BLOCKCHAIN AND INTELLECTUAL PROPERTY RIGHTS: A SYMBIOTIC RELATIONSHIP**

ABSTRACT

Blockchain technology provides a way to record transactions that is designed to be highly secure, transparent, trustable, traceable, auditable and tamper-proof. Blockchain is an immutable (unchangeable, which means that a transaction or file recorded cannot be changed) digital ledger or digital record of transactions or data stored in multiple locations on a computer network. This paper aims to examine the relationship between blockchain technology and intellectual property rights. It evaluates the protection of blockchain by intellectual property rights and vice versa. It employs a doctrinal method of legal research and concludes that there is a growing symbiotic relationship between the two. It finds that the immutable nature of blockchain provides a history of ownership and creation that cannot be tampered with and eradicates fraud in every system in which blockchain is used. However, this same feature of blockchain has its downsides which includes the inability to correct errors in the record. It recommends an improvement in blockchain technology in this regard as well as increased awareness and usage of blockchain in the protection of intellectual property rights.

Keywords: Blockchain Technology; Intellectual Property, Artificial Intelligence.

INTRODUCTION

Intellectual Property Rights (IPR) is gaining more prominence as people become more aware of the protection afforded to their creative and innovative works as well as their intangible commercial assets. However, with the emergence of new technologies and increasing threat to the protection of IPR, the industry is witnessing the need for the same technology to be employed in more effective protection of IPR. An example of recent technologies that can be used to strengthen the IPR protection is blockchain technology. With its growing popularity, blockchain has advantages such as decentralized network, secure information, and transparency and this can be helpful in the protection of Intellectual Property Rights.[1]

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Increasingly, blockchain technology is becoming important and of varied use in the society. While cryptocurrencies are one of the most popular examples or uses of blockchain technology, other uses, such as for smart contracts, exists. Blockchain is also beginning to perform an important role in the protection of intellectual property rights. The immutable, decentralized and tokenization features of blockchain make it very useful in the protection of some intellectual property rights. This immutable nature of blockchain provides a history of ownership and creation that cannot be tampered with. This is imperative to an intellectual property owner as it prevents a claim to ownership from being contested by another person. Using smart contracts with blockchain technology adds a layer of security and can be used to provide licences or obtain royalties.[2]

This paper examines the symbiotic relationship between blockchain and intellectual property rights. Therefore, part two focuses on blockchain technology by defining it, explaining its nature, types of the technology. Part three expatiates on intellectual property rights. Part four explores the relationship between intellectual property rights (IPR) and blockchain by examining how IPR protects blockchain and blockchain can in turn protect IPR. Part five examines the challenges of blockchain technology which adversely affects its performance. The paper is concluded in part six and recommendations are made in part seven.

DEFINITION AND NATURE OF BLOCKCHAIN TECHNOLOGY

Blockchain is defined as a decentralized, distributed ledger technology that records the provenance of a digital asset. It is a system of recording information that is difficult to change, hack or cheat the system.[3] In simpler terms, blockchain is a technology where any digital information is distributed across the network, given the information is time stamped, immutable

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[1] Shairwal S, "Blockchain & IPR a Breakthrough Collaboration" (LexologySeptember 17, 2020) <http://www.lexology.com/library/detail.aspx?g=ac54cb4d-9b47-46ad-81a4-55ef28bd0f96> accessed January 13, 2022

[2] Christopher Heer and Sarah Halkyard and others, "How Blockchain Can Help to Protect Intellectual Property in the Age of the Internet of Things" (IoT For AllNovember 19, 2020) <https://www.iotforall.com/blockchain-intellectual-property-iot> accessed June 20, 2021

[3] "What Is Blockchain?" (Blockchain Explained: What is blockchain? | Euromoney Learning) <https://www.euromoney.com/learning/blockchain-explained/what-is-blockchain#:~:text=Blockchain%20is%20a%20system%20of,computer%20systems%20on%20the%20blockchain> accessed January 20, 2021

and transparent to everyone present in the network. Blockchain has prominent implications in various domains such as crypto currency, health care, real estate, voting systems, supply chain and logistics, etc.[4]

