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Review Article

Analyzing the Consolidation of Intellectual Property and Artificial Intelligence: Challenges and Opportunities

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ABSTRACT: ***There are both opportunities and challenges for legal systems around the world in the developing field of the link between intellectual property (IP) and artificial intelligence (AI). The issue of how current intellectual property laws can support and safeguard AI-generated works is becoming more urgent as AI technologies develop and become more involved in innovation. Traditional IP rights, including patents, copyrights, and trademarks were designed with human creators in mind but AI systems are now capable of generating inventions, artworks, and other creative works autonomously. This raises fundamental questions about authorship, ownership, and the attribution of rights. For instance, the question of whether AI systems qualify as inventors under patent law is a contentious topic with various jurisdictions debating the need for legal reforms. Similarly, in copyright law, the question of who owns AI-generated creative works is whether it's uncertain if the user, the programmer, or the AI itself. This study explores the evolving legal landscape of AI and IP analyzing current challenges, case studies, and potential solutions. It highlights the necessity of a well-rounded strategy that protects the rights of creators while promoting innovation. iAs AI continues to revolutionize industries understanding and adapting IP laws will be crucial to fostering an environment where both human and machine creativity can thrive.***

KEYWORDS: IPR, Copyright, Ethics, Innovation, Ownership, Patents.

INTRODUCTION

The legal environment at the point of contact of AI and IP is complicated and changing quickly. As AI technology develops at an unprecedented pace they have begun to challenge the traditional frameworks of IP law, particularly in areas related to ownership, creation, and safeguarding the rights of intellectual property. AI is no longer merely a tool used by human creators it has become capable of creating works autonomously. This development has raised numerous questions about the applicability of existing IP laws to AI-generated works and has necessitated a rethinking of intellectual property policies across jurisdictions worldwide [1]. This intersection represents an area of great importance as it could shape the future of innovation and creativity in the 21st century. Intellectual property rights, traditionally designed to protect human creators have long been seen as essential to incentivizing innovation and

rewarding original thought. The fundamental tenet of intellectual property law is to give authors the sole authority to choose how their works are used, distributed, and marketed [2].

These legal protections are intended to inspire individuals and entities to invest time, effort, and resources into new ideas and creative works knowing that they will be able to reap the benefits of their inventions. However, the emergence of AI challenges this paradigm in several key ways and one of the most significant of these challenges is the question of authorship. Patents, copyrights, and trademarks are examples of intellectual property rights that have historically been awarded to human producers. In patent law, for example, the issue of inventorship has become a key point of contention [3]. Patent law traditionally requires that an inventor be a natural person. However, in recent years there have been cases where AI systems have contributed to or entirely generated inventions. This has prompted legal experts and policymakers to question whether the current patent laws are adequate for addressing AI-generated innovations. Some jurisdictions have already begun to grapple with the question of whether AI can be credited as an inventor. Figure 1 shows various applications of the connection between AI and IP [4].

