

Challenges of Patent Protection in the Digital Era: A Legal Analysis of Indonesia and a Comparative Study of the Patent Protection Model in China

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Abstract

Patent protection faces increasing challenges in the digital era due to the rapid development of software-based inventions, artificial intelligence, algorithms, and cross-border digital technologies that are not always adequately addressed by traditional legal frameworks. In Indonesia, these challenges are reflected in lengthy patent examination procedures, limited institutional capacity, and regulatory gaps in protecting digital innovations, while China has adopted a more adaptive and technology-oriented patent protection model. This study addresses the problem of how patent protection systems respond to digital-era challenges, focusing on the adequacy of Indonesia's patent regime and the comparative effectiveness of China's patent protection model. The general objective of this research is to analyze and compare the patent protection systems of Indonesia and China in responding to technological advancements in the digital era, with the aim of identifying regulatory gaps, institutional differences, and best practices that may strengthen patent protection in Indonesia. This study employs a normative juridical method with a comparative legal approach, relying on statutory analysis and library-based research of patent regulations, policies, and scholarly literature in both jurisdictions. The findings reveal that Indonesia's patent protection system, although progressively reformed through Law No. 13 of 2016 and its amendment under Law No. 65 of 2024, remains constrained by slow examination processes, limited recognition of software-related inventions, weak enforcement mechanisms, and low public awareness. In contrast, China demonstrates a more responsive and efficient patent system through the integration of digital technologies, accelerated examination timelines, blockchain-based administration, and specialized intellectual property courts. The comparative analysis highlights that China's strong institutional capacity and digital integration significantly enhance legal certainty and enforcement effectiveness. The study's significance lies in providing normative and practical insights for policymakers,

emphasizing the need for Indonesia to modernize its patent framework, strengthen institutional capacity, and adopt digital-based mechanisms to ensure effective patent protection and foster innovation in the digital age.

Keywords: Patent protection; Digital innovation; Comparative legal study; Indonesia; China

Introduction

Patent protection plays a vital role in promoting innovation and fostering technology-based economic growth (Sudirman & Disemadi, 2021; Disemadi, 2022; Tjandrawinata, Budi & Heliany, 2025). In the digital era, technology advances rapidly, creating various innovations that require legal protection to prevent misuse by unauthorized parties (Lazuardi & Gunawan, 2024; Shahid, Suddle & Qureshi, 2025). The growing number of patent infringements in the digital sphere indicates that existing protection systems still have significant weaknesses in addressing technological developments. According to data from the Directorate General of Intellectual Property (*Direktorat Jenderal Kekayaan Intelektual/DJKI*) of the Ministry of Law and Human Rights of the Republic of Indonesia, the number of patent applications has reached 4,511, consisting of 3,723 patent applications, 785 simple patent applications, and 3 applications under the Patent Cooperation Treaty (PCT). However, the number of examiners remains insufficient due to retirement and staffing constraints, resulting in suboptimal examination processes. Consequently, patent protection faces increasingly complex challenges amid technological advancement and globalization (Wahyuni & Zainuddin, 2021).

This complexity is evident from the rise in intellectual property rights (IPR) violations, including unauthorized use of patented technologies and illegal distribution of innovative products on digital platforms (Sidiprasetija et al., 2024). In Indonesia, the issue is further exacerbated by the outdated legal framework governing patents—namely, Law No. 13 of 2016 concerning Patents—which has been deemed insufficiently adaptive to digital technological developments and therefore inadequate in providing effective protection for innovators.

Indonesia's patent protection system continues to face several challenges, ranging from lengthy registration procedures to weak enforcement mechanisms

against patent infringement (Disemadi, 2023). As noted by (Ritonga et al., 2024), many innovations fail to receive adequate protection due to limited registration infrastructure and low public awareness of the importance of patents. In contrast, China has adopted a more progressive approach to patent protection. The Chinese government has integrated digital technologies into patent registration processes, including the use of blockchain to enhance data transparency and security (Disemadi et al., 2023). Moreover, China has established specialized Intellectual Property (IP) courts to expedite patent dispute resolution, making it one of the countries with the highest number of patents globally and offering stronger protection for innovators.

