

DIGITAL TRANSFORMATION IN PROTECTING INTELLECTUAL PROPERTY RIGHTS IN INDONESIA

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Abstract: *This paper discusses the challenges and opportunities faced by Indonesia in protecting intellectual property rights (IPR) in the digital era. The authors examine the challenges faced by Indonesia in protecting IPR, including the problem of uneven digital infrastructure, suboptimal law enforcement, and lack of awareness and education regarding the importance of IPR protection. They also review opportunities and initiatives that can be taken in digital transformation to improve IPR protection, such as cooperation between the government and industry, supporting regulations and policies, and applying technology and innovation in IPR protection. The paper aims to provide a better understanding of the role of digital transformation in protecting IPR in Indonesia and to provide insight into the challenges faced and opportunities that can be exploited to strengthen IPR protection in the digital era. The results of the research show that digital transformation has had a significant impact on the protection of IPR in Indonesia. Successful initiatives, such as implementing a digital trademark registration system, using A.I. technology for content filtering, and collaborations between the government and industry, have contributed to IPR protection.*

Keywords: *Digital Transformation; Technology; Intellectual Property Rights; Indonesia*

INTRODUCTION

Digital transformation has changed the landscape of business and everyday life worldwide. Amid rapid advances in information and communication technology, Indonesia has also experienced a shift towards a growing digital economy. In this context, protecting intellectual property rights (IPR) is becoming increasingly important to encourage innovation, creativity, and investment in the digital era.

IPR covers various aspects, including copyrights, patents, trademarks, industrial designs, and trade secrets [1, 2]. However, digital transformation has created new challenges in protecting IPR in Indonesia. Technological developments such as the internet, cloud computing, artificial intelligence, and blockchain have enabled more accessible and faster access to intellectual works but have provided new avenues for IPR infringement. In addition, Indonesia, a country with a large population and rapid economic growth, has great potential to develop a digital economy. However, existing challenges, such as uneven digital infrastructure and law enforcement that still need to be improved, can hinder practical IPR protection efforts in the digital era.

In this context, it is crucial to examine the challenges and opportunities faced by Indonesia in meeting digital transformation in protecting IPR. By understanding this issue, the government, stakeholders, and society can work together to create an environment conducive to innovation, creativity, and effective protection of IPR in the digital era.

In this paper, we examine the challenges faced by Indonesia in protecting IPR in the digital era, including the problem of uneven digital infrastructure, suboptimal law enforcement, and lack of awareness and education regarding the importance of IPR protection. In addition, opportunities and initiatives that can be taken in digital transformation to improve IPR protection will also be reviewed, such as cooperation between the government and industry, supporting regulations and policies, and applying technology and innovation in IPR protection.



Thus, this research will provide a better understanding of the role of digital transformation in protecting IPR in Indonesia and provide insight into the challenges faced and opportunities that can be exploited to strengthen IPR protection in the digital era.

1. PROBLEMS

This study aims to analyze digital transformation in Indonesia's IPR protection context. In particular, this research aims to:

1. Analyze the challenges faced by Indonesia in protecting IPR in the digital era, including the problem of uneven digital infrastructure, suboptimal law enforcement, and lack of awareness and education regarding the importance of protecting IPR in the digital era.
2. Identify opportunities and initiatives that can be taken in digital transformation to improve IPR protection in Indonesia, such as cooperation between the government and industry, supporting regulations and policies, and applying technology and innovation in IPR protection.
3. Analyze case studies that describe the successes and challenges of implementing digital transformation in protecting IPR in Indonesia. This case study will provide concrete insights into the efforts that have been made and the results that have been achieved in protecting IPR in the digital era.
4. Provide recommendations that can be used by the government, stakeholders, and the public to improve IPR protection in Indonesia through digital transformation. This recommendation includes concrete steps that can be taken to overcome existing challenges and take advantage of the opportunities that exist in the protection of IPR in the digital era.

This research will provide a deeper understanding of digital transformation in protecting IPR in Indonesia by achieving these goals. The results of this research can become the basis for developing policies and strategic steps to increase IPR protection in the digital era and contribute to advancing innovation, creativity, and sustainable economic growth in Indonesia.

