Patent Protection for Artificial Intelligence as Computer-Implemented Inventions Between Indonesia and Japan

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Abstract

The development of artificial intelligence (AI) technology has had a significant impact on various sectors, including industry, health, and education. AI not only improves operational efficiency but also creates innovations that change human interaction with technology. In this context, protecting intellectual property rights, especially patent rights, is very important to encourage innovation and investment. This study discusses the challenges and opportunities faced by Indonesia in formulating patent protection regulations for AI-based inventions and compares them with the more comprehensive legal framework in Japan. Although Law Number 13 of 2016 in Indonesia provides a legal basis for patent protection, there is still legal uncertainty and a lack of specific regulations regarding AI inventions. In contrast, Japan has developed clear guidelines from the Japan Patent Office (JPO) that support patent protection for AI technology. This study suggests that Indonesia needs to formulate more specific and comprehensive regulations to improve intellectual property rights protection in the AI sector. By adopting best practices from Japan, it is hoped that Indonesia can encourage more investment and innovation in the field of artificial intelligence, which in turn will contribute to economic growth and national competitiveness.

Keywords: *Artificial Intelligence, Patent Protection, Intellectual Property Rights, Regulation, Innovation, Indonesia, Japan.*

A. INTRODUCTION

The development of artificial intelligence (AI) technology has brought significant impacts in various sectors, including industry, healthcare, and education. AI not only improves operational efficiency but also creates innovations that can change the way humans interact with technology. In this context, the protection of intellectual property rights, particularly patents, is crucial to encourage innovation and investment in this field (WIPO, 2020). Advancements in artificial intelligence (AI) technology have become one of the main factors driving innovation in the age of Industrial Revolution 4.0 and Society 5.0. In this regard, the protection of intellectual property rights, especially patents, is crucial to support the development and marketing of AI-focused inventions.

In Indonesia, the regulations governing patents do not cover provisions related to AI inventions, whereas Japan has formulated a more complete legal framework to protect such inventions. In Indonesia, the legal framework governing patent protection is set out in Law No. 13/2016 on Patents. While this law provides a legal basis for patent protection, challenges in implementation and enforcement remain a significant issue. One of the main challenges is the lack of provisions that specifically regulate artificial intelligence as an invention implemented in a computer. This creates

legal uncertainty for innovators and researchers working in the field of AI (Sari, 2021). A study shows that there is an increasing number of AI-related patent applications in Indonesia, with a total of 400 applications in the last eight years (Yasmon, 2024). However, without clear regulations regarding the legal status of AI as inventors or creators, many inventions could potentially go unprotected.

Meanwhile, Japan as one of the most technologically advanced countries has developed a more comprehensive legal framework regarding patent protection for AI. Japan has recognized the importance of AI in innovation and has adopted a more progressive approach to regulating patent rights for inventions generated by this technology. According to the Japan Patent Office (JPO), Japan has issued clear guidelines regarding patents for AI technologies, which include criteria for patentability and how to assess inventions involving AI ("Guidelines for Patent Examination in AI Technologies," 2021). With clearer regulations in place, Japan can create a conducive environment for the development and commercialization of AI technologies.

With the rapid development of AI technology, there is an urgent need to formulate specific regulations governing patent protection for AI-based inventions in Indonesia. This regulation will not only provide legal certainty for inventors and companies but will also encourage investment in research and development of new technologies5. In the absence of a clear legal framework, the potential for innovation in the field of AI may be hampered.

A comparison between Indonesia and Japan regarding patent protection for artificial intelligence as a computer-implemented creation is imperative. This is not only to understand the differences in the way the two countries apply the law but also to find best practices that Indonesia can adopt to strengthen the protection of intellectual property rights in the AI sector. Therefore, this study aims to investigate the challenges and opportunities that Indonesia faces in formulating more effective regulations for AI patent protection, as well as evaluate how Japan's experience can be a useful source of reference. Patent protection for artificial intelligence as a computer-implemented creation requires serious attention from Indonesian policy makers. By adopting best practices from Japan and other countries that have successfully regulated patent protection for this new technology, Indonesia can improve its standing in the global digital era.

The purpose of this research is to analyze and compare the legal framework governing patent protection for artificial intelligence in Indonesia and Japan and identify differences and similarities in the legal approaches taken by the two countries, while the benefits of clear and comprehensive regulations are expected to encourage more investment and innovation in the field of artificial intelligence in Indonesia, which in turn can contribute to economic growth and national competitiveness.

