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Reforming Patent Law in the Age of Artificial Intelligence

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ABSTRACT

The rise of AI as a creator challenges patent law's human-centered perspective, which exclusively sees creators. AI innovations aren't covered by Indonesia's Patent Law No. 13 of 2016. The national patent system is confusing concerning who invented, owns, and is liable. This paper examines the normative opportunities and problems of revising Indonesia's patent system to include AI-generated ideas while retaining legal clarity, equity, and international intellectual property norms. This work uses normative and comparative legal analysis to support a progressive patent system reform in Indonesia by introducing a hybrid inventorship model that recognizes human–AI collaboration. This study uses statutory, conceptual, and comparative frameworks for normative juridical research. It analyses primary, secondary, and tertiary legal materials, including Indonesia's patent legislation, WIPO recommendations, and comparative jurisprudence from the US, EU, and China. Our study reveals that Indonesia's patent laws are still anthropocentric and unsuited for AI-generated ideas, producing legal ambiguity and insufficient innovation incentives. Some countries have human inventors but are incorporating AI-assisted inventions. Indonesia must restructure its legal system with a hybrid inventorship strategy that ensures responsibility, transparency, and technological adaption.

INTRODUCTION

As AI learns to generate and solve issues on its own, who owns inventions and whether current patent procedures are sufficient have arisen. Despite these advances, most places still see inventors as humans. Even if AI is heavily involved in invention, the USPTO's 2024 advice states that only natural beings can be legally recognized as inventors[1]. For example, referring to The DABUS litigation, particularly *Thaler v. Vidal*, firmly established that under current U.S. patent law, only natural persons qualify as inventors, thereby excluding AI systems from legal recognition despite their autonomous inventive capabilities. Patent regulations in the US and UK state that only humans can invent, hence AI systems are not inventors, no matter how creative they are[2]. Despite evidence that robots can be

[1] Mateo Aboy, Kathleen Liddell, and Aparajita Lath, "Inventorship in the Age of AI: Examining the USPTO Guidance on AI-Assisted Inventions," *Journal of Intellectual Property Law and Practice* 20, no. 7 (August 5, 2025): 495–502, https://doi.org/10.1093/jiplp/jpaf019.

[2] Tongyuan Zhang, "Legal Analysis and Challenges of Artificial Intelligence as an Inventor: A Study Based on UK and US Patent Law," *Lecture Notes in Education Psychology and Public Media* 96, no. 1 (June 20, 2025): 115–20, https://doi.org/10.54254/2753-7048/2025.BO24151.

creative, the DABUS cases Thaler v. Iancu and Thaler v. Vidal highlighted how difficult it is for the legal system to embrace AI discoveries[3]. Thus, researchers and policymakers have increasingly supported a sui generis framework to address AI-generated technology concerns, arguing that current legal institutions are inadequate[4]. Recognizing AI as inventors could disturb the balance between economic interests and social costs, which would have major moral and ethical implications for patent law[5]. Many believe patent reform is needed to make AI innovation simpler and safeguard and hold AI-created outputs responsible[6]. Due to present legal theories, AI systems cannot be called inventors, but new technology may require future laws to address these challenges while safeguarding the public's interests[7].

AI-generated inventions raise significant legal challenges, particularly inventorship, ownership, and patentability, that the Indonesian patent system, established by Law Number 13 of 2016, cannot address. Legal emphasis on human inventors leaves a regulatory hole because AI systems cannot be recognized as original idea creators. International judicial decisions like Thaler v. Vidal have confirmed that inventorship is limited to natural persons and that human participation in patent applications is necessary[8]. Legal studies reveal that Japan has protected AI-related patents better than Indonesia, which is unclear. This may discourage investors from investing in Indonesia and hinder AI technology development[9]. The lack of patentability for AI-generated works reduces innovation incentives, slowing technical advancement and competitiveness. Due to these limitations, legal scholars are emphasizing the necessity for Indonesia to reform its patent laws to include AI breakthroughs[10]. Japan and the US have clearer AI-related intellectual property laws and better counsel, so these improvements might adopt their techniques[11]. These amendments would strengthen the legislation, advance technology, and ensure that AI fits into the innovation ecosystem in a way that benefits society and the economy. Machine-generated creativity will disrupt patent

[3] Innocent Nsabimana and Bugingo Emmanuel, "Navigating Innovation: Legal Challenges at the Crossroads of AI and Patent Law," *International Journal of Innovative Science and Research Technology*, April 26, 2025, 1434–40, https://doi.org/10.38124/ijisrt/25apr995.

[4] Chisanga Mutale, "Crossing Frontiers: A Comparative Exploration of AI Inventorship and Ownership in Patent Law," *International Journal of Research in Social Science and Humanities* 05, no. 11 (2024): 57–69, https://doi.org/10.47505/IJRSS.2024.11.5.

