

LEGAL CERTAINTY OF PATENTS FOR ARTIFICIAL INTELLIGENCE (AI)-BASED INNOVATIONS: A COMPARATIVE STUDY BETWEEN CHINA AND INDONESIA

Nur Aisyah Thalib¹, Abd Thalib²

Fakultas Hukum, Universitas Islam Riau¹²

nuraisyah@law.uir.ac.id

Abstract

The development of artificial intelligence (AI) raises new issues for patent protection, particularly regarding the role of AI in the creation of inventions. This study compares patent law for AI-based innovations in Indonesia and China. Normative legal research is conducted using legislative, conceptual, and comparative methodologies. The research results show that Law Number 13 of 2016 concerning Indonesian Patents still stipulates that the inventor must be human. The law does not regulate algorithm patents, AI training data, or AI-generated inventions. Those who innovate feel uncertain about this situation. Conversely, China has implemented more comprehensive laws, as evidenced by the CNIPA guidelines and the 2020 Patent Law, which open up more space for AI-based patents and offer a higher degree of legal certainty thru clear technical standards. According to this research, Indonesian patent regulations need to be updated to adapt to advancements in AI technology.

Keywords: Patent; Artificial Intelligence; Legal Certainty

Backgorund

In the 21st century, artificial intelligence (AI) technology has transformed human life, industries, and even decision-making processes in many fields. (Ramadhan, 2022) Now, AI can not only be used as a human-controlled tool, but has also evolved into systems capable of learning independently, analyzing large-scale data, and generating outputs such as decisions, inventions, and works that were previously only possible for humans to create. (Fallah & Masturi, 2025) The development of Industry 4.0 and Industry 5.0 aligns with this technological advancement, which increasingly emphasizes the integration of digital technology with production processes and intelligence-based services.(Ramadhan, 2022)

More than 50% of people worldwide have used AI in industries, defense, healthcare, finance, and government. A McKinsey report (2023) shows that after the COVID-19 pandemic, AI usage tripled from the previous year. (Fallah & Masturi, 2025) This development shows that artificial intelligence has already become a major pillar of contemporary economic innovation and is no longer just a technological trend. The EDBI and Kearney study estimates that by 2030, AI's economic contribution to Indonesia's GDP could reach 12%, or US\$366 billion, at the Southeast Asian regional level. According to this projection, Indonesia has a great opportunity to boost its economic growth in the long term thru the use of artificial intelligence technology. (Vasiljeva et al., 2017)

However, advancements in artificial intelligence have complex legal consequences, particularly in the field of intellectual property rights (IPR), specifically patents. The status of AI during the invention creation process is one of the important questions that arises. Currently, autonomous and self-learning AI can innovate without direct human involvement. This capability raises an important question: can artificial intelligence be classified as an inventor? Can the results of an invention entirely generated by artificial intelligence be patented? How does the invention affect moral and economic rights?

The DABUS (Device for the Autonomous Bootstrapping of Unified Sentence) case, which was filed as the inventor by several countries including the United States, the European Union, South Africa, the United Kingdom, and Australia, sparked a global debate about the status of AI as an inventor. (Ginanjari, 2025) In the 2021 case of *Thaler v. Commissioner of Patents*, the Australian trial court finally recognized AI as an inventor. This decision is highly debated. This case sparked widespread debate about the role of AI in the global patent system, although the decision was later overturned on appeal. The discussion revealed disagreement within the international legal system regarding the adoption of artificial intelligence technology. This is particularly relevant to how AI is protected by law, whether necessary mechanisms exist to safeguard it, and who is responsible for the invention. (Wibowo, 2023)

Law Number 13 of 2016 concerning Patents is still used in Indonesia to protect AI-based inventions. However, this law does not comprehensively regulate inventions generated by artificial intelligence systems. Essentially, a patent provides protection to inventors in a specific field of technology. (Thalib & Thalib, 2025a) It is impossible for artificial intelligence to be recognized as an inventor because the Patent Law states that an inventor is "a person or several people. (Wasiska & Faisal, 2025) This creates legal uncertainty, especially when artificial intelligence innovations are developed independently or without human assistance. (Tsabitha, 2025) Additionally, computer programs are considered unpatentable under the Patent Law unless they produce a specific technical effect. Nevertheless, most AI innovations come from algorithm-based programming. (Ginanjari, 2025)