The formulation of the problem in this study focuses on the scope and challenges of patent protection for artificial intelligence (AI) as computer-implemented inventions in Indonesia and Japan. It examines how patent protection is applied in both countries, considering the legal frameworks, regulatory approaches,

and enforcement mechanisms that govern AI-related innovations. Additionally, this study explores the barriers faced in securing patents for AI technologies, including issues related to patent eligibility, novelty assessment, and the adaptability of existing intellectual property laws to emerging AI developments. By analyzing these aspects, the research aims to provide insights into the effectiveness and limitations of current patent systems in fostering AI innovation in Indonesia and Japan.

B. LITERATURE REVIEW

1. Patent Protection

Through Law Number 65 of 2024 concerning Patents, the Indonesian Government has changed the definition of "invention" to an Inventor's idea that is expressed in a specific problem-solving activity in the field of technology, either in the form of products or processes, and includes further refinement and development of existing products or processes (Compagnucci & Spigarelli, 2024). This change reflects the government's efforts to adjust regulations to the dynamics of technological developments, including artificial intelligence (AI)-based innovations and the Industrial Revolution 4.0. Thus, the scope of inventions in the Indonesian patent system is broader, providing space for increasingly complex and multidisciplinary innovations (De Almeida et al., 2021).

Patents themselves are defined as Exclusive Rights granted by the state to Inventors for inventions that meet the patent criteria, namely novelty, inventive step, and can be applied in industry (industrial applicability). This exclusive right provides legal protection for patent holders, ensuring that their inventions cannot be used or exploited by other parties without permission (Nnawulezi et al., 2023). Meanwhile, for Simple Patents, the requirements that must be met include novelty, development of existing products or processes (incremental improvements), practical uses, and can be applied in industry (industrial applicability). This Simple Patent is a solution for innovations that are improvements with more specific added value, protecting innovations that are not always large-scale but still have significant economic and technical benefits (Polater & Konertz, 2025).

The following are six key principles in patent protection that underlie the protection of technological innovation and invention:

a. First-to-File

   This principle states that patent rights are granted to the party who first applies, not to the party who first discovers or uses the invention. Therefore, it is very important for innovators to immediately file a patent application so that exclusive rights to their invention are guaranteed (Schmitt & Denter, 2024). In many cases, delays in filing can cause patent rights to fall into the hands of other parties who file applications first, even though they are not the first to develop the technology. This first-to-file system is applied in various countries, including Indonesia and Japan, to create legal certainty in the protection of intellectual property (Ouyang et al., 2022).

b. Patent Information
Every patent application must include complete and clear information about the invention, including a detailed description, claims that show the uniqueness of the technology, and drawings or diagrams that illustrate how the invention works. This information is the basis for patent examiners to assess the eligibility of the invention to be granted a patent (Casola & Lavelli, 2022). In addition, after the patent is approved, this information will be published so that it can be a reference for the public, especially for researchers, innovators, and industries who want to develop the technology further. This publication also serves to avoid double patent claims and encourage transparency in the world of innovation, so that the development of science and technology can take place more quickly (Blind et al., 2022).

c. Basis for Protection Only Arises upon Application
Patent rights will not be granted automatically to every invention that meets the criteria of novelty, inventive step, and can be applied in industry. Patent protection can only be obtained if there is an official application submitted by the Inventor or a party granted rights by the Inventor, such as a company or research institution (Stanková, 2021). Without an application, even if an invention has high innovative value, it will still not receive legal protection. Therefore, Inventors must understand the patent application procedure and ensure that the required documents have been prepared properly so as not to lose their patent rights due to administrative negligence (Klincewicz & Szumiał, 2022).

d. Obligation to Pay Annual Fees
After a patent is granted, the patent holder is obliged to pay an annual fee as a form of patent protection extension. This fee is required to ensure that exclusive rights remain valid and do not expire before the protection period ends (Danish et al., 2024). If this annual fee is not paid within the specified period, the patent can be revoked, and the invention will become public domain, meaning that anyone can use it without permission from the previous patent holder. This payment obligation aims to prevent inactive patent monopolies and ensure that only truly useful and further developed inventions remain protected in the patent system (Amirulloh & Muchtar, 2024).

e. Universal Substantive Examination
Every patent application must go through a strict substantive examination process to ensure that the invention truly meets the three main requirements for a patent, namely novelty, inventive step, and industrial applicability. This process is carried out by a patent examiner who will examine whether the invention is truly new or has been patented before, whether there are innovative elements that are not general or are merely minor modifications of existing technology, and whether the invention has practical uses that can be applied in the industrial world. This examination process is carried out strictly and based on international standards so that only inventions that are truly

innovative and have a significant impact in the field of technology are eligible for patent protection (Gorbatyuk & Kovács, 2022).

