Artificial Intelligence and Blockchain: A Breakthrough Collaboration in IP Law

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Artificial Intelligence and blockchain technology now influence the intellectual property environment. For example, machine learning is now regularly used in trademark and patent searches in IP databases. Machine learning implementations in different IP areas, including patent tracking, copyright evaluation, and trademark comparisons, can now be seen more often. A vast range of LP notary implementations are proposed using blockchain technologies, and new networks emerge, using both AIs and blockchains to build new IP communities. The growth of such technology in LPP is mainly driven by the IT industries, particularly technology entrepreneurs. In the context of the non-registered IP rights such as copyright (which under the Berne Convention for the Protection of Literary and Artistic Works and in many jurisdictions is not registrable) and unregistered design rights, blockchain technology can play an important role, too, because it can prove its conception, use and qualification (for example the countries where the design was first marketed and originality). Uploading the author or creator's work and design data into a blockchain would produce a time-stamped record and solid proof of originality.So, IPO has laid the groundwork for the technology's fusion into the IP ecosystem. Several other possible uses include ledger management, the creation of a monitoring authority to track the use of IP properties in the market and commercialization for investors via a bidding system. It will provide innovators with a centralized, government-backed market to attract investors and technology titans.

Keywords: Artificial Intelligence, Blockchain, Copyright, Design, Patent, Smart Contract, IPR Ledger, Distributed Ledger Technology

With blockchain technology being commonplace, players in the market and developers in Blockchain will have to work gradually together to create standards and interoperability protocols. Different government departments and IP registries, such as the EU Intellectual Property Office (EUIPO), constantly examine blockchain abilities. The EU Commission is planning a blockchain observatory. Recently, the USCongress set up a Congressional Blockchain Caucus.[1]

The driving force behind using blockchain technologies in intellectual property law is feeding into the respective databases of all applicable data on innovation. Data may be stored by the patent office or other competent authority for a patent application. As noted previously, blockchain technology distributes the entered data over different hubs and stations to offer more protection in a centralized network than storage techniques.

IP rights are generally administered by Governments or their subordinate I.P. repository offices. The issues of piracy of copyrighted works are a serious concern. As the market gets more concentrated and globalized, the issue will become more vulnerable to treatment. Therefore, Blockchain technology provides untouched and new registration possibilities to tackle these modern obstacles.

It then seems to be only a matter of time before the law tackles possible challenges to the wide-ranging legal implementation of the technology, such as law and jurisdiction, the enforceability of smart rights, private security considerations, and computer protection reliability of smart contracts, rules, and definitions of smart contracts.

Law and technology are compatible because once a new technology is created, regulation guarantees that it is secured as an Intellectual Property (IP) asset when the law needs to be technologically adaptable to have additional control.

Intellectual Property Rights (*IPR*) has become more prominent as people have become more conscious of their artistic rights. The industry is experiencing the need for technological development to properly secure I.P. rights in light of the advent of emerging technologies and the increasing danger to IP rights.These questions are not only about the

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privileges but also about the administration of IP assets. The new digital job requires a fresh look using the latest technology to improve the IP system.

Blockchain and Artificial Intelligence (AI) are the current and potential drivers of all technological realms. These inventions have gone into every industry over the last decade and revolutionized their operations. If 'Blockchain' is known as an indestructible directory of connected independent blocks that hold encrypted information, 'AI' can be loosely defined as the ability of an artificial computer system to simulate and perform a human brain's cognitive activity. A workshop hosted by WIPO demonstrated the need for IP offices to use blockchain technologies to help us handle IP properties. After that, several IP offices started to see how Blockchain and AI could be used in their work.

The use of Blockchain and other technology such as natural language, A.I., and machine learning automates all human-assisted or manual processes in whole or in part.[2] Each industry uses this technology to minimize human labor or improve its work's productivity. However, the main question is how IP office practices in innovators, clients, professionals, and examiners improve by introducing an AI and machine learning-powered automated directory.

The world is attracted by the untapped technology possibility in many businesses as blockchain technology and cryptocurrency becomes increasingly prominent. Apps such as the open network, safe content, and openness make it better than others.

What is Blockchain and Artificial Intelligence?