[5] Moin Athar Sushil Kumar Singh, Devendra, Monica Kharola Tapan Kumar Chandola, and Diwakar Das, "AI, Patent and the Threshold of Human Invention- A Legal Analysis," *Journal of Informatics Education and Research* 5, no. 3 (July 21, 2025), https://doi.org/10.52783/jier.v5i3.3280.

[6] Dhannjay Singh Pundir et al., "The Rise of Artificial Intelligence in Intellectual Property Law: Patentability and Copyright Issues," Metallurgical and Materials Engineering 31, no. 4 (April 16, 2025): 40–43, https://doi.org/10.63278/1394.

[7] Katsiaryna Rusinovich, "The Intersection of AI and Intellectual Property Law: Navigating Legal Frontiers," *International Journal of Science and Research (IJSR)* 12, no. 12 (December 5, 2023): 356–57, https://doi.org/10.21275/SR231128214222.

[8] Andi Istiana Inayah Dwi Putri and Anugrah Ade Putra, "Implementation of Artificial Intelligence in Patent Systems: A Systematic Literature Review on Effectiveness and Legal Implications," *Multidisciplinary Indonesian Center Journal (MICJO)* 2, no. 3 (August 20, 2025): 3907–17, https://doi.org/10.62567/micjo.v2i3.1208.

[9] Veni Theresya Fortuna Rumahorbo, Evi, and Ivans Januardy, "Patent Protection for Artificial Intelligence as Computer-Implemented Inventions Between Indonesia and Japan," *International Journal of Science and Society* 7, no. 1 (March 21, 2025): 629–40, https://doi.org/10.54783/ijsoc.v7i1.978.

[10] Namira Romaito Siregar et al., "Urgensi Regulasi Atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum Di Indonesia," *JUNCTO: Jurnal Ilmiah Hukum* 6, no. 2 (December 19, 2024): 244–52, https://doi.org/10.31289/juncto.v6i2.3334.

[11] Raihan Rahmatillah and Sanusi Sanusi, "Patent Protection for Artificial Intelligence: A Comparative Study of Indonesia and The United States," *Student Journal of International Law* 4, no. 1 (December 30, 2024): 42–56, https://doi.org/10.24815/sjil.v4i1.31473.

systems worldwide, thus Indonesia's legal system must modernize to be competitive and defend the public interest[12].

AI's integration into Indonesia's IP framework creates normative and institutional challenges, especially patent law. AI can improve creativity and productivity, but Indonesian law fails to handle AI-created works[13]. AI is not a legal entity, making it harder to grant intellectual property rights to its innovations[14]. AI cannot invent under Indonesian Patent Law No. 65 of 2024[15]. Following international cases like Thaler v. Vidal, patent applications must involve humans[16]. Jakarta must immediately establish a legal framework that considers AI's role in intellectual property, notwithstanding these challenges. Rights clarity and safety are ensured. Modifying restrictions and importing ideas from other countries may be needed to sustain a creative ecosystem. AI improved patent systems, but it also showed that examiners must learn more and be more upfront about AI choices. Indonesia must protect artists' rights and promote innovation as AI improves. The law must change with technology[17].

Indonesia's patent system change in response to artificial intelligence (AI) provides opportunities and challenges, especially in recognizing inventorship, adjusting to new rules, and clarifying the law. Indonesian patent law (Law No. 13 of 2016) does not recognize AI as an inventor. In other countries, like the US case Thaler v. Vidal, AI can't be an inventor but can aid if many people are involved[18]. This lack of recognition creates legal gray areas because present intellectual property rules don't encompass AI works. People who use AI programs own these works, not the AI[19]. The Indonesian legal structure needs major changes to cover AI-generated intellectual property, which is crucial for AI technology innovation and investment[20]. Japan's comprehensive AI patent protection rules may assist Indonesia, according to comparative evaluations[21]. Patent classification and prior art searching have become more efficient with AI[22]. There are still issues with making AI decisions explicit and helping patent examiners who don't understand the subject. Indonesia should clarify that AI

[12] Irawati Irawati et al., "Legal Protection of Ai-Generated Creative Works in the Age of Digital Disruption: An Intellectual Property Law Perspective," *International Journal of Social Science and Human Research* 08, no. 06 (June 21, 2025), https://doi.org/10.47191/ijsshr/v8-i6-54.

[13] Putri and Putra, *"Implementation of Artificial Intelligence in Patent Systems: A Systematic Literature Review on Effectiveness and Legal Implications."*

[14] 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.

[15] Zakiran, et al, *Op. Cit.*

[16] Yuka Latieful Mantiqa, Mulida Hayati, and Satriya Nugraha, "Generative AI In The Context Of Intellectual Property Law: Urgency, Challenges, And Legal Protection," *Journal of Law, Politic and Humanities* 5, no. 6 (September 1, 2025): 4753–60, https://doi.org/10.38035/jlph.v5i6.2160.