The idea behind blockchain technology was described as early as 1991 when research scientists Stuart Haber and W. Scott Stornetta introduced a computationally practical solution for time-stamping digital documents so that they could not be backdated or tampered with.[5] The system used a cryptographically secured chain of blocks to store the time-stamped documents and in 1992, merkle trees[6] were incorporated to the design, making it more efficient by allowing several documents to be collected into one block. However, this technology went unused and the patent lapsed in 2004, four years before the inception of the Bitcoin.[7]

The active application or use of blockchain began with cryptocurrencies. In late 2008, a white paper introducing a decentralized peer-to-peer electronic cash system called Bitcoin was published. It was distributed to a cryptography mailing list by a person or group going by the alias 'Satoshi Nakamoto.' This was the birth of cryptocurrencies based on block chain technology. Vitalik Buterin, a programmer and co-founder of Bitcoin Magazine, felt that Bitcoin needed a scripting language for developing decentralized applications in 2013. When he was unable to persuade others in the community to agree with him, Vitalik began the development of Ethereum, a new blockchain-based distributed computing platform with scripting functionality known as smart contracts.[8] Today, blockchain technology is gaining mainstream attention and is already being used in a wide range of applications, not just cryptocurrencies.[9]

Smart contracts are executable codes that run on top of the blockchain in order to facilitate, execute, and enforce an agreement between untrustworthy parties without the involvement of a

[4]Prasad S, “The Future of Blockchain in Intellectual Property” (automation.com) <https://www.automation.com/en-us/articles/january-2021/the-future-of-blockchain-in-intellectual-property> accessed June 20, 2021

[5] Khan NM and others, “History of Blockchain Technology: A Detailed Guide” (101 BlockchainsDecember 21, 2020) <https://101blockchains.com/history-of-blockchain-timeline/> accessed August 20, 2021

[6] The Merkle tree, also known as the hash tree, is a data structure that is used for data verification and synchronization. It's a tree data structure in which each non-leaf node is a hash of its children. All of the leaf nodes are the same depth and as far to the left as possible. It maintains data integrity by employing hash functions.

[7] Khan NM and others, “History of Blockchain Technology: A Detailed Guide” (101 BlockchainsDecember 21, 2020) <https://101blockchains.com/history-of-blockchain-timeline/> accessed August 20, 2021

[8] ibid

[9] Binance Academy, “History of Blockchain” (Binance Academy August 24, 2021) <https://academy.binance.com/en/articles/history-of-blockchain> accessed August 26, 2021

trusted third party.[10] Smart contracts enabled network automation and the conversion of paper contracts to digital contracts. Smart contracts, as opposed to traditional contracts, allowed users to codify their agreements and trust relationships by enabling automated transactions without the supervision of a central authority.[11] Smart contracts can be created and deployed on a variety of blockchain platforms (e.g., NXT, Ethereum, and Hyperledger Fabric). Contract programming languages, contract code execution, and security levels are among the features offered by various platforms for developing smart contracts. Some platforms enable the development of smart contracts using high-level programming languages.[12]

In the Chinese case of *Hangzhou Huatai Media Culture Media Co., Ltd. v. Shenzhen Daotong Technology Development Co., Ltd*,[13] City Express newspaper licensed the Plaintiff for publication of an article regarding a swimming pool incident. First Female Fashion Network, a website owned by the Defendant, published the article without obtaining a license. The Plaintiff was authorized by the newspaper to enforce online infringements and filed the lawsuit at the Hangzhou Internet Court. In order to prove its claim, the Plaintiff presented screenshots of the infringing website's article. The screenshot's authenticity was demonstrated through a third-party evidence preservation platform, who certified that the electronic data was not tampered with by storing the electronic data in blockchain. The court first examined and confirmed that the Plaintiff and the third-party provider are unaffiliated on a corporate or shareholder level. The Court also checked and confirmed the integrity of the online platform's methodology and the evidence saved and submitted to court through the said platform. The Plaintiff prevailed in this case based on the above blockchain evidence. This shows the increasing importance of blockchain.

