Research Article

Patents at the Crossroads: Legal Pathways for Advancing Technology Transfer in Indonesia

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ABSTRACT

Indonesia needs technology for industrial infrastructure, but it is still controlled by developed countries. Patent licensing agreements can help facilitate this process. However, Indonesia's patent registrations are slow due to a lack of regulations and internal factors.This study aims to analyze the role of patent licensing in transferring technology from developed to developing countries. Patent license agreements play a crucial role as a mechanism for technological development. Therefore, it is essential to find solutions to ensure an effective transfer of technology.This research employs a statutory and conceptual approach. The analysis follows a deductive method by examining general laws and regulations before drawing conclusions.The results show that several regulations related to technology transfer serve as the main reference for understanding why technology transfer is difficult to achieve and identifying its underlying causes. Once these causes are identified, appropriate solutions can be proposed. The lack of regulations in Indonesia's legal framework for technology transfer hinders its full potential. In conclusion, Indonesia's technology transfer laws have not been effective due to the absence of clear implementation guidelines and strict penalties. Therefore, a specific law regulating technology transfer is needed, emphasizing its importance and benefits while ensuring a strong commitment from all relevant parties.

Keywords: Patent License; Technology Transfer; Indonesia Law; Working Patent Contract

A. INTRODUCTION

Indonesia, as a developing country, requires technology to build various industrial infrastructures (Ellitan, 2020). Currently, technology remains largely controlled by developed countries, while developing nations struggle to keep up (Wagire et al., 2021). To bridge this gap, patent licensing agreements between developed and developing countries serve as a crucial mechanism. Therefore, it is essential to establish an appropriate legal framework to ensure that patent licenses achieve their intended targets and objectives. Patents should not be monopolized to the extent that others are denied the opportunity to implement them (Meghani, 2021). If a patent is implemented by its inventor (the owner), the implementing party must facilitate technology transfer, job creation, and investment in the country where the patent is applied (Hutauruk, 2022).

However, the anticipated technology transfer has not proceeded smoothly (Da Silva, Kovaleski, & Pagani, 2019). A major challenge, particularly for developing countries (Morah,

1996), is that technology-owning nations are often reluctant to fully share their technology (Dung, Tri, & Minh, 2021). As a result, legal protection and technology transfer through the patent system have become significant issues of international concern (Hall, 2014), especially for developing nations that lag far behind industrialized countries (Wade, 2003). On one hand, developing countries urgently need technology to drive economic growth (Benoit, 1978). On the other hand, developed countries view technology as a valuable asset that must be protected and, if utilized, should generate financial returns (Heeks, 2010).

According to Anthony D'Amato and Doris Estella Long in *International Intellectual Property Law* (D'Amato & Long, 1997), several theories have been proposed regarding intellectual property (IP). One of these is *prospect theory*, which applies to IP protection in the field of patents. This theory suggests that when an inventor discovers a significant invention that initially appears to have limited benefits, but later another party develops it into a useful and innovative product, the original inventor should receive legal protection for their initial discovery. Another relevant concept is the *trade secret avoidance theory*, which posits that in the absence of patent protection, companies have a strong incentive to safeguard their inventions as trade secrets. This theory argues that patent protection can be economically inefficient, leading inventors to prefer trade secret regimes over patent registration. As a result, patent registration rates in Indonesia remain low despite the country's considerable potential, supported by numerous government and private research institutions. This gap explains why patent growth in Indonesia remains stagnant and lags behind other countries.

The *National Law Development Agency (BPHN)* highlights this issue in its draft *Patent Law*, noting that while Indonesia has been a member of the WTO and has ratified various international conventions on intellectual property rights (IPR), including the *Patent Cooperation Treaty (PCT)* through *Presidential Decree No. 16 of 1997*, domestic patent applications remain significantly lower than those from foreign applicants. Despite a notable increase in patent applications via the "PCT route" received by the *Directorate General of Intellectual Property* (Ditjen HKI), the number of locally filed patents is still disproportionately small compared to foreign applications.

In the patent system, two types of licenses exist: *voluntary licenses* and *compulsory licenses* (Reichman, 2009). A compulsory license can only be granted if a voluntary licensing agreement is unsuccessful (Moser & Voena, 2012) or if the patent holder refuses to grant a license (Anawalt, 1989). In the context of technology transfer, developed countries are expected to facilitate and support developing nations in acquiring technology (Guo & Li, 2018). This obligation is outlined in *Article 7 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)* (Haugen, 2021; Budi, Girodon-

Hutagalung, & Irawati, 2024; Roisah, 2015), which Indonesia has ratified through *Law No. 7 of 1994* (Romadhona, 2022).