[17] Francisca Romana Nanik Alfiani and Rineke Sara, "The Improvement of Digital Literacy to Secure Data and Privacy in the Digital Age," *Interdiciplinary Journal and Hummanity* (INJURITY) 3, no. 12 (December 20, 2024): 832–39, https://doi.org/10.58631/injurity.v3i12.1374.

[18] Putri and Putra, *Op. Cit.*

[19] Zakiran, et al. *Op. Cit.*

[20] Rumahorbo, Evi, and Januardy, *"Patent Protection for Artificial Intelligence as Computer-Implemented Inventions Between Indonesia and Japan."*

[21] Siregar et al., *"Urgensi Regulasi atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia."*

[22] Putri and Putra, *Op. Cit.*

methods can be trademarked and provide flexible, international-standard guidelines[23]. This would clarify the law and promote AI innovation. This strategy would clarify AI-related patent restrictions and ensure fairness in the legal system. This would boost technology and the economy[24].

Talk about revising Indonesia's intellectual property rules, especially for AI-created works, demonstrates that the policy has large gaps and that a hybrid inventorship model is needed to keep up with global AI governance. Since generative AI can autonomously create works covered by copyright and patent laws, the rapid progress of AI technology undermines intellectual property systems[25]. Indonesian law does not recognize AI as a legal entity with intellectual property rights[26]. This makes it unclear who owns and protects AI works. The lack of AI legislation makes it tougher to enforce intellectual property rights and keep AI systems accountable[27]. Comparative studies imply that Indonesia could benefit from adopting the U.S. "Work Made For Hire" theory to recognize AI as a new legal entity[28]. Blockchain technology and global best practices could make the creative economy more sustainable by making AI-generated material clear and verifiable [29]. Harmonizing innovation with legal protections to ensure that AI-driven creation does not infringe human creators' rights highlights the need for reform[30]. AI could co-invent with humans in a hybrid inventorship approach. This would make Indonesia's patent law more international and the intellectual property system more flexible [31]. This proposal would clarify the law, promote ethical AI use, and introduce innovative concepts to ensure Indonesia can responsibly and sustainably use AI[32].

In the expansive framework of the digital economy, the interplay between artificial intelligence and patent protection transcends the conventional discourse surrounding inventorship. Artificial intelligence has emerged as a pivotal catalyst for digital innovation, facilitating the swift advancement of technologies across various domains such as data analytics, biotechnology, smart manufacturing, financial technology, and digital platforms. As AI systems increasingly engage in research and development activities, they expedite the creation of technical solutions that may fulfill the criteria for patentable inventions. As a result, patent protection assumes a significant function in sustaining incentives for innovation within the digital economy by guaranteeing that technological investments, inclusive of those associated with AI systems, can be legally safeguarded and commercially leveraged.

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[23] Rahmatillah and Sanusi, *"Patent Protection for Artificial Intelligence: A Comparative Study of Indonesia and The United States."*

[24] Didi Jubaidi and Khoirunnisa Khoirunnisa, "Artificial Intelligence in the Perspective of Indonesian Law: Subject or Object of Law?," *Asian Journal of Education and Social Studies* 50, no. 11 (November 27, 2024): 302–14, https://doi.org/10.9734/ajess/2024/v50i111655.

[25] Tasya S. Ramli et al., "Artificial Intelligence as Object of Intellectual Property in Indonesian Law," *Journal of World Intellectual Property* 26, no. 2 (2023): 142–54, https://doi.org/10.1111/jwip.12264.

[26] Zakiran, et al., *Op. Cit.*

[27] Mantiqa, Hayati, and Nugraha, *"Generative AI In The Context Of Intellectual Property Law: Urgency, Challenges, And Legal Protection."*

[28] Rahmatillah and Sanusi, *"Patent Protection for Artificial Intelligence: A Comparative Study of Indonesia and The United States."*

[29] Mantiqa, et al. *Op. Cit.*

[30] Sudirman et al., *"Intellectual Property Challenges for AI-Driven Creativity: A Focus on Copyright and Patents in Emerging Economies."*

[31] Rahmatillah and Sanusi, *Op. Cit.*

[32] Ferdinand Lisaldy, Ismail Ismail, and Dewi Iryani, "Lex AI: Solution for Governance of Artificial Intelligence in Indonesia," *DIH: Jurnal Ilmu Hukum*, February 26, 2024, 50–67, https://doi.org/10.30996/dih.v20i1.9632.

In this regard, patent law operates not merely as a tool for safeguarding inventions but also as an institutional framework that underpins technological competitiveness and fosters digital economic expansion.

In the current context, AI is best viewed as a technological facilitator of innovation rather than merely a patentable entity. Existing patent laws predominantly regard human beings as inventors, relegating AI to a supportive role without independent patent rights. AI technologies can aid researchers in idea generation, process optimization, and inventive solution identification through their computational strengths. However, the determination of inventorship is still tied to human creativity and accountability. Thus, in this age of technological change, AI should be seen as a collaborative tool for innovation in the patent framework rather than as an independent inventor.