Artificial Intelligence

There has been a lot of discussion in recent about the development of artificial intelligence and its ability to replace a significant percentage of the labor force.[3] According to this perception, artificial intelligence may ultimately lead to the end of the human species and all occupations."[4] Similar and dramatic predictions can also be seen in the legal field, with assertions that "academically trained attorneys arc increasingly being replaced by technology,"[5] that AI is developing the ability to put forth arguments in a logical way[6], and that the theory of disruptive innovation will show Big Law being upended by new, technological start-ups.[7]

Nevertheless, within these various assertions regarding the legal community, little is said about what AI is explicit.[8] Many speak of the roles and implications of AI without defining it or briefly giving differing and simplified views of what it is.[9] While some consider it presumptuous to attempt to resolve the dispute of how AI in the practice of law is defined,[8] this Comment, and future discussions, require a working definition and established scope.

AI has an impressive underpinning in computer science, mathematics, philosophy, psychology, and economics. Neuroscience, linguistics, and biology.[10] Preceding a definition, a satisfying way to view current AI generally is as "a big forest of academic and commercial work around 'the science and engineering of making intelligent machines'"[11] This view combines the definition given by John McCarthy,[11] the individual who coined the term artificial intelligence, with the expertise of Michael Mills.[12] Mills, in his 2016 white paper, gives a snapshot of this forest with the following diagram:[13]

As shown in AI covers a variety of processes, including those, such as image recognition or robotics, that currently have no implementation in the practice of law (Fig. 1).[13] Differing somewhat in their approach, AI experts Russell and Norvig provide the following four concepts with which to view AI:

 (i)		Systems that think like humans,
 (ii)	Systems that act like humans,
(iii)	Systems that reason, and
(iv)	Systems that act rationally.[14]

Blockchain Technology

Blockchain technology is a digital public ledger system built on a shared, decentralized, peer-to-peer (P2P) network.[15] This Distributed Ledger Structure[16] is a type of Distributed Ledger Technology (DLT), where users control the ledger without the interference of outside parties. The technology is
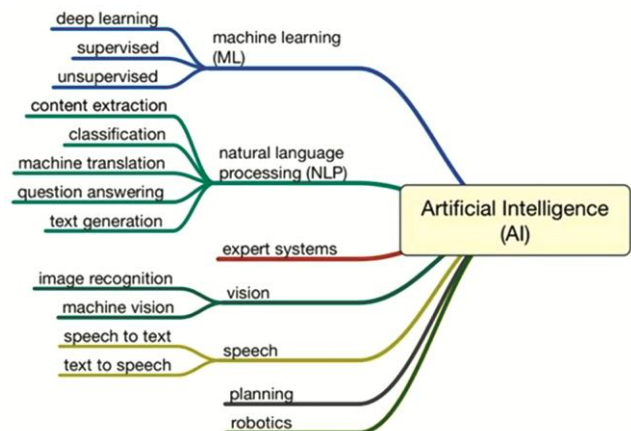

Fig. 1 — Processes covered under AI

timeless since it consists of information storage in cryptographic blocks composed of codes, each comprising individual transaction data and each uniquely stamped. These blocks are connected to a blockchain using hash pointers.[17]

The directory or ledger is managed in clustered form by the network members, i.e., nodes. It is tampering resistant as any modifications or transfers eventually cannot occur without the consent of these network users.Blockchain has a multi-dimensional utility for storing all kinds of data such as transactions, multimedia data, architecture data, etc. The information, which is most suspected of cyber assault, can be secured by an unalterable blockchain scheme.[17]

A primary algorithm generally secures the information transfer between the user and the recipient. Each of the three parties—the user, the sender, and the receiver—is given a set of cryptographic keys. The user gives the receiver the encrypted data. A decentralized P2P network, or nodes, receives the broadcast of the transaction between the user and the recipient. A fresh stamped block is created by network miners, who are responsible for maintaining and validating the blockchain-based transaction record and serves as proof of work. To ensure that no records can be changed, each new block that is added to the Blockchain is given a cryptographic signature. Any participant in the network can access the information. Public and private blockchain are the two primary types of blockchain networks.[18]

In a public blockchain, everyone may access the network for public broadcasting and transaction transparency, but only those with authorization can see the information in a private blockchain.[18] The private blockchain is typically favoured by regulated organizations that restrict access to just specific invited parties.

