

Tokenized Creativity: Navigating the Legal Terrain of NFTs and Intellectual Property

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Abstract

Technological advancements in the fourth industrial revolution have shifted creative works from traditional to digital formats, with innovations like IoT, AI, and Blockchain transforming industries, including digital art. Non-Fungible Tokens (NFTs) have emerged as a revolutionary method for verifying ownership and protecting digital assets like artworks, music, and videos using blockchain technology. This study explores the characteristics and legal protections of NFTs, emphasizing their potential to safeguard intellectual property rights and facilitate online trading of digital assets. Despite NFTs' promise of secure ownership records, challenges such as counterfeiting, copyright infringement, and regulatory inadequacies persist, particularly in Indonesia, where current regulations, including the Copyright Law, are insufficient to address NFT complexities. The decentralized nature of blockchain further complicates enforcing intellectual property rights across diverse jurisdictions. Using a normative qualitative methodology, this study analyzes case studies and recent legal advancements related to blockchain technology, highlighting the need for adaptable legal frameworks to manage digital artwork in the NFT ecosystem. Innovative solutions like open copyright or open licensing principles are recommended to enhance security, authenticity, and collaboration in digital art. In conclusion, while NFTs offer significant opportunities for intellectual property rights transformation and monetization, addressing these challenges is crucial to maximize their benefits in the evolving digital landscape.

Keywords: Blockchain; Intellectual Property Rights; NFT

Abstrak

Kemajuan teknologi pada revolusi industri keempat telah mengubah karya kreatif dari format tradisional ke format digital, dengan inovasi seperti IoT, AI, dan Blockchain yang mengubah industri, termasuk seni digital. Token Non-Fungible (NFT) telah muncul sebagai metode revolusioner untuk memverifikasi kepemilikan dan melindungi aset digital seperti karya seni, musik, dan video menggunakan teknologi blockchain. Studi ini mengeksplorasi karakteristik dan perlindungan hukum NFT, menekankan potensinya untuk melindungi hak kekayaan intelektual dan memfasilitasi perdagangan aset digital secara online. Meskipun NFT menjanjikan pencatatan kepemilikan yang aman, tantangan seperti pemalsuan, pelanggaran hak cipta, dan kelemahan peraturan masih terus terjadi, khususnya di Indonesia, di mana peraturan yang ada saat ini, termasuk Undang-Undang Hak Cipta, tidak cukup untuk mengatasi kompleksitas NFT. Sifat blockchain yang terdesentralisasi semakin mempersulit penegakan hak kekayaan intelektual di berbagai yurisdiksi. Dengan menggunakan metodologi kualitatif normatif, penelitian ini menganalisis studi kasus dan kemajuan hukum terkini terkait teknologi blockchain, menyoroti perlunya kerangka hukum yang dapat disesuaikan untuk mengelola karya seni digital di ekosistem NFT. Solusi inovatif seperti hak cipta terbuka atau prinsip lisensi terbuka direkomendasikan untuk meningkatkan keamanan, keaslian, dan kolaborasi dalam seni digital. Kesimpulannya, meskipun NFT menawarkan peluang besar untuk transformasi dan monetisasi hak kekayaan intelektual, mengatasi tantangan ini sangat penting untuk memaksimalkan manfaatnya dalam lanskap digital yang terus berkembang.

Kata Kunci: Blockchain, Hak Kekayaan Intelektual, NFT

1. Introduction

The rapid advancements in technology, particularly with the onset of the fourth industrial revolution, have greatly influenced human existence. This revolution altered humanity's

perception of technology and had a profound impact on society's material, social, economic, and cultural aspects¹. The key drivers of change in the fourth industrial revolution are innovations like the Internet of Things (IoT), Big Data, Artificial Intelligence (AI), Blockchain, autonomous cars, genetic engineering, and robotics. IoT is a significant invention that enables devices to connect with one other over the internet, revolutionizing how people conduct daily tasks including payments, transportation orders, and deliveries². In addition to IoT, AI, which replicates human intellect, has led to the development of applications like autonomous vehicles, virtual assistants like Google Assistant and Siri, and is also utilized in police enforcement, as seen in Hangzhou, China. Moreover, technological advancements foster synergy between the Internet of Things (IoT) and Artificial Intelligence (AI) by utilizing Blockchain technology. The blockchain, invented in 2009, has gained significant appeal as a crucial technical advancement. This technology offers a safe and unchangeable method of storing digital data by creating a ledger of transactions using unique tokens. These technologies are creating new opportunities and shifting paradigms in several industries, such as data security and transparency, alongside their advancements³.