Working patents serve as tangible assets that demonstrate the feasibility and potential value of an innovation, forming the foundation for further technology transfer, licensing, and investment opportunities (Budi, 2019). These patents are actively implemented in products, processes, or services, highlighting their practical applications and commercial viability. Technology transfer refers to the process of transferring knowledge, expertise, or technology from one organization to another, often for commercialization (Dewi & Suteki, 2017). Patents play a central role in this process by providing legal protection for innovations, making them more attractive to potential recipients (Pandey, de Coninck, & Sagar, 2022). The presence of a working patent enhances trust in a technology's market readiness, facilitating negotiations for transfer agreements. Licensing is a common method for monetizing patents, allowing third parties to use patented technologies in exchange for royalties, lump-sum payments, or other benefits. A working patent signals market readiness and increases the likelihood of commercial success, making it appealing for investment (Göktepe-Hulten & Mahagaonkar, 2010). Investors, including venture capitalists, private equity firms, and corporate backers, may inject funds into startups or companies with patented technologies to scale production, expand markets, or enhance innovations (Masrur et al., 2024). Thus, working patents act as a bridge connecting innovation, commercialization, and financial growth through technology transfer, licensing, and investment.

Despite the existence of national and international regulations, these frameworks have not fully facilitated the rapid technology transfer that Indonesia needs. This is evident from Indonesia's slow technological growth. In 2016, Indonesian patent registrations totaled 10,366, compared to 23,610 in Japan. In 2017, Indonesian registrations increased slightly to 10,876. Between 2020 and 2023, there was a significant rise in patent registrations, reaching 10,858, 12,474, 14,047, and 15,030, respectively. However, in 2024, registrations declined sharply to 8,088 (Direktorat Jenderal Kekayaan Intelektual, 2024).

According to Aisyah Nur Thalib et al., *Indonesian Patent Law No. 14 of 2001* outlines two mechanisms for transferring foreign technology to developing nations: licensing to local firms and direct investment (Thalib, Santoso, & Prananingtyas, 2019). Some governments have implemented an automated licensing system to address shortcomings in compulsory licensing. This system allows patentees to protect their patents from compulsory licensing or revocation due to non-use by voluntarily petitioning the patent office to annotate the patent with the phrase "licenses of right." In involuntary licensing, patentees may assign licenses to third parties under conditions determined by a legally authorized entity, including remuneration. In the

absence of an alternative arrangement, patent holders can voluntarily grant licenses to third parties for the duration of the patent's validity. This method is particularly beneficial for developing countries, as it ensures that once a patent is available for licensing, its use is no longer dependent on the patent holder's discretion. Additionally, *Investment Law No. 25 of 2007* mandates that foreign-invested companies establish and/or offer training and educational programs for Indonesian nationals, either domestically or abroad. While this regulation is essential for national industrial development, technology transfer remains primarily an economic arrangement, limiting its direct benefits for Indonesian citizens.

A study by Yurida Zakky Umami indicates that *Regulation No. 36 of 2018* governs the registration of intellectual property licensing agreements in Indonesia, following *Ministerial Regulation No. 8 of 2016* on intellectual property licensing (Umami, 2019). However, there is no clear documentation or registration process for these agreements, leaving both the Indonesian government and the public unaware of the terms between foreign technology owners and Indonesian licensees. The *Patent Law* lacks detailed provisions on how the government can regulate the content and limitations of these agreements. Technology companies exploit this legal ambiguity by arguing that licensing agreements fall primarily under *Articles 1338 and 1320 of the Civil Code*, which uphold the principle of contractual freedom. *Ministerial Regulation No. 8 of 2016* requires applicants to submit a registration application, but registration is based on voluntary disclosure without mandatory requirements or enforcement. The lack of synchronization between government and ministerial regulations on intellectual property licensing creates legal uncertainty, weakening Indonesia's intellectual property framework and technology transfer efforts.

According to Romli Mubarok, inventions or technological discoveries in Indonesia are protected through patents, which are exclusive rights granted by the state to inventors for their technological innovations (Mubarok, 2016). Patents are awarded for a period of 20 years from the date of application submission and cover procedures, applications, formulations, goods, and items utilizing specific processes. Meanwhile, simple patents receive legal protection for 10 years. Article 2 of the Patent Law outlines the requirements for patent issuance, emphasizing that an innovation must include an inventive step, meaning it is not obvious to someone skilled in the relevant technical field. The assessment of whether an invention is unexpected must be based on the knowledge available at the time of application submission or, in cases where priority rights are claimed, at the time of the first application.

Article 16 of the Patent Law defines the exclusive rights of patent holders, granting them sole authority to exploit their patents and prevent others from doing so without permission. These

exclusive rights include manufacturing, using, selling, importing, leasing, distributing, or offering the patented product for sale, lease, or distribution. The exclusive rights outlined in Article 16 pertain to both patented items and methods, allowing the patent holder to commercially utilize the invention independently or to grant rights to others. Licensing serves as a legal mechanism for technology transfer and is categorized into exclusive and non-exclusive licenses. An exclusive license permits the patent holder to fully exploit their patent rights, whereas a non-exclusive license does not provide complete authorization. Licenses can be either general, granted by the patent holder, or compulsory, issued by the Directorate General of Intellectual Property.