Blockchain and Law on Intellectual Property

Similar to how Artificial Intelligence will affect Intellectual Property Law, blockchain technology will likewise produce disruptions in this area of the law. Nevertheless, the main question still unresolved is how it will work? A brief definition of Blockchain published in The Economist states, "the blockchain is a shared, trusted, public ledger that everyone can inspect, but which no single user controls.[19] The participants in a blockchain system collectively keep

the ledger up to date: it can be amended only according to strict rules and by general agreement."[20]

The above definition of blockchain has the following traits, which are easy to spot if we pay close attention to it:

1. A reliable public ledger that is distributed;
2. All can investigate
3. No control by a single user;
4. A responsibility from everyone to update the ledger;
5. Only when there is universal consent and rigorous adherence to the regulations; and
6. Maintains a record of all transactions.

The kind of cutting-edge IP registries that we want to observe should follow the above requirements and that should be constantly ethical, accessible, honest, and decentralized. This also implies that this registry is open and accessible for anyone to examine.

Blockchain technology has more applications than only cryptocurrencies like Bitcoin and Ethereum.[21] This technology will make a low-cost, tamper-proof public database for various purposes in order to build its market worldwide. How is that possible? As reported by The Economist:[22]

"A group of vetted participants within an industry might instead agree to join a private blockchain that needs less security. Blockchains can also implement business rules, such as transactions only if two or more parties endorse them, or if another transaction has been completed first."[23]

These existing international Intellectual Property registries rely substantially on the upkeep and correctness of their databases. Nevertheless, solutions are needed for the high maintenance costs, ineffective operations, and integrity issues with these databases.

Requirements of Blockchain

In the field of intellectual property, every slight distinction counts, from the date or time of filing to the topic of any innovation or alteration of any prior art. Our biggest concern is how any new inventions will be put into practice. The primary issue throughout any patent's investigation is frequently the time or date the application was submitted to the patent office. Therefore, demonstrating that the invention had the same qualities as of the filing date is frequently a key objective of any patent application.[24]

The main intention behind implementing the blockchain technology associated with IP is to input all the necessary technological data into the relevant

database. The appeals board or the patent office are the entities that have the authority to directly save data related to a patent application.According to the aforementioned analyses and discussions, blockchain technology offers a higher security level than those who save their processes in a centralized database by distributing the input data over several hubs and stations.

Blockchain and Fusion of Artificial Intelligence

IP processes are becoming quicker and faster with current technological advances. Many advances have been made concerning introducing IP data into blockchain technologies.[25] A blend of AI and Blockchain technology from an IP point of view will be fascinating. The primary objective of the AI will be to help analyze the different requests sent to the patent office. Blockchains have higher accuracy data, but users must also search for keywords to find the most appropriate data for their requirements. The amount of effort and time required to analyze or assess patent applications would be significantly reduced with using Artificial Intelligence.

Recording the tests' results to determine patentability and several other types of analysis, such as landscape or freedom to operate, are included in a patent study or inspection. An analyst often prepares a list of search engine scripts or queries to obtain the relevant results for an idea.The results are then analyzed and submitted along with the study's summary for the applicable patent application. This technique is quite a time taking and costly. The analyzer analyses each piece of prior art from several databases in accordance with the query to provide a conclusive answer. In the event of an inspection, data for the analysis is collected from the several data sets present in the blockchain technology.[26]

AI technologies may circumvent the burden of studying relevant previous work and swiftly achieve a conclusion when the data is delivered *via* the blockchain approach. AI technology may also assist in building better search queries, save consumers time and money, and minimize the possibility of human mistakes while constructing a search strategy.

The decisive results from a patent study are what researchers and innovators concentrate on in order to determine the best course of action. From the controller's point of view, this technology setup will lessen the possibility of human error.The data stored via blockchain technology will be far safer and more intact compared to centralized databases or data sets.

The study material, including the field of knowledge and innovations, is vast, and using present techniques does not ensure an acceptable outcome. Nevertheless, results might be generated with 95% accuracy by combining Blockchain and Artificial Intelligence.[24]

Scope in IPR Laws

Governments or their subordinate IP repository bodies frequently handle IP rights.[24] Due to their physical limitations, these systems cannot frequently protect such rights. With the introduction of online sharing techniques, copyrighted work piracy has become a primary concern. As the market becomes more consolidated and worldwide, the problem will probably get more treatable and require more workable and reliable remedies. Blockchain technology presents several new avenues in the same context.

IP Registration

IP registries are kept on paper or computers around the world. These documents, including subsequent transfers of these IP rights, have legal value as evidence.The IP records are being registered at many external IP repositories. Therefore, there is a high likelihood that the information is out of sync. In such a scenario, frequent material modification offers a significant issue.