2. RESEARCH METHOD

This study aims to investigate Digital Transformation in protecting IPR in Indonesia. The following are the stages of the research methodology we carried out:

1. Scope Identification: Determine the scope of research that includes aspects related to digital transformation in protecting IPR in Indonesia, such as copyrights, patents, trademarks, industrial designs, or trade secrets.
2. Literature Search: (a) Conduct literature searches using academic databases, online libraries, scientific journals, and other trusted sources. (b) Using relevant keywords to get literature that fits the research topic.
3. Source Evaluation: (a) Conduct a critical evaluation of the sources found, including the reliability, relevance, and quality of these sources. (b) Ensure that the selected literature comes from a trusted source and has a good reputation.
4. Literature Analysis: (a) Read and analyze the literature that has been found. (b) Record and classify information relevant to the research topic. (c) Pay attention to the themes, findings, and opinions from the literature.
5. Synthesis and Summary: (a) Synthesize and summarize the information that has been collected. (b) Identify common themes or patterns that emerge from the literature. (c) Make a summary that includes the important points that will be included in the paper.

3. DIGITAL TRANSFORMATION IN THE CONTEXT OF IPR PROTECTION

IPR protection has developed along with advances in digital technology. [3] propose Using Deep Learning for Image Watermarking Attacks. Macq et al. give an overview of the state of the art of 3D digital watermarking and assess how it could be extended to ensure the IPR protection of printed 3D models [4]. Andreeva et al. presents the evolution of the legal doctrine and philosophy regarding the right to work, its transformation, differentiation, and protection [5]. A capability model describes the complete set of features that an organization requires to execute its business



model or fulfill its mission; the user's environment must be increasingly included in the design and development of necessary and desired solutions [6]. They present the components of the MCP-LGPD capability model (process capability model – general data protection law) to understand the functionality and underlying flows in the context of Lei Geral de Proteção de Dados (LGPD). In this sense, to ensure technological, economic, and social progress, IPR must become the only essential element for protecting ideas, stimulating innovation and creativity, and designing and contributing to the creation of technology. Lazariuc et al. emphasize the need to address IPR in the context of global ethics because IPR is also the social responsibility and moral duty of every global citizen, whether creative or consumer, to respect the cultural and intellectual heritage of humanity and to contribute to its diversification and to overcome the challenges of the contemporary world in the digital age [7].

Digital transformation refers to the widespread use of digital technology and affects various aspects of life, including protecting IPR. In the context of IPR protection, digital transformation refers to changes in how IPR is protected, managed, and utilized in the digital era. Digital transformation significantly changes IPR protection by using new technology and innovation. Some aspects of digital transformation that are relevant to IPR protection include:

IPR Registration and Management: Digital transformation has enabled a digital IPR registration and management system [8]. Online platforms and applications have been developed to simplify registering trademarks, copyrights, and patents. Blockchain technology also creates evidence of authentication and authenticity in IPR protection [9, 10]. **Law Enforcement:** Digital transformation provides new challenges related to IPR violations in law enforcement. Infringements such as content piracy, copyright infringement, and trademark counterfeiting often occur in the digital environment. Therefore, new methods and tools, such as artificial intelligence (A.I.) technology and data analysis, are used to detect and deal with IPR infringement in the digital world. [11, 12].

Content Monitoring and Screening: In this connected digital era, monitoring and filtering content that violates IPR is essential. Digital technologies enable the use of algorithms and data analysis to identify and remove content that violates IPR, such as content that violates copyright or contains counterfeit products [13, 14].

Partnership and Collaboration: Digital transformation encourages partnerships and collaborations between the government, industry, and rights holders to enhance IPR protection. For example, government agencies can work with online platforms and digital service providers to develop more effective IPR protection mechanisms and promote compliance with rules and regulations.

Digital transformation in the context of IPR protection provides both opportunities and challenges. Opportunities include increasing efficiency, accessibility, and effectiveness in protecting IPR in the digital age. However, challenges include the complexity of IPR violations in the digital environment, disparities in access to technology, and the need for increased awareness and education for IPR owners. In facing challenges and taking advantage of opportunities, the government, law enforcement agencies, industry, and rights holders must collaborate in developing policies, regulations, and strategies that align with developments in digital transformation. Thus, IPR protection can be increased effectively, supporting innovation, creativity, and economic growth in the digital era.