Digital technological advancements, particularly within the framework of the fourth industrial revolution, have transformed the distribution of copyright works from traditional to digital formats. This enhances the convenience and efficiency of distributing works of art, music, and other digital content⁴. Advancements in information technology have a notable societal influence by creating a more interconnected society and driving swift transformations. Information technology has the ability to enhance human well-being and advancement, but it also increases individuals' susceptibility to crimes like identity theft and privacy breaches. Non-Fungible Token (NFT) technology, which operates on the Blockchain network, is a popular digital product today. NFTs enable the verification of ownership for digital assets including movies, tweets, photographs, music, and more using distinct, non-interchangeable tokens. NFTs allow for the online buying and selling of digital assets using bitcoin⁵. NFT technology is an innovative method that safeguards the copyright of artwork by guaranteeing permanent ownership of digital goods through Blockchain. NFTs limit the possibility of art piracy by clearly and irrevocably recording all purchasing moves⁶.

While NFTs have the potential to safeguard the copyright of digital works and streamline the trading of digital assets, further research is necessary to thoroughly examine their benefits and potential challenges. NFTs possess the capability to significantly influence the digital art ecosystem and enhance the protection of intellectual property rights⁷. Nonetheless, NFTs are susceptible to counterfeiting, which constitutes a violation of Copyright Law. Despite the blockchain technology's promise of providing a secure and

¹ Inglehart, Ronald. *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Princeton university press, 2020.

² Greengard, Samuel. *The internet of things*. MIT press, 2021.

³ Salkin, Ceren, Mahir Oner, Alp Ustundag, and Emre Cevikcan. "A conceptual framework for Industry 4.0." *Industry 4.0: managing the digital transformation* (2018): 3-23.

⁴ Li, Feng. "The digital transformation of business models in the creative industries: A holistic framework and emerging trends." *Technovation* 92 (2020): 102012.

⁵ Prévost, Emeric. "The Law Applicable to Digital Representations of Off-chain Assets." In *Blockchain and Private International Law*, pp. 285-313. Brill Nijhoff, 2023.

⁶ *Ibid.*

⁷ Mishra, Prachi, Ashish Kumar Singhal, Virendra Singh Thakur, Dilip Sharma, and Mishika Bedi. "Beyond Traditional Intellectual Property: Rise of Non-Fungible Tokens (NFTs) and Role of Blockchain in Protecting Digital Art." (2024).

immutable record of ownership, incidents of digital art forgery and unauthorized reproduction of NFTs have been documented.

Achieving a balance between technological advancements and copyright protection in the digital age is crucial. Regrettably, Indonesian national regulations, including the Copyright Law and other pertinent regulations, have proven inadequate in addressing these issues comprehensively. The current legal frameworks fall short in managing the complexities and challenges presented by the digital and NFT markets. Consequently, there is an urgent need for more adaptable legal regulations that can keep pace with the rapidly evolving digital landscape and offer robust protection for both creators and consumers. Also, issues that are exacerbated by legal complications across different jurisdictions, which impede the efficient application of conventional methods for monitoring and protecting intellectual property rights becoming one of problem on this realm. Decentralized networks inherently involve individuals from several legal jurisdictions due to their architecture⁸. This diversity adds complexity to the intricate field of law enforcement and the adjudication of issues relating to intellectual property rights.