This conceptual distinction is vital for Indonesia's adaptation of its patent framework to the digital economy. Regulatory reform should clarify the legal status of AI-assisted inventions and define meaningful human contribution and accountability. This approach will align the patent regime with existing legal principles while accommodating technological changes. A balanced regulatory framework will enable Indonesia to leverage AI's innovative potential while ensuring legal certainty, ethical responsibility, and sustainable development in the digital economy.

METHODS

This paper examines Indonesian legal norms, doctrines, and regulatory frameworks governing AI and the patent system using a normative juridical framework. In this paradigm, the paper examines normative potential and difficulties from AI and patent law convergence, particularly in inventorship, ownership, and accountability. The normative juridical approach of this study mixes statutory, conceptual, and comparative examination. The statutory method examines laws, rules, and treaties that establish patent protection and inventorship. The conceptual approach examines AI intellectual property rights' legal and philosophical foundations. To strengthen Indonesia's patent law, the comparative method examines regulatory frameworks in the US, EU, China, and Japan. Combining these strategies helps explain how legal adaptation might align patent laws with emerging technologies.

The research approach was organized into interrelated stages to ensure a logical and systematic progression from conceptual identification to normative synthesis. First, I read a lot of academic papers and official documents from international patent offices like the USPTO, EPO, CNIPA, and WIPO. This step established a framework for understanding how AI-generated ideas and patent examination methods affect the law. Looking at the rules differently was next. The study examined how different countries handle AI-related inventions and how they differ. It concerned ownership, invention, and AI in patenting. Comparative results were studied to provide normative conclusions for Indonesian law.

A case-based analysis of how the USPTO, EPO, and WIPO applied AI in international patent examination constituted the third phase. This investigation examined the merits and cons of algorithmic decision-making, particularly bias and interpretation consistency. The data from this

phase were used to make ethical and constructive recommendations for improving AI-driven patent processes. The research produced a regulatory reform model and policy recommendations. This phase aimed to build a mixed legal system that enables AI contribute to new ideas. This would clarify the legislation while enabling technological flexibility. This process created a prescriptive model to help lawmakers, regulators, and policymakers modify Indonesia's patent system.

This study uses a large collection of primary, secondary, and tertiary legal materials. Primary legal materials include Patent Law Number 13 of 2016, ministerial intellectual property rules, and international treaties including the TRIPS Agreement and WIPO Guidelines on Artificial Intelligence and Intellectual Property Policy. These resources form the analysis's normative underpinning. Scholarly publications, law journals, policy assessments, and expert commentary examine how AI has shaped intellectual property law. Comparing primary sources to others adds depth and meaning. Tertiary legal materials including legal dictionaries, white papers, and institution reports explain concepts and situations.

DISCUSSION

Normative Interpretation of AI and Inventorship

The creative power of artificial intelligence (AI) makes the traditional patent law definition of inventorship less legitimate. Thus, inventor eligibility requirements must be reconsidered. Today's patent systems, especially in the U.S. and U.K., prove innovators are real. Important instances like Thaler v. Comptroller illustrate that AI isn't an inventor[33][34]**.** This human-centered approach may make it tougher to spot AI-generated inventions, which are getting better at coming up with fresh ideas[35][36]**.** The USPTO advises that AI-assisted inventions must have a meaningful human contribution[37]**.** This suggests that patent applications without inventors may fail. AI changes require legislative adjustments to address these challenges. This could modify inventorship definitions and regulations[38][39]**.**

The Normative Gap in Indonesia’s Patent Framework

AI-generated creations are difficult to legalize under Indonesian patent law, specifically Law Number 13 of 2016. It doesn't say who invented, owns, or is accountable for them. AI breakthroughs are tougher to defend since the law doesn't recognize AI[40]. AI-generated creations are difficult to legalize under Indonesian patent law, specifically Law Number 13 of 2016. It doesn't say who

[33] Zhang, “Legal Analysis and Challenges of Artificial Intelligence as an Inventor: A Study Based on UK and US Patent Law.”
[34] Rita Matulionyte, “‘AI Is Not an Inventor’: Thaler v Comptroller of Patents, Designs and Trademarks and the Patentability of AI Inventions,” *Modern Law Review* 88, no. 1 (2025): 205–18, https://doi.org/10.1111/1468-2230.12907.
[35] Tim W. Dornis, “Artificial Intelligence and Innovation: The End of Patent Law As We Know It,” *SSRN Electronic Journal,* 2020, https://doi.org/10.2139/ssrn.3668137.
[36] Sushil Kumar Singh, Tapan Kumar Chandola, and Diwakar Das, “AI, Patent and the Threshold of Human Invention- A Legal Analysis.”
[37] Aboy, Liddell, and Lath, “Inventorship in the Age of AI: Examining the USPTO Guidance on AI-Assisted Inventions.”
[38] Dornis, *Op. Cit.*
[39] Zhang, *Op. Cit.*
[40] Zakiran, et al, *Op. Cit.*

invented, owns, or is accountable for them. AI breakthroughs are tougher to defend since the law doesn't recognize AI[4142]. This means that AI users usually own the works AI makes, per their terms and conditions. The lack of defined rules in Indonesia makes it even more dubious if AI-related inventions may be patented[43]. Similar issues exist in the US. Indonesia needs flexible, direct rules to support AI innovation and investment[4445].