Patent protection in Indonesia faces significant legal challenges. Despite revisions through Law No. 13 of 2016 to accommodate technological progress, Indonesia still lags far behind other nations in adapting to the speed of digital technology (Santosa et al., 2024). This study aims to compare patent rights in Indonesia and China. Under the Patent Law of the People's Republic of China, administered by the China National Intellectual Property Administration (CNIPA), China has established a Re-Examination Panel to efficiently resolve patent-related disputes (McGeoch, 2021). Accordingly, further analysis is needed regarding the application of technologies such as blockchain in Indonesia's patent registration system, which remains limited in implementation.

In Indonesia, enforcement of patent law still relies on conventional mechanisms that are ill-equipped to address infringements in the digital realm. Meanwhile, China operates 18 specialized IP courts with integrated digital evidence systems (McGeoch, 2021), whereas Indonesia continues to face difficulties in resolving disputes involving digital technology (Hermansyah, 2023). The examination periods also differ significantly: in China, patent examination takes approximately 15 months, while in Indonesia, the process can take 3–5 years. Understanding how China achieves such efficiency could offer practical solutions for improving Indonesia's patent regulation.

Public awareness regarding patent protection in Indonesia also remains low, especially among small communities (Ainabila, Disemadi & Hutauruk, 2024). In contrast, China has implemented extensive educational programs to

raise awareness about IP protection, particularly among industry players. Hence, Indonesia needs broader socialization and education initiatives to enhance public understanding of Intellectual Property Rights (IPR), especially patent protection, and its benefits. Furthermore, users often upload or share copyrighted works without permission, revealing a regulatory gap concerning enforcement mechanisms for copyright and patent violations on digital platforms—areas not explicitly covered in current legislation. This research contributes normatively by recommending increased legal literacy among social media users and reinforcing the state's role in enforcing IP laws in the digital age.

Previous studies have addressed important aspects of patent systems and IP protection in Indonesia and China, forming the foundation for the novelty of this research. (Ribowo & Roisah, 2019) examined the comparative mechanisms of simple patent protection and found notable differences between the two countries' approaches despite both adhering to WTO/TRIPS standards. However, their study did not specifically address adaptation to digital innovation. (Ruhtiani, 2022) analyzed communal intellectual property protection—particularly traditional knowledge—but did not discuss modern technology-based patents. (Djuliana & Gultom, 2023) explored unregistered well-known trademark protection, highlighting differences in legal approaches but not patent protection in the digital context. (Rahmatillah & Sanusi, 2024), identified patent regulatory challenges in AI but did not directly compare Indonesia and China. Therefore, there remains a research gap in examining similarities and differences in the Indonesian and Chinese patent systems in addressing digital challenges, especially regarding software-based patents, algorithms, and digital IP law enforcement.

This study provides both theoretical and practical contributions. Theoretically, it enriches the discourse on legal protection for patents in Indonesia and China in the digital era, emphasizing the need for updated regulations responsive to rapid technological changes. Practically, it offers guidance for policymakers and legal practitioners in Indonesia to adapt patent regulations to the digital environment and underscores the importance of effective patent protection. However, the study's limitation lies in its focus on

only two countries, leaving room for further comparative research involving other nations facing similar challenges, to broaden understanding of patent protection in the age of digitalization.

This research is centered on three primary problem formulations: first, how Indonesia's patent protection system addresses the challenges posed by the digital era; second, how China's patent protection model responds to the rapid advancement of digital technology; and third, what similarities and differences exist between the patent systems of Indonesia and China in confronting digital-era challenges. This research focuses on three main objectives: first, to analyze and understand how patent protection systems operate and adapt in the digital era; second, to examine how China addresses and safeguards patent rights amid continuous advancements in digital technology; and third, to identify the similarities and differences between the patent systems of Indonesia and China in responding to technological innovation and digital transformation.

Research Method

This study employs a normative juridical research method, which focuses on the examination of legal documents and statutory regulations as the primary research objects. The method involves a comparative analysis of patent law regulations in Indonesia and China, particularly in addressing the challenges arising from digitalization. The study emphasizes the necessity of establishing clear regulations and consistent sanctions for patent infringements, as such violations cause significant harm to patent holders. The purpose of this method is to evaluate and identify relevant legal issues and research questions. The approach adopted in this study is a comparative legal approach, aiming to compare the legal frameworks governing patent protection in Indonesia and China. It involves an in-depth examination of relevant laws, regulations, and legal provisions in both jurisdictions. Data were collected through a library research technique, which includes gathering and analyzing various sources of literature such as books, academic journals, policy reports, statutory instruments, and other official documents related to patent protection. The research utilizes a descriptive-qualitative analytical method, which entails systematically describing

and interpreting data based on legal principles. This technique involves structuring and presenting the collected legal materials coherently according to established legal analysis standards. The sources analyzed consist of relevant legal documents and scholarly literature, which are then interpreted to provide a clear and comprehensive understanding of the patent protection systems in Indonesia and China. This method enables the researcher to present logical and in-depth arguments grounded in available legal materials. The analytical process begins with the collection of pertinent legal sources, followed by their interpretation and evaluation to derive meaningful conclusions within the framework of comparative legal analysis.

