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Copyright Regulation of AI-Generated Works: A Comparative Study of Indonesia, the United States, and Germany

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ABSTRACT

Purpose: This study examines copyright regulation in the era of AI through a comparative legal analysis between Indonesia, the United States, and Germany, with the primary aim of analyzing how the copyright regulatory frameworks in the three countries accommodate AI-generated works and to identify regulatory gaps that may hinder legal certainty in the context of generative AI.

Research Design and Methodology: This study uses normative legal research methods with statutory and comparative legal approaches, analyzing legal implications of AI-generated works and conducting an assessment of the relevant primary law sources.

Findings and Discussion: Findings highlight that Germany stands out as the most advanced through the amendment of UrhG and the adoption of the DSM Directive, while the United States follows with clear output regulation through USCO policies. Indonesia lags behind, still relying on Law No. 28 of 2014's rather classical understanding of copyrights. The research identifies two major gaps that create legal challenges: regulatory preparedness and legal uncertainty around output and input layers.

Implications: This study recommends a two-layer reform direction for Indonesian copyright law by proposing clearer rules on AI-generated outputs and the use of copyrighted works as AI training inputs, drawing from the United States' human authorship and Germany's text and data mining framework. The contribution of this study lies in its addition to the growing body of literature around generative AI in the legal sphere and practical implications for future legal development.

Introduction

AI-generated works have become a significant phenomenon within the creative industry, with data showing that the global market for AI-generated images is projected to exceed $0.9 billion by 2030, marking a 254% increase from $0.26 billion in 2022.[1] Furthermore, nearly half of artists (45.7%) report that text to image technology greatly assists their creative process, indicating that AI is becoming more deeply integrated into artistic practices.[2] Generative AI tools like Midjourney (26.8%), Dall-E (24.4%), and Nightcafe (23.2%) together accounted for nearly a quarter of the generative AI market share in 2023,[3] reflecting the growing popularity of generative AI technology in the field of digital art. As these developments continue, AI is no longer just an assistant but plays a central role in creating works traditionally produced by human intellectual creativity.

This phenomenon presents new challenges for copyright law, as AI-generated works raise uncertainties regarding ownership and create legal ambiguities that current regulations have yet to

[1] Ming-Hui Huang and Roland T Rust, "Automating Creativity," *ArXiv Preprint ArXiv:2405.06915*, 2024.
[2] Huang and Rust.
[3] Dominik K. Kanbach et al., "The GenAI Is out of the Bottle: Generative Artificial Intelligence from a Business Model Innovation Perspective," *Review of Managerial Science* 18, no. 4 (April 13, 2024): 1189–1220, https://doi.org/10.1007/s11846-023-00696-z.

fully address.[4] The impact of these developments is also felt by World Trade Organization (WTO) member countries, such as Indonesia, the United States, and Germany.[5] Between September 2022 and August 2023, these countries Indonesia (1.4 billion visits), the United States (5.5 billion visits), and Germany (630 million visits) ranked among the top 10 contributors to AI application visits globally, according to data from WritterBuddy.[6][7] This data shows the high adoption of AI technology, which consequently requires these countries to be more proactive in anticipating copyright challenges associated with AI-generated works. This data serves as a basis for comparative studies of regulations in these countries, analyzing how each provides legal certainty in copyright protection in the AI era.

Currently, Indonesia, the United States, and Germany all have not yet concretely addressed the copyright implications of AI-generated works. Indonesia still adheres to Law No. 28 of 2014 on Copyright (UU No. 28 Tahun 2014), which considers only humans as creators of works.[8] The United States follows Title 17 of the United States Code (Title 17 U.S.C.), Copyright Act of 1976,[9] which was later amended by the Digital Millennium Copyright Act of 1998 (DMCA).[10] Germany follows the Copyright Act of 9 September 1965, also known as the Urheberrechtsgesetz (UrhG).[11] As an European Union Member State, Germany is subject to Regulation (EU) 2024/1689, the EU Artificial Intelligence Act, which represents the primary regulatory framework for AI.[12] Despite Germany's more advanced development, there are still gaps in how copyright is applied to AI-generated works, particularly due to the fact that the IPR Law is in itself a distinct legal domain, requiring a highly specific legal coverage instead of generalized legal norms around AI and its legal implications.

The lack of clarity in AI-related regulations, particularly in relation to the validity of moral and economic rights, will create confusion regarding who holds copyright over AI-generated works.[13] Consequently, this creates a wave of legal uncertainties that are difficult to navigate around for both the average user of generative AI systems and AI-savvy artists whose livelihood depends on the monetization of their works. From the lack of legal certainty, disputes could arise and negatively impact the overall predictability and exacerbate the anxieties and cynicism around such crucial technology for the future. While determining the characteristics fit for a work to be considered worthy of copyright protection is often straightforward, the potential issues around agency, the lack of creative control during creation, and potential lack of human intervention have prompted serious issues around not only the utilization of copyrighted AI-generated, but also the very validity of such work to even be copyrighted.

This research is built upon the rising urgency for all legal systems to promptly adopt to the changes that technological developments have brought and will continue to bring to the lives of many people, in what can be considered an accelerated rate. More importantly, it touches on the novel aspect of comparative analysis around Indonesia, the United States, and Germany, a combination that may look random immediately but can potentially provide crucial insights for policymakers and scholars who are interested in comprehensively dissecting and understanding the development and

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[4] Shlomit Yanisky-Ravid and Luis Antonio Velez- Hernandez, "Copyrightability of Artworks Produced by Creative Robots and Originality: The Formality-Objective Model," *Minnesota Journal of Law, Science & Technology* 19, no. 1 (2018): 1, https://doi.org/10.24926/15529541.3793.

[5] Stefan Koos, "AI Model Training and Copyright Law: Legal Challenges and Regulatory Approaches in the EU, US, and Asia," *Indonesian Civil Law Journal* 1, no. 2 (2025): 55–78.

[6] Nabilah Muhamad, "Indonesia, Penyumbang Kunjungan Aplikasi AI Terbanyak Ke-3 Di Dunia," *Data Boks*, 2024, https://databoks.katadata.co.id/teknologi-telekomunikasi/statistik/a49ed3eb121983b/indonesia-penyumbang-kunjungan-aplikasi-ai-terbanyak-ke-3-di-dunia.

[7] Sujan Sarkar, "AI Industry Analysis: 50 Most Visited AI Tools and Their 24B+ Traffic Behavior," *Writerbuddy*, 2023, https://writerbuddy.ai/blog/ai-industry-analysis.

[8] Calista Putri Tanujaya, "Analisis Karya Ciptaan Artificial Intelligence Menurut Undang-Undang Nomor 28 Tahun 2014 Tentang Hak Cipta," *JLEB: Journal of Law, Education and Business* 2, no. 1 (April 1, 2024): 435–43, https://doi.org/10.57235/jleb.v2i1.1763.

[9] Jessica Gillotte, "Copyright Infringement in AI-Generated Artworks," *UC Davis Law Review* 53, no. 5 (2020).

[10] Lilik Prihatin, Maria Yosepin Endah Listyowati, and Thomas Ichfan Hidayat, "Perlindungan Hak Kekayaan Intelektual: Sebuah Esensial Hak Cipta Pada Era Revolusi Industri 4.0," *UNES Law Review* 6, no. 4 (2024): 11321–29.