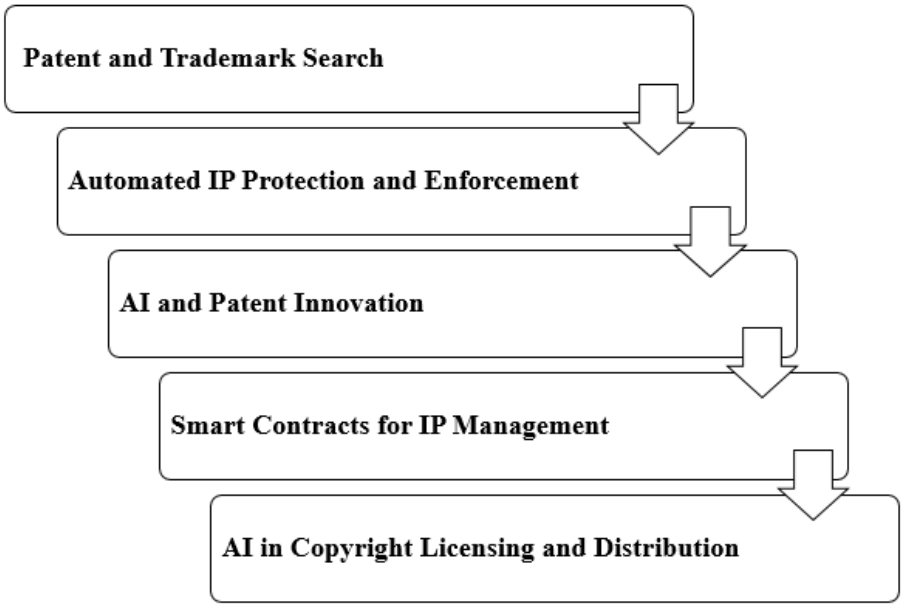

Figure 1: Shows various applications of the connection between AI and IP.

The U.S. Patent and Trademark Office decided in 2021, for example, that AI systems do not qualify as inventors in patent applications. The decision was based on the premise that inventors must be human beings in line with the requirement for natural persons to hold patents. In a similar vein, patent applications listing AI systems as inventors have been denied by the European Patent Office in Europe. However, this issue is far from settled, and debates continue in many countries regarding whether current patent frameworks should be updated to accommodate AI-driven innovation. At the heart of this issue is the concept of inventorship itself [5]. Traditional patent law is built on the idea that human inventors conceive new ideas and bring them to fruition through ingenuity and labor. However, when an AI system generates an invention the line between human creativity and machine-generated output becomes blurred. In some cases, an AI may simply assist in the invention process by analyzing large sets of data and providing insights or recommendations, while in other cases it may independently generate an entirely novel invention based on its programming and algorithms [6].

This raises the question of whether an AI system's output can truly be considered an invention and whether the current legal framework is equipped to deal with such innovations. Another significant area where AI intersects with IP law is copyright. Copyright law, like patent law, is intended to safeguard authors' rights by giving them sole authority over their works of art. Copyright law, however, requires that a work be the product of human authorship. The issue becomes more complicated when AI is participating in the formation of works such as music, paintings, literature, and even software code [7]. For instance, because copyright law demands human authorship, the Copyright Office in the US has decided that works produced by AI systems cannot be protected by copyright. The Office has rejected copyright registration for works created entirely by AI arguing that the absence of a human author means that the work does not meet the statutory requirements for protection. Figure 2 depicts the disadvantages of the connection between intellectual property and artificial intelligence [8].

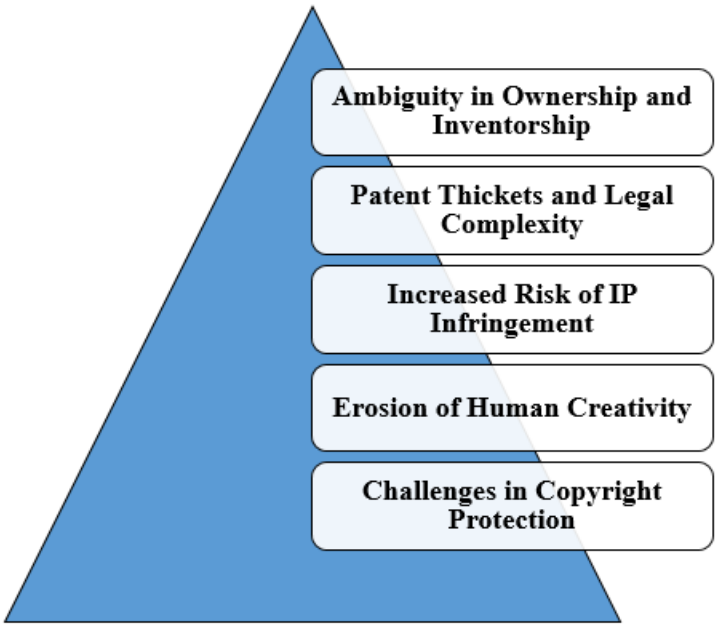

Figure 2: Depicts the disadvantages of the connection between intellectual property and artificial intelligence.

However, this position is not universally accepted, and other countries, such as the United Kingdom have taken a more flexible approach allowing for some AI-generated works to be copyright-protected alongside the human worker or programmer serving as the legal author. This discrepancy in legal interpretations highlights a critical gap in current copyright frameworks. In practice, it is not always clear how much human involvement is necessary for an AI-generated work to qualify for protection. In some cases, the human user may provide input in the form of training data or guidance for the AI system, while in other cases the AI may generate works entirely on its own [9]. The question of who holds the copyright in such instances is complicated by the fact that the AI itself cannot be considered an author in the traditional sense as it lacks the legal status of a person.