Doctrinal Evaluation of Legal Certainty and Justice

When adopting AI, Indonesia's IP framework faces normative and institutional challenges, especially patent law. While AI can boost creativity and efficiency, the Indonesian legal system fails to handle AI-created works. Since AI is not a legal entity, giving intellectual property rights to its new ideas and works is problematic[46]. Law 65 of 2024 banned AI inventorship in Indonesian patents. Following international cases like Thaler v. Vidal, patent applications must involve humans[47]. Legalizing AI could diminish human dignity by equating people with non-autonomous things, which has major philosophical and moral ramifications[48]. Indonesia must immediately create a legislative framework that considers AI's role in intellectual property, notwithstanding these challenges [49]. This clarifies and protects rights. This may need changing conventions and adopting foreign best practices to preserve a creative ecology[50]. AI has made patent systems more efficient, but it has also revealed that examiners must learn more and be more transparent about AI judgments[51]. Indonesia must protect creators' rights and promote new ideas as AI progresses. Law must adapt to emerging technologies[5253].

Comparative Perspective: Lessons from Global Jurisdictions

Adding AI to Indonesia's Patent system causes several laws and institution issues, especially in patent law. AI could boost creativity and productivity, but the Indonesian legal system struggles to

[41] Rumahorbo, et al, *Op. Cit.*
[42] Siregar et al., *"Urgensi Regulasi Atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia."*
[43] Rahmatillah and Sanusi, *"Patent Protection for Artificial Intelligence: A Comparative Study of Indonesia and The United States."*
[44] Siregar et al., *"Urgensi Regulasi Atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia."*
[45] Putri and Putra, *"Implementation of Artificial Intelligence in Patent Systems: A Systematic Literature Review on Effectiveness and Legal Implications."*
[46] Tim W. Dornis, "Of 'Authorless Works' and 'Inventions without Inventor' – The Muddy Waters of 'AI Autonomy' in Intellectual Property Doctrine," *SSRN Electronic Journal*, 2021, https://doi.org/10.2139/ssrn.3776236.
[47] J. Wu, "Bridging the Artificial Intelligence Inventorship Gap," *Russian Journal of Economics and Law* 18, no. 1 (March 19, 2024): 190–216, https://doi.org/10.21202/2782-2923.2024.1.190-216.
[48] Jan Phillip Rektorschek and Tobias Baus, *"Protectability and Enforceability of AI-Generated Inventions,"* 2020, 459–77, https://doi.org/10.1007/978-3-030-48266-4_22.
[49] Andreas Engel, "Can a Patent Be Granted for an AI-Generated Invention?," *GRUR International* 69, no. 11 (November 1, 2020): 1123–29, https://doi.org/10.1093/grurint/ikaa117.
[50] Ahmad Fadavi and Mohsen La'l Alizadeh, "Ownership of Artificial Intelligence-Generated Works: An Overview of the Emerging Intellectual Property Challenges in the Technology Era," https://doi.org/10.30497/law.2024.245828.3492.
[51] Kanishka Vaish et al., "The Challenge of Recognizing Artificial Intelligence as Legal Inventor: Implications and Analysis of Patent Laws," 2024, 299–311, https://doi.org/10.1007/978-981-99-7216-6_25.
[52] Sushil Kumar Singh, Tapan Kumar Chandola, and Diwakar Das, *"AI, Patent and the Threshold of Human Invention- A Legal Analysis."*
[53] Yurii Khodyko, "Legal Regime of Inventions Created by Artificial Intelligence," *Law, State and Telecommunications Review* 16, no. 1 (May 11, 2024): 322–43, https://doi.org/10.26512/lstr.v16i1.48972.

handle AI-related issues[5455]. A person must make an innovation and creative step under European patent law. This means only new inventions can be patented[56]. Human inventors are likewise valued under China's patent rules. They now allow patents for AI-related ideas that improve computer systems or user experience[57]. Despite laws that only people can be inventors, AI is being used in patent evaluation. AI tools are used to determine if something is patentable, fresh, and inventive, and to look for prior art, speeding up the patent examination process[58]. Ethics difficulties arise when AI is used in patent practice, including transparency and document verification, which are especially important in the U.S. While AI can't invent, it can aid the process[59]. However, patent protection requires a natural person's significant contribution[60]. Current patent rules don't cover AI-generated inventions, therefore calls for a unique approach to address these issues have grown as the discourse over AI's role in inventorship continues[61]. This shows that we need to work together more on a global scale and make policy changes to find a balance between protecting intellectual property and encouraging AI-driven innovation[62].