The Patent Law replaced Law Number 13 of 1997 due to its inadequacy in addressing contemporary technological advancements. To prevent unauthorized replication or infringement, any entity intending to manufacture or develop a patented invention for commercial gain must obtain formal consent from the patent holder, referred to as a "license." If another party develops the patented technology for commercial or other purposes, the original patent holder is entitled to appropriate compensation, reflecting the economic benefits derived from their work. This study aims to identify the role of patent licensing agreements in technology transfer, particularly in the context of Indonesia as a developing country.

Indonesia's technology transfer policies emphasize self-reliance, sustainable development, and knowledge dissemination to enhance national innovation and capacity (Hidayat & Virgianita, 2019). Key domestic regulations include Law No. 13/2016 on Patents, which mandates the utilization of patents in Indonesia and requires technology owners to collaborate with local institutions or companies. The Investment Law (Law No. 25/2007) encourages foreign investors to prioritize partnerships with Indonesian entities to facilitate technology transfer in priority sectors such as renewable energy and manufacturing. Government Regulation No. 29/2019 on Industrial Empowerment obligates companies, particularly foreign-owned enterprises, to contribute to workforce training and technology adoption in industrial sectors.

International regulations also play a role in governing technology transfer, including the World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), Special and Differential Treatment (SDT) provisions, the United Nations Framework Convention on Climate Change (UNFCCC), and the Sustainable Development Goals (SDGs). Additionally, Indonesia has established specific agreements with countries such as Japan, South Korea, and China to enhance technology transfer in key sectors like automotive, electronics, and artificial intelligence. Despite these measures, the implementation of patent licensing for technology transfer in

Indonesia remains challenging. Several obstacles hinder the effectiveness of technology transfer through patent licensing (Faujura, Gultom, & Sudjana, 2021). These obstacles stem from both internal and external factors (Roh, Lee, & Yang, 2021).

External factors primarily involve the policies of licensing countries, which often seek to retain control over their technology, fearing that its transfer could lead to competitive disadvantages (Pitkethly, 2001). Additionally, licensing contracts frequently contain clauses that disproportionately favor licensors, giving them greater bargaining power over licensees (Goldman, 1991). As a result, Indonesian licensees have limited opportunities to include clauses that protect their interests in technology transfer agreements (Andrenelli et al., 2019). Analyzing these external factors is essential for developing a more balanced approach to technology transfer.

On the other hand, internal challenges in Indonesia include the lack of regulatory synchronization, which hampers effective technology transfer. According to the Global Innovation Index 2024, Indonesia ranks 54th out of 133 countries, with an overall score of 30.6, classifying it as an upper-middle-income country (Dutta et al., 2024). However, the current regulatory framework remains unresponsive to the needs of technology transfer. This paper will analyze the shortcomings of Indonesia's legal and regulatory framework to understand why technology transfer has been slow to develop. Addressing these legal and institutional gaps is crucial to fostering a more effective technology transfer system in Indonesia.

B. RESEARCH METHODS

This research employs normative legal research, utilizing a statutory and conceptual approach (Vermeule, 2006). The analysis is conducted using the deductive method (Worster, 2013), examining general laws and regulations, supplemented by specific clauses in license contracts relevant to addressing the research problem. This study analyzes various laws and regulations concerning technology transfer. The primary legal materials consist of patent laws, as well as other laws and regulations related to technology transfer. Meanwhile, the secondary legal materials include expert opinions in the field, complemented by legal materials in the form of patent license contract clauses that primarily benefit the licensor.

C. RESULTS AND DISCUSSION

1. Challenges and Legal Frameworks in Technology Transfer in Indonesia

Patent law serves as a legal mechanism that grants inventors exclusive rights to their inventions for a specified period, typically 20 years. The primary purpose of patent law is to incentivize innovation by providing temporary monopolies over inventions in exchange for public disclosure. However, the effectiveness of patents depends on their real-world impact on technological progress, competition, and society. Patent law is designed to balance two conflicting

interests: rewarding inventors with exclusive rights and promoting public access to knowledge and innovation.

From a legal positivism perspective, patents exist as legal facts because they are established by law, regardless of their effectiveness in fostering innovation. In contrast, legal realism argues that the effectiveness of patents depends on their actual impact on technological advancement, competition, and economic growth. In practice, patents do not always fulfill their intended purpose and can create monopolies that hinder competition. Large corporations often engage in patent hoarding, acquiring numerous patents not to innovate but to block competitors. This demonstrates how the legal system can be manipulated to serve interests contrary to its original intent. The effectiveness of patent law largely depends on the way institutions implement and enforce it. Patent offices, courts, and regulatory agencies shape how patents function in practice. If patent offices grant overly broad or vague patents, it can lead to the rise of patent trolls, entities that exploit the system by suing companies for infringement without producing anything. Enforcement also varies by jurisdiction—weak legal systems fail to prevent patent infringement, while overly strict enforcement can suppress competition and stifle innovation. As a result, the real-world application of patent law often deviates from its intended purpose due to institutional inefficiencies, corporate strategies, and socioeconomic dynamics.