As a result, the human creator of either the AI system or the owner of the AI's rights is often credited with the copyright even though they may not have directly created the work. This situation is especially problematic in creative industries where copyright is the primary tool for protecting and monetizing artistic works. If AI-generated works can be freely copied and

reproduced without any clear ownership it could undermine the incentive for human creators to produce original works [10].

Furthermore, it raises concerns about AI systems' potential to dominate creative fields displacing human artists and musicians. As such, there is a growing need for policymakers to reconsider the part AI plays in the process of creativity and to explore ways in which copyright law can be adapted to account for machine-generated works. Trademark law also faces new challenges in the age of AI. AI technologies are increasingly used in the creation of brand names, logos, and other elements of corporate identity [11].

In some cases, AI systems are capable of generating unique and distinctive trademarks that are as effective as those created by human designers. The ownership and security of trademarks created by AI are called into question by this. Conventional trademark law is predicated on the idea that serves as identifiers of the source of goods or services and is meant to distinguish one brand from another. However, when an AI system generates a trademark, it may not be immediately clear who owns the rights to the mark [12].

AI's involvement in trademark generation also introduces new risks related to the potential for infringement. AI systems, especially those trained on large datasets may inadvertently generate marks that resemble existing trademarks leading to issues of confusion and potential legal disputes. This presents a challenge for trademark law which is primarily concerned with preventing consumer confusion and protecting the distinctiveness of brands. The ability of AI to generate large volumes of potential trademarks could strain the trademark registration process and lead to difficulties in ensuring that new marks do not conflict with existing ones [13].

AI has major consequences for IP law that go beyond these particular domains. Because AI technologies automate processes, boost creativity, and accelerate invention, they can completely change whole sectors. This is especially true of machine learning and deep learning algorithms. However, these advances also create new legal and ethical challenges related to ownership, accountability, and access. As AI systems improve their ability to produce new inventions, artworks, and business models it becomes increasingly difficult to determine who should be entitled to the benefits of such creations [14].

Concerns regarding the centralized nature of authority in the control of a small number of powerful tech firms that operate AI systems are also becoming more prevalent. These companies could potentially own vast amounts of intellectual property created by their AI systems raising questions about competition, monopolies, and access to knowledge. The implications for innovation and economic inequality are significant as smaller creators may be at a disadvantage when competing against AI-driven processes controlled by large corporations. In response, some have suggested that new IP frameworks should be developed that ensure a fairer distribution of benefits protecting the rights of individuals and smaller entities while fostering innovation [15]. The ongoing development of AI technologies and their impact on IP law requires ongoing dialogue and adaptation. As AI continues to evolve its relationship with intellectual property will remain one of the most important legal and ethical challenges of our time requiring careful thought, collaboration, and reform. In this rapidly changing environment striking a balance between encouraging innovations protecting creators' rights, and ensuring fair access to the benefits of AI-generated works will be essential in shaping Intellectual property law's prospects in the era of artificial intelligence [16].

LITERATURE REVIEW

Yusef *et al*. [17] discussed that by replacing the principles of AI-generated intellectual property algorithms AI can now autonomously create works created by humans that can be considered works of art. However, according to current thinking, things created by non-humans may not be considered copyrighted. In addition, there are obstacles to their inclusion which requires quick and equitable resolution of legal issues. This study's goal is to determine whether the legal requirement to protect intellectual property requires the recognition of such ownership or, for example, whether it is necessary to create new entities for intellectual property. General problem-solving is used to reach conclusions based on cause-effect analysis using cause-effect diagrams.