A blockchain is a database that has various unique features one of which includes immutability and this refers to the fact that once an entry is added to a blockchain database, it cannot be removed. A blockchain database is decentralized, which means it is not managed by a single

[10] Buterin V, "A Next-Generation Smart Contract and Decentralized Application Platform" (2014) 3 white paper
[11] Singh A and others, "Blockchain Smart Contracts Formalization: Approaches and Challenges to Address Vulnerabilities" (2020) 88 Computers & Security 101654
[12] Khan SN and others, "Blockchain Smart Contracts: Applications, Challenges, and Future Trends" (2021) 14 Peer-to-Peer Networking and Applications 2901
[13] (2018) Zhe 0192 No. 81

entry and is not susceptible to group manipulation.[14] A blockchain can be open to the public or at the very least to a large number of interested people, each of whom can have a complete copy of the database to examine. Finally, a blockchain database enables the use of a unique digital identity, or token, to "tokenize" actions or social and commercial logic. Blockchain can help people to establish a trusted, self-organized, open and ecological intellectual property protection system.[15]

Blockchain has certain advantages[16] which include the fact that it is a secure system. The blockchain responsible for keeping record of all the transactions cannot be edited or manipulated by a single party. Both ends of a transaction and the public can view the transaction data at any given time. This makes online transactions more secure. Being an open source ledger, every transaction is made public and this leaves no room for fraud. Also, there is no third-party interference. For instance, no government or financial institution has control of cryptocurrencies which are based on blockchain technology; hence the value of the currency cannot be meddled with by such third parties. Furthermore, the transactions are instant and a person can complete a series of transactions quickly. With its unique combination of characteristics, such as decentralization, immutability, and transparency, blockchain technology has great potential to foster various sectors for example, the finance, medicine, manufacturing, and education sectors.[17]

TYPES OF BLOCKCHAIN TECHNOLOGY

Blockchain is an open, distributed ledger that efficiently and permanently records transactions between parties.[18]There are four main types of blockchain networks.[19] The public blockchains are the first type of blockchain technology. Public blockchain is non-restrictive and permissionless, and anyone with internet access can sign on to a blockchain platform to become

[14] Lin J and others, "Blockchain and IOT-Based Architecture Design for Intellectual Property Protection" (2020) 4 International Journal of Crowd Science 283

[15] ibid

[16] "Advantages and Disadvantages of a Blockchain" (eToroXMay 20, 2019) <https://etorox.com/blockchain-academy/advantages-and-disadvantages-of-a-blockchain> accessed August 20, 2021

[17] Casino F, Dasaklis TK and Patsakis C, "A Systematic Literature Review of Blockchain-Based Applications: Current Status, Classification and Open Issues" (2019) 36 Telematics and Informatics 55

[18]Makridakis S and Christodoulou K, "Blockchain: Current Challenges and Future Prospects/Applications" (2019) 11 Future Internet 258

[19] Parizo C, "What Are the 4 Different Types of Blockchain Technology?" (SearchCIOMay 28, 2021) <https://searchcio.techtarget.com/feature/What-are-the-4-different-types-of-blockchain-technology#:~:text=There%20are%20four%20main%20types,consortium%20blockchains%20and%20hybrid%20blockchains> accessed August 20, 2021

an authorized node.[20] This user can access current and past records and conduct mining activities which is the complex computations used to verify transactions and add them to the ledger. No valid record or transaction can be changed on the network, and anyone can verify the transactions, find bugs or propose changes because the source code is usually open source.[21] Cryptocurrencies like Bitcoin are examples and they helped to popularize distributed ledger technology (DLT). It removes the problems that come with centralization, including less security and transparency. DLT doesn't store information in any one place, instead distributing it across a peer-to-peer network. Its decentralized nature requires some method for verifying the authenticity of data. That method is a consensus algorithm whereby participants in the blockchain reach agreement on the current state of the ledger. Proof of work (PoW) and proof of stake (PoS) are two common consensus methods.[22]