Beside, there are significant concerns about the possibility of digital asset counterfeiting. Cases of NFT counterfeiting show that even though there is a guarantee of an original certificate from the creator, fake digital works are still often found. For example, in a report by CNBC in 2021, it was discovered that a leading NFT trading platform, OpenSea, experienced large-scale circulation of fake artwork, resulting in significant losses for genuine collectors and artists⁹. Furthermore, a study conducted by Vice in 2022 found that digital work theft and illegal duplication of NFTs had become a growing problem¹⁰. A prominent case is the theft of a digital artwork from renowned artist Beeple, which was resold as an NFT without permission. This case caused huge losses for Beeple and highlighted weaknesses in the existing NFT verification system. Although NFTs promise security through blockchain technology, the practice of theft and counterfeiting shows that digital crime can still exploit loopholes in this system.

In the legal realm, consumer protection in NFT trading is still inadequate. In Indonesia, legal protection for NFT buyers is regulated in Law no. 19 of 2016 concerning Information and Electronic Transactions (ITE), but its implementation still has many challenges. Meanwhile, at the international level, the Bern Convention for the Protection of Works of Art and Literature and the TRIPS (Trade-Related Aspects of Intellectual Property Rights) Agreement from the WTO regulate copyright protection. However, this regulation does not fully accommodate the dynamics and complexity of NFT trading in the digital era. These incidents of counterfeiting and selling fake digital works are certainly detrimental to consumers. They may purchase assets that they think are genuine, but turn out to be fake, which not only wipes out the value of their investment but also discredits the digital art market as a whole. Defrauded consumers often have no clear legal path to compensation, given the complexity and globality of digital transactions. This shows that stronger legal protection and better verification systems are needed to prevent and combat counterfeiting in NFT trading.

⁸ Vergne, Jean-Philippe. "Decentralized vs. distributed organization: Blockchain, machine learning and the future of the digital platform." *Organization Theory* 1, no. 4 (2020): 2631787720977052.

⁹ Bhujel, Sangam, and Yogachandran Rahulamathavan. "A survey: Security, transparency, and scalability issues of nft's and its marketplaces." *Sensors* 22, no. 22 (2022): 8833.

¹⁰ *Ibid.*

The researches initiated to research more about how blockchain technology, the foundation of NFTs, can enhance the security and authenticity of digital artworks when linked into digital rights management systems. Blockchain offers reliability and transparency in documenting ownership and transactions, which decreases the likelihood of counterfeiting and copyright infringement¹¹. Innovative solutions are being suggested in the form of open copyright or open licensing principles. Granting digital art creators the ability to control their copyright based on their choices will enhance flexibility and cooperation within the digital art sector¹². This research highlights the significance of using creative solutions and incorporating technologies like NFTs and blockchain to safeguard copyright and preserve the authenticity of digital artworks in the constantly changing digital age.

Based on the descriptions above, the problem can be formulated as follows:

- 1) How do technological developments, especially in the context of the industrial revolution 4.0, influence the distribution of creative works from conventional forms to digital formats?
- 2) How do Non-Fungible Tokens (NFTs) play a role in protecting digital artwork copyrights and facilitating online trading of digital assets?
- 3) What are the potential benefits and challenges that may arise from using NFT technology in the context of intellectual property rights?
- 4) How can the integration of blockchain technology and open copyright concepts improve security, authenticity and collaboration in the digital art industry?

2. Method

This study will utilize a normative qualitative methodology, utilizing a case study approach. The research will commence by conducting a comprehensive examination of laws and regulations that are relevant to the case as the primary data source. While the secondary data in this research are from journals, documents, news, and online media. The study will examine case studies and recent legal advancements related to blockchain technology, the foundation of NFTs, and how they might enhance security and dependability in documenting ownership and transactions of digital artworks.

3. Analysis and Discussion

Exploring NFT Guidelines in Indonesia: Hurdles and Prospects in the Digital Economic Age

The rising global interest in NFTs reflects the growing appeal of digital assets utilizing blockchain technology¹³. NFTs are exclusively traded on specialist platforms like CryptoPunks, OpenSea, and Rarible, and have become essential in the digital economy. Thailand had the highest number of NFT users globally in 2021, with 5.65 million users, followed by Brazil with 4.99 million users and the United States with 3.81 million users, according to the Statista Digital Economy Compass 2022¹⁴. Indonesia ranks eighth with 1.25 million NFT users¹⁵. The data indicates widespread use of NFTs across different countries,

¹¹ Prévost, Emeric. *Loc. Cit.*

¹² Ku, Raymond Shih Ray. "The creative destruction of copyright: Napster and the new economics of digital technology." *The University of Chicago Law Review* (2002): 263-324.