Florent *et al*. [18] stated a significant development in intellectual property law is the connection between intellectual property and artificial intelligence. After a comprehensive but selective discussion, many aspects of AI-related work are likely to become relevant due to legal precedents and the right of originators to start from the laws and international organizations. In light of this, the University of Zurich's Center for Intellectual Property and Competition Law and the Swiss Intellectual Property Institute are investigating the possible future of intellectual property law in terms of intelligence through research and policy. This study provides a first overview of proposals for AI-based intellectual property law reform as well as a brief overview of AI/IP research. These recommendations include the author's right to intellectual property in copyright law and the human right to intellectual property developed in patent law which are necessary to protect the exclusive rights of intellectual property, the establishment of intellectual property, rules for categorizing it, and exceptions to the safeguarding of intellectual property position to support growth, education, etc.

Marta Duque *et al*. [19] reviewed that among the 21st century's most significant technologies is artificial intelligence (AI). Technology companies use Copyrights, trade secrets, and patents are examples of intellectual property rights to protect the investment made in the business. The quantity of open-source AI initiatives financed by significant AI patent holders continues to increase along with AI-related patent applications. This study examines the broad application of open licensing in the IP sector and the commercial and political justifications for this. It specifically evaluates how intellectual property and "open" are used in the competitive ecosystem, and how certain players are utilizing open licenses to draw a lot of attention and establish a community around themselves. To analyze the impact of openness, this study also includes discussions on the protection of intellectual property rights. Finally, it examines the most popular open-source licenses used in intellectual property projects and identifies current and emerging issues related to intellectual property and intellectual property rights.

Sanju Kumar *et al*. [20] explored that artificial intelligence (AI) affects patent protection through patents. This study adopts comparative law to examine Japan's intellectual property protection policy through legal standards. The research results show that Indonesia's national law has not yet implemented intellectual property protection rules. Although copyright is the closest form of protection it is still imperfect because copyright protection for intellectual property is only considered as copyright protection for modern computers, and the two should be very different. As long as the relevant intellectual property has products or categories protected by Japanese patents, the Japanese patent system can adapt to the environment for protecting intellectual property. Intellectual property protection issues in Indonesia and Japan are complex and diverse.

DISCUSSION

The connection between AI and IP presents one of the most significant legal challenges and opportunities of the 21st century. As AI systems continue to evolve becoming more autonomous and capable of producing original works, the traditional frameworks that govern IP law designed for human creators are being increasingly questioned. This intersection not only forces legal systems to adapt but also prompts broader debates about authorship, ownership, and the nature of creativity itself. At the heart of this issue is the way that IP law which has historically served to incentivize human ingenuity can be reconciled with a world where machines are capable of generating valuable intellectual outputs. Artificial Intelligence, particularly machine learning algorithms and neural networks has advanced to the point where it can generate works that were once seen as solely within the domain of human creation. From music and literature to medical discoveries and technological innovations AI is now capable of producing work that can be as sophisticated, and sometimes more efficient than that produced by humans. This development presents new questions about how legal frameworks designed to protect human creators should be adapted to address works created by non-human entities. AI's growing role in the creative process raises important concerns about the limits of IP protections and the need for reform in how intellectual property is understood, applied, and protected. The question of authorship is among the biggest obstacles that AI presents to IP law. The foundation of traditional intellectual property laws, including copyrights, patents, and trademarks, is the idea that they safeguard human-made works of art. The fundamental assumption is that Intellectual property is a result of human creativity. However, AI systems can now generate creative works ranging from software code and inventions to artistic works like paintings, music, and literature without direct human intervention. In the realm of patents, the issue of AI as an inventor has generated considerable debate. Patent law, historically has required that the inventor of an innovation be a natural person. This is reflected in the language of most patent statutes worldwide which specifically define inventors as human beings.

However, as AI systems become more sophisticated, they are beginning to generate inventions that would qualify for patent protection under traditional criteria. For instance, there are cases in which AI-driven systems have been used to develop new drugs, new materials, or even innovations in robotics, and AI has contributed significantly to the creative process. In some jurisdictions, such as the United States and Europe patent offices have ruled that an AI cannot be named as an inventor. In these cases, patent offices have maintained that only natural persons can hold inventorship status. The USPTO's decision was based on the understanding that the legal framework governing patents requires human inventors, a stance that is currently supported by most patent laws around the world. However, other jurisdictions, such as South Africa and Australia have seen patent applications with AI systems listed as inventors, and the debate continues to unfold globally. The question of whether AI can be named an inventor presents a profound challenge to patent law. Patent law generally assigns ownership of a patent to the inventor or to an entity such as a corporation to which the inventor assigns the rights. However, if the inventor is not a human being this creates ambiguity about who owns the rights to the patent. This question of ownership becomes even more pressing as AI systems become more autonomous in their capabilities and contribute more significantly to innovation.