Indonesia faces significant challenges in technological advancement due to the lack of AI legislation. (Rahadianputri, 2024) Beside the issue of inventors, there are legal issues related to using copyrighted datasets to train AI models. (Fallah & Masturi, 2025) Generative AI models like ChatGPT, DALL-E 2, DeepSeek, and Gemini use extremely large datasets, some of which could potentially infringe on copyright or privacy rights. (Apriyanto et al., 2025) There is no clear law in Indonesia regarding text and data processing, the use of copyrighted data for AI training, or licensing procedures. This condition raises concerns about the possibility of future IPR conflicts if not properly regulated. (Tsabitha, 2025)

Meanwhile, other countries like China have adopted strict patent laws for AI-based innovation. (Hartanto et al., 2025) China has established a number of strategic regulations. Some of these include The Patent Law of the People's Republic of China (2020 amendment) and the Guidelines for Patent Examination issued by the China National Intellectual Property Administration (CNIPA). The guidelines state that China allows the patenting of innovations involving algorithms or mathematical models as long as it can be proven that the innovation has a specific technical effect or technical solution. This method increases the number of AI patents in China because it provides flexibility for AI innovations to fall within the scope of patents. (He, 2020)

Additionally, China has more mature legislation on data governance, such as the Data Security Law (2021), the Personal Information Protection Law (2021), and the Cybersecurity Law (2017). This legislation provides clear standards for data usage, privacy protection, and companies' obligations to manage data for AI training purposes. With this legislation in place, the AI development ecosystem in China is more organized than before. (Apriyanto et al., 2025)

Additionally, policies such as the New Generation Artificial Intelligence Development Plan (2017), Made in China 2025, and the AI Innovation Action Plan were created by the Chinese government to support research, development, and patent protection of AI technology. With these policies, China is among the countries with the fastest growth in AI patents worldwide. (Apriyanto et al., 2025) With a progressive approach, China regulates AI technically and makes it a priority for economic development and technological self-reliance. (Rahadianputri, 2024)

Indonesia and China differ in terms of regulatory readiness, legal protection, and

policy support for artificial intelligence-based innovation. Indonesia is still reactive and does not yet have specific patent examination guidelines for artificial intelligence-based innovation, while China has developed technical guidelines that allow for more flexible patent protection. (Nararya et al., 2024)

Due to this situation, Indonesia must urgently make legal changes in the field of patents to address the complexities of AI technology development. These changes will provide legal certainty for inventors, researchers, the technology industry, and the public in general. Indonesia risks losing global competitiveness in the field of artificial intelligence if it does not receive sufficient updates. (Wasiska & Faisal, 2025)

Research on the legal certainty of patent rights for AI-based innovations is crucial due to the rapid development of AI and its accompanying challenges. A comparative analysis between Indonesia and China is expected to provide insights into efficient and flexible legal models for patent protection of artificial intelligence innovations. The results of this research are expected to assist in the formulation of Indonesian patent policies to make them more responsive to technological developments and support national development goals in the digital era.

Research Problem

From the background described above, some of the problems that will be examined in this study are as follows first How is the Legal Certainty of Patents for AI-Based Innovations in Indonesia and the second How is the Legal Certainty of Patents for AI-Based Innovations in China.

Research Method

The normative legal research method is used in this study. This research focuses on the doctrines, legislation, and literature regarding patent regulation for artificial intelligence-based innovations in Indonesia and China. The methods used include a legislative approach (Indonesian Patent Law and Chinese Patent Law), a conceptual approach (conceptual understanding) to understand the concepts of inventor, AI innovation, and algorithm protection, and a comparative approach (comparing approaches) to compare the level of legal certainty in both countries. Regulations, technical guidelines, books, journals, and other official documents were used to gather legal materials. (Thalib & Thalib, 2025b) Then, to gain a comprehensive understanding of AI patent regulations and their legal certainty issues, a qualitative-descriptive analysis was conducted.