Results and Discussions

The Patent Protection System in Indonesia in Facing the Challenges of the Digital Era

The legal protection of patents in Indonesia is governed by Law No. 13 of 2016 on Patents, which defines a patent as an exclusive right granted by the state to an inventor for an invention in the field of technology for a specified period, allowing the inventor to personally exploit the invention or to authorize others to do so (Ritonga et al., 2024). There are two types of patents recognized under Indonesian law: ordinary patents and simple patents. An ordinary patent is granted for an invention that is novel, involves an inventive step, and is industrially applicable. Meanwhile, a simple patent is granted for an invention that, while new, constitutes an enhancement or modification of an existing product or process and remains industrially applicable (Rizqita et al., 2022). Hence, a simple patent does not require the same complex inventive step as an ordinary one.

Indonesia adheres to the “first-to-file” principle, meaning that patent rights are granted to the first applicant who files an eligible invention. Legal protection for a simple patent is provided if the invention demonstrates novelty and constitutes a development of an existing product or process applicable in industry, as stipulated in Article 3(2) of Law No. 13 of 2016 on Patents (Martinelli

et al., 2024). However, certain inventions cannot be patented, such as processes or products contrary to statutory regulations, religion, public order, or morality; medical or veterinary methods; as well as theories and methods in science or mathematics. Likewise, natural phenomena, laws of nature, abstract ideas, literary works, musical compositions, and artistic creations are excluded from patent protection, though they may be protected under copyright law.

In the digital era, the criteria for patent eligibility in Indonesia remain consistent with traditional standards but must consider the unique technical and commercial characteristics of digital innovations. An invention must be demonstrably new, not publicly disclosed before, and capable of industrial application. Examinations now include searches in both the DJKI patent database and international patent offices to ensure novelty, particularly for inventions related to software, algorithms, or digital systems. The inventive step should provide a significant new method or algorithmic approach, and the invention must be practically applicable across various sectors such as software, hardware, e-commerce, social media, and financial technology, with clear commercial potential and economic value (Hawin & Riswandi, 2020).

In practice, the Directorate General of Intellectual Property (*Direktorat Jenderal Kekayaan Intelektual/DJKI*) faces increasing pressure due to the surge of patent applications from around the world, resulting in application backlogs, long processing times, and quality issues in examinations. To address this, applicants can now submit patents online through paten.dgip.go.id, and digital technologies, including AI-assisted searches, are used to improve examination speed and accuracy (Martinelli et al., 2024). DJKI also collaborates with foreign IP offices, such as Singapore's, through Patent Examination Cooperation Programs to enhance search and examination efficiency (DJKI, 2024).

Once registered, a patent holder in Indonesia has exclusive rights to exploit the invention, including manufacturing, using, selling, and importing the patented product or process (Nursalim et al., 2024). The patent holder may prohibit others from performing these acts without authorization and may grant licenses under agreed terms (Pamolango et al., 2023). The main obligation of a patent holder is to pay annual maintenance fees. Patent protection lasts 20 years

from the filing date for ordinary patents and 10 years for simple patents. The patent must be worked within Indonesia, meaning it should be produced or utilized domestically to promote technology transfer, investment, and employment (Rizkiawan, 2025).

However, the digital era presents increasingly complex challenges to patent protection. Technologies enabling instantaneous distribution of innovations facilitate digital piracy, making infringement detection and enforcement more difficult (Suhaeruddin, 2024). The ease of duplication exacerbates losses for patent holders, while global distribution raises jurisdictional issues due to differing IP regulations across countries. Rapid advancements in AI, blockchain, and the Internet of Things (IoT) outpace the ability of existing legal frameworks to adapt, and the emergence of AI-generated inventions raises new questions about ownership rights (Hutasoit et al., 2023). Therefore, a paradigm shift in patent protection is essential to align with digital-era realities.