The second type of blockchain to be discussed are private blockchains. This refers to a blockchain network that works in a restrictive environment like a closed network, or that is under the control of a single entity.[23] While it operates like a public blockchain network in the sense that it uses peer-to-peer connections and decentralization, this type of blockchain is on a much smaller scale. Instead of just anyone being able to join and provide computing power, private blockchains typically are operated on a small network inside a company or organization. They're also known as permissioned blockchains or enterprise blockchains.[24]

Sometimes, organizations will want the best of both worlds of public and private blockchains. They can therefore use hybrid blockchain, a type of blockchain technology that combines elements of both private and public blockchain.[25] It lets organizations set up a private, permission-based system alongside a public permissionless system, allowing them to control

[20] Zhao, W.; Yang, S.; Luo, X. On consensus in public blockchains. In Proceedings of the 2019 International Conference on Blockchain Technology, Honolulu, HI, USA, 15–18 March 2019; pp. 1–5

[21] ibid

[22] Parizo C, "What Are the 4 Different Types of Blockchain Technology?" (SearchCIOMay 28, 2021) <https://searchcio.techtarget.com/feature/What-are-the-4-different-types-of-blockchain-technology#:~:text=There%20are%20four%20main%20types,consortium%20blockchains%20and%20hybrid%20blockchains> accessed August 20, 2021

[23] Dragonchain, "What Different Types of Blockchains Are There?" (DragonchainApril 18, 2019) <https://dragonchain.com/blog/differences-between-public-private-blockchains> accessed August 20, 2021

[24] ohan, C. State of public and private blockchains: Myths and reality. In Proceedings of the 2019 International Conference on Management of Data, Amsterdam, The Netherlands, 30 June–5 July 2019; pp. 404–411

[25] Zheng, Z.; Xie, S.; Dai, H.; Chen, X.; Wang, H. An overview of blockchain technology: Architecture, consensus, and future trends. In Proceedings of the 2017 IEEE International Congress on Big Data (BigData Congress), Honolulu, HI, USA, 25–30 June 2017; pp. 557–564.

who can access specific data stored in the blockchain, and what data will be opened up publicly.[26] Usually, transactions and records in a hybrid blockchain are not made public but can be verified when needed, such as by allowing access through a smart contract. Confidential information is kept inside the network but is still verifiable. Even though a private entity may own the hybrid blockchain, it cannot alter transactions. When a user joins a hybrid blockchain, they have full access to the network. The user's identity is protected from other users, unless they engage in a transaction. Then, their identity is revealed to the other party.[27]

Consortium blockchain, also known as a federated blockchain, is similar to a hybrid blockchain in that it has private and public blockchain features. But it's different in that multiple organizational members collaborate on a decentralized network. Essentially, a consortium blockchain is a private blockchain with limited access to a particular group, eliminating the risks that come with just one entity controlling the network on a private blockchain.[28] In a consortium blockchain, the consensus procedures are controlled by preset nodes. It has a validator node that initiates, receives and validates transactions. Member nodes can receive or initiate transactions.[29] Consortium blockchains are appropriate for companies that have similar goals and are willing to share costs and data.[30]

INTELLECTUAL PROPERTY RIGHTS

Intellectual property is an intangible creation of the human mind, usually expressed or translated into a tangible form that is assigned certain rights of property. Every human being is endowed with certain but varying degree of intellect.[31] Intellectual property is a category of property that includes intangible creations of the human intellect such as inventions, literary and artistic works, designs and symbols, names and images used in commerce. It is a product of the human

[26] Parizo C, "What Are the 4 Different Types of Blockchain Technology?" (SearchCIOMay 28, 2021) <https://searchcio.techtarget.com/feature/What-are-the-4-different-types-of-blockchain-technology#:~:text=There%20are%20four%20main%20types,consortium%20blockchains%20and%20hybrid%20blockchains> accessed August 20, 2021