[11] Kamila Kempfert and Wolfgang Reißmann, "Transformative Works and German Copyright Law as Matters of Boundary Work," 2017.

[12] Robert Kilian, Linda Jäck, and Dominik Ebel, "European AI Standards – Technical Standardisation and Implementation Challenges under the EU AI Act," *European Journal of Risk Regulation* 16, no. 3 (September 23, 2025): 1038–62, https://doi.org/10.1017/err.2025.10032.

[13] Irsyad Maulana Achmadi, Aisha Tsabita Kamila, and Feymi Angelina, "Penegakan Perlindungan Hak Cipta Bagi Karya Buatan Artificial Intelligence Menggunakan Doktrin Work Made For Hire," *Anthology: Inside Intellectual Property Rights* 1, no. 1 SE-Articles (January 4, 2024), https://ojs.uph.edu/index.php/Anthology/article/view/7855.

implications of AI-based technologies. Practically, the findings are expected to assist policymakers in Indonesia, the United States, and Germany in formulating copyright regulations that are more adaptable to AI developments.

Literature Review

Previous studies have examined the urgency of modernizing copyright regulations in the AI era. Research by Fauzi et al., (2022) on the validity of copyright over AI-generated works in Indonesia found that AI-generated works without human intervention do not receive copyright protection, although this study is limited in addressing the need for specific regulations.[14] A study by Sun (2022) compared regulations in China, the European Union, and the United States, proposing a dual-layer legal mechanism for AI works, but it has yet to accommodate a broader legal model.[15] Additionally, research by Indri Hapsari et al., (2024) on the legitimacy of intellectual property generated by AI in Indonesia identified and analyzed Indonesia's copyright and industrial property laws.[16] Supporting this, Tanujaya's (2024) research also emphasized the need for copyright regulations that keep pace with the AI era, particularly regarding works created by AI under Law No. 28 of 2014.[17] Meanwhile, Zhuk (2023) study highlighted the need for full copyright protection for AI works in the European Union, the United States, and China.[18] The study crucially notes the EU as having the most advanced regulatory development among the three, particularly with the enactment of Artificial Intelligence Act, while the US and China are still ridden with uncertainty around the copyright validity of AI-generated works. Progressive law theory is a particularly important conceptual-analytical tool for this topic, as Kusumawardani (2019) shows in a study that the emphasis on "law for humans, not humans for law" can be a crucial anchor of legal development in an era where human agency and creativity are increasingly blurred due to the rise of AI.[19]

Despite the rapidly growing body of literature around AI-generated works and their copyright implications, the understanding of the particular topic in Indonesia is not yet extensive. While the cited studies have explored the implications in a broad manner, specific focus on output and human intervention, particularly through a comparative lens with developed nations, has not yet been explored. Therefore, this study fills this specific research gap by carrying out a comparative legal analysis between Indonesia, the United States, and Germany to assess the existing regulatory landscape and highlight the urgency of modernizing copyright regulations in the AI era, particularly as a response to the legal gaps identified. This specific combination of legal systems, as stated earlier, is the primary point of novelty, allowing comparative insights into how a developing legal system may adapt selected regulatory models from more established jurisdictions without losing sight of domestic legal needs and the human-centered orientation of progressive law. The core limitation of this study is its lack of primary empirical evidence to support the narrative around enforcement, as the study focuses instead on the doctrinal analysis of the relevant regulatory frameworks from the three instead. Nevertheless, this study can contribute to the quest of understanding copyright implications around AI-generative works, which has become a part of many creative works in today's creative industries.

This research utilizes Progressive Legal Theory as an analytical tool to understand and examine the urgency of modernizing copyright regulations in the AI era. Progressive Legal Theory is a legal

[14] Rizki Fauzi, Tasya Safiranita Ramli, and Rika Ratna Permata, "MASA DEPAN HAK CIPTA: TINJAUAN KEABSAHAN HASIL KARYA KECERDASAN ARTIFISIAL DI INDONESIA," *Citizen : Jurnal Ilmiah Multidisiplin Indonesia* 2, no. 1 (February 5, 2022): 118–28, https://doi.org/10.53866/jimi.v2i1.51.
[15] Haochen Sun, "Redesigning Copyright Protection in the Era of Artificial Intelligence," *Iowa Law Review* 107 (2022): 1213–51.
[16] Dwi Ratna Indri Hapsari et al., "The Legality of Intellectual Property by Artificial Intelligence in Indonesia," *KnE Social Sciences*, January 5, 2024, https://doi.org/10.18502/kss.v8i21.14791.
[17] G.P. Raiwella, Dwi Sartika Paramyta, and M.Y.F. Hafidz Nasution, "The Copyright Ownership Status of Visual Works Generated by Artificial Intelligence," *Al-Qanun: Jurnal Kajian Sosial Dan Hukum Islam* 6, no. 1 (June 21, 2025): 81, https://doi.org/10.58836/al-qanun.v6i1.24326.
[18] Alesia Zhuk, "Navigating the Legal Landscape of AI Copyright: A Comparative Analysis of EU, US, and Chinese Approaches," *AI and Ethics* 4, no. 4 (November 30, 2024): 1299–1306, https://doi.org/10.1007/s43681-023-00299-0.
[19] Qur'ani Dewi Kusumawardani, "HUKUM PROGRESIF DAN PERKEMBANGAN TEKNOLOGI KECERDASAN BUATAN," *Veritas et Justitia* 5, no. 1 (June 26, 2019): 166–90, https://doi.org/10.25123/vej.3270.

theoretical framework developed by Satjipto Rahardjo,[20] as a reaction to dissatisfaction with traditional legal theories and practices. Advocates of progressive law criticize the significant gap between legal theory and its practice in society, arguing that traditional law often fails to respond to the evolving social issues. This theoretical framework argues that law should not be limited to the text of statutes but must also consider the sense of justice alive in society.[21] Progressive Legal Theory encourages law to actively adapt to social and technological changes,[22] strongly suggesting that law must be responsive to societal dynamics, including technological developments such as AI.[23]

Research Design and Methodology

This research, focusing on the modernization of copyright regulations for AI-based works, is a qualitative study employing a normative legal research method.[24] The selection of the normative legal research method is considered relevant as this study will examine the copyright regulations in Indonesia, the United States, and Germany in relation to AI-generated works. This research uses a statutory approach and a comparative legal approach.[25] The selection of countries for the comparative analysis is based on their different levels of regulatory development in responding to AI-generated works. Indonesia represents a developing legal system that still relies on Law No. 28 of 2014 on Copyrights (Copyrights Law), while United States was selected because it has developed administrative guidance through the United States Copyright Office and applies the fair use doctrine in relation to AI training data. Germany, on the other hand, was selected due to its copyright framework, through UrhG and the implementation of the DSM Directive, combined with the country's binding position under the Artificial Intelligence Act (AI Act) of the European Union. This comparison allows the study to identify regulatory gaps and possible reform directions for Indonesia, by directly gathering insights from the two more developed systems countries.