In Indonesia, enforcing patent rights remains particularly challenging due to the global and decentralized nature of digital technologies. Patent infringements include unauthorized manufacturing, use, sale, or import of patented products. Violations are punishable by fines of up to IDR 1 billion and imprisonment of up to four years, alongside potential civil damages (Syahputra & Silalahi, 2025). Nevertheless, proving infringement, especially for software or digital content, remains difficult (Arnanda et al., 2024). To strengthen enforcement and innovation, the Indonesian government continues to promote patent protection through incentives for inventors and businesses, as patents drive collaboration and technology transfer via licensing (Tambunan, 2025). Despite the existence of an online filing system, bureaucratic inefficiencies persist, and public understanding of intellectual property remains low (Hawin & Riswandi, 2020). DJKI conducts outreach programs, training, and seminars to raise awareness and encourage patent applications, thereby promoting innovation and economic growth (Rizkiawan, 2025).

As digital technologies such as software, algorithms, and AI evolve rapidly, Indonesia's legal framework must become more flexible to accommodate innovation while maintaining protection standards (Edgina et al., 2024). Patent

protection should extend beyond physical inventions to include digital innovations, supported by international cooperation to establish harmonized global standards that mitigate cross-border infringements.

In 2024, the government enacted Law No. 65 of 2024, the Third Amendment to Law No. 13 of 2016 on Patents, in response to fast-paced technological developments and growing societal demands (DJKI, 2024). This amendment introduces comprehensive provisions on digital-era inventions, including restrictions on computer program-related inventions and deadlines for filing applications following public disclosure. The reform aims to streamline the patent registration process and enhance legal certainty for inventors, businesses, and academic institutions (Ristawati, 2024). Moreover, it emphasizes collaboration between the government, industry, and academia to ensure effective implementation of patent policies. Through continuous public outreach and education, DJKI seeks to strengthen public understanding of patent law and foster an innovation-driven ecosystem that supports Indonesia's economic growth.

The Patent Protection System of the People's Republic of China in Responding to the Development of Digital Technology

The Patent protection in the People's Republic of China is governed by the Patent Law of the People's Republic of China, which was first enacted in 1984 and has since undergone several amendments, primarily to ensure compliance with China's obligations under the TRIPS Agreement (Ruhtiani, 2022). China adopts the first-to-file system, which grants patent rights to the first individual or entity to submit an application. The 2008 amendment introduced provisions on the protection of genetic resources, while subsequent revisions extended patent terms for new pharmaceutical products and related inventions as compensation for regulatory review periods. In addition to the Patent Law, the Implementation Regulations and Examination Guidelines issued by the China National Intellectual Property Administration (CNIPA) serve as supplementary

instruments overseeing patent administration and examination processes (Faustine et al., 2024). Together, these instruments form a comprehensive legal framework that ensures patent protection and promotes innovation in China.

China recognizes three main types of patents: invention patents, utility model patents, and design patents. First, invention patents are regarded as the “gold standard” of protection, covering significant technological innovations that demonstrate novelty, inventiveness, and industrial applicability. They provide protection for 20 years from the filing date and undergo substantive examination to ensure compliance with strict legal standards. These patents typically protect new technical solutions or improvements to existing products, processes, or uses—such as advancements in pharmaceuticals, medical treatments, manufacturing processes, or disruptive technologies like artificial intelligence and renewable energy. The examination process generally takes three to five years, and annual maintenance fees are required to keep the patent in force (Ribowo & Roisah, 2019).

Second, utility model patents—often referred to as “petty patents”—offer a faster and more affordable protection mechanism for practical or incremental innovations. Protection lasts 10 years from the filing date and involves formal examination only, which expedites registration. These patents are ideal for improvements in shape, structure, or combination of product features, such as mechanical modifications or efficiency improvements in components. Applications are typically approved within 6 to 12 months, providing a temporary safeguard while awaiting the approval of a corresponding invention patent. Although not substantively examined, utility model patents remain an effective tool for protecting minor yet valuable technical improvements (Ribowo & Roisah, 2019).

Third, design patents focus on protecting the aesthetic features of products—such as shape, pattern, color, or their combination—that contribute to commercial value. These patents are particularly significant for industries where visual appeal determines market success. As of the 2021 amendment, the protection term for design patents was extended from 10 to 15 years. Applications undergo only formal examination to verify compliance with originality and

distinctiveness requirements. Typical examples include innovative smartphone designs, furniture models, and fashion patterns. Registration is generally completed within 6 to 8 months, with low filing and maintenance costs (Ruhtiani, 2022).