Table 1. Comparative Patent Regulation on AI Inventorship

Jurisdiction	Legal Basis	Recognition of AI as Inventor	Key Case / Policy	Approach to AI-Assisted Inventions	Regulatory Character
United States	35 U.S.C. §100(f) – "individual" interpreted as natural person	❌ Not recognized	Thaler v. Vidal (Fed. Cir. 2022); USPTO 2024 Guidance	Patentable if there is "significant human contribution"	Human-centered, but administratively adaptive
European Union (EPO)	Article 81 EPC – inventor must be designated (natural person)	❌ Not recognized	EPO Board of Appeal J 8/20 & J 9/20 (DABUS cases)	Patentable if technical character & inventive step are satisfied; inventor must be human	Strict legal-personality doctrine; strong emphasis on legal certainty
China	China Patent Law; CNIPA Examination Guidelines	❌ Not recognized	CNIPA rejection of DABUS; AI	Patentable if AI-related invention provides technical	Technically pragmatic; innovation-oriented

[54] Sushil Kumar Singh, et al.
[55] Mutale, "Crossing Frontiers: A Comparative Exploration of AI Inventorship and Ownership in Patent Law."
[56] Eva Stanková, "Human Inventorship in European Patent Law," *The Cambridge Law Journal* 80, no. 2 (July 28, 2021): 338–65, https://doi.org/10.1017/S0008197321000507.
[57] Stephen M. Hou, "International Patent Office Guidance on Artificial Intelligence Inventions," *SSRN Electronic Journal*, 2024, https://doi.org/10.2139/ssrn.4843648.
[58] Viktoria Schrön, Künstliche Intelligenz Im Patentrecht (Nomos Verlagsgesellschaft mbH & Co. KG, 2023), https://doi.org/10.5771/9783748943150.
[59] Hou, *"International Patent Office Guidance on Artificial Intelligence Inventions."*
[60] Nukeu Adriani, "Electronic Copy Available at : Electronic Copy Available At :," Grou 23529, no. 2 (2018): 1–45.
[61] Wen Ding and Shemin Deng, "The Patentability of AI-Generated Technical Solutions and Institutional Responses: Chinese Perspective vs. Other Countries," *Information* 16, no. 8 (July 24, 2025): 629, https://doi.org/10.3390/info16080629.
[62] Jamshid Kazimi and Harsita Thalwal, "Intellectual Property Protection in AI-Driven Innovations: A Comparative Analysis," in 2024 First International Conference on Technological Innovations and Advance Computing (TIACOMP) (IEEE, 2024), 320–26, https://doi.org/10.1109/TIACOMP64125.2024.00060.

			Examination Guidelines	solution and technical effect	
Japan	Japan Patent Act; JPO Examination Guidelines	✗ Not recognized	JPO AI-related Examination Guidelines	Patentable if human involvement can be identified; AI treated as tool	Administrative flexibility without statutory amendment

Source: Authors' own work

A comparative assessment reveals a shared global consensus that inventorship remains limited to natural persons. However, regulatory divergence appears in the degree of administrative flexibility toward AI-assisted inventions. While the United States emphasizes "significant human contribution," the European Union prioritizes legal personality and accountability, China focuses on technical effect, and Japan strengthens examination guidance without revising statutory inventorship definitions. Indonesia may draw normative lessons from these differentiated yet convergent approaches.

Ethical and Procedural Challenges in AI-based Patent Systems

Algorithmic bias, openness in decision-making, and accountability in intellectual property rights distribution are major ethical and procedural issues when AI is integrated into patent systems. AI has improved patent systems by automating patent classification and prior art searches. About 190,000 AI patents were issued worldwide between 2000 and 2022[63]. This integration raises ethical issues such algorithmic bias and lack of transparency, which could jeopardize patent judgments[64]. The landmark Thaler v. Vidal decision shows that AI cannot be legally designated an inventor. This shows the importance of human participation in patenting[65]. AI's autonomous decision-making could jeopardize human oversight and responsibillity, hence this legal framework is needed to ensure accountability [66]. Due of AI's potential to autonomously create art, intellectual property rules, which historically acknowledge only human creators, must be amended[67]. According to Mohanta et al. (2025), ethical frameworks and cross-disciplinary collaboration should ensure that AI technologies promote innovation without compromising ethics. AI should be transparent and accountable, and strong regulations are needed to reduce the hazards of AI-driven innovation[68]. Many countries must modify their intellectual property laws as AI transforms them. They must support fresh ideas while doing the right thing and upholding the law[69].