This research will use secondary data sources in the form of legal materials, including primary legal sources (legislation) such as Law No. 28 of 2014 (Indonesia), Title 17 U.S.C., the Copyright Act of 1976, and the DMCA (United States), UrhG (Germany), as well as The European Union (EU) Artificial Intelligence Act (AI Act) and the Directive 2019/790 on Copyright in Digital Single Marketing (DSM Directive). Secondary legal materials consist of journal articles, books, and scholarly commentaries discussing copyright, AI-generated works, legal certainty, progressive law, and comparative copyright regulation. Tertiary legal materials include dictionaries, legal encyclopedias, and other supporting sources used to clarify legal concepts. Data collection will employ document study techniques, where the researcher will gather information from primary legal materials for analysis. The data analysis will use a descriptive-qualitative approach, analyzing the collected legal materials that are relevant to this study. The comparative analysis is conducted through several stages. First, this study starts the discussion by identifying the copyright rules applicable to AI-generated works in each country, relative to the legal implications. Then, the study continues by comparing the recognition of copyright ownership in the output layer. This stage of the comparative analysis focuses specifically on the position of AI-generated works and the requirement of human authorship. Lastly, the study compares the regulation of the input layer, especially the legality of using copyrighted works as AI training data. These stages help lead the analysis to the identification of regulatory gaps, along with insights from the more developed systems of the US and Germany. With the insights gathered, the study can then recommend actionable steps that Indonesia can take to at least gradually move towards a more coherent copyright protection in the era of AI.

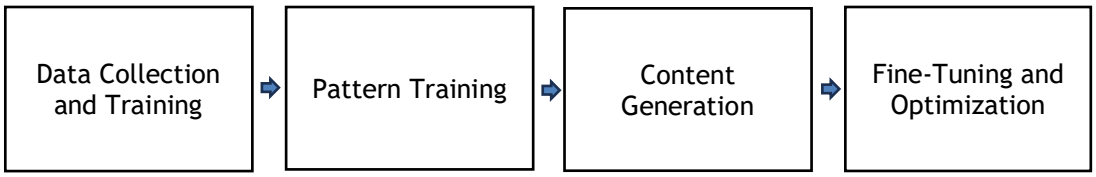
[20] M. Yasin Al Arif, "Penegakan Hukum Dalam Perspektif Hukum Progresif," *Undang: Jurnal Hukum* 2, no. 1 (October 28, 2019): 169–92, https://doi.org/10.22437/ujh.2.1.169-192.
[21] Lutfil Ansori, "REFORMASI PENEGAKAN HUKUM PERSPEKTIF HUKUM PROGRESIF," *Jurnal Yuridis* 4, no. 2 (January 11, 2018): 148, https://doi.org/10.35586/.v4i2.244.
[22] Vianda Avivah, "Paradigma Hukum Progresif Dalam Upaya Penyelesaian Kekerasan Dalam Rumah Tangga," *Oetoesan-Hindia: Telaah Pemikiran Kebangsaan* 5, no. 2 (2023): 87–98.
[23] Kusumawardani, "HUKUM PROGRESIF DAN PERKEMBANGAN TEKNOLOGI KECERDASAN BUATAN."
[24] Hari Sutra Disemadi, "Lenses of Legal Research: A Descriptive Essay on Legal Research Methodologies," *Journal of Judicial Review* 24, no. 2 (November 30, 2022): 289–304, https://doi.org/10.37253/jjr.v24i2.7280.
[25] David Tan, "Metode Penelitian Hukum: Mengupas Dan Mengulas Metodologi Dalam Menyelenggarakan Penelitian Hukum," *Nusantara: Jurnal Ilmu Pengetahuan Sosial* 8, no. 8 (2021): 2463–78.

Findings and Discussion

Copyright Regulations in Indonesia, the United States, and Germany in Accommodating AI-Generated Works

AI is a technological development that enables computer programs or machines to perform tasks that typically require human thought or decision-making.[26] H.A. Simon, a political scientist from the United States, defines AI as a computer program capable of performing tasks that humans consider intelligent, meaning AI attempts to mimic human thinking abilities in problem-solving contexts.[27] Although AI development began in the mid-twentieth century and experienced several periods of stagnation, recent advances in deep learning have enabled AI systems to perform increasingly complex tasks, including content generation.[28] From this dynamic development of AI, the technology has now reached a point where it not only serves as a tool for solving problems but can also be used to generate artistic works that were once solely produced by human intellectual creativity.[29] This is due to AI's design incorporating deep learning technology, which uses layered neural networks to recognize complex patterns in data by mimicking the structure and function of the human brain. Deep learning has been pivotal in AI's development as it can process large amounts of data with high accuracy, solving complex tasks that closely resemble human abilities.[30] With these advancements, AI can now create works of art in various forms, including music, literature, design, and visual arts.

Figure 1.
How Generative AI Works



Source: Constructed from the findings of Feuerriegel et al. (2024)[31]

The above flowchart illustrates how generative AI works, passing through two layered structures: the gradual processing of input layers leading to output at the final layer.[32] It starts with the collection and processing of large-scale data as initial learning material. The collected data is used for AI training, where the model learns patterns, language structures, and relationships between elements. After training, the model begins to develop generative capabilities, producing new content

[26] Christopher Collins et al., "Artificial Intelligence in Information Systems Research: A Systematic Literature Review and Research Agenda," *International Journal of Information Management* 60 (October 2021): 102383, https://doi.org/10.1016/j.ijinfomgt.2021.102383.
[27] H.A. Simon, "Artificial Intelligence: Where Has It Been, and Where Is It Going?," *IEEE Transactions on Knowledge and Data Engineering* 3, no. 2 (June 1991): 128–36, https://doi.org/10.1109/69.87993.
[28] Michael Haenlein and Andreas Kaplan, "A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence," *California Management Review* 61, no. 4 (August 17, 2019): 5–14, https://doi.org/10.1177/0008125619864925.
[29] Anna Sungkar, "Digital Art," *Dekonstruksi* 9, no. 02 (March 27, 2023): 32–41, https://doi.org/10.54154/dekonstruksi.v9i02.143.
[30] Yoshua Bengio, Yann Lecun, and Geoffrey Hinton, "Deep Learning for AI," *Communications of the ACM* 64, no. 7 (July 21, 2021): 58–65, https://doi.org/10.1145/3448250.
[31] Stefan Feuerriegel et al., "Generative AI," *Business & Information Systems Engineering* 66, no. 1 (February 12, 2024): 111–26, https://doi.org/10.1007/s12599-023-00834-7.
[32] Manas Deb and Tokunbo Ogunfunmi, "Information-Theoretical Analysis of a Transformer-Based Generative AI Model," *Entropy* 27, no. 6 (May 31, 2025): 589, https://doi.org/10.3390/e27060589.

based on its training understanding. Fine-tuning is then performed to optimize the model for specific tasks, improving its overall performance to generate relevant, consistent, and high-quality outputs.[33]

For every creation in the fields of science, art, and literature, countries around the world provide legal protection for the creators or copyright holders of these works. This protection is provided through the establishment of copyright regulations. Copyright regulations grant moral and economic rights to creators as exclusive rights over their works. The primary function of copyright protection is to ensure that the works are not misused, altered, or distributed without the creator's permission, aiming to maintain the integrity of the work and ensuring that the creator receives economic benefits from their creation.[34] This protection also provides creators with a sense of security, which in turn encourages them to continue developing their creativity in producing new works for society. Based on this conceptual anchor that explains the relationship between generative AI and copyright protection, the comparative analysis for the three countries is conducted by examining three primary legal indicators. The first one is normative basis of copyright protection, which serves to identify the positive legal instruments that form the foundation of copyright protection in each jurisdiction. The second one is the legal subject recognition as creator or author. Lastly, the analysis will focus on the existing legal norms that could potentially be interpreted to govern the issues around AI-related input and output layers.