Copyright law exists to protect the creative creations by authors, including music, art, and literature by granting exclusive rights to the creator of the work. Copyright laws around the world have generally adhered to the principle that for a work to be protected, it must be written

by a human. In some countries, the creation of works by humans is expressly required by US copyright law. In the United Kingdom, for instance, there is more flexibility, and the law allows for AI-generated works to be protected under copyright with the human who owns or operates the AI system being considered the author. This divergence between jurisdictions highlights the lack of a clear, unified approach to AI and copyright, and suggests that reforms may be necessary to account for AI-generated works. The issue of authorship in copyright law is complicated further by the role of human involvement in the AI creation process. In some cases, AI-generated works may involve substantial human involvement, whether in the form of providing training data, setting parameters, or guiding the AI system's output.

This remains an open question with some arguing that AI should be seen as a tool that assists human creators while others contend that AI is fundamentally capable of creating new works independently of human intervention. The legal and ethical issues raised by AI and IP law also extend into the realm of trademarks. AI systems are increasingly being used to create brand names, logos, and other elements of corporate identity. AI can generate countless potential trademarks, and these marks may be distinctive and effective in their own right. Trademark law generally requires that a mark serve to distinguish the source of goods or services and be unique in its presentation. However, when AI systems are used to generate trademarks the human role in creating the mark becomes unclear, raising further questions about ownership and the potential for infringement. Moreover, the use of AI in generating trademarks may increase the risk of trademark infringement as AI systems may inadvertently create marks that are similar to existing trademarks leading to confusion among consumers. AI systems can generate a large number of possible marks quickly and efficiently, but ensuring that these marks do not infringe upon existing trademarks may require significant oversight and regulation. This is an area where traditional IP law may struggle to keep pace with technological advancements.

At the heart of all these issues is the broader question of whether existing IP law is fit for purpose in an age of artificial intelligence. The principles underlying IP law promoting innovation, incentivizing creators, and protecting intellectual outputs remain relevant but the way these principles are applied may need to evolve in response to new technologies. AI challenges traditional notions of authorship, ownership, and creativity, and this requires a rethinking of the laws that govern intellectual property. The challenge for lawmakers and legal experts is to strike a balance between acknowledging AI's contribution and protecting human creators' rights in generating new intellectual property. On one hand, it is essential to encourage innovation by providing creators with clear legal protections. On the other hand, as AI systems continue to evolve and play a more central role in innovation it is important to ensure that legal frameworks are flexible enough to account for machine-generated works without stifling creativity or innovation. The development of new legal frameworks that particularly handle AI-generated intellectual property is one possible remedy. These frameworks could establish rules for how AI systems can be credited with creating works, how ownership should be determined, and how rights can be assigned to AI-generated inventions, artworks, and trademarks. Another possible approach is to build on existing IP laws by extending the definition of authorship and inventorship to include AI systems with certain qualifications and restrictions. For example, AI could be considered a co-author or co-inventor alongside human creators with the rights to the work being shared between the human and machine creators.

Ultimately, the relationship between AI and IP law is still in its early stages, and it will require ongoing collaboration among legal scholars, lawmakers, technology developers, and industry

stakeholders. As AI keeps evolving the future of innovation and creativity finding a way to adapt IP law to this new reality will be essential to ensuring that the benefits of AI-driven progress are fairly distributed that creators are protected, and that society as a whole can continue to thrive in a world increasingly powered by AI. The intersection of AI and IP represents an exciting frontier in the evolution of law with significant implications for the future of creativity, technology, and intellectual property protection. Balancing the need for innovation with the protection of rights will remain one of the most pressing challenges in the years to come. The connection between IP and AI brings forth several advantages, such as increased innovation and efficiency but it also presents significant disadvantages that impact both the legal system and the creators or users of AI. These disadvantages primarily arise from the challenges of ownership, legal complexity, and the potential exploitation of AI's capabilities in ways that undermine intellectual property rights. Traditional IP laws are designed with human creators in mind which leads to confusion about whether the rights should belong to the developer of the AI, the user who employed the AI, or even the AI system itself. This creates significant legal uncertainties, particularly in areas like patent law where inventorship is a critical component. For example, in cases where AI creates a novel invention determining the rightful owner and inventor becomes a challenge that current IP systems are not fully equipped to address.