¹³ Patrickson, Bronwin. "What do blockchain technologies imply for digital creative industries?." *Creativity and Innovation Management* 30, no. 3 (2021): 585-595.

¹⁴ Statista. "Digital Economy Compass 2022." Statista, www.statista.com/study/128160/digital-economy-compass-2022/.

¹⁵ *Ibid.*

highlighting the vital role they play in global digital economic developments¹⁶.

The rise in interest may indicate individuals' confidence in the potential worth and distinctiveness of digital assets like art, music, or other forms of creative content. NFT assets can be seen as creations due to the creative process involved in their steady development through conversion or minting¹⁷. This evaluation aligns with the definition of creation outlined in Article 1 Number 3 of the Copyright Law, encompassing works of science, art, and literature created via inspiration, skill, and imagination and manifested in tangible form¹⁸. Challenges exist in regulating and safeguarding intellectual property rights for creators of digital art in the realm of NFT technology. Counterfeiting and copyright infringement pose a significant danger to artists' integrity and the value of digital artwork. Decentralized platforms make it harder to determine ownership and monitor rapid copyright changes.

In Indonesia, the existing Copyright Law (Law No. 28 of 2014 on Copyright) does regulate digital works, offering protection to digital art as it does to traditional forms of creative expression¹⁹. This legislation ensures that digital artists can claim their rights over their creations, receive fair remuneration, and take legal action against unauthorized use. The Copyright Law encompasses a wide range of digital creations, including music, videos, and various forms of digital visual art. This law also does not adequately address the complexities introduced by NFT technology. While this law encompasses various forms of digital works, it lacks provisions specifically designed to manage the unique aspects of NFTs. NFTs utilize blockchain technology to record ownership and authenticity, a process not explicitly recognized or protected under the current legal framework²⁰. This omission results in a significant gap in legal protection for creators of NFTs, leaving their intellectual property rights insufficiently safeguarded.

Moreover, the existing Copyright Law does not effectively cover the distribution of royalties and consumer protection within the NFT ecosystem. NFTs enable creators to receive royalties each time their works are resold in secondary markets, a mechanism not accommodated by the current law, which generally only addresses initial transactions²¹. Consequently, creators do not have clear legal assurance regarding their ongoing royalty rights. Additionally, consumer protection is inadequately addressed, leaving buyers vulnerable to issues such as purchasing counterfeit works, fraud, or privacy violations.

However, the rise of NFTs (Non-Fungible Tokens) presents a new paradigm that the current Copyright Law does not adequately address. NFTs represent a unique digital asset that

¹⁶ Gillpatrick, Tom, Semra Boğa, and Oncel Aldanmaz. "How can blockchain contribute to developing country economies? A literature review on application areas." *Economics* 10, no. 1 (2022): 105-128.

¹⁷ Chandra, Yanto. "Non-fungible token-enabled entrepreneurship: A conceptual framework." *Journal of Business Venturing Insights* 18 (2022): e00323.

¹⁸ Undang-Undang Republik Indonesia Nomor 28 Tahun 2014 Tentang Hak Cipta. 2014.

¹⁹ Deniesa, Salsabilla, Dela Rinanda Putri, and Arqam Amrullah. "Copyright Protection for Creators of Digital Artwork." *Indonesian Comparative Law Review* 4, no. 1 (2021): 43-58.

²⁰ Rehman, Wajiha, Hijab e Zainab, Jaweria Imran, and Narmeen Zakaria Bawany. "NFTs: Applications and challenges." In *2021 22nd International Arab Conference on Information Technology (ACIT)*, pp. 1-7. IEEE, 2021.

²¹ Zou, Dongchen, Meilin Gu, and Dengpan Liu. "When ownership and copyright are separated: Economics of non-fungible token marketplaces with secondary markets." *Decision Support Systems* (2024): 114247.