1) Copyright Regulation in Indonesia

The protection of copyright in Indonesia is based on regulations evolving over time, starting with Auteurswet 1912, a legacy of Dutch colonial law. Indonesia's first national copyright law, Law No. 6 of 1982, was passed in 1982 and was later revised in 1987 with Law No. 7 of 1987. This revision expanded the scope of protection and shifted the violation standard from quantitative to qualitative, while maintaining a voluntary registration system as evidence in disputes. In 1997, Law No. 12 of 1997 replaced the previous law, further changing the violation standard and solidifying copyright law in Indonesia. In 2002, Law No. 19 of 2002 updated the law to accommodate developments in technology and the creative economy. The most significant change came with the enactment of Law No. 28 of 2014, which expanded the scope of protection, regulated bilateral and multilateral agreements, and adjusted the regulations to global dynamics, forming the current legal basis for copyright law in Indonesia.[35]

The foundation. of copyright protection in Indonesia is defined in Law No. 28 of 2014, which provides provisions on copyright ownership. Article 1, Paragraph (1) of this law defines copyright as an exclusive right automatically held by the creator once the work is realized in a tangible form, without requiring registration, though it remains subject to the limitations outlined in the law. So, who can be classified as a creator with these exclusive rights? Further, Article 1, Paragraph (2) of this law stipulates that the creator is an individual or a group who creates a work with unique or personal characteristics, either individually or collectively.

The definition of creator in Article 1, Paragraph (2) of Law No. 28 of 2014 grants copyright to "individuals or groups". From this wording, it can be understood that the creator's rights are granted to "people". Referring to the Indonesian Dictionary (KBBI), the word "person" means a human being, a living creature with intellect. This inherent intellect distinguishes humans from AI. Human intellect allows moral judgment, whereas AI cannot assume moral responsibility.[36]

[33] Yihao Hou et al., "Fine-Tuning a Local LLaMA-3 Large Language Model for Automated Privacy-Preserving Physician Letter Generation in Radiation Oncology," *Frontiers in Artificial Intelligence* 7 (January 14, 2025), https://doi.org/10.3389/frai.2024.1493716.
[34] Ninda Alfani et al., "IMPLEMENTASI UU NOMOR 28 TAHUN 2014 DALAM PERLINDUNGAN HAK CIPTA DI ERA DIGITAL," *JOURNAL OF ADMINISTRATIVE AND SOCIAL SCIENCE* 4, no. 1 (December 15, 2022): 23–36, https://doi.org/10.55606/jass.v4i1.112.
[35] Raihana Raihana et al., "Eksistensi Pengaturan Hak Cipta Di Indonesia," *Innovative: Journal Of Social Science Research* 3, no. 5 SE-Articles (October 26, 2023): 6039–49, https://j-innovative.org/index.php/Innovative/article/view/5547.
[36] Arditya Prayogi and Riki Nasrullah, "Artificial Intelligence Dan Filsafat Ilmu: Bagaimana Filsafat Memandang Kecerdasan Buatan Sebagai Ilmu Pengetahuan," *LogicLink*, December 22, 2024, https://doi.org/10.28918/logiclink.v1i2.8947.

Since AI lacks moral awareness, it cannot be held accountable for actions, making it an object rather than a subject under the law.[37]

A study by Disemadi & Sudirman (2025), examining AI's position as a legal subject under Immanuel Kant's theory of human dignity, found that AI is not recognized as a legal subject in Indonesian positive law. AI does not have rights and obligations, nor does it possess moral awareness and accountability, meaning AI is classified as a tool created by humans.[38] A further study by Disemadi & Silviani (2025) on AI's moral rights in the context of Law No. 28 of 2014 concluded that AI is not recognized as a legal subject due to its lack of moral awareness, intention, and responsibility. AI-generated outputs reflect algorithms and data patterns provided by users, not personal expressions like those created by humans.[39]

Based on this analysis, the ownership of copyright for AI-generated works in Indonesia, according to Law No. 28 of 2014, only recognizes humans as copyright subjects. Since AI lacks moral rights, unlike humans, AI is not recognized as a subject of copyright. To date, there is no specific law in Indonesia addressing the existence and use of AI, meaning copyright ownership still refers to Law No. 28 of 2014.

2) Copyright Regulation in the United States

In the United States, copyright regulations are governed by Title 17 U.S.C., which includes provisions on ownership, exclusive rights of creators, fair use of works, and enforcement mechanisms. This regulation serves as the primary legal framework for copyright protection in the U.S. Additionally, there are other provisions related to copyright, such as the Copyright Act of 1976, which outlines the exclusive rights of creators and the protection of their works. This was later amended by the DMCA, which addresses two key aspects: anti-circumvention rules for digital protection technology and the safe harbor provision for internet service providers, protecting them from direct liability for copyright infringement by users, as long as they follow procedures like notice and takedown.

Under Section 102(a) of Title 17 U.S.C., copyright is defined as legal protection for original works fixed in a tangible medium. Section 106 clarifies that under U.S. copyright law, authors or creators have full control over the reproduction, distribution, performance, display, and adaptation of their works. Furthermore, Section 201(a) & (b) explains that a creator can be an individual or an employer (under the "work made for hire" concept). Section 107 governs fair use, allowing works to be used without permission for specific purposes such as education, in accordance with applicable regulations.

In response to AI advancements, the U.S. established the National Artificial Intelligence Initiative Act of 2020, aimed at coordinating AI research, development, and implementation at the federal level. This law coordinates through the National AI Initiative Office and supports the creation of National AI Research Institutes to foster innovation in various sectors, while reinforcing AI security, transparency, and ethics. In response to AI's rapid growth, President Donald Trump proposed an AI policy document titled "Winning the Race: America's AI Action Plan" in July 2025, focusing on three main pillars: accelerating AI innovation, building AI infrastructure, and ensuring U.S. leadership in international diplomacy and security.[40]

U.S. copyright law states that works created entirely by AI without human involvement are not eligible for copyright protection. The U.S. Copyright Office has explicitly rejected copyright

[37] Piotr Staszkiewicz et al., "Artificial Intelligence Legal Personality and Accountability: Auditors' Accounts of Capabilities and Challenges for Instrument Boundary," *Meditari Accountancy Research* 32, no. 7 (December 16, 2024): 120–46, https://doi.org/10.1108/MEDAR-10-2023-2204.

[38] Hari Sutra Disemadi and Lu Sudirman, "REASSESSING LEGAL RECOGNITION OF AI: HUMAN DIGNITY AND THE CHALLENGE OF AI AS A LEGAL SUBJECT IN INDONESIA," *Masalah-Masalah Hukum* 54, no. 1 (March 27, 2025): 1–12, https://doi.org/10.14710/mmh.54.1.2025.1-12.