These repositories may create an exhaustive register for all IP assets, starting from the day of their registration, thanks to the DLT-based technology. This will primarily help copyright authors to validate their claim to original authorship. Blockchain technology will be essential in trademark law when revocation arguments for non-use are made.[27] This will help identify the legitimate owner or author and execute royalties on any assignments or transfers of copyrights that may be granted, reducing the number of legal disputes.This system might be useful for mergers and acquisitions, assignments and licensing, and auditing.

Ledger Maintenance & Anti- Counterfeiting

Authorities must adhere to technology in this era of rapid technological advancement and the development of E-Contracts or Smart Contracts to deliver enhanced and traceable transactions. A process called chain of supply or chain of custody records every transaction, but it also creates the potential for corruption.

Blockchain technology may be used to record these e-contract transactions at each link in the chain, which is essential for customs officials to spot counterfeit

goods and prevent their entry into the domestic market.

Trade Secret

The growing ordinary company, particularly in the small and medium industries, is a persistent worry about protecting their discoveries as trade secrets. These trade secrets are kept as proof on a private blockchain system where the data is encrypted, enabling sharing while keeping it safe from infringement by third parties.[28]

Better Governance

Poor governance and outdated systems have always been a problem for all intellectuals who wish to spread their ideas and seek intellectual property protection. Since each state has a different legal framework for intellectual property rights, enforcing rights abroad is challenging, making the whole system inefficient and incompatible. Nevertheless, Blockchain tackles this problem head-on by providing a single platform where a consensus framework may be created and accepted by everyone. Although the transaction rate would be (relatively) lower when compared to the cryptocurrency market using this solution and method, even one transaction per minute would significantly impact the patent sector.

Equality for Small Organizations

Few industrial giants dominate the dense niche of intellectual property rights, and every second patent comes from them, usually issued without problems. The underlying problem is that S.M.E.s and universities struggle to deal with long and complex processes, and when something goes wrong, it is much more challenging to claim intellectual property and solve the problem. However, with the help of blockchain technology, the procedure has become extremely quick and easy, allowing almost anyone on the internet to obtain a patent. Consequently, this convenience fosters an environment where multiple entrepreneurs can present their ideas, secure funding, protect intellectual property, and claim it when needed with just a few clicks for a quick turnaround.

World Intellectual Property Offices (WIPO)

WIPO was established to promote and preserve intellectual property throughout the globe via collaboration with governments and international organizations, as well as to link IP Laws systems worldwide through consistent standards and infrastructure.

Blockchain offers a foundation for creating a shared platform via an autonomous organization, leading to borderless online cooperation where different parties can automatically submit their compliance to the proper authorities, eventually leading to a uniform structure worldwide.

The Patent Prosecution Highway (PPH) plan,[29] which requires cooperation with other IP offices throughout the prosecution process, is one of 26 treaties managed by WIPO, which now has 193 members.While some information on IP assets is in the public domain, gathering and mining such data might be complex. In particular, for divisions like the International Searching Authority, International Preliminary Examining Authority, or Receiving Office, which would benefit from tracking already registered patents, trademarks, or copyright, blockchain technology streamlines the process by providing a single platform for broadcasting.[30]

Legal Developments and Implications

Worldwide

The information may be utilized to resolve numerous IP issues by enforcement agencies such as police, customs, excise, or society due to its unique attribute of being nearly unalterable.

The various patent offices andlegislative wings have started accepting the Blockchain as "admissible evidence." Several instances of Blockchain being used as evidence among electronic evidence by courts or other authorities are listed below:

Blockchain is gradually being accepted as "admissible evidence" by many governments and patent offices. Here are several situations where courts or other authorities have considered Blockchain while evaluating electronic evidence.

France was the first country to impose regulations on the blockchain-based recording and trading of securities. The French government ordered the enactment of "mini-bond" regulation laws in April 2016. The ruling described Blockchain for the first time as "a shared electronic storage device" or "a shared electronic recording system providing for authentication."