Discussion

A. Legal Certainty of Patents for AI-Based Innovations in Indonesia

The development of artificial intelligence (AI) technology has brought significant challenges to the legal system in Indonesia, particularly in the field of intellectual property rights (IPR) related to patents. In the context of Indonesian positive law, patent protection is regulated thru Law Number 13 of 2016 concerning Patents, which is entirely based on the traditional assumption that inventors are human. (Wasiska & Faisal, 2025) According to Article 1, paragraph (3) of the Patent Law, an inventor is a "person." This means that AI cannot be considered an inventor in the legal sense. (Purwaningsih & Islami, 2023)

Actually, this idea follows the classical perspective on legal subjects, which states that only entities with free will, the capacity to act, and the ability to be held accountable for their actions can be considered legal subjects. (Ginanjar, 2025) Experts like OK Saidin and Endy M. Astiwara state that AI does not possess such capabilities because AI is merely an algorithmic system that operates based on instructions and data provided by humans. Therefore, artificial intelligence is only considered a technical tool used in the innovation process, rather than an entity with legal rights to do so. (Purwaningsih & Islami, 2023)

Conversely, questions arise when contemporary AI has been able to generate new technical solutions that humans never even considered. In many cases worldwide, AI systems such as machine learning and deep understanding have produced innovative outputs that no longer simply execute human commands but genuinely generate independent results based on complex data processing. (Ramadhan, 2022) The question of who is worthy of being considered the inventor in this case of invention arises: is it the AI developer, the AI operator, the data owner, or the AI itself? For researchers, technology companies, and investors involved in the artificial intelligence industry, Indonesian patent law does not provide answers to these questions.

In terms of computer program classification, there is increasing legal uncertainty. Computer programs are generally not patentable under the Patent Law unless they have a "certain technical effect." (Rahadianputri, 2024) However, this "technical effect" standard is not thoroughly explained, leading to diverse interpretations in practice. According to Article 4 of the Patent Law, some AI innovations can be classified as business methods or mathematical algorithms. (Ramadhan, 2022) This has the potential to hinder the protection of AI innovations with high technical value. Due to this uncertainty, examiners lack specific standards for assessing the inventive step (non-obviousness) made automatically by AI. (Ramadhan, 2022) Because of AI's ability to generate things that are "unclear" to humans, the inventive step becomes relatively small in the context of AI. However, AI systems may be able to do this easily. (Apriyanto et al., 2025) This contradicts the old patent doctrine, which calculated the inventive step based on the average skilled person in the relevant field. (Wibowo, 2023)

Because AI lacks the capacity to be held responsible, legal liability for AI inventions must be determined in Indonesia. The law must determine who is responsible for patent infringement or any harm that may be caused by the use of AI inventions. (Wibowo, 2023) However, there are no regulations regarding this. The lack of legal certainty causes doubt among investors and technology companies in Indonesia about aggressively developing AI innovations. This is because even in academic discourse, there is no consensus on who should be responsible: the AI owners, the AI developers, or the AI users. (Hartanto et al., 2025)

Although there is no official law, the government has issued several policies, such as the National Artificial Intelligence Strategy (Stranas AI) 2020–2045 and the Circular Letter of the Minister of Communication and Information Number 9 of 2023 regarding Artificial Intelligence Ethics. (Apriyanto et al., 2025) However, these regulations are not binding and do not address important issues regarding patent protection or the legal status of AI generated works. (Wasiska & Faisal, 2025) It cannot provide legal certainty to inventors, research institutions, the technology industry, or investors because the law is more of an ethical standard and general policy. (Rahadianputri, 2024)

Institutional aspects pose additional problems. To date, the Directorate General of Intellectual Property has not issued technical guidelines or guidelines for substantive examination that regulate the parameters for examining inventions based on artificial intelligence. (Kusnadi & Putri, 2025) However, some countries have begun to use the guidelines, such as the United States, the EPO (Office of European Patents), and South Korea. (Nararya et al., 2024) In Indonesia, this examination standard gives patent examiners a very wide margin for interpretation, potentially leading to inconsistencies in administrative decisions. This will weaken legal certainty and create uncertainty for patent applicants in the field of artificial intelligence. (Tsabitha, 2025)