[39] Hari Sutra Disemadi and Ninne Zahara Silviani, "Konsepsi Hak Moral Atas Karya Di Era Artificial Intelligence: Dialektika Hukum Dalam Perspektif Paradigma Konstruktivisme," *Jurnal Magister Hukum Udayana (Udayana Master Law Journal)* 14, no. 1 (April 22, 2025): 109, https://doi.org/10.24843/JMHU.2025.v14.i01.p06.

[40] Emily M Karlberg and David M McIntosh, "Winning the Race: America's AI Action Plan: Key Pillars, Policy Actions, and Future Implications," *Ropes & Gray*, 2025, https://www.ropesgray.com/en/insights/alerts/2025/07/winning-the-race-americas-ai-action-plan-key-pillars-policy-actions-and-future-implications.

registration for works created solely by AI unless there is substantial human involvement in the creative process.[41] Official guidelines from the U.S. Copyright Office assert that works generated by machines without human intervention cannot be registered.[42] This principle is grounded in various legal rulings, such as the Trade-Mark Cases, 100 U.S. 82, 94 (1879), which clarified that copyright only protects "intellectual labor" arising from human creativity. In the case of Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884), the court ruled that copyright applies only to the "original intellectual conception of the author".[43] Therefore, under current law, AI-generated works cannot have copyright protection unless there is significant human contribution.

Research by Kasap (2019) on the ownership of AI-generated works in the U.S. confirmed that the 2016 case *Naruto v. Slater* emphasized that non-human entities, like animals or machines, cannot be considered creators, as U.S. copyright law requires human authorship.[44] Additionally, Kahveci (2023) found that U.S. law continues to require "human authorship", meaning generative AI cannot be classified as a creator because it does not fulfill this requirement. Users of AI can be categorized as creators only if their contribution is creative, not merely pressing a button.[45]

3) Copyright Regulation in Germany

Germany regulates copyright through the Copyright and Related Rights Act (UrhG), which was first enacted on September 9, 1965, and last amended on June 23, 2021. Section 2 UrhG lists the types of works protected by copyright, including literature, music, art, photography, film, and technical and scientific illustrations, as long as the work reflects intellectual creativity and originality. However, ideas, concepts, scientific theories, facts, and historical events are not protected by copyright. The definition of copyright is provided in Section 11 of UrhG, which protects authors as creators in relation to the personal intellectual connection to their works and the use of those works, ensuring compensation for the creators. Section 15 grants exclusive rights to the creator for exploiting their work. Regarding copyright ownership, Section 10 states that a creator is the individual designated as the author or creator. Under German positive law, only humans (natural persons) can be considered creators because they possess intellectual thought.[4647]Therefore, AI cannot be classified as the creator of generative AI works because AI is not a natural person.

Germany is a member of the European Union and one of the founding six countries of the European community in 1951, which later evolved into the EU.[48] As an EU member, Germany adheres to regulations set by the EU. Regarding AI advancement, the EU released The European Union Artificial Intelligence Act 2024/1698 (AI Act), the world's first regulation on AI. This act does not directly govern copyright over AI works but focuses on regulating the use of AI based on risk.

The EU also has specific guidelines on copyright through the DSM Directive, which adjusts copyright law to accommodate technological developments. This directive addresses issues like text and data mining (TDM) and the opt-out mechanism for copyright holders. Article 3 of the

[41] Van Anh Le, "Copyright of Photography and Artificial Intelligence: A Tale of Two Technologies," *Journal of Intellectual Property Law & Practice* 20, no. 8 (August 19, 2025): 562–69, https://doi.org/10.1093/jiplp/jpaf039.
[42] Ryan Abbott and Elizabeth Rothman, "Disrupting Creativity: Copyright Law in the Age of Generative Artifical Intelligence," *Florida Law Review* 75, no. 6 (2023): 1141.
[43] Le, "Copyright of Photography and Artificial Intelligence: A Tale of Two Technologies."
[44] Atilla Kasap, "COPYRIGHT AND CREATIVE ARTIFICIAL INTELLIGENCE (AI) SYSTEMS: A TWENTY-FIRST CENTURY APPROACH TO AUTHORSHIP OF AI-GENERATED WORKS IN THE UNITED STATES," June 28, 2021, https://doi.org/10.31235/osf.io/gnyha.
[45] Zeynep Ülkü Kahveci, "Attribution Problem of Generative AI: A View from US Copyright Law," *Journal of Intellectual Property Law and Practice* 18, no. 11 (November 22, 2023): 796–807, https://doi.org/10.1093/jiplp/jpad076.
[46] Daria Kim, "The Illusory Standard of Significant Human Contribution to AI-Assisted Inventions after the DABUS Decision of the German Federal Court of Justice," *IIC - International Review of Intellectual Property and Competition Law* 56, no. 2 (February 17, 2025): 369–80, https://doi.org/10.1007/s40319-025-01567-8.
[47] Bo Yun, "Differences in the Definition of an Author under Copyright Laws of the United Kingdom, the United States, and Germany in the Context of Artificial Intelligence," *Research and Commentary on Humanities and Arts* 2, no. 2 (May 20, 2024), https://doi.org/10.18686/rcha.v2i2.4028.
[48] Elżbieta Czarny and Jerzy Menkes, "European Union and European Germany," *Oeconomia Copernicana* 6, no. 4 (December 31, 2015): 7, https://doi.org/10.12775/OeC.2015.026.

DSM Directive provides exceptions for TDM for scientific research by research institutions and heritage conservation organizations, which are mandatory exceptions. Article 4 expands TDM to commercial purposes, but it remains a conditional exception because copyright holders can reserve rights (opt-out). This opt-out must be machine-readable, such as through metadata or technical settings for online works. As an EU member, Germany adopts the DSM Directive into its national law under UrhG, specifically Section 44b, allowing TDM for legally accessible works, provided that copyright holders do not opt-out. This ensures that TDM for AI training can proceed as long as rights are not explicitly reserved by the copyright holders.[49][50] This regulation balances the exclusive rights of creators with the need for technological innovation.

4) Comparison of Copyright Regulations Across Countries

Table 1.
Comparison of Copyright Regulations in Indonesia, the United States, and Germany in Accommodating AI-Generated Works