This issue is particularly relevant in Indonesia, where existing laws and regulations do not comprehensively regulate technology transfer (Kumar, Kumar, & Persaud, 1999). Provisions on technology transfer often serve as mere complementary measures rather than enforceable obligations with strict sanctions (Anokhin, Wincent, & Frishammar, 2011). This lack of enforcement has been a significant internal barrier to effective technology transfer. Several Indonesian laws and regulations address technology transfer (Asmoro, 2017), including Law Number 13 of 2016 on Patents. Article 78 of this law explicitly states that license agreements must not contain provisions that could harm Indonesia's national interests or impose restrictions that hinder the country's ability to transfer, control, and develop technology (Barizah, 2021).

A key provision in Indonesia's patent law is Article 20 of Law No. 13 of 2016, which requires patent holders to implement their inventions in Indonesia (Geofrey & Roisah, 2020). This provision was later amended by the Omnibus Law (Law No. 11 of 2020), which introduced comprehensive reforms across various sectors, including intellectual property. Before the amendment, patent holders were required to manufacture their patented products or use patented processes in Indonesia within three years of patent approval, with non-compliance resulting in patent revocation or compulsory licensing. However, the Omnibus Law eased these requirements by broadening compliance

options, allowing licensing as a valid form of implementation, and adopting a more investor-friendly approach. While sanctions for non-compliance remain, the amendment provides greater clarity and flexibility, reducing risks for patent holders who prefer licensing agreements over direct manufacturing. The revised law reassures foreign investors and patent holders, who can now maintain their patents without establishing costly local operations. Nonetheless, critics argue that the relaxation of local manufacturing requirements undermines the original intent of Article 20, potentially limiting Indonesia's direct benefits in industrial and technological development (Roisah et al., 2022). The amended Article 20 reflects Indonesia's effort to balance national interests with the need to foster a business-friendly environment for foreign investors.

Furthermore, Article 79(3) of the Patent Law states that a patent license agreement cannot include provisions that hinder Indonesia's technological development, particularly in terms of technology transfer from developed countries. If an agreement contains such restrictive clauses, it will not be recorded by the Ministry of Law and Human Rights of the Republic of Indonesia, rendering it unenforceable against third parties (Larasati, Munabari, & Sumarwan, 2022). Consequently, unregistered patent license agreements cannot legally bind third parties.

The Patent Law also includes provisions for compulsory licensing (Love, 2007). Article 100 emphasizes that, concerning semiconductor technology, a compulsory license may only be used for public, non-commercial purposes or when a court or regulatory body has determined that the patent holder engaged in monopolistic or unfair business practices. However, in practice, compulsory licensing has played a limited role in accelerating the transfer of advanced technology. Studies indicate that compulsory licensing has not significantly contributed to technology transfer, as it is rarely utilized for mastering and developing technology (Rahma, 2022). Despite the provisions allowing both standard and compulsory licensing, technology transfer has not occurred as expected. One reason for this stagnation is the amendment of Article 20, which was replaced by Article 107 of Law No. 11 of 2020 on Job Creation (Omnibus Law) (Perdana, 2021). The obligation to transfer technology, as previously required under Article 20, has effectively been removed.

Originally, Article 20 of Law No. 13 of 2016 mandated that patent holders manufacture products or use patented processes in Indonesia to support technology transfer, investment absorption, and employment generation (Septihana & Cahyarini, 2022). However, Article 107 of Law No. 11 of 2020 no longer emphasizes these objectives. The revised regulation considers a patent implemented if the patent holder manufactures, imports, or licenses the patented product. Similarly, process patents are deemed implemented if the resulting products are manufactured, imported, or licensed. Consequently, there is no longer an explicit obligation for patent holders to manufacture

products in Indonesia or contribute to technology transfer, investment, and job creation. This shift has removed the nationalistic spirit from patent regulations, weakening efforts to protect Indonesia's interests and promote economic self-reliance.

This situation reflects a new form of technological colonization, where patents serve as tools for developed industrial nations to exert control over developing countries. Despite the TRIPs Agreement's mandate for technology transfer, its implementation remains challenging. Amendments in Indonesia's patent law were influenced by pressure from developed countries, which seek to protect their intellectual property rights and prevent their patents from being appropriated through technology transfer agreements.

Further complicating the situation, Minister of Law and Human Rights Regulation No. 15 of 2018 allows patent holders to postpone the implementation of Article 20 for up to five years if they are unable to comply (Septihana & Cahyarini, 2022; Rahayu et al., 2023). This creates a legal inconsistency, as lower regulations effectively override higher legal provisions, contradicting fundamental legal principles.

Technology transfer is also addressed in Law No. 25 of 2007 on Investment (Leonard et al., 2020), particularly in Article 10(4) and Article 18(3)(d), which require foreign investment companies to engage in technology transfer when operating in Indonesia (Sara, 2021). Additionally, Law No. 11 of 2019 on the National Science and Technology System mandates that research collaborations between foreign investors and Indonesian institutions include technology transfer mechanisms (Suryahartati, 2019).