Additionally, because AI operates on data, its output often stems from processing large datasets, which may contain works or information protected by intellectual property rights (IPR) belonging to other parties. Consequently, there is a risk of inadequate

implementation and overlapping rights when AI innovations relate to other IPR fields such as copyright and trade secrets. (Wibowo, 2023) Indonesia may face more difficult legal issues in the future if there are no clear rules regarding data processing in the context of AI patents. (Putra & Barkatullah, 2025) Many local industry players do not understand intellectual property rights, which exacerbates this ambiguity. As a result, many innovations are not registered or properly patented.

Considering all these conditions, Indonesia needs a comprehensive legal reform that includes revising the Patent Law, determining the status of AI inventions, establishing guidelines for substantive examination, and clear legal liability policies. Indonesia will fall behind in global competition in the field of artificial intelligence if these updates are not made.

B. Legal Certainty of Patents for AI-Based Innovations in China

Legal certainty regarding patent protection for AI-based innovations is very strong, as China adopts a regulatory system that is flexible, progressive, and highly sensitive to technological advancements. (Apriyanto et al., 2025) Although Chinese patent law does not textually recognize AI as an inventor, the Chinese government is creating innovation policies, laws, and technical interpretations to clarify the human position regarding AI. (Apriyanto et al., 2025) Therefore, China created a system that not only provides legal protection but also aggressively promotes technological advancement. (Apriyanto et al., 2025)

China's legal system, which combines elements of civil law and common law, is an important foundation for its legal certainty. (Apriyanto et al., 2025) Although laws are very important, the role of court decisions or rulings with precedent value is also very strong. (Tsabitha, 2025) This allows Chinese law to develop dynamically in accordance with technological advancements. This sets it apart from Indonesia, which is still very normative and doesn't give judges much room for interpretation. This method allows China to overcome the lack of AI regulation in patent law by using judicial interpretation without waiting for legislative revisions. (Apriyanto et al., 2025)

The 2019 case of Tencent v. Shanghai Yingxun was a landmark in AI legal certainty in China. In this case, Tencent's AI system Dreamwriter automatically generates news articles based on financial data. Tencent is suing for copyright infringement because another party copied the content. The court ruled that the article was protected by copyright because, although created by artificial intelligence, the creative process still required human contribution. AI is not considered an independent author because humans act as the primary controllers, determining the algorithms, input data, article structure, and writing style parameters used by the AI. (Wibowo, 2023)

In terms of patents, this decision is very significant. Chinese courts and administrative authorities apply the same principle regarding AI inventions. In other words, even if AI produces innovative output, the patent is still granted to the person or legal entity that develops, operates, or controls the AI. This is referred to as a legal analogy. (Apriyanto et al., 2025) This principle is a real-world implementation of the doctrine of jobs created for employment, as explained in the file materials. This doctrine states that the party directing the creation process has rights to works or inventions made with the help of certain tools

or systems, including AI. This doctrine makes AI industry players more legally secure because AI products are not considered "without an inventor," but have legitimate rights holders. (Apriyanto et al., 2025)

In addition to the jurisprudential aspect, the Chinese government has strategically formulated policies aimed at promoting AI growth. In the 2017 "New Generation Artificial Intelligence Development Plan," the government made AI a national priority sector and emphasized its integration into all sectors of life, such as the economy, education, military, and government. (Vindriyanto & Kornelis, n.d.) In terms of intellectual property rights, China has instructed its patent authorities to expedite the examination of AI patents, formulate clearer substantive examination standards, and provide a special channel for high-tech patent applications. This creates an environment that makes it easier for companies to obtain legal protection for their innovations, including those generated with advanced AI. (Apriyanto et al., 2025)

China also has clear technical standards for assessing AI strength. One element evaluated is whether the AI model or algorithm makes a real technical contribution to the hardware or software involved. Chinese patent examiners have been trained to assess "technical effect," "technical means," and "technical contribution," which are the three key components that determine the patentability of artificial intelligence based inventions. (Ramadhan, 2022) This framework is far more advanced than Indonesia's, which does not yet have specific examination guidelines for AI technology. This provides patent applicants with certainty about what qualifies.