A. Definition of Digital Transformation

The literature review conducted by Mergel et al. focuses on developing a conceptual framework that explores the reasons, processes, and expected outcomes of digital transformation in the public sector. Their study involved an in-depth analysis and synthesis of existing literature in constructing a comprehensive framework that reconciles digital transformation's various definitions and aspects [15]. Similarly, Veldhoven et al. conducted a literature study to identify a clear purpose of digital transformation. Their research also resulted in developing a structured framework encompassing different stages, activities, and outcomes associated with digital transformation [16].

Luppini contributes to understanding digital transformation by conceptualizing it as an emerging interdisciplinary field. Additionally, the author identifies key research areas that currently



constitute the domain of digital transformation [17]. Gong et al. aim to establish a unified definition of "digital transformation" through a rigorous review and analysis of 134 well-received, published reports in the literature. Their research differentiates digital transformation from related terms and provides a scientifically grounded definition [18]. Abdallah et al. presents a review of the concept of digital transformation, specifically in the manufacturing industry. Their study examines the existing literature on the topic to provide insights and a comprehensive understanding of digital transformation within this sector [19].

From the several papers above, it can be concluded that the definition of digital transformation is a change that involves the application of digital technology, innovation, cultural change, and management of digital values in certain organizations, public sectors, or industries. The goal is to achieve significant changes in how things work and the services provided and create added value through digital technology.

B. IPR Protection in the Digital Age

Protection of IPR in the digital era is a complex challenge because the development of digital technology has changed the production, distribution, and use of intellectual works. Some aspects that need to be considered in the context of IPR protection in the digital era are:

1. **Copyright:** Copyright protects creative works such as music, films, literature, and software. In the digital era, circulation and distribution of these works can be done more quickly through the internet and digital technology. However, challenges arise in controlling and protecting copyright amid technological advances, such as digital piracy and illegal use of content.
2. **Patents:** Patents protect new technological inventions. In the digital age, patents can involve hardware, software, and computing technology innovation. However, challenges arise in dealing with issues such as overlapping software patents and the protection of inventions related to algorithms and artificial intelligence.
3. **Trademarks:** Trademarks protect a product or service's brand identity and distinctiveness. In the digital age, trademarks can relate to domain names, social media usernames, and online content. Challenges that arise include trademark infringement through misuse of brand names in domains or fraudulent actions on online platforms.
4. **Industrial Design:** Industrial design protects industrial products' visual and aesthetic aspects. In the digital era, industrial design can involve user interface displays, digital product designs, and graphic designs. The challenge is plagiarism or illegally using industrial designs in a digital environment.
5. **Trade Secrets:** Trade secrets protect confidential information, such as chemical formulas, technologies, or business strategies, which is a competitive advantage. In the digital age, protecting trade secrets is even more important due to the risks of hacking, data theft, and information security breaches.

To face the challenges of protecting IPR in the digital era, steps such as:

1. Development of adequate policies and regulations to protect copyrights, patents, trademarks, industrial designs, and trade secrets in the digital environment;
2. Increasing awareness and education about protecting IPR in the digital era for industry players, rights holders, and the general public;
3. Collaboration between the government, the private sector, and related institutions to develop a practical framework for dealing with IPR violations in the digital world; and
4. Use appropriate technologies such as digital watermarks, content safeguards, and digital rights management systems to help protect and manage IPR in the digital age.

It is important to continue observing technological developments and practices related to IPR protection in the digital era because these challenges continue to evolve along with emerging technological advances.



C. Change Brings about by Digital Transformation

Digital transformation has brought significant changes in various aspects of life, including business, industry, society, and culture. Some of the changes brought about by digital transformation include:

1. **Use of Technology:** Digital transformation is changing the way we use technology. Increasing accessibility and adoption of digital technologies such as the internet, mobile devices, and cloud computing have made it easier for us to connect and interact globally. It also opens doors for innovations and technology-enabled business models.
2. **Business Change:** Digital transformation is affecting the way businesses are run. Companies are adopting digital technologies, including process automation, data analytics, artificial intelligence, and the Internet of Things (IoT). This helps increase business efficiency, productivity, and adaptability in rapid market changes.
3. **Customer Experience:** Digital transformation has changed how we interact with products and services. Consumers have greater access to information, purchasing options, and channels of communication with brands. The company also uses customer data to improve personalization, user experience, and customer satisfaction.
4. **Innovation and Research:** Digital transformation has accelerated the pace of innovation and research in various fields. Technological developments such as artificial intelligence, data analytics, and cloud computing enable new discoveries, predictive modeling, and broader exploration in science, technology, and business.
5. **Social Change:** Digital transformation has also affected the social aspects of our lives. Internet and social media have made it possible for easier connection and interaction between individuals in different parts of the world. It also influences how we communicate, share information and participate in society.
6. **Education and Learning:** Digital transformation affects education and learning by adopting technology in the teaching and learning process. Distance learning, e-learning platforms, and digital content have provided greater accessibility to education, training, and self-development.
7. **Economic Changes:** Digital transformation has brought about structural changes in the economy. New business models, such as the sharing economy and e-commerce, have emerged. Large technology companies also play an essential role in the global economy and form complex digital ecosystems.

These changes continue as technology evolves and its wider adoption within various sectors. Organizations and individuals need to adapt to these changes and take advantage of them to achieve competitive advantages and new opportunities.

4. CHALLENGES OF IPR PROTECTION IN DIGITAL TRANSFORMATION IN INDONESIA

The protection of creative content in the digital realm faces significant challenges. Yuspin et al. highlights the legal protection issues creators encounter when uploading their works through online media platforms. This suggests that ensuring proper IPR protection for digital content remains a challenge in Indonesia [20]. The digital transformation gap in public healthcare systems, as highlighted by Nascimento et al., indicates that implementing digital technologies and processes in healthcare may face challenges related to IPR protection. Protecting the intellectual property of digital health solutions and data privacy may pose obstacles in the digital transformation of the healthcare sector [21].

The development of digitalization in the economy, as discussed by Rizka, implies the need for robust IPR protection mechanisms to foster innovation and support digital transformation. Protecting digital innovations and ensuring a favorable legal environment for businesses engaging in digital transformation can be challenging in the face of rapid technological advancements [22]. The adaptation of organizations, such as Suara Muhammadiyah, to the digital era, as explored by Sukmono et al., may encounter challenges related to changes in audience behavior and the



management of digital content. These challenges may involve protecting IPR associated with digital media and addressing copyright infringement or unauthorized use [23].

The concept of digital sovereignty, as examined by Gavrilov, raises challenges in protecting national interests, including IPR, in the global digital landscape. Developing effective legal frameworks and approaches to addressing IPR protection within digital sovereignty can be complex and require cooperation between various stakeholders [24]. The implementation of emerging technologies, such as blockchain, in developing digital solutions, as discussed by Wilford et al., introduces techno-ethical issues and the need for robust IPR protection mechanisms. Balancing the benefits of advanced technologies with intellectual property protection can be challenging in the digital transformation journey [25].

In summary, IPR protection in Indonesia's digital transformation context faces challenges related to legal frameworks, content protection, copyright infringement, digital sovereignty, and emerging technologies. Addressing these challenges is crucial to foster innovation, ensuring fair competition, and supporting the growth of digital industries in the country.

A. Digital Infrastructure

Unequal and widely accessible digital infrastructure is a significant challenge in protecting IPR in digital transformation in Indonesia. Differences in the accessibility of digital technology between urban and rural areas and disparities in internet access are substantial barriers. This can hurt law enforcement efforts and oversight of IPR violations in the digital era.

In Indonesia, there is a significant division between urban areas with a good digital infrastructure and fast and stable internet access. In contrast, in rural areas, the accessibility of digital infrastructure is still limited. Inadequate infrastructure in rural areas, such as the availability of slow and unstable internet networks, low signal quality, and limited access to technological devices, makes people in rural areas more vulnerable to IPR infringements.

This inequality of access is a severe challenge in law enforcement and monitoring IPR violations in the digital era. Without an equitable and affordable digital infrastructure, it is difficult for law enforcement agencies and authorities to monitor and deal with online IPR infringements effectively. In addition, limited accessibility can also hinder the public from understanding the importance of IPR and the impact of violations. To overcome this challenge, serious efforts need to be made to improve digital connectivity in all regions of Indonesia. This involves investing in technological infrastructure development, such as building high-speed internet networks, improving signal quality, and deploying access to affordable technology devices. In addition, training and education on the use of digital technology and the importance of protecting IPR are also essential to increase public awareness of this issue.