The latest amendment to Indonesia's Patent Law, Law No. 65 of 2024, represents the third revision of Law No. 13 of 2016. This amendment modernizes the country's intellectual property framework, aligning it with global best practices (Law No. 65 of 2024). Key changes include clearer regulations on computer-related inventions, improved patent protection for software innovations, and provisions addressing patents related to living organisms. These reforms aim to strengthen inventor protection and enhance Indonesia's global competitiveness in intellectual property. However, despite these improvements, the law lacks strict enforcement mechanisms, making it less effective in ensuring compliance.

On an international level, Article 7 of the TRIPs Agreement (Rochel, 2020), which Indonesia ratified through Law No. 7 of 1994 (Butt, 2014), emphasizes the obligation of developed countries to facilitate technology transfer to developing nations. However, Indonesia's Intellectual Property Law does not clearly outline this obligation.

In conclusion, while national and international laws recognize the importance of technology transfer, Indonesia's legal framework remains insufficiently enforceable. Presidential Regulation No. 118 of 2020 on Industrial

Technology Procurement via Turnkey Projects seeks to accelerate technological mastery in Indonesia. However, effective implementation remains a challenge due to legal inconsistencies and external economic pressures.

The provision stipulated that the Technology Provider was obligated to carry out technology transfer. Failure to comply would result in strict sanctions; however, the specific sanctions were not clearly regulated. Article 25, paragraph (1), outlined that technology transfer could be carried out through several stages (Thalib, 2014):

1. Planning;
2. Design and engineering;
3. Procurement;
4. Construction;
5. Operational trials (commissioning);
6. Operation and maintenance;
7. Decommissioning;

The existence of these various forms of technology transfer demonstrated that such transfers were permissible, provided they adhered to the established regulations. The ultimate goal was to ensure the rapid and effective implementation of technology transfer.

On the other hand, to accelerate technology transfer, the government could provide fiscal stimulus to encourage innovation among all technology development stakeholders. This stimulus could take the form of tax reductions for technology imports and incentives such as subsidies in various sectors. To facilitate technology imports effectively, policy implementation must be carefully targeted. Successful technology transfer depends on industries having the necessary resources to apply newly acquired technologies. Therefore, interventions should focus on industrial sectors that are financially and human-resource-ready. Conversely, technology transfer in unprepared or unproductive sectors may fail to yield optimal results due to the lack of human resource capabilities to manage the technology effectively.

Furthermore, Article 2 of Government Regulation No. 20 of 2005, concerning the Transfer of Intellectual Property Technology and the Results of Research and Development Activities by Higher Education Institutions and Research and Development Institutions (Ariyesti et al., 2022; Loeneto et al., 2022), mandates that universities and research institutions must undertake the transfer of intellectual property technology and research results. This applies particularly when research and development activities have been fully or partially funded by the government and/or local authorities, as long as such transfers do not conflict with public order or statutory regulations.

The obligation to transfer intellectual property technology and research outcomes applies to the Government, Regional Governments, Business Entities, and/or the general public. The primary objective of technology transfer is to disseminate science and technology while enhancing society's capacity to utilize and master these advancements for national and societal benefit. Article 13 specifies

that technology transfer must adhere to the following conditions (Busroh, 2018):

a. The recipient of intellectual property technology transfer and research outcomes should primarily be domestic entities.
b. The recipient must have the capability to utilize and master science and technology for the benefit of society and the state.
c. Intellectual property and research results transferred through technology must not be classified as confidential under existing legislation.
d. The implementation of technology transfer must not conflict with public order or legal regulations.

Interestingly, technology transfer can occur through both commercial and non-commercial means. If conducted on a non-commercial basis, it aims to:

a. Promote the mastery and application of essential science and technology for local, regional, and national development.
b. Encourage scientific and technological discoveries that benefit society, regions, and the state.
c. Support the growth of small and medium-sized enterprises (SMEs).

To facilitate the technology transfer program, universities and research and development institutions are required to establish dedicated work units responsible for managing and implementing technology transfer initiatives within their organizations.

Despite the well-intentioned objectives of this government regulation, its implementation has faced challenges. To date, universities have not effectively developed programs as envisioned in the regulation. Research efforts remain routine, with little focus on addressing technology transfer issues. This situation has been further exacerbated by funding reductions due to the COVID-19 pandemic, which has negatively impacted research quality and slowed progress in technology transfer initiatives.

2. Working Patent Contract Clauses and Their Impact on Technology Transfer in Indonesia

Patent working contracts and patent licenses play a crucial role in technology transfer by providing structured mechanisms for sharing innovations, facilitating knowledge dissemination, and driving economic and technological progress. These agreements define the rights and responsibilities of the parties involved in utilizing a patented invention, thereby promoting collaborative research and development (R&D), fostering localized technology transfer, and stimulating economic growth (Roisah, Rahayu, & Rachmanda, 2023).