[63] Putri and Putra, "Implementation of Artificial Intelligence in Patent Systems: A Systematic Literature Review on Effectiveness and Legal Implications."
[64] Subhash Chandra Bose Naripeddy and Viswanadha Raju Thotakura, "Ethical Challenges and Solutions in the Deployment of Artificial Intelligence Sys-Tems," *Journal of Artificial Intelligence General Science* (JAIGS) ISSN:3006-4023 8, no. 02 (August 4, 2025): 81–110, https://doi.org/10.60087/jaigs.v8i02.392.
[65] Sushil Kumar Singh, et al. *Op. Cit.*
[66] Oleksandr Pashchenko, Volodymyr Khomenko, and Tetyana Medvedovska, "Ethical Dilemma of The Use of Artificial Intelligence in Scientific Research and Innovation," in Digital Transformation in Ukraine: Ai, Metaverse, and Society 5.0 (SciFormat Publishing Inc., 2024), 130–35, https://doi.org/10.69635/978-1-0690482-1-9-ch14.
[67] Said Saidakhrarovich Gulyamov, "AI Authorship and Ownership of Intellectual Property in Industrial Power and Control Systems," in 2023 5th International Conference on Control Systems, Mathematical Modeling, Automation and Energy Efficiency (SUMMA) (IEEE, 2023), 217–21, https://doi.org/10.1109/SUMMA60232.2023.10349471.
[68] Gulyamov. *Ibid.*
[69] Rusinovich, *"The Intersection of AI and Intellectual Property Law: Navigating Legal Frontiers."*

The Role of AI in Enhancing Patent Administration Efficiency

With automated prior-art searches, semantic analysis, and data-driven decision support systems, AI can improve patent management. AI improves patent systems by automating time-consuming operations like classifying patents and finding previous art[70]. AI technologies like machine learning and deep learning algorithms suggest keywords, discover relevant documents, and rank them to help with previous art searches. This speeds and lowers job costs[71]. From disclosure to management, AI-powered technologies have improved patent management accuracy and strategic decision-making[72]. AI in patent examination, especially prior art searches, does not violate individual rights or promote discrimination, unlike other administrative law sectors, making it a worthwhile investment[73]. Making AI decision-making clearer and developing tools to assist people choose are ongoing issues[74]. To properly leverage AI, the patent sector must adapt its personnel and expertise[75]. Despite these difficulties, AI is altering intellectual property management. In India, it has expedited up IP processes and reduced outstanding applications[76], so more people like it. To overcome AI-generated IP and ownership rights issues, we need AI-specific laws. It will balance innovation and IP protection[77]. AI's role in patent administration will undoubtedly rise, making things faster, more precise, and encouraging new ideas[78].

The Need for Normative Reform and Institutional Adaptation

Indonesia's patent system has to be updated to make it easier to identify inventors, more transparent, and easier to hold AI-assisted creations accountable to keep up with technological advancement. The Indonesian legal system doesn't recognize AI as a legal entity, making it difficult to determine who owns and is responsible for AI inventions. The US Thaler v. Vidal case, which ruled that AI can't invent, indicates that individuals must participate in patenting. Indonesia should also clarify AI's role in ideation[79]. The Indonesian Patent Act limits patents to specific computer programs. Adding clear standards that allow AI algorithms to be patented, like in the US, would reduce legal

[70] Kanishka Vaish et al., "Artificial Intelligence Reducing the Intricacies of Patent Prior Art Search," in 2023 International Conference on Computational Intelligence and Sustainable Engineering Solutions (CISES) (IEEE, 2023), 978–82, https://doi.org/10.1109/CISES58720.2023.10183481.
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[73] Arti Kaur Rai, "Machine Learning at the Patent Office: Lessons for Patents and Administrative Law," *SSRN Electronic Journal*, 2019, https://doi.org/10.2139/ssrn.3393942.
[74] Putri and Putra, *Op. Cit.*
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[77] Salim Malik. Ibid.
[78] Homaira Huda Shomee et al., "A Survey on Patent Analysis: From NLP to Multimodal AI," June 26, 2025, http://arxiv.org/abs/2404.08668.
[79] Putri and Putra, *"Implementation of Artificial Intelligence in Patent Systems: A Systematic Literature Review on Effectiveness and Legal Implications."*

confusion[80]. The lack of AI rules in Indonesia hinders accountability, especially for AI-caused harm, requiring adaptive legal policies and a clearer regulatory framework[81]. AI has improved patent systems, but it's still difficult to make unambiguous choices and give examiners all the information they need[82]. Japan protects AI works with extensive AI laws. Indonesia might use these rules to boost innovation and investment[83]. AI could be added to the US Copyright Law's "Work Made For Hire" definition to establish accountability and legal recognition[84]. Overall, these revisions would update Indonesia's patent law to reflect emerging technology, promote ethical AI use, and safeguard the public [85].