The government, related institutions, and the private sector must work together to address digital infrastructure inequalities. Policies supporting digital infrastructure development throughout Indonesia must be implemented, including subsidy or incentive programs to improve internet access in remote areas. In addition, cooperation with internet service providers and technology companies is also essential to expand the reach of digital infrastructure across the country.

By increasing digital connectivity that is equitable and affordable, law enforcement and monitoring efforts against IPR violations in the digital era can be increased. Adequate infrastructure will enable law enforcement agencies and authorities to more effectively track and act on IPR violations, thereby creating a safer and fairer environment for IPR holders in Indonesia.

B. Law Enforcement

Protecting IPR in digital transformation in Indonesia is a significant challenge for law enforcement. The complexity of IPR violations in the digital environment, such as content piracy, copyright infringement, and trademark counterfeiting, demands increased capacity and coordination between law enforcement agencies, authorities, and rights holders.

The development of digital technology has provided new challenges in law enforcement related to IPR. IPR violations in the digital era can cross national borders and involve various parties operating



in the global digital environment. Therefore, there is a need for close cooperation between law enforcement agencies, authorities, and rights holders from different countries to deal effectively with this challenge. Increasing the capacity of law enforcement agencies ability to understand IPR issues in the digital era, the technology used in IPR violations, and compelling investigative methods is fundamental. Training and developing skills in law and digital technology are vital in facing the challenges of law enforcement in the digital era.

In addition, coordination between law enforcement agencies, authorities, and rights holders also needs to be improved. Close collaboration and mutual support between various stakeholders will strengthen law enforcement efforts related to IPR protection. This involves exchanging relevant information, data, and evidence, coordinating investigations, and prosecuting IPR violations in the digital environment. In addition to the national level, law enforcement efforts related to IPR protection in the digital era also require broader international cooperation. IPR violations often involve actors operating outside national borders; international coordination is vital in dealing with this challenge. Partnerships in law enforcement, exchange of intelligence information, and harmonization of legal policies can strengthen efforts to protect IPR in the digital era. In addition, efforts to increase public awareness about protecting IPR in digital transformation are also significant. Effective public education and campaigns can help change public perceptions of respecting and protecting IPR. Through this awareness raising, it is hoped that the public will better understand the consequences of IPR violations and encourage compliance with existing regulations. With capacity building, effective coordination, and solid international cooperation, law enforcement related to IPR protection in the digital era in Indonesia can become more effective. This will create a safer and more supportive environment for innovation and creativity and promote the sustainable development of creative industries.

C. Awareness and Education

Awareness and education about the importance of IPR protection in digital transformation is crucial in facing this challenge in Indonesia. A higher awareness of the importance of protecting IPR and a better understanding of the consequences of IPR violations can provide a strong foundation for efforts to protect IPR in the digital era.

First, raising public awareness about IPR protection in the digital era involves effective public campaigns and outreach. Through campaigns targeting various levels of society, both creative industry players, business actors and consumers, it is crucial to convey the importance of respecting IPR and its consequences. This campaign can be carried out through social media, advertising campaigns, seminars, and workshops to reach a wider audience. Second, better education about IPR in formal and non-formal education settings is also essential. The education curriculum must strengthen students' understanding of IPR, the role and importance of copyrights, trademarks, patents, and industrial design rights. This can be implemented by improving learning materials related to IPR and developing special modules or lessons on IPR protection in digital transformation.

Training and educational programs for businesses, content creators, and technology users must also be carried out. This program can provide a deeper understanding of IPR protection, governance of IPR in the digital era, and how to avoid and report IPR violations. In this way, individuals and organizations will be better able to protect their creative works and understand the steps needed to achieve optimal protection. Besides education, collaboration between the government, industry, and educational institutions is essential in increasing awareness and understanding of IPR protection in digital transformation. The government can facilitate collaboration by involving industry players, educational institutions, and creative communities in developing educational programs, seminars, and conferences focusing on protecting IPR in the digital era. This can create synergy and broader knowledge exchange and encourage adopting best practices in protecting IPR. With increased awareness and adequate education, it is hoped that people will understand more about the importance of IPR protection in digital transformation. Communities aware of IPR will



become vital partners in protecting and respecting creative works and supporting innovation development in Indonesia.