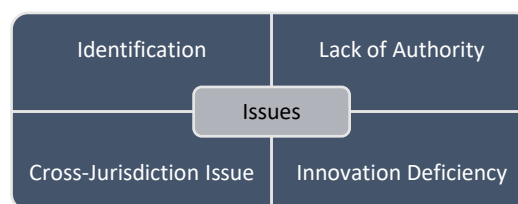
certifies ownership and authenticity using blockchain technology²². Unlike traditional digital art, NFTs are indivisible and have unique attributes, making them distinct from other digital files. This uniqueness is where the existing Copyright Law falls short. While it can protect digital art from unauthorized reproduction and distribution, it struggles to handle the complexities of ownership and authenticity that NFTs introduce.

NFTs are traded on decentralized platforms, which complicates the enforcement of copyright laws²³. The decentralized nature of these platforms means that they operate without a central authority, making it challenging to monitor and enforce copyright protection. This creates loopholes that can be exploited for counterfeiting and unauthorized sales, undermining the rights of original creators. The current legal framework in Indonesia does not provide specific provisions for the protection of NFTs, leaving a gap that could potentially harm digital artists who venture into this new form of digital expression. To bridge this gap, there is a pressing need for new regulations tailored to the nuances of NFTs. Such regulations should focus on clearly defining ownership, establishing the authenticity of digital works, and providing mechanisms for artists to protect their NFT creations from infringement.

Law Number 28 of 2014 on Copyright offers a pertinent legal foundation for this scenario. An artist will automatically acquire exclusive rights to a work once it is created, as stipulated by this statute. Copyright grants automatic protection to artistic works upon creation²⁴. If an NFT item is copyrighted, the creator and rights holder will have moral and economic rights over the work. Law Number 28 of 2014 grants economic rights to artists, allowing them to profit from their creative works through activities like as publication, distribution, replication, and duplication. The moral rights of the creator are perpetual and irrevocable, even if economic rights have been transferred²⁵. Moral rights encompass elements like crediting the author's name on published works or altering the title of the work, as outlined in Article 5 of Law Number 28 of 2014 about Copyright.

Decentralized environments like blockchain technology or peer-to-peer networks present many issues related to intellectual property rights (IPR), such as follows:

Figure 1. Issues Related to IPR arises from Decentralized Environments



Navigating decentralized networks to identify and maintain intellectual property rights (IPRs) owners is a complex challenge. This duty involves identifying IPR holders and closely monitoring how their content is being used, especially with the risk of unlawful content spreading over decentralized networks. Since these networks function without a

²² Raman, Ramakrishnan, and Benson Edwin Raj. "The world of nfts (non-fungible tokens): The future of blockchain and asset ownership." In *Enabling blockchain technology for secure networking and communications*, pp. 89-108. IGI Global, 2021.

²³ *Ibid.*

²⁴ Chandra, Yanto. *Loc. Cit.*

²⁵ Caso, Roberto, and Giulia Dore. "Academic copyright, open access and the "moral" second publication right." *European Intellectual Property Review* 2022, no. 6 (2022): 334-343.

centralized regulating body, monitoring and controlling such actions become increasingly complex.²⁶ Beside, the decentralized structure of these networks, without a central authority, poses a major issue in enforcing intellectual property rights due to the lack of a single body with the power to guarantee and monitor compliance.

This inherent trait hampers the conventional enforcement methods that frequently depend on centralized supervision. The legal complexities arising from different jurisdictions significantly impede the effective monitoring and protection of intellectual property rights within decentralized networks. The inherent diversity of these networks exacerbates challenges in law enforcement and adjudication. Disparate legal frameworks between jurisdictions further obstruct the establishment of unified approaches to intellectual property protection. Consequently, there is a pressing need for legal innovation to develop and enforce frameworks capable of managing intellectual property claims within the decentralized architecture.

Finally, it is essential to have a regulatory framework that is dynamic and allows for continuous updates of rules and regulations²⁷. Adopting this flexible strategy is crucial for addressing new difficulties quickly and ensuring strong and efficient protection of intellectual property rights in this constantly changing decentralized environment. Decentralized networks' ongoing development requires a legal framework that is as flexible and creative as the technology it aims to regulate.