Another significant disadvantage is the creation of patent thickets which complicates the patent landscape. AI technologies, especially in fields like machine learning can generate a multitude of innovations in a very short period. This results in a dense cluster of patents covering overlapping or similar technologies creating what is known as a patent thicket. These thickets make it difficult for innovators, particularly smaller companies and startups to navigate the complex web of patents without risking infringement. The sheer volume of patents can also discourage new entrants to the market stifling competition and innovation. In addition, the complexity of managing these patents and the associated legal risks can be overwhelming, particularly for smaller entities that lack the resources to address potential patent conflicts. AI also increases the risk of unintentional IP infringement. AI systems used to generate content whether it's music, art, or software can unintentionally replicate elements from existing works. For example, an AI-driven tool designed to create music could inadvertently produce a melody that closely resembles an existing copyrighted song. Similarly, AI used for reverse engineering could unintentionally infringe on patented technologies or expose trade secrets. This creates a situation where the boundaries of IP rights are blurred leading to more frequent and harder-to-detect violations. Infringement cases involving AI-generated content are challenging to resolve as it can be difficult to determine whether the infringement was intentional or the result of the AI's operations. The growing use of AI in creative fields also poses a threat to human creativity. As AI systems become more proficient at producing art, literature, and other forms of creative output there is a risk that the value placed on human-made creations could diminish.

AI's ability to quickly generate content that mimics human creativity challenges the authenticity and originality of creative works. This could devalue the work of human artists, writers, and inventors leading to confusion about what constitutes genuine, original creativity. Additionally, the sheer volume of AI-generated content could flood the market potentially overshadowing the unique contributions of human creators. Furthermore, AI-generated works present challenges for copyright protection. Copyright laws, which traditionally require a human author struggle to address works created by machines. If an AI generates a song or an artwork the question arises as to who should own the copyright. This ambiguity in copyright

ownership creates a significant gap in the protection of creative works leaving both creators and users uncertain about their rights and responsibilities. Lastly, the inequality in access to AI tools exacerbates existing disparities in innovation. Large corporations with their vast resources, can develop and deploy cutting-edge AI systems that can enhance their IP management and creation processes. However, smaller entities and individual creators may lack the resources to access these same tools placing them at a disadvantage. This inequality in the availability and application of AI could concentrate IP power in the hands of a few large players, further marginalizing smaller innovators and limiting the diversity of new ideas in the market. While the intersection of AI and IP presents opportunities for advancement, it also introduces significant disadvantages. These include ownership uncertainties, patent thickets, increased infringement risks, the devaluation of human creativity, challenges in copyright protection, and growing inequality.

CONCLUSION

In the field of law, the connection between AI and IP offers both tremendous benefits and challenges. As AI technologies continue to advance their role in generating creative works, inventions, and innovations grows posing difficult issues of ownership, authorship, and rights distribution. Traditional IP laws are designed with human inventors to address the implications of machine-generated works. Issues such as whether AI systems can be considered inventors or authors, and who owns the rights to AI-generated inventions and creative works are at the forefront of legal discussions. While some jurisdictions have attempted to adapt existing frameworks, the quick growth of AI emphasizes the need for new legal agendas or reforms that explicitly discuss the particular difficulties that AI presents. This might include redefining the concept of authorship or inventorship to recognize AI as a tool or a co-creator while ensuring that human creators and innovators retain their rights. Balancing innovation, protection of rights, and equitable access to AI-driven creations is essential for fostering a fair and sustainable intellectual property system. As AI continues to shape industries ongoing dialogue and adaptation of IP laws will be crucial to safeguarding creativity and encouraging responsible technological advancement.