5. OPPORTUNITIES IN DIGITAL TRANSFORMATION TO IMPROVE IPR PROTECTION IN INDONESIA

Implementing digital transformation can enhance IPR protection in Indonesia by automating and improving business processes related to IPR management [26]. This approach emphasizes appropriate governance and hybrid workforce management to sustain the results. The mining industry can benefit from digital transformation initiatives, which can contribute to improving IPR protection. The mining industry's key aspects, challenges, and success factors should be considered in implementing digital transformation [27].

The competency development of aircraft maintenance personnel is crucial for the success of digital transformation initiatives. Establishing a competency framework aligned with digital transformation goals can support improving IPR protection in this sector [28]. Comparative analysis of different countries' digital economies, as described by Ignatova et al., can provide insights into best practices and strategies that Indonesia can apply to strengthen IPR protection within the digital economy [29].

Managing agrotechnology changes in digital transformation requires methodological approaches and practical guidelines. Developing models and managing large amounts of data can improve IPR protection in the agricultural sector [30]. A multi-stakeholder collaborative approach is proposed as a policy for preparing for Industry 4.0 and optimizing limited resources. This approach can facilitate the developing and gathering of digital transformation initiatives, including those focused on IPR protection [31]. In the mining sector, a conceptual framework for digital transformation can guide effective implementation strategies to improve IPR protection. Attention should be given to core managerial areas for successful digitization processes [32].

In conclusion, opportunities and initiatives in digital transformation, such as process automation, competency development, comparative analysis, methodological approaches, multi-stakeholder collaboration, and conceptual frameworks, can improve IPR protection in Indonesia. These initiatives can enhance the management and safeguarding of IPR within the digital economy and specific industries like mining and agriculture.

A. Cooperation between Government and Industry

Cooperation between the government and industry is crucial in facing the challenges of protecting IPR in digital transformation in Indonesia. Close collaboration between the two parties can create a conducive environment for protecting IPR and encourage sustainable creative industries development. The following are several aspects that need to be considered in cooperation between the government and industry:

1. Policies and regulations: The government must develop adequate policies and regulations to protect IPR in the digital era. The policy must accommodate technological changes and ensure that IPR are effectively protected. In developing policies, involvement and input from industry players are crucial so that these policies can accommodate the needs and dynamics of the industry.
2. Collaboration in law enforcement: The government and industry need to work together regarding IPR violations. This collaboration includes exchanging information, coordinating law enforcement actions, and cooperating in investigating and prosecuting IPR violations in the digital environment. Governments can also involve industry in forming enforcement policies, thereby ensuring that these policies reflect the needs and realities of the industry.
3. Support in developing innovation and creative industries: The government can support creative industries in developing innovation and IPR. This can be done through funding programs, incentives, and facilities for industry players to secure and protect their IPR. This support can also provide adequate infrastructure and accessibility for the industry to develop and compete in the digital era.



4. Education and awareness: Government and industry can work together to educate and raise awareness about IPR protection. This includes outreach campaigns, training, and workshops for industry players, content creators, and the general public. In this case, the government can provide support by providing resources and facilities. At the same time, the industry can play an active role in conveying messages and sharing experiences about the importance of protecting IPR.
5. Developing an inclusive digital ecosystem: Government and industry must work together to develop an inclusive and sustainable digital ecosystem. This includes building digital infrastructure that is equitable and affordable, increasing accessibility of technology, and developing policies that promote innovation and investment in the digital sector. This collaboration will create an environment that supports creative industries' growth and IPR protection in the digital era.

With good cooperation between the government and industry, it is hoped that IPR protection in digital transformation can be improved, innovation can develop, and Indonesia's creative industries can compete globally.