To address these difficulties, governments and regulatory organizations must establish suitable legislation to manage digital artwork in the NFT ecosystem. This encompasses legislation about copyright, royalty distribution, and consumer safeguarding. Legal innovation is necessary to preserve a balance between safeguarding intellectual property rights and promoting decentralized technical advancement. Legal protection is crucial in human life, especially when it comes to NFT trading online. The regulation of NFTs is now facing issues, since the Commodity Futures Trading Supervisory Agency (BAPPEBTI) has said that there are no official regulations expressly governing NFTs²⁸. Current restrictions mostly pertain to the guidelines for trading cryptocurrency assets on futures exchanges. NFT assets and crypto assets can be regarded the same under BAPPEBTI Regulation Number 8 of 2021 if there are no explicit regulations, despite their differences²⁹. The necessary conditions include utilizing distributed ledger technology for distribution, possessing a collateralized crypto asset, and undergoing evaluation through the analytical hierarchy process technique controlled by BAPPEBTI.

Kominfo stated in Press Release No.9/HM/KOMINFO on January 16, 2022, that they will oversee NFT transactions in Indonesia because of the increasing number of customers. The regulations require compliance with laws regarding NFT transactions, protection of

²⁶ Schranz, Melanie, Gianni A. Di Caro, Thomas Schmickl, Wilfried Elmenreich, Farshad Arvin, Ahmet Şekercioğlu, and Micha Sendel. "Swarm intelligence and cyber-physical systems: concepts, challenges and future trends." *Swarm and Evolutionary Computation* 60 (2021): 100762.

²⁷ Muhammad, Tayyab, Muhammad Tahir Munir, Muhammad Zubair Munir, and Muhammad Waleed Zafar. "Integrative Cybersecurity: Merging Zero Trust, Layered Defense, and Global Standards for a Resilient Digital Future." *International Journal of Computer Science and Technology* 6, no. 4 (2022): 99-135.

²⁸ Paesano, Federico, and Dorothy Siron. "Working Paper 38: Cryptocurrencies in Asia and beyond: law, regulation and enforcement." *Basel Institute on Governance Working Papers* (2022): 1-69

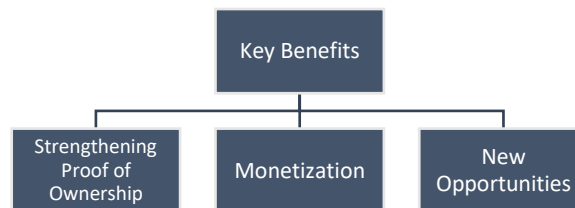
²⁹ BAPPEBTI Regulation No. 8 of 2021. "Pedoman Penyelenggaraan Perdagangan Pasar Fisik Aset Kripto di Bursa Berjangka." 2021

personal data, and intellectual property rights, particularly copyright³⁰. BAPPEBTI ensures legal certainty in law enforcement by citing Article 50 of Regulation Number 8 of 2021, which pertains to the Guidelines for Organizing Physical Market Trading in Crypto Assets on the Futures Exchange. Some parties contend that BAPPEBTI offers restricted options.

Unraveling the Advantages of NFTs: IPR Transformation, Monetization, and Emerging Prospects in the Digital Age

Several studies have emphasized the significant potential of NFTs (Non-Fungible Tokens) in advancing Intellectual Property Rights (IPR). Two studies demonstrating this substantial influence are conducted by The Block Research and Forrester Research. In 2021, The Block Research study reported that the worldwide NFT market had a value of \$41 billion³¹. This research demonstrates the swift expansion and significant influence of NFTs in the digital environment. According to a report by Forrester Research, the NFT industry is projected to reach \$12.4 billion by 2026³². The forecast indicates that NFTs will persist as a significant influence in the digital economy, rather than being a passing fad. NFTs have the potential to revolutionize the management and protection of intellectual property rights (IPR) by providing benefits to creators, IPR owners, and consumers. Key benefits of using NFTs are as follows:

Figure 2. Key Benefits of NFTs



NFTs, or Non-Fungible Tokens, play a pivotal role in enhancing the verification of ownership within the realm of intellectual property rights. By providing decentralized and immutable evidence of ownership, NFTs establish a formidable barrier against counterfeiting or unauthorized alterations, thus significantly bolstering the security for authors and rights owners³³. A compelling illustration of this is evident in the art world, where digital artist Beeple harnessed the power of NFTs to authenticate his artwork, resulting in a groundbreaking auction at Christie's where his creation fetched a staggering \$69 million³⁴.