In 2016, Vermont passed a law stating that blockchain receipts are acceptable, along with a written statement from a person confirming the details of the transaction. Under Vermont's Rules of Evidence 12 V.S.A. §1913, blockchain receipts are considered authentic documents.[31] Section 224 of the

Delaware General Corporation (DGCL) was changed in the year 2017, granting permission to keep business records utilizing "distributed computer networks or databases." [32]

In a well-known copyright case in 2018, when the plaintiff used a third-party blockchain submission service to gather online website evidence of an alleged copyright infringement, the Hangzhou Internet Court accepted the blockchain-authenticated evidence. It was the first court to do so in that nation."[33] In Hangzhou (China), a court recognized blockchain-based evidence for the first time in 2018.[34] Immediately following this decision in 2019, the Apex Court of China affirmed the use of evidence stored and validated on blockchain platforms.

Arizona HB 2417 modified the Arizona Electronic Transaction Act to incorporate smart contracts, blockchain data, and digital signatures, which "may not be denied legal effect, validity or enforceability."[35] In the year 2018, similar laws were passed in Ohio.[36]

India

In India, despite no specific legislation or regulation that might control blockchain usage and functioning. The government has taken a favorable position toward using technology throughout time as usage grows.

The Indian IT Act, 2000[37] incorporates safeguards to prevent the unauthorized and illegal use of the computer system, in addition to providing legal recognition and protection for transactions made via electronic communication. Additionally, the legal significance of e-contracts[38] or smart contracts has expanded after the Indian Evidence Act was revised by Section 65A, making them admissible as a piece of evidence in a court of law.

Section 65B of the Indian Evidence Act, 1872 states about the Acceptability of Electronic records, which sometimes could be for enforcement purposes and jurisdiction over transactions on a blockchain network.[39]

In his Union Budget Speech of 2018, the former Finance Minister declared that India would study blockchain technology's application proactively to strengthen the digital economy. The Indian think tank NITI Aayog has recently released severalvisionary ideas and inventions, including the domestic blockchain project IndiaChain, to further this goal.In order to prepare for implementing a decentralized data marketplace based on blockchain technology, the NITI Aayog even published a discussion paper.[40]

A few other groups are also focusing on the development and expansion of the technology, in addition to the active government initiatives toward its development. Examples of such organizations include NASSCOM and FICCI.

Potential Hurdles

The system's exorbitant cost is the major difficulty.The widespread use of Blockchain results in enormous energy consumption, and as a result of continuous operation, the hardware's efficiency tends to degrade, necessitating frequent network upgrades at unreasonably high costs.

Recognition in the legal system would be a severe obstacle to blockchain technology. However, there are ongoing efforts worldwide to recognizeBlockchain in different laws. Compatibility, standards, privacy, public trust in technology and participants, and so forth are some more issues.

Future Scope of Blockchain in Intellectual Property

The Blockchain may significantly impact the intellectual property sector due to its accountability, security, transparency, and immutability. However, because blockchain technology is still in its infancy, there is a chance that we may soon see a wide variety of sophisticated applications of Blockchain for intellectual property.[41]

Blockchain-based Smart Contracts in Intellectual Property

A smart contract is a blockchain-based computer program that executes automatically when a transaction's pre-set conditions are satisfied.[42] The process of purchasing a patent in the area of intellectual property involves a number of steps, including confirming the transfer of the patent, confirming its validity, negotiating the purchase agreement, carrying out and paying the transaction, and finally gathering information from all the patent offices involved in the transaction.Smart contracts help in streamlining the above steps.[43]

Use of Smart Contracts

As the name suggests, there is a contract between the two parties, just like in the real world. The primary and most important distinction, though, is that it can be made or carried out without the necessity for a centralized authority. A smart contract[27] is a self-executing entity that connects two companies in a secure and decentralized digital

environment. Smart contracts imitate one-window operations in addition to enhancing security.[44] For instance, using smart contracts, everything can now be completed automatically, and ownership is transferred digitally rather than requiring multiple office visits to register a patent, verify its assignment, legality, negotiations, sales agreement, and payment execution, then send notices of the transfer to each patent office.[45]

Consequently, the complexity is decreased significantly, and the length may be shortened to minutes rather than weeks or even months in manual methods. The most common approach for fraudsters to steal our work is to pretend that we never performed it in the first place.Blockchain technology cleverly solves this problem, which refuses to accept any "delete" instructions from anyone inside or outside the network. Because of this, records for an entity can always be added to but never removed. So, once we develop anything, we may transfer the intellectual property rights to someone else, but no one can erase the fact that we owned it in the first place.[46]

Since smart contracts require a digitalized and secure transaction mechanism that fosters trust between parties without compromising security, smart contracts can be widely implemented as blockchain technology develops.[47] As the world of I.P. opens up to take advantage of new age technologies. Smart contracts are beneficial for automatically initiating legitimate binding contracts, especially for content such as songs, photos, etc.