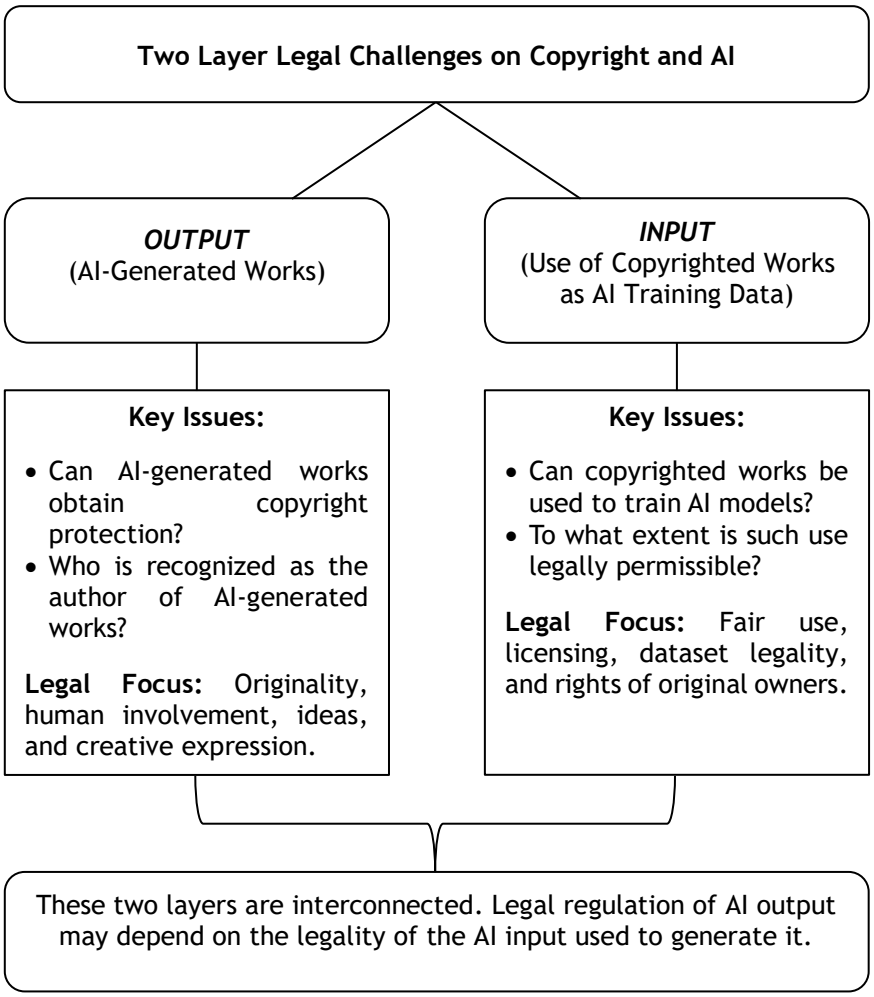
Aspect	Indonesia	United States	Germany
Legal Basis	Has: UU No. 28 of 2014 on Copyright	Has: Title 17 U.S.C. (Copyright Act of 1976 & DMCA 1998)	Has: UrhG, last amended on June 23, 2021
Subject Who Can Be a Creator	Only humans, as per the definition of "creator", which means "person" (Article 1 Paragraph (2)). The word "person" refers to humans (KBBI).	Individuals (author) or employers (work made for hire) (Section 201(a) & (b) Title 17 U.S.C.). Creators must be human, according to USCO guidelines.	Only natural persons can be creators, i.e., individuals recognized as the author of a work (Section 10 UrhG).
Regulation on AI	No specific AI law, only SE Kominfo 9/2023 on AI Ethics focusing on ethical principles for business actors.	Has: - National AI Initiative Act of 2020, focusing on coordinating AI research, ethics, and security. - White House AI Action Plan 2025, focusing on 3 pillars: innovation, infrastructure, global diplomacy & security.	Has: EU AI Act 2024/1698, regulating AI based on risk usage. The focus is on security, transparency, not copyright ownership.
Recognition of AI as Copyright Owner (AI-Generated Works)	Not recognized, AI is not a legal subject and lacks moral and legal responsibilities. AI is considered a tool, not a legal subject.	Not recognized, USCO rejects registration of works purely made by AI. Protection only applies if there is substantial human creative contribution.	Not recognized, Section 10 UrhG only recognizes humans as creators. AI is not a natural person.
Regulation on AI Training Data (AI Input)	No specific regulation on AI training data, all copyright law still follows UU No. 28 of 2014.	Governed by fair use doctrine and licensing (Title 17 U.S.C., Section 107).	Allows TDM on lawfully accessible content unless the rights holder opts-out (Article 3 & 4 DSM Directive, later adopted in Section 44b UrhG).

Source: Primary Legal Materials from Indonesia, the United States, Germany, and the European Union.

[49] Nicolas Jondet, "The Text and Data Mining Exception in the Proposal for a Directive on Copyright: Why the European Union Needs to Go Further than the Laws of Member States," *Propriétés Intellectuelles*, no. 67 (2018): 25–35.
[50] Lisa Löbling et al., "Navigating the Legal Landscape: Technical Implementation of Copyright Reservations for Text and Data Mining in the Era of AI Language Models," *JIPITEC–Journal of Intellectual Property, Information Technology and E-Commerce Law* 14, no. 4 (2023).

The following table consolidates the comparative findings by identifying the normative basis, recognized copyright subject, AI-related regulatory framework, recognition of AI as copyright owner, and regulation of AI training data in each country. Table 1 shows that the three countries share a common denominator, particularly in how they recognize copyright protection through national legal instruments and limiting authorship to human legal subjects. However, the countries differ significantly in their regulatory preparedness for AI-related output and input issues. The similarities include that all three countries Indonesia, the United States, and Germany have specific national regulations that govern copyright. All three countries also recognize only humans as the sole legal subjects entitled to copyright, with AI not being acknowledged as a creator subject. However, significant differences arise in how each country accommodates AI's development, particularly in the realm of copyright. These differences become clearer when the legal challenges related to AI and copyright are categorized into two main layers: the output layer and the input layer.

Concept Map 1.
Two-Layer Legal Challenges on Copyright and AI



Source: (Ampovska, 2025)[51]

The concept map above illustrates the two layers that represent challenges in copyright law and AI. Based on previous research by Ampovska (2025), legal challenges regarding AI-generated works can be divided into two main issue layers: the output layer and the input layer.[52] The output layer

[51] Marija Ampovska, "Judicial Responses to AI-Generated Works: A Comparative Case Law Analysis on Copyright," *Review of European and Comparative Law* 62, no. 3 (September 30, 2025): 107–31, https://doi.org/10.31743/recl.18615.
[52] Ampovska.

concerns the legal status of ownership over AI-generated works, focusing on whether these works can receive copyright protection, their originality, and how much human involvement is needed for AI works to meet the criteria for copyright. On the other hand, the input layer addresses the legality of using copyrighted works as AI training data, with a focus on potential violations of both economic and moral rights of the original creators. These two layers are interdependent, as AI's ability to generate output stems from its training on input data, where it learns patterns and structures to create a specific model. The legal validity of the input layer impacts the validity of the output, making it necessary to have regulations that address both the output and input layers to tackle these challenges.[53]

From the comparison of copyright regulations between Indonesia, the United States, and Germany regarding how these countries accommodate the two-layer legal challenges, the findings are as follows:

1. **Indonesia**: Indonesia's copyright law still follows Law No. 28 of 2014, which only recognizes humans as legal subjects who can own copyright. This law was established long before AI began producing works and has not been updated to address such developments. Therefore, regarding the output layer, AI-generated works cannot be granted copyright protection under this regulation. Additionally, there is no specific regulation on the use of copyrighted works for AI training data in Indonesia.
2. **United States**: Regarding the output layer, through the official guidelines of USCO in 2023, the U.S. clearly only recognizes copyright for works created by humans. Works entirely generated by AI cannot be registered for copyright.[54] USCO states that works fully generated by AI do not meet the human originality requirement. Protection can only be provided if there is substantial human creative contribution.[55] Regarding the input layer, the U.S. uses the fair use doctrine to govern the use of copyrighted works as training data for AI. In this context, AI training is considered a transformative use, as machine learning does not replicate the original work but extracts patterns and gathers statistical information.[56] Therefore, the use of copyrighted data for AI training is allowed and can be considered valid as long as it meets the four fair use factors (purpose and nature of use, nature of the copyrighted work, substantiality, and market impact).[57]
3. **Germany**: Germany's copyright regulation, last amended in 2021, only recognizes natural persons (humans) as creators (Section 10 UrhG), making it clear that AI-generated works cannot be protected under copyright. Regarding the input layer, Germany has adopted the TDM mechanism from the DSM Directive into Section 44b UrhG. This allows the use of copyrighted works as AI training data as long as the user has lawful access and the rights holder has not opted out.[58]