Patent licenses grant licensees the right to use, produce, or sell an invention protected by a patent. These licenses can be exclusive, non-exclusive, or compulsory in specific circumstances. They facilitate knowledge exchange, reduce barriers to adoption, promote global technology diffusion, and allow for customized technology transfer. Additionally,

licenses can be tailored to specific needs, such as sublicensing rights, field-of-use restrictions, or technology adaptation requirements.

When effectively implemented, patent working contracts and licenses serve as complementary tools for achieving technology transfer objectives. They promote the commercialization of innovations, bridge gaps between inventors and implementers, and strengthen industrial and economic ecosystems. By enabling the application of advanced technologies, these instruments contribute to industrial development, job creation, and the enhancement of technological capabilities.

Patent working contracts and licenses are fundamental to technology transfer, providing structured frameworks for innovation sharing, knowledge dissemination, and economic advancement. When well-designed and effectively executed, these mechanisms create synergies that benefit both innovators and adopters, fostering sustainable development and global technological progress.

However, certain factors can hinder the effectiveness of patent license contracts, particularly clauses that fail to provide adequate protection or strong rights to the licensee. Some of these clauses impose restrictions that limit technology transfer, known as restrictive business practices (RBP). These include (Khairandy, 2016):

> "*The clauses in the license agreement were designed to limit the licensee's ability to develop the technology they received for free. These clauses included exclusive grant back provisions, challenges to validity, exclusive dealing, restrictions on research, use of personal resources, price fixing, restriction of adaptation, exclusive sales or representation agreements, ties arrangements, export restrictions, restrictions after expiration of arrangement, volume limiting, scope, and production capacity clauses, and conditional clauses. Exclusive grant back provisions required the licensee to provide the results of their technological innovation to the owner for free. Challenges to validity restricted technology recipients from questioning the validity of the licensed patent, which could have led to the technology becoming public domain. Exclusive dealing clauses prohibited the licensee from entering into similar agreements with other parties for profit or technological activities. Restrictions on research, use of personal resources, price fixing, restriction of adaptation, exclusive sales or representation agreements, ties arrangements, export restrictions, restrictions after expiration of arrangement, volume limiting, scope, and production capacity clauses, and conditional clauses were all designed to restrict the licensee's ability to develop the technology they received for free. The license agreement provided severe conditions for the licensee to develop the technology they received for free, limit their ability to conduct research, use personal resources, and restrict adaptation. These clauses also imposed restrictions on the licensee's ability to use the technology after the contract period, and limited the licensee's participation in the company's management*"

The inclusion of such clauses hinders the technology transfer process by limiting

opportunities for licensees to develop and enhance the technology. As a result, the intended technology transfer is not effectively implemented, reducing opportunities for licensees in developing countries to participate in the process. Bakti Trisnawati (2016) has expressed concerns regarding these clauses, particularly:

a) Grant-Back Clause

This clause requires the technology tenant to transfer any new inventions to the technology owner. Some agreements provide compensation for these obligations, while others do not. The provision aims to grant the licensor or patent holder partial or full rights to improvements or developments of the patented invention, with or without compensation. However, this clause places the licensee in a disadvantaged position, as they are required to adopt new technologies or modifications introduced by the technology owner. Simultaneously, any inventions made by the licensee must be transferred to the patent owner, either wholly or partially, with or without compensation. Consequently, this clause is unfavorable to the licensee.

The World Intellectual Property Organization (WIPO), as a specialized agency responsible for managing intellectual property rights, has developed a model licensing agreement for developing countries. This model offers a more balanced approach to grant-back clauses, minimizing their restrictive impact on licensees. The model differentiates between "improvement" and "development," ensuring that both parties share information about technological advancements while maintaining confidentiality until the patent application is published.

WIPO's licensing agreement model aims to create a more equitable balance between licensors and licensees by establishing reciprocal obligations for sharing new technological discoveries. However, WIPO cannot enforce this model on member countries, including Indonesia, as there are no binding regulations requiring its adoption. As a result, this model serves merely as a guideline, referred to as the "Licensing Guide," which member states may use at their discretion.

b) Research and Development Clause

Patent licensing agreements often include a research and development (R&D) clause to facilitate technological advancements. This clause benefits licensees by fostering innovation, leading to modifications in production processes or products. These modifications may qualify for patent protection and be licensed to third parties. However, effective R&D requires experience and a deep understanding of the relevant technology. Therefore, successful research and development necessitate collaboration among licensors, licensees, and foreign technology suppliers to optimize technological advancements.

c) Tie-In Clause

This clause obligates the licensee to purchase additional products or services from the licensor. While this may not pose an issue if these products and services are essential for production, problems arise when unnecessary

purchases are imposed on the licensee. Such obligations can be financially burdensome and disadvantageous to both the licensee and the state. Commonly, these clauses restrict licensees by requiring them to import raw materials, components, or other essentials exclusively from the licensor. In many cases, licensees must obtain prior approval from the licensor even when these materials are available domestically.