Additionally, China has a clearer mechanism for who is responsible for AI innovation. In the Chinese system, AI developers are responsible for algorithm design, and AI operators are responsible for algorithm usage. Data owners are recognized as having an important role and can be a relevant party in IPR protection, according to some industry guidelines. (Apriyanto et al., 2025) This multilayer method is very helpful in reducing conflict and increasing the proportion of legal certainty for all parties involved.

The presence of a massive AI industry fully supported by the state also increases legal certainty. Large companies such as Tencent, Alibaba, Huawei, and Baidu are global leaders in AI R&D. These companies are actively collaborating with the Chinese government to develop industry-specific standards, technical guidelines, and IPR protection policies. By working together, regulations become flexible and aligned with the latest technological developments. (Apriyanto et al., 2025) It's no surprise that AI patent applications in China are increasing sharply every year, indicating that the country has enacted laws supporting innovation.

China can be considered a country with misrepresentation because a very strong AI-based patent protection system has been built thru this mechanism, as well as progressive jurisprudence, the work-made-for-hire doctrine, substantive examination guidelines, the country's strategic policies, and collaboration with industry. (Apriyanto et al., 2025)

Conclusion

Law No. 13 of 2016 on Patents still regulates patent rights in Indonesia, which

requires that the inventor must be human, so AI cannot be considered a creator or inventor. Additionally, Indonesia does not have technical laws governing patent protection for AI-created works. These regulations cover the protection of algorithms, data structures, and the legality of training data. As a result, there is no clear legal certainty regarding AI-based innovation. This raises doubts about who is entitled to patents for inventions made independently or semi-automatically by AI.

China has a more advanced patent legal system to respond to developments in artificial intelligence. The 2020 Patent Law Amendment and its implementing guidelines provide more room for artificial intelligence-based innovation, particularly by accepting algorithms with "real technical value" as patentable inventions. However, the country still stipulates that inventors must be human, and has provided more detailed guidelines on artificial intelligence patents. As a result, AI innovators in China are more legally protected than in Indonesia.

Recommendation

1. Indonesia needs to update its patent regulations by adding specific provisions regarding artificial intelligence-based innovation. These provisions could include recognizing the role of artificial intelligence in the creative process, rules on the use of data for artificial intelligence training, and technical definitions of patentable algorithms.
2. The Indonesian government should create technical guidelines, similar to what China has done thru CNIPA, to provide certainty to patent applicants, especially regarding requirements.
3. Because AI innovation often relies on big data, harmonization between patent law and data protection is necessary. Without adequate regulations, legal protection for innovation outcomes will be weak.
4. Researchers and academics should encourage further research on the potential role of AI in innovation, both as a co-inventor and as a facilitator of innovation. This study will help build a more flexible patent law model.
5. Indonesia can adopt China's best practices, especially regarding technical patent examination guidelines for AI, so that the national legal system can provide stronger legal certainty and attract technology investment.