REFERENCES

[1] D. R. Indri Hapsari, A. Pratama, N. P. Hidayah, and I. Anggraeny, "The Legality of Intellectual Property by Artificial Intelligence in Indonesia," *KnE Soc. Sci.*, 2024, doi: 10.18502/kss.v8i21.14791.

[2] K. Pu, "Intellectual property protection for AI algorithms," *Front. Comput. Intell. Syst.*, 2023, doi: 10.54097/fcis.v2i3.5210.

[3] S. Chesterman, "Good models borrow, great models steal: intellectual property rights and generative AI," *Policy Soc.*, 2024, doi: 10.1093/polsoc/puae006.

[4] T. Liu and Z. Yu, "The relationship between open technological innovation, intellectual property rights capabilities, network strategy, and AI technology under the Internet of Things," *Operations Management Research*. 2022, doi: 10.1007/s12063-021-00242-8.

[5] X. Zhang, "Intellectual Property Challenges in AI-Generated Art," *Lect. Notes Educ. Psychol. Public Media*, 2024, doi: 10.54254/2753-7048/34/20231892.

[6] N. Li, "Combination of Blockchain and AI for Music Intellectual Property Protection," *Comput. Intell. Neurosci.*, 2022, doi: 10.1155/2022/4482217.

[7] D. Somaya and L. R. Varshney, "Embodiment, Anthropomorphism, and Intellectual Property Rights for AI Creations," 2018, doi: 10.1145/3278721.3278754.

[8] I. R. Mešević, "Reevaluating Main Concepts of Intellectual Property in the Light of AI-Challenges," in *European Union and Its Neighbours in a Globalized World*, 2023.

[9] R. Henderson, "AI and Intellectual Property Ownership: Who Is the 'Inventor' When the Machine Self-Develops?," *Bus. Law Rev.*, 2023, doi: 10.54648/bula2023015.

[10] M. Kop, "AI & Intellectual Property: Towards an Articulated Public Domain," *SSRN Electron. J.*, 2019, doi: 10.2139/ssrn.3409715.

[11] J. Ume, "What AI Means for Intellectual Property," *ITNOW*, 2023, doi: 10.1093/combul/bwad059.

[12] G. Ren, J. Wu, G. Li, S. Li, and M. Guizani, "Protecting Intellectual Property With Reliable Availability of Learning Models in AI-Based Cybersecurity Services," *IEEE Trans. Dependable Secur. Comput.*, 2024, doi: 10.1109/TDSC.2022.3222972.

[13] A. J. C. Trappey, M. Lupu, and J. Stjepandic, "Embrace artificial intelligence technologies for advanced analytics and management of intellectual properties," *World Pat. Inf.*, 2020, doi: 10.1016/j.wpi.2020.101970.

[14] H. Zhang, J. Gong, and W. Wu, "Artificial Intelligence for Text Generation: An Intellectual Property Perspective," 2024, doi: 10.1007/978-981-99-7587-7_23.

[15] W. Khan, "Intellectual Property in the Days of AI-Language Software," *SSRN Electron. J.*, 2023, doi: 10.2139/ssrn.4622409.

[16] J. Smits and T. Borghuis, "Generative AI and Intellectual Property Rights," 2022.

[17] J. Estupiñán Ricardo, M. Y. Leyva Vázquez, A. J. Peñafiel Palacios, and Y. El Assafiri Ojeda, "Intelligence and intellectual property artificial," *Univ. y Soc.*, 2021.

[18] P. G. Picht and F. Thouvenin, "AI and IP: Theory to Policy and Back Again – Policy and Research Recommendations at the Intersection of Artificial Intelligence and Intellectual Property," *IIC Int. Rev. Intellect. Prop. Compet. Law*, 2023, doi: 10.1007/s40319-023-01344-5.

[19] C. M. Ferrandis and M. D. Lizarralde, "Open sourcing AI: Intellectual property at the service of platform leadership," *J. Intellect. Prop. Inf. Technol. E-Commerce Law*, 2022.

[20] R. Saputra, T. Tiolince, Iswantoro, and S. K. Sigh, "Artificial Intelligence and Intellectual Property Protection in Indonesia and Japan," *J. Hum. Rights, Cult. Leg. Syst.*, 2023, doi: 10.53955/jhcls.v3i2.69.