Tie-in clauses are prevalent in licensing contracts, and while they may be acceptable if they benefit Indonesian licensees, they also pose potential risks. These clauses may lead to economic losses by increasing tax liabilities and allowing excessive foreign exchange outflows. Consequently, the government must carefully scrutinize licensing agreements that contain such binding clauses. Ideally, restrictive provisions should be minimized or eliminated to create a balanced contractual relationship between licensors and licensees.

In patent licensing agreements, both parties should hold equal bargaining power to prevent coercion by the licensor. Coercion in contract negotiations results in an imbalance where licensors, typically possessing superior leverage, impose restrictive terms that hinder technology transfer. Additional external factors further complicate licensing agreements, as these contracts are primarily conducted between private entities and governed by private law principles such as freedom of contract, consensual agreements, and the doctrine of *pacta sunt servanda* (agreements must be honored). Consequently, licensors often hold stronger negotiating positions than licensees, including state-owned enterprises (SOEs) or private companies.

To facilitate technology transfer, licensing contracts must establish a fair balance of rights and obligations. Licensees should have the ability to incorporate specific provisions that ensure technology transfer. According to Hayyan Ul Haq (2011), developing countries often exhibit structural dependency on licensors, relying extensively on technology from developed nations. In practice, technology transfer remains difficult due to the reluctance of developed countries to share their technological expertise, as they seek to maintain economic advantages. If technology is fully transferred to licensee countries, licensors risk losing substantial business revenue. Haq's perspective highlights the pragmatic realities of international technology transfer, where capitalist-driven economic interests shape licensing agreements (Haq, 2011).

Achieving comprehensive technology transfer remains challenging, if not impossible. Therefore, specific strategies and legal mechanisms must be developed to address these barriers. At present, no international or multilateral framework explicitly defines what aspects of technology should be transferred from developed to developing countries or what should be developed independently by recipient countries (Kuswartojo, 2002). One effective approach is to establish legal instruments that regulate

technology transfer systematically. Clear legal provisions must be implemented to address the regulatory framework and national legal policies governing technology transfer (Irawan, 2019).

According to Endang Purwaningsih (2010), Indonesia faces several challenges in implementing technology transfer, including:

1. Low labor quality
2. Imbalance of power and decision-making authority within companies
3. Difficulties in continuing technology transfer after patent licensing agreements expire
4. Weak research and development (R&D) institutions
5. Lack of specific government regulations for technology transfer through foreign patent licensing
6. Political policy constraints
7. Dependence on foreign licensors for technology
8. Environmental pollution concerns
9. Workforce discipline and social issues
10. Economic, social, cultural, and national security challenges

These challenges significantly impact technology transfer efforts, often impeding their successful implementation. Moving forward, these obstacles must be addressed through forward-looking legislation to create an enabling environment for technology transfer. Without such reforms, these issues will continue to hinder technological advancements.

A deeper analysis reveals that many of these challenges originate in the licensee country itself. Consequently, developing countries struggle to access advanced technology, as critical information related to technology transfer remains difficult to obtain and implement.

In this context, the United Nations Conference on Trade and Development (UNCTAD) has emphasized that technology transfer to developing countries has been a key subject of international economic discussions for over three decades (Nachum, 2001). In particular, the role of transnational corporations (TNCs) in developing, implementing, and disseminating technology across national borders has been widely analyzed. As a result, various policy initiatives have emerged at national, regional, and multilateral levels, leading to numerous legal provisions at both the national and international levels (Nachum, 2001).

The role of foreign investors in establishing transnational business entities in Indonesia is crucial for the country's economic growth. However, it is equally important that these entities actively contribute to technology transfer and development. Effective technology transfer has significant economic implications for recipient countries, fostering industrial growth and human resource competitiveness. Nevertheless, it also involves substantial financial commitments, requiring strategic planning and investment to maximize the benefits of technological advancements (Prasetiyo, 2020).

3. Legal Frameworks and Institutional Roles in Indonesia Technology Transfer

Roscoe Pound's theory of law as a tool for social engineering (June 2012) has inspired solutions in the field of technology transfer. Since some existing laws have proven ineffective in facilitating technology transfer, there is a need for specific legislation governing this process. To address this issue, the government and the legislature (DPR) should draft and enact a dedicated law to regulate technology transfer, ensuring its implementation is efficient and precise. This concept aligns with the notion of law as an instrument of reform, which fundamentally refers to the role of legal regulations in directing human activities towards desired developmental or transformative goals (Kusumaatmadja, 1986).

A law specifically designed to regulate technology transfer must prioritize Indonesia's national interests as a developing country with an urgent need for technological advancement. Its provisions should include the following key aspects (Sumantoro, 1993):

1. Establishing a conducive and favorable environment for technology transfer activities.
2. Ensuring mutual benefits for both patent holders and licensees.
3. Encouraging and facilitating the smooth transfer of technology.
4. Implementing fair and objective terms and conditions based on mutual agreement.
5. Adhering to international norms and codes of conduct.
6. Ensuring the government consistently upholds its obligations under international law.