Bibliography

- Apriyanto, D., Subarsyah, T., & Rodiah, S. (2025). Kecerdasan Buatan (Artificial Intelligence) Dalam Perlindungan Hak Kekayaan Intelektual Yang Berkeadilan. *Jurnal Prisma Hukum*, 9(8).
- Fallah, S. N., & Masturi, F. N. (2025). Perspektif Hukum Hak Kekayaan Intelektual Hak Cipta Tantangan dan Peluang dalam Era Artificial Intelegent dan Revolusi Industri 5.0. *Journal of Innovative and Creativity*, 5(3).
- Ginanjari, D. (2025). Membangun Sistem Paten Yang Adaptif Untuk Algoritma Artificial Intelligence Di Indonesia. *Jurnal Rechten: Riset Hukum Dan Hak Asasi Manusia*, 7(1).
- Hartanto, M. P., Mahendrasusila, F., Maxmiliano, P., & Oentoro, B. A. (2025). Perdebatan Hak Cipta Atas Karya Kecerdasan Buatan (Ai): Menuju Kerangka Hukum Adaptif Yang Mendukung Inovasi Teknologi. *PERAHU (Penerangan Hukum) Jurnal Ilmu Hukum*, 13(1).
- He, T. (2020). The Sentimental Fools And The Fictitious Authors: Rethinking The Copyright Issues of AI-Generated Contents In China. *Asia Pacific Law Review*, 27(2).
- Kusnadi, S. A., & Putri, D. W. S. (2025). Perlindungan Hak Privasi Dalam Penyalahgunaan Teknologi Deepfake Di Indonesia. *Jurnal RechtsVinding*, 14(2).
- Nararya, C. L., Sudirman, & Umar, W. (2024). Kepastian Hukum Kekayaan Intelektual Terhadap Karya Ilmiah Yang Dihasilkan Chatgpt. *Rewang Rencang : Jurnal Hukum Lex Generalis*, 5(4).
- Purwaningsih, E., & Islami, I. (2023). Analisis Artificial Intelligence (Ai) Sebagai Inventor Berdasarkan Hukum Paten Dan Hukum Islam. *Jurnal Ilmiah Galuh Justisi*, 11(1).
- Putra, A. Y., & Barkatullah, A. H. (2025). Kepastian Hukum Hak Cipta Atas Karya Yang Dihasilkan Oleh Artificial Intelligence. *Jurnal Ilmiah Muqoddimah: Jurnal Ilmu Sosial, Politik Dan Humaniora*, 9(2).
- Rahadianputri, M. A. (2024). Analisis Yuridis Invenisi Artificial Intelligence Perspektif Undang-Undang Nomor 13 Tahun 2016 tentang Paten. *Civilia : Jurnal Kajian Hukum Dan Pendidikan Kewarganegaraan*, 3(2).
- Ramadhan, G. D. (2022). *Perlindungan Hukum Atas Invenisi Artificial Intelligence Di Era Revolusi Industri 4.0 & Society 5.0*. Universitas Islam Indonesia.
- Thalib, N. A., & Thalib, A. (2025a). Effectiveness of Patent License Arrangements in Encouraging Technology Transfer in Indonesia. *Pandecta Research Law Journal*, 20(1).
- Thalib, N. A., & Thalib, Abd. (2025b). Pembagian Royalti Hak Cipta Lagu sebagai Harta Bersama Pasca Putusnya Perkawinan dalam Perspektif Hukum Kekayaan Intelektual dan Hukum Perdata di Indonesia. *Amnesti : Jurnal Hukum*, 7(2).
- Tsabitha, T. M. (2025). Perlindungan Hak Kekayaan Intelektual atas Karya AI: Studi Kasus ChatGPT dan DeepSeek dalam Perspektif TRIPS Agreement. *UNES Law Review*, 8(1).
- Vasiljeva, T., Shaikhulina, S., & Kreslins, K. (2017). Cloud Computing: Business Perspectives, Benefits and Challenges for Small and Medium Enterprises (Case of Latvia). *Procedia Engineering*, 178.
- Vindriyanto, & Kornelis, Y. (n.d.). Artificial Intelligence Sebagai Subyek Hukum Khusus Dalam Kekayaan Intelektual Di Masa Mendatang. In *Media Keadilan: Jurnal Ilmu Hukum*.
- Wasiska, A., & Faisal, A. (2025). Perlindungan Hukum Atas Karya Yang Dihasilkan Oleh Kecerdasan Buatan (Ai) Dalam Kerangka Hak Kekayaan Intelektual Di Indonesia. *Mustika Justice*, 4(2).
- Wibowo, R. J. A. (2023). Ciptaan dan Invenisi Hasil Kecerdasan Buatan dalam Perspektif Hak Cipta dan Paten. *Jurnal Ilmiah Kebijakan Hukum*, 17(3).