China also provides a six-month grace period for inventors to file patent applications after publicly disclosing their inventions—such as during exhibitions, conferences, or publications—without losing novelty (Nathaniel et al., 2024). Furthermore, China allows dual-filing strategies, permitting applicants to file both an invention patent and a utility model patent for the same technical solution. This dual approach provides immediate protection through the utility model patent and long-term security through the invention patent (Faustine et al., 2024).

The Chinese system's reliance on the first-to-file principle underscores the importance of swift submission to avoid forfeiture of rights. China's membership in the Patent Cooperation Treaty (PCT) facilitates international patent protection through a single application process. However, foreign inventors residing in China must obtain a Foreign Filing License before submitting patent applications abroad, as required by Article 18A of the Chinese Patent Law. All patent applications must be submitted in Mandarin Chinese, making accurate translation and local legal expertise essential (Ruhtiani, 2022).

Despite its strengths, China's patent protection system faces several challenges, including unauthorized production by domestic companies, online piracy, and trademark squatting. Issues such as forced technology transfer and malicious patent cancellations by competitors persist. The first-to-file mechanism can also result in the loss of patent rights due to delays in filing. Foreign entities sometimes encounter trade secret misappropriation and bad-faith trademark registration by local actors (Putri, 2023). Moreover, the misuse of punitive damages in "patent trolling" cases—where individuals or entities accumulate patents solely to demand financial settlements—has raised concerns about legal exploitation and its chilling effect on innovation (Magdariza, 2023).

Nevertheless, patent enforcement in China has improved remarkably. The judiciary has strengthened IP courts and tribunals, introducing punitive damages

to increase the cost of infringement and deter violations. In 2023, Chinese courts awarded damages in 319 IP infringement cases, marking a 117% annual increase, with total compensation reaching 1.16 billion yuan (Najmi & Daulay, 2023). These reforms were complemented by actions against illegal trademark registrations and counterfeiting, and by enhanced protection for emerging IP categories, including artificial intelligence (AI) and data ownership rights (Kartikawati, 2025; Hariyanto et al, 2024).

China's commitment to intellectual property protection is reflected in the launch of its National IP Blueprint 2024–2035, jointly developed by CNIPA and other top IP regulatory bodies. This roadmap aims to digitize and modernize the national patent system, establish smart IP enforcement mechanisms, and reinforce IP-specialized courts to ensure legal consistency and efficiency (Devi & Sulistyono, 2024). CNIPA has also streamlined patent examination procedures, reducing review times to 16 months in 2023—faster than in the United States, Europe, Japan, and South Korea—and further targeting 15 months by 2025 (Kartikawati, 2025). Through these reforms, China demonstrates a comprehensive and future-oriented patent system that integrates digital technologies, enhances transparency, and balances protection with innovation. Its evolving framework positions the country as a global leader in intellectual property governance amid the rapid advancement of digital technology.

Similarities and Differences Between the Patent Systems of Indonesia and China in Addressing Digital-Era Challenges

In the rapidly evolving digital era, the patent protection system has become vital as a key driver of innovation and knowledge-based economic growth. Patents grant inventors exclusive rights to exploit their inventions while simultaneously promoting the dissemination of technology through publication. Amid globalization and digital transformation, nations are building patent systems that are not only legally robust but also responsive to the dynamics of emerging technologies such as artificial intelligence (AI), blockchain, and the Internet of Things (IoT) (Martinelli et al., 2024). Indonesia and China—two countries with distinct legal traditions—face a shared challenge: how to protect

exclusive invention rights within a rapidly changing digital ecosystem. As a developing country, Indonesia continues to strengthen its regulatory and institutional capacities in the field of intellectual property, whereas China, as a major economic power, has positioned its patent system as a strategic instrument for technological diplomacy and industrial competitiveness.