The development of such a law aligns with O.K. Saidin's perspective, which highlights that countries like Japan have established Technology Agencies responsible for overseeing and guiding the recording of patent licensing agreements to ensure compliance with existing regulations (Saidin, 1995). Similarly, the formation of a law on technology transfer should include provisions for establishing a Technology Agency tasked with supervising, implementing, and regulating technology transfer activities in Indonesia. This would ensure that technology transfer is effectively realized.

The legal framework and the supporting agency should align with Friedman's theory, which states that an effective legal system consists of three essential components: a legal structure (the institutions responsible for enforcing laws), legal substance (the rules and principles that form the legal framework), and legal culture (the attitudes and behaviors of society toward the law) (Rustanto, 2012).

The process of drafting and enacting this law must commence as soon as possible and involve all relevant stakeholders in the technology transfer ecosystem. Key institutions such as the Directorate General of Intellectual Property, the Ministry of Law and Human Rights, the Indonesian Institute of Sciences, the Ministry of Education, Research, and Technology, universities, and the Investment Coordinating Board (BKPM) should actively participate in its formulation. According to Mochtar Kusumaatmadja, effective legal development

should not be limited to codified laws and regulations but must also encompass the institutions and processes necessary for implementing these laws in practice (Kusumaatmadja, 1975).

Additionally, Kusumaatmadja emphasized that an adequate legal system must integrate both written legal frameworks and institutional mechanisms to ensure effective implementation. Legal development should begin with statutory reforms, followed by the evolution of unwritten legal norms, particularly through jurisprudence (Kusumaatmadja, 1975). Based on this perspective, enacting a law governing technology transfer would provide significant benefits to both society and the state, which have long awaited a structured mechanism for technology transfer to enhance national welfare. Moreover, such a law would promote justice for all parties involved in patent licensing agreements, ensuring that both licensors and licensees comply with its provisions (Kusumaatmadja, 1975).

Furthermore, the patent licensing agreements should be structured to create a mutually beneficial arrangement between licensors and licensees. The rights and obligations of both parties must be balanced and equitable. A well-regulated technology transfer framework through patent licensing will help achieve the intended objectives.

Several countries have successfully implemented legal policies to promote technology transfer through patent utilization, fostering innovation, foreign investment, and domestic capacity building. For instance, Vietnam has made significant progress in technology transfer since joining the World Trade Organization (WTO) in 2007 and adopting the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement (Quoc, 2020). Key measures include an improved intellectual property (IP) framework, tax incentives for technology transfer, compulsory licensing, and collaborative research agreements.

South Korea has emerged as a global innovation leader through robust policies such as the Technology Transfer Promotion Act (TTPA), government-led R&D programs, and the establishment of the Korea Technology Transfer Center (KTTC) (Hong et al., 2023). Meanwhile, China has positioned itself as a hub for technology transfer by implementing patent-friendly policies, regulating technology imports and exports, establishing Special Economic Zones (SEZs), and providing tax incentives (Thalib, 2016; Li et al., 2021).

Singapore exemplifies the successful integration of a strong IP ecosystem into technology transfer efforts, facilitated by its IP Hub Master Plan, Technology Transfer Offices (TTOs), and R&D incentives (Wong et al., 2022). Brazil, on the other hand, has adopted innovative approaches such as the Law of Innovation (2004), which encourages partnerships between public research institutions and private enterprises, facilitating the licensing and commercialization of patents (Dias & Porto, 2018). Brazil has also effectively used compulsory licensing, particularly in the pharmaceutical sector, to ensure

technology transfer and improve access to essential medicines.

Overall, countries such as Vietnam, South Korea, China, Singapore, and Brazil have demonstrated successful strategies in promoting technology transfer through patent-based mechanisms. These examples highlight the importance of well-crafted legal frameworks and policy measures in fostering innovation and economic growth in developing nations.

D. CONCLUSION

Technology transfer through patent licensing agreements and various laws and regulations in Indonesia has not been successful thus far, primarily due to the absence of clear and enforceable provisions governing its implementation. Existing laws regulating technology transfer lack strict penalties for violations, rendering technology transfer little more than a symbolic concept within legal frameworks rather than a practical, enforceable mechanism. This issue stems from the legislators' lack of assertiveness and the ambiguity in regulatory provisions.

To address delays in technology transfer, it is essential to establish a dedicated law specifically regulating this process. Such a law must clearly emphasize the significance of technology transfer in Indonesia and its crucial role in promoting national welfare and economic prosperity. Moreover, strict sanctions for violations must be explicitly outlined to ensure compliance and prevent stagnation in technological advancements. Effective technology transfer can only be achieved if all stakeholders involved in the legislative process demonstrate a strong commitment to meaningful reform.

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