Proposed Hybrid Inventorship Model

Indonesia's patent system might be balanced by a hybrid inventorship model that respects human and AI contributions, promoting equity, legal certainty, and innovation. AI makes patent systems more efficient, notably automated patent classification and inspection systems. While making choices clearer and helping patent examiners learn more about what they don't know, it has also made things harder[86]. The Indonesian legal system does not recognize AI works, which may cause confusion and intellectual property protection issues[87]. Current patent law exclusively recognizes human inventors, even if AI systems can generate new ideas, widening this disparity[88]. Thaler v. Vidal proves that AI cannot invent but can assist with human involvement[89]. The universal paradigm of augmented invention, which acknowledges patentable outputs produced cooperatively by humans and AI under strong human control, could address these issues by changing patent systems to reflect AI's impact on innovation processes[90]. This strategy supports the premise that Indonesia should study more developed patent systems like the US, which has clearer laws and precedents, to improve its own[91]. Japan's legal system shows that Indonesia needs flexible and specialized policies to protect AI-generated intellectual property, highlighting the need for regulatory improvement[92]. Indonesia

[80] Rahmatillah and Sanusi, *"Patent Protection for Artificial Intelligence: A Comparative Study of Indonesia and The United States."*
[81] Jubaidi and Khoirunnisa, *"Artificial Intelligence in the Perspective of Indonesian Law: Subject or Object of Law?"*
[82] Putri and Putra, *Op. Cit.*
[83] Siregar et al., *"Urgensi Regulasi atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia."*
[84] Bagus Gede Ari Rama, Dewa Krisna Prasada, and Kadek Julia Mahadewi, "Urgensi Pengaturan Artificial Intelligence (AI) dalam Bidang Hukum Hak Cipta di Indonesia," *Jurnal Rechtens* 12, no. 2 (2023): 177.
[85] Alfiani and Sara, "The Improvement of Digital Literacy to Secure Data and Privacy in the Digital Age."
[86] Putri and Putra, *"Implementation of Artificial Intelligence in Patent Systems: A Systematic Literature Review on Effectiveness and Legal Implications."*
[87] Irawati, et al., *"Legal Protection of Ai-Generated Creative Works in the Age of Digital Disruption: An Intellectual Property Law Perspective."*
[88] Sushil Kumar Singh, Tapan Kumar Chandola, and Diwakar Das, "AI, Patent and the Threshold of Human Invention- A Legal Analysis."
[89] Putri and Putra, *Op. Cit.*
[90] Haim V. Levy, "Revisiting Patent Law Paradigms: Legal, Economic, and Ethical Implications of AI-Driven Inventions in the Biosciences: Introducing the Universal Model of Augmented Invention," *Law, Ethics & Technology*, August 29, 2025, https://doi.org/10.55092/let20250006.
[91] Rahmatillah and Sanusi, *"Patent Protection for Artificial Intelligence: A Comparative Study of Indonesia and The United States."*
[92] Siregar et al., "Urgensi Regulasi Atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia."

might make the legal system more welcoming to technological innovation and ensure that human and AI ideas are equally and legally acknowledged by utilizing a hybrid inventorship model.

Alignment with Global Legal Principles and WIPO Standards

Legislative reform in Indonesia should focus on revising the Patent Act to explicitly address AI-assisted inventions, as current laws do not recognize AI as a legal subject capable of holding patent rights, which hampers innovation and legal clarity[93]. The absence of specific provisions for AI in patent law creates ambiguity, as seen in the DABUS case, where AI-generated inventions lack recognition, potentially discouraging further technological advancements[94]. Introducing human oversight requirements and clear attribution standards would enhance legal certainty and ensure that creators and inventors are adequately acknowledged and compensated for their contributions[95]. By learning from international best practices, such as those in Japan, Indonesia can develop a robust legal framework that fosters AI innovation while protecting the rights of original creators[96].

CLOSING

The study says that Indonesia's current patent law is still focused on people and doesn't take into account the fact that AI can now make inventions. This makes it hard to tell who owns what and who is in charge. Indonesia's patent system needs to be changed so that it is more fair and clear. This means changing the definition of an inventor, making it clearer who is responsible for what, and making sure that its rules are the same as those set by WIPO, TRIPs, and the best patent systems in the world. This research enhances Indonesia's intellectual property discourse by presenting a hybrid inventorship model that recognizes human–AI collaboration as a legitimate form of inventive activity, thereby preserving balance among innovation incentives, justice, and legal certainty.

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[94] Supriati, “Legal Protection of Patent Rights on Artificial Intelligence Work”; Sushil Kumar Singh, Tapan Kumar Chandola, and Diwakar Das, “AI, Patent and the Threshold of Human Invention- A Legal Analysis.”

[95] Siregar et al., “Urgensi Regulasi Atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia”; Mantiqa, Hayati, and Nugraha, “Generative AI in The Context of Intellectual Property Law: Urgency, Challenges, and Legal Protection.”

[96] Siregar et al., “Urgensi Regulasi atas Produk Artificial Intelligence Sebagai Upaya Perlindungan Hukum di Indonesia”; Mantiqa, Hayati, and Nugraha, “Generative AI in The Context of Intellectual Property Law: Urgency, Challenges, And Legal Protection.”

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