Both Indonesia and China base their patent systems on international legal principles established under the Paris Convention for the Protection of Industrial Property and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). As members of the World Trade Organization (WTO), both countries are obligated to implement minimum standards of intellectual property protection (Ritonga et al., 2024). In Indonesia, patent regulation is codified in Law No. 13 of 2016 on Patents, which replaced previous legislation to align with global developments (Nathaniel et al., 2024). Meanwhile, China governs its patent law through the Patent Law of the People's Republic of China, which has undergone several major amendments, most recently in 2020, to address technological advances and the surge in patent filings. Substantively, both systems recognize novelty, inventive step, and industrial applicability as essential requirements for patentability. Additionally, both jurisdictions provide protection for utility model patents (simple patents), acknowledging smaller-scale technical innovations (Sugito & Syahrudin, 2021).

Despite these shared international foundations, significant differences exist in how each country responds to the challenges of digital innovation, particularly in protecting software and algorithms (Arnanda et al., 2024). China's patent system demonstrates a high degree of adaptability through regulatory updates that allow patent protection for software-based inventions, provided that the algorithms are applied within a concrete technical context. The Patent Examination Guidelines issued by the China National Intellectual Property Administration (CNIPA) state that an algorithm may qualify as a patentable invention if integrated into a technical process, such as hardware systems or automated control mechanisms. In contrast, Indonesia maintains a more restrictive approach; its Patent Law does not explicitly recognize software as a patentable subject matter, categorizing it instead under copyright protection.

This limitation constrains the scope of protection for functionally technical digital innovations, potentially impeding the growth of technology-driven enterprises, particularly startups relying on application-based or information systems innovation (Taqiya & Bustani, 2025).

Institutional capacity plays a pivotal role in determining the effectiveness of a patent protection system. In Indonesia, the Directorate General of Intellectual Property Property (*Direktorat Jenderal Kekayaan Intelektual/DJKI*) under the Ministry of Law and Human Rights is responsible for administering and examining patent applications. However, DJKI faces constraints in the number and technical expertise of patent examiners, particularly in rapidly evolving digital technology sectors (Ruhtiani, 2022). Consequently, examinations often experience delays, and the outcomes may not fully capture the technical complexity of submitted inventions. Conversely, China, through CNIPA, has developed a more structured and integrated examination framework that employs digital technologies to screen and evaluate inventions efficiently. CNIPA collaborates with private and academic institutions to enhance the quality of examinations and adapt to new technological trends. The Chinese government strategically positions CNIPA as a central institution in its national innovation strategy, supported by substantial resources and strong political backing. This institutional disparity underscores that institutional efficiency and capacity are key determinants of a patent system's ability to respond effectively to digital-era demands.

Digital challenges extend beyond registration and encompass legal enforcement—an area where notable differences between Indonesia and China persist. Indonesia has yet to establish a specialized Intellectual Property Court distinct from its general judiciary (Ruhtiani, 2022). Patent disputes are adjudicated by commercial courts, which often face limitations in judicial expertise and procedural efficiency, leading to prolonged litigation and weak deterrence against infringement (Sugito & Syahrudin, 2021). In contrast, China has established specialized IP courts in major cities such as Beijing, Guangzhou, and Shanghai, staffed by judges with both legal and technical backgrounds. These courts enable faster, more professional, and more consistent adjudication of

patent disputes. Furthermore, CNIPA plays an active supervisory role in monitoring the enforcement of court decisions, fostering a more integrated IP enforcement ecosystem.

To clarify and systematically compare these two patent systems, a comparative table may be constructed, outlining seven key dimensions that form the foundation of modern patent governance: the legal framework, compliance with international agreements, recognition of software and algorithmic patents, institutional examination capacity, enforcement mechanisms, judicial infrastructure, and the existence of specialized intellectual property courts. This structured comparison highlights how Indonesia and China, though grounded in similar international norms, diverge in institutional readiness, technological adaptability, and legal responsiveness to the demands of the digital era.

TABLE I. Comparison of the Patent Systems of Indonesia and China

Aspect	Indonesia	China	Similarities	Differences
Legal Basis	Law No. 13 of 2016 and Law No. 65 of 2024	Patent Law of the People's Republic of China & CNIPA Regulations	Both adopt the first-to-file principle	Indonesia is based solely on national law, while China integrates national legislation with international policy frameworks
Types of Patents	Standard Patent and Simple Patent	Invention Patent, Utility Model, and Design Patent	Both recognize technical and innovative patents	Indonesia recognizes two patent types; China recognizes three