Blockchain for Determining Creatorship/Proof-of-Ownership

Blockchain technology has the potential to be a reliable tool for verifying the rightful ownership of works of intellectual property.[48] An individual can submit an application to the Patent Office to secure a patent for innovation and protect its intellectual property. However, the burden of expressing ownership of the creative work is on the creator in copyright matters because there is a lack of official proof. In the internet age, where anybody can download creative content like a recorded song, photo, artwork, etc. and use it in any way they like, exercising copyright has become even more challenging.[49]

With the development of Industry 4.0 and digitization, the system must demonstrate intellectual property ownership and ensure its protection.[50] Interestingly, one of these technologies is Blockchain

which can satisfy the system's objectives by offering security and verification of intellectual property ownership.Numerous business entities have already begun deploying a blockchain-based time-stamp and validation system to safeguard their digital assets.

Blockchain for Enabling Intellectual Property Marketplace

A form of distributed ledger technology (DLT) is Blockchain.[51] In distributed ledger technology, numerous separate computers (nodes) are utilized to record, share, and synchronize transactions on each electronic ledger. Blockchain can be used as a potential intellectual property marketplace where authors can offer their digital works as ledgers with brief descriptions. Further, patent holders and inventors can utilize the Blockchain to discover possible licensees for their inventions' related intellectual property.

The sector has seen a transformation in terms of information exchange thanks to blockchain technology. This new method of information exchange will affect all industries more broadly because it preserves durability, security, and transparency. Indeed, intellectual property rights are one of the areas where information sharing needs to be maintained with the relevant regulations. Given the potential of blockchain ledger technology, we may be able to see applications in sharing information on intellectual property rights data.

Blockchain for Unifying Global Patent/Intellectual Property System

The Blockchain and decentralized accounting technology would resolve the issue of standardizing the patent system across all nations.This might significantly increase the effectiveness of managing intellectual property, speed up the innovation process within businesses, and encourage the exchange of information between them *via* the ledger.

Blockchain technology has the potential to become a global system for protecting digital assets due to theresult of its immutability, security, and transparency.[52] Governments and lawmakers around the world are gradually adopting Blockchain as evidence.Future governments may someday adopt Blockchain as a fundamental technology, perhaps integrating the entire intellectual property system.

Blockchain for Maintaining Version Control of Digital Assets

Patents, Research Publications, copyrights, etc., are considered digital resources with multiple versions over their lifetime, and technology is needed to link

these replicas of digital assets throughout their existence. In such systems, blockchain technology can be utilized to link all of their digital assets utilizing blockchain ledger technology and could be applied to end-to-end asset cycle maintenance.

Defensive disclosure is a technique used to stop someone from patenting an innovation by making it publicly known and establishing it as prior art.[53] The Blockchain may serve as a secure publishing platform where each file is assigned a unique fingerprint, copies are removed, the platform supports versioning, each network node can select the content it serves, and the database is indexed and searchable.

Using a blockchain-based system to connect multiple digital assets and be able to control them in a timely manner opens up many opportunities for collaboration in various aspects. It allows people to shape their ideas, resulting in stimulated innovation in the industry.

Conclusion

Although each nation has its own system or set of laws to protect intellectual property rights, the fundamental principle is still the same: no one should be allowed to claim ownership of anything that they did not develop. A robust intellectual property system requires strong, traceable, immutable, and auditable records of intellectual property rights. In today's world of globalization, where the world is closed by the internet, the need to strengthen the intellectual property regime is gradually increasing. Blockchain is one such revolutionary technology that would be helpful in better protecting intellectual property. From the study above, it is clear that Blockchain has immense potential to meet the needs of IP offices around the world today. By ensuring faster search results and tamper-proof records management, the technology would help to properly track and enforce IP rights and minimize IP litigation.

Despite the enormous potential of blockchain technology, some limitations discourage the implementation of the technology in a normally functioning system. It has been argued that new technological developments can correct these shortcomings over time, but this should not hamper the applicability of such a breakthrough technology. These challenges need to be addressed effectively to harness the invaluable benefits of blockchain technology.

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