Beyond ownership verification, NFTs empower creators by enabling direct monetization of their work without the need for intermediaries. This newfound capability grants creators greater control over the distribution and pricing of their works, while simultaneously

³⁰ Hafizhah, Annisa, Aji Baskoro, and Aisha Radha Wahyuda. "Regulation Responding to Innovation: Addressing the Potential Threats to NFT and Metaverse Intellectual Property." *Indonesian Law Journal* 16, no. 2 (2023): 205-228.

³¹ Hartwich, Eduard, Philipp Ollig, Gilbert Fridgen, and Alexander Rieger. "Probably something: A multi-layer taxonomy of non-fungible tokens." *Internet Research* 34, no. 1 (2024): 216-238.

³² *Ibid.*

³³ Alnahari, Mohammed Saeed. "Exploring the Potential of Blockchain Technology for Improved Management and Safety of Underground Utilities." PhD diss., Arizona State University, 2023.

³⁴ Fortnow, Matt, and QuHarrison Terry. *The NFT Handbook: How to create, sell and buy non-fungible tokens*. John Wiley & Sons, 2021.

amplifying their potential earnings. Noteworthy examples include musicians like Kings of Leon, who boldly released their latest album as a non-fungible token, a move aimed at maximizing their earnings and establishing a direct and intimate connection with their fanbase. Moreover, NFTs open doors to fresh possibilities in the monetization of intellectual property rights. Creators can leverage NFTs to implement automated royalty systems, ensuring a streamlined process for earning royalties whenever their work is resold³⁵. This innovation extends to the realm of games and metaverses, where NFTs provide creators with the ability to authorize the usage of their works, thereby tapping into novel revenue streams. The SuperRare platform, for instance, employs smart contracts to guarantee creators automatic royalties whenever their works find new owners, showcasing the transformative potential of NFTs in reshaping how intellectual property rights are valued and monetized in the digital landscape³⁶.

NFTs use blockchain technology to ensure transparency and certainty in owning digital assets. They also create chances to enhance the value and monetization of art and intellectual property rights in the digital age. Studies indicate that legal protection can be enhanced by utilizing blockchain technology as the foundation for NFTs³⁷. Blockchain technology enhances security and authenticity of digital artworks, minimizes counterfeiting risks, and promotes transparency in copyright transactions. NFTs provide for the transparent recording of ownership and transaction history of digital artworks, instilling confidence in rights holders. Key findings from this research encompass: First, Intellectual Property Rights and Smart Contracts. The copyright of a digital artwork is retained by the owner, safeguarding the work even in the realm of NFTs. The NFT owner's ability to copy or redistribute the work is restricted and depends on the agreement made at the time of NFT purchase. Smart contracts are automated code on a blockchain network that can manage the allocation of royalties for each resale of a work in the form of an NFT. This ensures that the creator of a digital artwork receives compensation whenever the piece is sold. Next, Implementing an Open License Concept to Enhance Flexibility and Collaboration.

NFT acquisitions frequently include a license or agreement that dictates the rights and responsibilities of the NFT holder. The open licensing concept is a novel approach to safeguarding the intellectual property rights of digital artwork on the NFT platform. This notion allows creators to tailor their copyright management to their tastes, perhaps fostering collaboration and innovation in the digital art sector.