Based on the analysis of these countries' regulations regarding the two-layer legal challenges in copyright and AI, the conclusion is that Germany has the most comprehensive regulation, both in terms of the output and input layers. The German regulations, amended in 2021, have incorporated the DSM Directive, making Germany's legal framework the most responsive to current technological advancements. The United States excels in the regulation of the output layer, where copyright ownership is governed by official USCO policy. For the input layer, the U.S. uses the fair use doctrine, though this doctrine is determined on a case-by-case basis through a four-factor test, making it less structured than Germany's TDM approach. Meanwhile, Indonesia lags behind both Germany and the United States in terms of both the output and input layers. There is no significant regulation regarding input, and the output regulation grants copyright ownership solely to humans but is not responsive

[53] Ampovska.
[54] Abbott and Rothman, "Disrupting Creativity: Copyright Law in the Age of Generative Artifical Intelligence."
[55] Abbott and Rothman.
[56] Ampovska, "Judicial Responses to AI-Generated Works: A Comparative Case Law Analysis on Copyright."
[57] Shayne Longpre et al., "A Large-Scale Audit of Dataset Licensing and Attribution in AI," *Nature Machine Intelligence* 6, no. 8 (August 30, 2024): 975–87, https://doi.org/10.1038/s42256-024-00878-8.
[58] Longpre et al.

to AI developments. This is due to Law No. 28 of 2014, which was drafted before AI could generate works and has yet to be updated to accommodate these advancements.

Legal Challenges Regarding Copyright Certainty in the AI Era in Indonesia, the United States, and Germany

After analyzing the comparison of regulations in the three countries in accommodating AI-generated works, the researcher identified two main gaps: (1) the gap in regulatory preparedness, and (2) the gap in the regulation of the output and input layers. Germany, in this case, has the most comprehensive regulation concerning generative AI, the United States has administrative guidelines from USCO, while Indonesia still relies on Law No. 28 of 2014, which was created before generative AI developed, making it increasingly unresponsive to current technological advancements. These gaps reflect the varying levels of preparedness among the three countries in addressing legal issues related to AI in the realm of Copyright.

The first gap lies in the differing levels of readiness among these countries to provide regulations that accommodate the legal issues surrounding AI-generated works. Indonesia's regulation still depends on Law No. 28 of 2014, which was written long before the advent of generative AI, and does not contain specific provisions regarding the ownership of AI-generated works or the use of data for AI training. In the United States, although AI-related ownership is not yet fully incorporated into legislation, it has been clearly defined through USCO guidelines (using the human authorship principle) and the fair use doctrine for AI training data cases. Meanwhile, Germany has updated its copyright laws through amendments to UrhG in 2021, regulating copyright ownership that is only granted to humans and adopting the EU DSM Directive on TDM into UrhG.

This comparison highlights the gap in regulatory readiness, with Germany demonstrating the highest preparedness due to its amendments and the adoption of the EU framework, providing legal certainty regarding AI-generated works. The United States also shows good readiness, especially in output regulation, through USCO's guidelines. In contrast, Indonesia lags as it has no relevant regulations addressing the advancement of AI in the field of copyright, making it less adaptable and responsive to technological developments. This gap underscores Indonesia's lower regulatory preparedness to accommodate AI-generated works. The second gap lies in the regulation of the output and input layers, which are crucial elements in determining the legality of AI-generated works. Regarding the output layer, both Germany and the United States have clearer regulations than Indonesia. Germany, through its legislation (Section 10 UrhG), explicitly states that only natural persons (humans) can be creators. In the United States, in response to generative AI developments, official USCO guidelines assert that copyright ownership is granted only to humans and works created by AI cannot be granted copyright unless there is substantial human creative contribution. In Indonesia, copyright ownership only recognizes humans as subjects based on Law No. 28 of 2014. However, this law does not provide more detailed provisions regarding AI-generated works or human contributions to AI creations, reflecting Indonesia's lag in adapting to technological advancements in the output layer.

Regarding the input layer, Germany also has the most comprehensive regulation, as seen in its adoption of TDM under Section 44b UrhG. This provision allows the use of copyrighted works as AI training data as long as the user has lawful access and the rights holder has not opted out. The United States, on the other hand, uses the fair use doctrine to govern the use of copyrighted works for AI training, which allows the use of copyrighted data for training AI as long as it meets the four fair use factors, although its application is uncertain as it depends on court interpretations. In Indonesia, there is no regulation regarding the input layer to guarantee the legality of using copyrighted works for AI training, leading to a legal vacuum in this area.

Based on this analysis, it is evident that the largest gap exists in Indonesia, as the regulation for both the output and input layers is outdated and unresponsive to the current state of generative AI. The United States excels in output regulation but still lacks stability in the input layer, relying on the fair use doctrine, which lacks clarity. Germany stands out for having comprehensive and clear regulations for both the output and input layers in its legislation.

The gap in both layers creates challenges in responding to technological advancements, especially as AI-generated works become increasingly prevalent. Both layers must be clearly regulated to accommodate this development. The lack of regulations on the input and the outdated regulations on output in Indonesia result in a legal vacuum for protecting AI-generated works. This legal vacuum creates uncertainty for creators, users of AI, and law enforcement, as there are no clear written guidelines on the legality of AI works or the use of training data for AI. The varying consequences of this gap can be highlighted in several perspectives. Specifically for creators who utilize many existing, rapidly developing AI tools, legal uncertainty around AI-assisted works can make it difficult to determine the validity of a claim for copyright protection, particularly when there is no clear rule on to what extent human contribution or intervention is needed to be proven. For copyright holders, on the other hand, the primary issue is the severe uncertainty regarding how their works can be protected from being utilized as AI training data or even as a part of prompt in a generative AI-tool, stemming from the lack of input-layer regulation. For law enforcement officials, the absence of specific norms weakens the basis for resolving disputes because there are no clear standards for assessing authorship, originality, infringement, or the legality of AI training data.

This situation aligns with Gustav Radbruch's Legal Theory of Purpose, which posits that for a rule to function as good law, it must meet three core values: justice, utility, and legal certainty.[59] From a juridical perspective, this analysis will focus on legal certainty. The principle of legal certainty is fundamental in creating regulations that are clear, logical, and applicable without ambiguity.[60] Legal certainty demands that regulations should be clearly formulated to provide boundaries on rights, obligations, and legal consequences for society.[61] One of the meanings of legal certainty according to Gustav Radbruch is that law must be positive law written regulations made by authorized bodies, mandatory for all members of society. If there is no clear positive law, or if there is a legal vacuum, legal certainty cannot be achieved. The absence of legal certainty leads to ambiguity, where society lacks clear boundaries on permitted and prohibited actions, and law enforcement has no firm foundation. Similarly, the legal vacuum concerning both the output and input layers in Indonesia indicates that the principle of legal certainty has not been adequately fulfilled. The absence of regulations regarding the ownership of AI-generated works and the legality of using copyrighted works as AI training data will create legal uncertainty, both for the public and for law enforcement, as there are no clear written guidelines on these matters.

