *Journal of Digital Technologies and Law* 3, no. 4 (2025): 677–704.

processes through which creative outputs are generated. Although highly sophisticated neural networks cannot always reveal every computational step, AI providers should offer sufficient explanations concerning data sources, model functionality, content generation mechanisms, and the degree of human intervention involved in producing particular outputs. Such explanations promote legal certainty by enabling courts, regulators, creators, and users to evaluate issues relating to originality, ownership, infringement, and liability more effectively.³⁰

The fifth component concerns copyright ownership, which remains one of the most legally complex aspects of AI-generated creativity. The proposed framework recognizes that ownership should not be determined through a single universal rule but rather according to the nature of the creative relationship between human participants and AI technologies. Depending upon the factual circumstances, copyright ownership may appropriately reside with the user exercising substantial creative control, the employer within an employment relationship, or another party designated through contractual allocation. Developers of AI systems generally should not automatically acquire ownership over every AI-generated output merely because they created the underlying technology. Clear statutory guidance concerning ownership allocation would significantly reduce legal uncertainty while facilitating commercial transactions involving AI-generated content.

The sixth and seventh components establish fair licensing mechanisms and fair remuneration, which together seek to reconcile AI innovation with the economic interests of copyright holders. The framework recommends the development of multiple licensing models, including collective licensing, compulsory licensing, extended collective licensing, and specialized AI training licenses permitting lawful access to copyrighted materials for machine learning purposes. These licensing arrangements should be complemented by fair remuneration mechanisms ensuring that creators receive appropriate economic compensation through benefit-sharing schemes, royalty distribution systems, or other equitable payment models. Such mechanisms encourage innovation without undermining the economic sustainability of creative industries.

The eighth component is accountability, which allocates legal responsibility among the principal actors participating in the AI ecosystem. Effective copyright governance requires clearly defined obligations for AI developers, AI providers, online platforms, commercial users, and other stakeholders involved in the generation, distribution, and commercialization of AI-generated works. Developers should ensure lawful model design and compliance with applicable copyright standards; AI providers should maintain transparency and licensing compliance; platforms should implement effective copyright management mechanisms; and commercial users should remain responsible for unlawful exploitation of infringing content. This differentiated allocation of responsibility reflects the collaborative nature of generative AI while preventing accountability gaps within complex digital ecosystems.³¹

The ninth component concerns judicial protection, which provides effective legal remedies for copyright disputes arising from AI-assisted creativity. Individuals and legal entities should possess accessible mechanisms to challenge copyright infringement, ownership disputes, unlawful AI training practices, and unauthorized commercial exploitation of protected works. In addition to conventional court proceedings, the framework supports the development of alternative dispute resolution mechanisms and specialized digital copyright tribunals capable of resolving technologically complex disputes efficiently and consistently. Such institutions would enhance legal certainty while reducing the costs and procedural barriers associated with traditional copyright litigation.

³⁰ Catherine Régis et al., *Human-Centered AI: A Multidisciplinary Perspective for Policy-Makers, Auditors, and Users* (CRC Press, 2024).

³¹ David W Opderbeck, "Copyright in AI Training Data: A Human-Centered Approach," *Okla. L. Rev.* 76 (2023): 951.

Overall, the Human-Centered AI Copyright Framework represents the principal theoretical contribution of this study to the fields of copyright law, artificial intelligence regulation, and intellectual property governance. Unlike previous studies that predominantly address isolated issues such as AI authorship, fair use, copyright infringement, or algorithmic transparency independently, the proposed framework integrates human authorship, lawful training data, transparency, explainability, copyright ownership, fair licensing, fair remuneration, accountability, and judicial protection into a comprehensive governance model. By harmonizing these interconnected principles, the framework demonstrates that sustainable copyright protection in the era of generative artificial intelligence requires a balanced legal architecture capable of simultaneously protecting human creativity, fostering responsible technological innovation, ensuring equitable economic participation, and safeguarding the broader public interest. Accordingly, the proposed model offers a normative roadmap for future copyright reform and contributes to the continuing development of global legal scholarship on AI, intellectual property, and digital innovation governance.

CONCLUSION

This study demonstrates that the rapid advancement of generative artificial intelligence has fundamentally transformed the creation, dissemination, and commercialization of intellectual works, thereby exposing significant limitations within conventional copyright law. The comparative analysis reveals that existing copyright regimes, including Indonesia's Copyright Law, remain predominantly grounded in the traditional doctrine of human authorship and have yet to comprehensively address the legal complexities arising from AI-generated content, algorithm-assisted creativity, training datasets, copyright ownership, liability, and transparency. Although international legal developments—through the Berne Convention, the TRIPS Agreement, the WIPO Copyright Treaty, the WIPO Conversations on AI and Intellectual Property, and the European Union's evolving regulatory framework—have begun to respond to these challenges, important normative gaps remain concerning the legal status of AI-generated works and the allocation of rights and responsibilities among users, AI developers, platform providers, and copyright holders. These findings indicate that technological innovation has progressed more rapidly than copyright regulation, creating increasing legal uncertainty that may undermine both the protection of creators and the sustainable development of artificial intelligence.

Building upon these findings, this study proposes a Human-Centered AI Copyright Framework as its principal theoretical contribution to the evolving discourse on copyright law and artificial intelligence governance. The framework integrates nine interrelated components—human authorship, lawful training data, transparency, explainability, copyright ownership, fair licensing mechanisms, fair remuneration, accountability, and judicial protection—into a coherent governance model capable of balancing technological innovation with the protection of intellectual property rights. Rather than positioning artificial intelligence as an autonomous legal creator, the proposed framework maintains that human creativity should remain the normative foundation of copyright protection while recognizing AI as an assistive technology that enhances, rather than replaces, human intellectual contribution. Accordingly, future copyright reform should establish comprehensive legal standards governing AI training data, clarify ownership of AI-assisted works, institutionalize transparent and accountable AI practices, ensure equitable compensation for creators, and strengthen dispute resolution mechanisms through effective judicial and alternative legal remedies. By integrating intellectual property principles with emerging AI governance standards, the proposed framework offers a normative roadmap for developing a sustainable, innovation-oriented, and human-centered copyright regime capable of responding to the challenges of the

digital era.

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