f. Territorial Protection

Patent rights are territorial, meaning that protection only applies in the country or region where the patent is registered and approved. In other words, if an invention is patented in Indonesia, then its protection only applies in Indonesia and does not automatically apply in other countries (Gagliani, 2021). To obtain protection in other countries, the Inventor must file a separate patent application in each destination country, either through the national system or an international patent mechanism such as the Patent Cooperation Treaty (PCT). This principle is important for innovators who want to secure their patent rights in the global market because, without protection in other countries, their inventions can be used freely by foreign parties without violating the law (De Rassenforsse et al., 2022).

By understanding these six principles, innovators and industry players can prepare the right strategy to legally protect their inventions, ensure their exclusive rights are maintained, and optimize

C. METHOD

This research uses Normative Juridical Research which is often used to examine legal issues by analyzing primary, secondary, and tertiary legal sources. This type of research aims to describe the topic and content of legal studies to create a deeper understanding of the issues being raised. The normative juridical research method is a method used to examine various theories, concepts, and laws related to the research subject. According to Johnny Ibrahim, this research is a scientific process that aims to find the truth through scientific logic from a normative perspective. This includes not only positive law but also broader norms. One of the main approaches applied in this research is the statutory approach, which includes an in-depth analysis of the rules and regulations relevant to a particular legal issue. This research focused on two main points, namely: (1) Identifying debates related to intellectual property rights protection for Artificial Intelligence in Indonesia, and (2) Comparing patent protection for Artificial Intelligence as a Computer-Applied Invention in Indonesia and Japan. The legal sources used in this study are divided into three categories: primary, secondary, and non-legal. Primary law consists of regulations, conventions, legal documents, as well as binding court decisions, including the 1945 Constitution, Law No. 13 of 2016 regarding Patents, Patent law in Japan is regulated in the Patent Act, which was first implemented in 1959 and has undergone several amendments, most recently with Patent Act No. 42 of 2021.

D. RESULT AND DISCUSSION

1. Patent Protection of Artificial Intelligence as Computer-Implemented Inventions in Indonesia and Japan

Artificial Intelligence is an artificial intelligence created by humans where this Artificial Intelligence is placed or inserted into the Software or software on the computer where the function of this Artificial intelligence itself is to help or relieve work. Artificial intelligence refers to the simulation of human intelligence in a machine that is programmed to think like a human and mimic his actions. The term can also be applied to technology or machines that exhibit properties associated with the human mind, where the process includes learning to acquire information and rules to use information, reasoning to use rules to reach approximate conclusions, and self-correction. Artificial intelligence is created to mimic human intelligence and can then be ("Legal Protection Of Artificial Intelligence Inventions In The Era Of Industrial Revolution 4.0 & Society," 2022).

Patents are exclusive rights granted by the State to inventors for their inventions in the field of technology for a certain period to carry out the invention themselves or give approval to other parties to carry it out. Law No. 13/2016 on Patents divides the scope of patent protection into two categories, namely General Patents and Simple Patents, each of which has certain criteria. General Patents are granted for new inventions, that contain inventive steps and can be applied in industry, while Simple Patents are granted for inventions that are new developments of existing products or processes and can also be applied in industry. Based on the definition in Article 1 paragraph (1) and Article 1 paragraph (2) of the Patent Law, the objects protected by patents are inventions in the field of technology that include products, processes, as well as improvements and developments of these products or processes (Aline & Nugrahani, n.d.). Artificial Intelligence (AI) as an element of technological development has created new challenges for the patent law system, especially in Indonesia. While Law No. 13/2016 on Patents provides a legal basis for invention protection, it does not regulate AI-derived inventions.

Following Law No. 13 of 2016 on Patents, for an invention on artificial intelligence to be patentable, there are several requirements, as follows:

a. Novelty: An invention is considered novel if there is no similarity with pre-existing technology. To ensure novelty, an examination of previously revealed technology is conducted. Article 5 paragraph (1) of the Patent Law states that an invention is considered novel if it is not the same as previously disclosed technology, including products, processes, and information.
b. Inventive Step: An invention is said to contain an inventive step if it is non-obvious. The inventive step is a prerequisite to prevent the grant of a patent on an invention that is easily foreseeable by a person who has certain expertise in the field of engineering. Article 7 paragraph (1) of the Patent Law states that an invention contains an inventive step if to a person having expertise in engineering, the invention is not foreseeable.

c. Industrial Applicability: Article 8 of the Patent Law states that an invention is patentable if it can be applied in industry, which means that the invention can be produced or used in various types of industries. If the invention is a product, the product must be able to be produced repeatedly with the same quality, while if it is a process, the process must be able to be carried out or applied in practice. An invention that meets these requirements will provide economic value that can be applied in the industry.