Principle of Protection	First to File	First to File	Both aim to accelerate the patent application process	-
Use of Technology	Online filing system (paten.dgip.go.id); AI-assisted examination	Blockchain integration, efficient service centers, AI-based systems	Both are adapting to digital technologies	China's system is more advanced and technologically integrated
Examination Period	3–5 years	15 months (by 2025)	Both face infringement challenges in the digital era	China's examination process is significantly faster and fully integrated
Specialized IP Courts	Limited specialized IP courts under commercial courts	18 specialized IP courts nationwide	Both have national legal frameworks as reference points	China has dedicated IP courts; Indonesia does not yet have a fully independent system
Public Education & Awareness	Generally low public awareness	High public awareness with national	Both require capacity building for law	Public awareness is higher and more

		education programs	enforcement officers	institutionalized in China
Digital Law Enforcement	Conventional approach; difficulty proving digital evidence	Digital evidence systems and significant punitive damages	Both regard patents as part of national innovation strategy	China recognizes and enforces digital evidence effectively; Indonesia has not yet optimized enforcement
Digital Innovation (Blockchain, AI, etc.)	Implementation not yet comprehensive	Advanced and systematic through the IP Blueprint 2035	Both promote cross-sector collaboration (government, industry, academia)	China has a clear digital innovation roadmap; Indonesia's implementation remains partial

From the table above, it is evident that China demonstrates a more progressive system in terms of patent protection for digital inventions and the strengthening of law enforcement institutions. The China National Intellectual Property Administration (CNIPA) serves not only as an administrative body but also as the driving force behind legal innovation in the field of intellectual property. In contrast, Indonesia still requires institutional strengthening, improvement in the quality and expertise of patent examiners, and the establishment of specialized courts to ensure optimal patent protection. The table illustrates that although both Indonesia and China adhere to international frameworks, national-level implementation is heavily influenced by institutional

capacity and each country's strategic approach in responding to the challenges of the digital era.

Conclusion

In conclusion, Indonesia's patent protection system, as governed by Law No. 13 of 2016 on Patents and its subsequent amendment under Law No. 65 of 2024, demonstrates a developing yet evolving framework aimed at strengthening intellectual property rights in the digital era. While Indonesia adheres to the first-to-file principle and has introduced digital registration mechanisms through DJKI's online system, challenges persist, including bureaucratic inefficiencies, limited examiner expertise, and low public awareness of patent significance. The rapid growth of digital technologies such as AI, blockchain, and IoT demands a more flexible and adaptive legal framework capable of addressing new forms of innovation and infringement. Moreover, enforcement remains a critical issue due to difficulties in proving violations and inadequate judicial specialization. To ensure effective protection, Indonesia must enhance institutional capacity, promote cross-sector collaboration among government, academia, and industry, and align its legal standards with global practices to safeguard innovation and competitiveness in the digital age.

China's patent protection system, governed by the Patent Law of the People's Republic of China and supervised by the China National Intellectual Property Administration (CNIPA), represents a comprehensive and adaptive legal framework designed to support innovation in the digital era. Through its three-tiered patent structure—invention, utility model, and design patents—China provides both flexibility and efficiency in safeguarding technological progress. Continuous amendments to its patent law, the implementation of digital integration strategies, and the establishment of specialized IP courts demonstrate China's proactive stance in strengthening intellectual property enforcement and fostering a culture of innovation. Despite persistent challenges such as patent trolling, trade secret theft, and unauthorized replication, China's commitment to modernization is evident in initiatives like the IP Blueprint 2035 and expedited examination timelines. Overall, China has successfully positioned

its patent regime as a strategic tool for technological leadership and economic competitiveness in the global digital landscape.

The comparison between Indonesia and China reveals that while both nations adhere to international frameworks such as the Paris Convention and TRIPS Agreement, their levels of implementation and institutional readiness differ significantly in addressing digital-era patent challenges. China demonstrates a more progressive and integrated system through CNIPA's digital innovation roadmap, specialized IP courts, and the incorporation of emerging technologies like AI and blockchain in patent administration and enforcement. In contrast, Indonesia continues to strengthen its regulatory and institutional framework but still faces obstacles such as lengthy examination periods, limited examiner expertise, and the absence of specialized judicial mechanisms. Despite these gaps, both countries share a common goal of enhancing patent protection to foster innovation and economic growth. Going forward, Indonesia can draw valuable lessons from China's experience, particularly in digital integration, institutional modernization, and legal adaptability, to establish a more effective and forward-looking patent protection system suited to the dynamics of the digital age.

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Competing Interest

The authors declare that there are no competing interests.

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