To address the legal challenges arising from these two gaps, the researcher uses Progressive Legal Theory as the basis for formulating more adaptive solutions. Progressive Legal Theory, developed by Satjipto Rahardjo, originated from criticism of positive law that is formal and procedural and often overlooks substantive justice.[62][63] According to Progressive Legal Theory, law is not something final and absolute but is a system that is always in a process of becoming (law as a process, law in the making).[64][65] Law is dynamic and can change to follow the developments of time, values, social conditions, and societal needs. This theory argues that law is made for people, not the other way around, as emphasized by Satjipto Rahardjo's statement, "law is for humans, not humans for law".[66] This theory encourages a humanistic approach that is not confined to the text of the law alone,

[59] Jerzy Zajadło, "Axiology of Law from General to Specific Philosophy of Law," *Studia Iuridica Lublinensia* 32, no. 4 (December 22, 2023): 191–217, https://doi.org/10.17951/sil.2023.32.4.191-217.
[60] Mario Julyano and Aditya Yuli Sulistyawan, "PEMAHAMAN TERHADAP ASAS KEPASTIAN HUKUM MELALUI KONSTRUKSI PENALARAN POSITIVISME HUKUM," *CREPIDO* 1, no. 1 (July 31, 2019): 13–22, https://doi.org/10.14710/crepido.1.1.13-22.
[61] Magali Eben, "Fining Google: A Missed Opportunity for Legal Certainty?," *European Competition Journal* 14, no. 1 (January 2, 2018): 129–51, https://doi.org/10.1080/17441056.2018.1460973.
[62] Kevin Rinaldi and Kholis Roisah, "Pengaruh Kecerdasan Buatan Dan Ilmu Hukum Dalam Kehidupan Bermasyarakat Dengan Pendekatan Teori Hukum," *Sang Pencerah: Jurnal Ilmiah Universitas Muhammadiyah Buton* 11, no. 1 (February 21, 2025): 205–19, https://doi.org/10.35326/pencerah.v11i1.6956.
[63] Siti Romlah, Salma Zavira, and Khansa Muafa, "Implementation of Progressive Legal Theory in Law Enforcement in Indonesia," *Journal La Sociale* 1, no. 6 (December 4, 2020): 24–30, https://doi.org/10.37899/journal-la-sociale.v1i6.187.
[64] Sulaiman Sulaiman and Derita Prapti Rahayu, "PEMBANGUNAN HUKUM INDONESIA DALAM KONSEP HUKUM PROGRESIF," *HERMENEUTIKA : Jurnal Ilmu Hukum* 2, no. 1 (March 30, 2018), https://doi.org/10.33603/hermeneutika.v2i1.1124.
[65] Made Oka Cahyadi Wiguna, "Pemikiran Hukum Progresif Untuk Perlindungan Hukum Dan Kesejahteraan Masyarakat Hukum Adat," *Jurnal Konstitusi* 18, no. 1 (May 27, 2021): 112–37, https://doi.org/10.31078/jk1816.
[66] M. Zulfa Aulia, "Hukum Progresif Dari Satjipto Rahardjo," *Undang: Jurnal Hukum* 1, no. 1 (June 1, 2018): 159–85, https://doi.org/10.22437/ujh.1.1.159-185.

making it a foundation for legal reform when existing laws no longer provide legal certainty for society.[67]

In the context of legal reform, Progressive Legal Theory promotes the creation of regulations that are adaptive and responsive, filling the legal gaps that previous regulations failed to address. By applying this theory, Indonesia can reform its legal framework on copyright to be more responsive to generative AI. Specifically, Indonesia can update Law No. 28 of 2014 to include provisions addressing the ownership of AI-generated works and the legality of using copyrighted works for AI training. Indonesia can adopt Germany's regulatory approach for the input layer, particularly the TDM mechanism, and the U.S. approach for the output layer, which clearly defines that works created entirely by AI are not eligible for copyright unless there is significant human creative contribution.

Most importantly, it is crucial to underscore that the proposed model should be treated pragmatically, where the reform is done by a number of selective adaptations instead of a blanket full adaptation. From the American approach, Indonesia can adapt the human authorship approach by setting the strict, fundamental rule that works generated entirely by AI are ineligible for legal protections through the copyright regime. This should be followed by the acknowledgement that human intervention is paramount for consideration of copyright protection, through the emphasis of human creative contribution. From the German approach, Indonesia can focus on applying the text and data mining model by regulating the use of copyrighted works as AI training data through requirements of lawful access, rights-holder reservation, and clear limitations on use. With these selective adaptations, Indonesia can better align with the existing normative architecture of its Copyright Law, allowing a direct connection between the necessary legal development and harmonization of regulatory landscape.

Conclusion

Indonesia, the United States, and Germany share similarities and differences in their copyright regulatory frameworks. Germany stands out as the most advanced country, having updated its regulations through the 2021 amendment of UrhG and adopted the DSM Directive, thereby providing a comprehensive framework for both the output and input layers. The United States follows closely, clearly regulating the output layer through USCO policies, although its regulation of the input layer, based on the fair use doctrine, still depends on a four-factor test and is less comprehensive than Germany's TDM approach. Indonesia, on the other hand, lags behind due to its sole reliance on the rather traditional structure of Law No. 28 of 2014, which is unresponsive to AI developments in both the output and input layers. This conclusion is derived from two major gaps identified. First, there is a gap in regulatory preparedness. Germany is the most prepared, as seen through its regulatory updates in the 2021 amendment of UrhG and the adoption of the DSM Directive. The United States is also relatively adaptive through USCO's policy on copyright ownership. In contrast, Indonesia remains behind because Law No. 28 of 2014 does not contain provisions relevant to AI developments, making the existing law incapable of addressing emerging legal issues. Second, there is a gap in the regulation of the output and input layers, where Indonesia lacks clear regulations for both, resulting in a legal vacuum that causes legal uncertainty.

To address these challenges, this study recommends a model of legal development that utilizes the selective approach. This model of legal development is constructed in a two-layer reform model for Indonesian copyright law. At the output layer, it is recommended that Indonesia adapts the United States' human-authorship approach by affirming that works generated entirely by AI cannot receive copyright protection, while also allowing AI-assisted works with substantial human creative contribution to receive the legal protection from the copyright regime. At the input layer, Indonesia should follow the German model by adapting the text and data mining framework. This can be done normatively by regulating the use of copyrighted works as AI training data through lawful access, clear limitations, and a rights-holder opt-out mechanism. Despite the limitation in primary evidence, the findings of this study contribute to the betterment of understanding around AI utilization in

[67] Mardona Siregar, "Teori Hukum Progresif Dalam Konsep Negara Hukum Indonesia," *Muhammadiyah Law Review* 8, no. 2 (August 3, 2024), https://doi.org/10.24127/mlr.v8i2.3567.

creative endeavors. More importantly, this study also contributes to the practical implications derived from the recommendations, which can be a point of reference for policymakers in Indonesia.

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