In Japan, patent protection for innovations based on Artificial Intelligence (AI) as Computer-Implemented Inventions (CII) is becoming increasingly crucial in a situation of rapid technological advancement. Japan, which is one of the leading countries in the field of technological innovation, has developed a legal framework that supports patent protection for AI products. Japan has a comprehensive patent legal framework governed by the Patent Law. Here are some of the highlights of patent protection for AI-based inventions:

a. Criteria for Obtaining a Patent:
   To get protection through patents, an AI invention needs to fulfill the conditions of novelty, inventive step, and industrial relevance. This is in line with Article 29, Paragraph 1 of the Japanese Patent Law, which emphasizes that the invention must be novel and not obvious to experts in the field, where the invention is already known to the public and the invention has been described in a distributed publication. An invention already known to the public can be an invention that was publicly demonstrated or sold in another country before the patent application was filed (Japan Patent Office (JPO), 2023).
b. Training Data and Learning Programs:
   Training data used in AI models can be protected with patents if there is clear evidence of technical progress. However, the AI model itself cannot be patented based on mere data and functionality without any significant additional innovation.

Training data is the set of information used to teach an artificial intelligence (AI) model to perform a specific task, such as recognizing patterns, performing classification, or making predictions. In the realm of patent law, training data can be considered a protected entity if it meets certain criteria:

a. Novelty: The training data must have elements that are new and not previously published. For example, if the data is obtained through a unique method or includes information that is not publicly available, then there is a possibility of obtaining patent protection.
b. Technical Advancement: Training data needs to demonstrate significant technical progress. This means that it should make a tangible contribution to the AI model's ability to solve problems or improve its performance, rather than just being a collection of data.
c. Structure and Organization: If the training data is structured in a way that shows creativity or innovation in the selection and organization of information, then it can meet the criteria of being a patentable invention. On the contrary, if

the data is just a collection of information without any innovative structure, then it will most likely not qualify for patent protection.

d. Special Guidance from the Japan Patent Office (JPO): The JPO has released a guide on the latest developments in AI-related inventions, which provides guidance for inventors during the patent registration process. The guide includes examples and criteria used to assess AI-based inventions (Alhidayah et al., 2023).

2. Barriers faced in patent protection for artificial intelligence in Indonesia compared to Japan

Obstacles faced in patent protection for artificial intelligence in Indonesia, Patent protection for artificial intelligence (AI) in Indonesia suffers from several hurdles that hinder the progress and creation of the technology. Although AI has become an important component in the fourth industrial revolution (4.0), the existing rules are still not fully prepared to meet the demands of legal protection for AI-based inventions. Some of these obstacles are as follows:

a. Lack of Specific Regulations
Indonesia's Patent Law No. 13/2016 does not specifically address AI-related inventions. This situation creates legal confusion for inventors as to whether their inventions are entitled to patent protection. Under these circumstances, many inventors feel unclear about the steps and requirements needed to obtain patent protection for their AI-based inventions (Kajian et al., n.d.).

b. Limited Inventors
The current patent law system in Indonesia only recognizes human individuals as inventors, while AI has no status as a legal subject. As a result, inventions created by AI cannot be patented, which hinders protection for innovations stemming from this cutting-edge technology. In other countries such as Japan and the United States, there is a more open approach to who can be recognized as an inventor, including recognition of the contribution of technology in the creation process.

c. Evaluation of Novelty and Creative Step
The criteria of novelty and creative step are often difficult to apply to AI-based inventions. The algorithms and models implemented in AI are usually very complex and difficult to assess within the framework of patent law. This can lead to uncertainty in the patent filing process, where many AI-based inventions may not qualify despite still having innovation value.

d. Low Interest in Intellectual Property Rights
Public and inventors' awareness of intellectual property rights (IPR), particularly patents, is still quite minimal in Indonesia. Many inventors do not realize the significance of patent protection or do not understand the patent registration process, thus they miss out on opportunities to protect their inventions.

e. High Cost of Registration
Patent filing in Indonesia is often considered expensive and complicated, especially for start-up companies or individuals who have limited resources. The cost to register and the annual fees needed to maintain the patent can be an additional burden for inventors, so many choose not to file a patent.