B. Supporting Regulations and Policies

Supporting regulations and policies is a crucial aspect of protecting IPR in digital transformation in Indonesia. The existence of a clear and effective regulatory framework can provide a solid legal foundation to protect IPR and encourage innovation in the digital age. The following are examples of regulations and policies that can support IPR protection:

1. Copyright Law: Copyright Law is the primary legal instrument that regulates IPR related to creative works. This law must be updated regularly to accommodate developments in digital technology and challenges that arise in the digital era. Regulations regarding the use of digital content, piracy, and copyright abuse are essential to this law.
2. Trademark Law: The Trademark Law protects trademarks and registered marks. In the digital age, regulations on trademark misuse and counterfeiting are essential in protecting brand owners from online infringement and fraud.
3. Patent Law: The Patent Law protects technological innovations by granting patent holders exclusive rights. Effective regulation of patents in the digital age must address issues such as software patents, algorithm patents, and the protection of IPR related to artificial intelligence.
4. Personal Data Protection Regulation: The protection of personal data is an essential aspect of digital transformation. Effective regulation on personal data protection can help protect IPR associated with data, such as trade secrets and know-how owned by companies.
5. Creative Industry Innovation and Empowerment Policy: Policies and programs that support innovation and empower creative industries also contribute to the protection of IPR. This includes providing incentives, funding support, accessibility of technology infrastructure, and training for creative industry players to protect and utilize their IPR in the digital era.
6. International Agreements and Cooperation: International agreements and cooperation also play an essential role in protecting IPR in the digital era. Indonesia can establish cooperation with other countries to exchange information, increase cross-border law enforcement, and harmonization of IPR protection policies at the global level.

The importance of regulations and policies that protect IPR and create a conducive environment for innovation, investment, and the growth of creative industries in Indonesia.

C. Technology and Innovation in IPR Protection

Technology and innovation are essential in protecting IPR in digital transformation in Indonesia. Technology and innovation can provide practical solutions to overcoming challenges and protecting IPR. Following are some examples of how technology and innovation can support IPR protection:

1. Blockchain Technology: Blockchain technology provides a secure and transparent mechanism for recording and verifying digital transactions. In IPR protection, blockchain can be used to verify



and validate copyrights, trademarks, and patents. The information recorded in the blockchain cannot be altered or falsified, thus providing greater security and reliability in protecting IPR.

2. **Artificial Intelligence:** Artificial intelligence can be used to identify and track IPR violations in the digital environment. Using algorithms and data analysis, A.I. can monitor and analyze online behavior to detect suspicious activity, including content piracy, trademark counterfeiting, and copyright infringement. A.I. can assist authorities and rights holders in expediting the process of law enforcement and handling IPR violations.
 3. **Digital Watermarking:** Digital watermarking is a method used to embed detailed information in digital content, such as pictures, videos, or music. This information can be digital watermarks that are invisible to the human eye but can be identified by particular devices. Digital trackers enable rights holders to track and prove ownership and recognize the legitimate content source, thus enhancing I.P. security and protection.
 4. **Big Data Analytics:** Big data analytics can be used to analyze big data generated in a digital environment, including data about IPR infringements. By analyzing this data, patterns and trends of IPR violations can be found, as well as identifying the parties involved. This information can be used to take appropriate and efficient law enforcement action.
 5. **Digital Education and Certification:** Innovation can also occur in education and certification. Creative industry players and rights holders can adopt online learning methods, e-learning platforms, and digital certificates to increase their understanding of IPR protection in the digital era. This helps raise awareness, experience, and compliance with IPR protection rules.
- Technology and innovation in protecting IPR provide advantages in detecting, preventing, and dealing with IPR violations in the digital era. However, paying attention to the security and privacy aspects of adopting these technologies is also necessary.

CONCLUSION


Digital transformation has significantly impacted the protection of IPR in Indonesia. Even though challenges need to be overcome, such as uneven digital infrastructure, complex law enforcement, and awareness and education that need to be increased, there has also been a success in implementing digital transformation in protecting IPR. Some of the achievements achieved include using a digital trademark registration system that simplifies the registration process, using artificial intelligence technology to filter online content and cooperation between government and industry. Technology and innovation, such as blockchain, digital trackers, big data analytics, and supportive policies, have significantly contributed to protecting IPR in the digital age.

However, challenges remain, such as complex law enforcement in cases of online violations, lack of awareness and education for owners of IPR, and the need to improve digital infrastructure that is equitable and affordable. In facing this challenge, more extraordinary efforts are needed to increase the capacity of law enforcement, raise awareness and education, and encourage cooperation between various related parties. By overcoming challenges and taking advantage of existing opportunities, IPR protection in digital transformation in Indonesia can be continuously improved. This will provide better protection of IPR, encourage innovation, and support the growth of creative industries in the digital era.

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