Last but not least, Oversight and Enforcement also Conflict Resolution NFT markets play a role in tracking the utilization of artworks in digital settings. They have the authority to establish regulations concerning the utilization of the work, which may include forbidding any usage that violates copyright. Establishing efficient and prompt dispute resolution methods in the NFT ecosystem is crucial for resolving conflicts related to the ownership, utilization, or distribution of royalties from digital artworks. Legal safeguards in the NFT space are growing in tandem with technical advancements and market shifts. Hence, industry and regulatory entities must stay updated on these

³⁵ Aksoy, Pinar Caglayan. *Loc. Cit.*

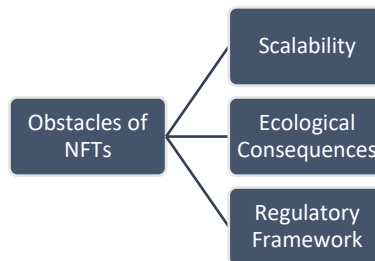
³⁶ Lee, Edward. "NFTs as decentralized intellectual property." *U. Ill. L. Rev.* (2023): 1049.

³⁷ Bonnet, Severin, and Frank Teuteberg. "Impact of blockchain and distributed ledger technology for the management, protection, enforcement and monetization of intellectual property: a systematic literature review." *Information Systems and e-Business Management* 21, no. 2 (2023): 229-275.

advancements to guarantee the adequate safeguarding of digital artworks and their associated rights³⁸.

As a result, NFTs have significant potential, but there are various obstacles and factors that must be considered.

Figure 3. Obstacles Derives from NFTs



The implementation of NFTs, facilitated by blockchain technology, presents numerous opportunities and challenges that require thoughtful evaluation. Scalability limits of blockchain technology provide a significant problem that may hinder the general acceptance and popular use of NFTs. Cryptocurrency mining, a key aspect of blockchain operations, has ecological repercussions that raise ethical issues because of their possible environmental damage³⁹. This prompts a need for careful consideration of the sustainability of current NFT use.

Regulatory uncertainty about NFTs in different countries is a considerable challenge. Ambiguous and inconsistent legislation present legal obstacles for authors and intellectual property rights holders, requiring meticulous handling of the intricate legal environment. An important study highlights the need to solve these difficulties in order to fully utilize the significant potential of NFTs in furthering intellectual property rights. It is crucial to find a balance between innovation and compliance with rules to responsibly and ethically use NFT technology into the digital ecosystem.

To properly utilize the revolutionary potential of NFTs, it is crucial to acknowledge and address these problems directly. Recognizing scaling challenges, environmental factors, and the necessity for thorough regulations is essential for managing the complex overlap of technology, intellectual property rights, and environmental sustainability. The importance of ongoing study and advancement in NFT technology, promoting a detailed strategy that tackles intricacies and maximizes the beneficial effects of NFTs in the changing digital environment.⁴⁰

4. Conclusion

Indonesian NFT regulations reveal a complex digital economy with challenges and prospects. NFTs are gaining popularity worldwide as digital assets, notably art and creative work, are valued more. Decentralized blockchain technology makes intellectual property

³⁸ Zhao, Zhao. "Fulfilling the Right to Follow: Using Blockchain to Enforce the Artist's Resale Right." *Cardozo Arts & Ent. LJ* 39 (2021): 239.

³⁹ Upadhyay, Arvind, Sumona Mukhuty, Vikas Kumar, and Yigit Kazancoglu. "Blockchain technology and the circular economy: Implications for sustainability and social responsibility." *Journal of cleaner production* 293 (2021): 126130.

⁴⁰ Aliyev, Hafiz, Ahmet Faruk Aysan, and Umar Nawaz Kayani. "Future Readiness with Non-Fungible Tokens (NFTs): Prospects and Challenges." (2023).

rights regulation and maintenance difficult. Indonesia's Copyright Law Number 28 of 2014 protects NFT authors' rights. No central authority makes it difficult to enforce intellectual property rights with blockchain technology. Regional legal complexities require imaginative and adaptable legal arrangements. Despite challenges, NFTs revolutionize intellectual property rights. NFTs leverage blockchain technology to verify ownership, allow writers to profit directly, and enable unique royalty structures. Smart contracts preserve copyright, but open licensing encourages digital art cooperation. NFTs must overcome blockchain scalability challenges, cryptocurrency mining environmental impacts, and regulatory uncertainty to reach their full potential. Innovation and compliance must be balanced for ethical and responsible NFT technology use in the evolving digital environment. To understand and maximize NFT benefits in the ever-changing digital ecosystem, continuous research and progress are needed.

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