3. Barriers faced in patent protection for artificial intelligence in Japan

Japan is one of the countries with well-developed patent regulations, including protection for inventions using artificial intelligence (AI). Despite having a better legal system than many other countries, Japan still faces challenges in providing patent protection for AI technologies. These challenges relate to legal, technical, and rapid technological advancements. Some of these challenges are as follows:

a. Vagueness in Definition and Criteria of Patentability
One of the major challenges is the vagueness in the definition of "invention" and patentability criteria for AI technologies. Although the Japan Patent Office (JPO) has issued guidelines related to AI-based inventions, there is still uncertainty regarding:
Definition of AI Invention: It is not always clear whether a particular AI algorithm or model can be considered a patent-eligible invention.
Criteria of Novelty and Inventive Step: Assessment of novelty and inventive step is often difficult as AI algorithms are often extensions of pre-existing technologies, making it difficult to prove significant innovation.

b. Technological Complexity
The rapid development of AI technology creates a gap between innovation and regulation. AI-based inventions often involve a combination of algorithms, training data, and complex machine-learning models. This poses a technical challenge for patent authorities in evaluating whether an invention truly qualifies for patentability or is merely an application of an existing technology.

c. Legal Uncertainty for Inventors
While Japan has a more structured legal system than many other countries, inventors still face legal uncertainty regarding patent protection for AI-based inventions. This uncertainty can affect inventors' decisions to file patent applications or invest in the development of new technologies. Inventors often doubt whether their inventions will be considered innovative enough to gain legal protection.

d. Cost and Registration Process
The patent registration process in Japan can be expensive and time-consuming, especially for complex AI-based inventions. Registration fees, annual fees to maintain the patent, as well as the need for consulting legal or technical experts can be an obstacle for startups or individuals with limited resources.

e. International Legal Challenges
As a member of international agreements such as TRIPS (Trade-Related Aspects of Intellectual Property Rights), Japan must ensure that its regulations

are in line with global standards. However, this also limits Japan's flexibility to develop customized regulations that suit local needs regarding patent protection for AI technologies.

Here are some comparative aspects between Indonesia and Japan in patent protection for AI:

a. Indonesia
   1). Regulation: Law No. 13 of 2016
   2). Special Guidelines: There are no special guidelines for Artificial Intelligence inventions.
   3). Legal Certainty: Low, due to the vagueness of norms
   4). Challenges: Legal chaos related to the definition and registration procedure
b. Japan
   1). Regulation: Patent Act no.42 of 2021
   2). Specific Guidelines: There are JPO guidelines regarding AI-based patent registration
   3). Legal Certainty: High, with clear rules on the Patentability of AI Invention
   4). Challenges: Technological complexity in determining inventiveness

E. CONCLUSION

Patent protection for artificial intelligence (AI) as an invention implemented in computers is an increasingly important issue during rapid technological development. In the context of Indonesia and Japan, there are significant differences in the legal framework and practice of patent protection that may affect the innovation and development of AI technology. In Indonesia, although Law No. 13/2016 provides the legal basis for patent protection, there are still major challenges faced, such as the lack of specific regulations regarding AI-based inventions, legal uncertainty regarding the status of AI as inventors, and low public awareness of intellectual property rights. This creates barriers for inventors and innovators to obtain adequate protection for their creations. While there has been an increase in the number of patent applications related to AI, the lack of clarity in regulation may hamper the potential for innovation in this sector. In contrast, Japan has developed a more comprehensive and progressive legal framework to protect AI-based inventions. With clear guidelines from the Japan Patent Office (JPO), Japan can provide greater legal certainty for inventors and innovators. The established patentability criteria, as well as the recognition of the complexity of AI technology, allow Japan to create an environment conducive to the development and commercialization of AI technology. From this comparison, it appears that Indonesia needs to formulate more specific and comprehensive regulations for patent protection for AI-based inventions. Adopting best practices from Japan and other countries that have been successful in this regard can help Indonesia improve intellectual property rights protection in the AI sector. With the right measures in place, Indonesia can capitalize on the huge potential offered by AI technology and ensure that innovations in this field are legally protected, so that they can thrive well in the era of Industrial Revolution 4.0 and Society 5.0. Overall, patent

protection for artificial intelligence as an invention implemented in computers requires serious attention from policy makers in Indonesia. By formulating clear and comprehensive regulations, it is expected to encourage more investment and innovation in the field of artificial intelligence, which in turn will contribute to economic growth and national competitiveness.

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