[27] ibid

[28] Iredale G, "What Are the Different Types of Blockchain Technology?" (101 BlockchainsNovember 3, 2021) <https://101blockchains.com/types-of-blockchain/> accessed August 20, 2021

[29] ibid

[30] Xu et al. 'A Taxonomy of Blockchain-Based Systems for Architecture Design'. (2017)IEEE International Conference on Software Architecture (ICSA), Gothenburg, Sweden, 3-7.

[31] Maqbool F, "Intellectual Property Rights Issues and Challenges of Academic Libraries in Digital Environment" (2016) 3 International Journal of Computer Engineering In Research Trends 639

mind or a product that came into existence as a result of man exerting his intellect.[32] It is a broad categorical description for the set of intangible assets owned and legally protected by a company from outside use or implementation without consent.

Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works; discoveries and inventions; words, phrases, symbols and designs. These laws protect the legal rights of creators and owners, in relation to intellectual creativity. IPR is a prerequisite for better identification, planning, commercialization, rendering and thereby protection of invention or creativity.[33]The nature of intellectual property rights includes intangibility, monopoly of rights, territoriality and independence of rights.

The ownership of intellectual property rights inherently creates a limited monopoly in the protected property. Intellectual property rights usually give the creator an exclusive right over the use of his/her creation for a certain period of time depending on the time frame stipulated by the law regulating the IP right in question. The true test of development for a nation lies in their capacity for exploitation of intellectual property rights. Like any other form of a conventional property, intellectual property can be bought, sold, licensed or exchanged

There are different types of intellectual property rights such as patents, designs, trademarks, copyright and trade secrets.

A patent is an intellectual property right granted to protect new inventions or improvements of an existing invention. It is granted by the government or its authorized agency under statutory law. Patents are granted in Nigeria under the Patents and Designs Act of 1970. Under the Act, a patent may be granted either for a product or for a process of making an invention[34] and the duration for protection lasts for a lifespan of 20 years,[35] provided the annual renewal fees are paid for the duration of its potential life. For an invention to qualify for registration, Section 1 of the Patents and Designs Act 1970, prescribes the conditions for patentability and provides: that an invention is patentable if it is new, results from an inventive activity and is capable of

[32] Bhattacharya S and Saha CN, “Intellectual Property Rights: An Overview and Implications in Pharmaceutical Industry” (2011) 2 Journal of Advanced Pharmaceutical Technology & Research 88
[33] Ibid
[34] Patents and Designs Act 1970, Section 3(3)
[35] Patents and Designs Act 1970, Section 7(1)

industrial application. Oyewunmi defines it as a legal right that confers on inventors of new and useful products or processes the rights to exclude others from the commercial exploitation of the invention.[36] The ultimate objective of the patent system is the promotion of science and technological development of the society. Like all other intellectual property rights, patent entails a form of social contract between the inventor and the society.[37]

In *Free World Trust v Electro Sante Inc*[38] the court stated that 'the patent protection rests on the concept of a bargain between the inventor and the public and in return for disclosure of the invention to the public, the inventor acquires for a limited time the exclusive right to exploit it. When a property owner holds a patent, others are prevented, under law, from offering for sale, making, or using the product.

A copyright is a type of intellectual property protection that protects original works of authorship, which might include literary works, musical works, artistic works, cinematograph works, sound recording; and broadcasts.[39] The Nigerian Copyright Act classifies computer programmes (also referred to as software) as literary works which are eligible for copyright protection.[40] A work is defined to include translation, adaptation, new versions, arrangement of preexisting works and anthologies or collection of works which present an original character.[41]

The Copyright Act goes further to provide under section 1(2) for the preconditions for the legal protection of a work and they include originality and fixation. Section 1(2)(b) of the Copyright Act in explaining the requirement of fixation provides that a work must have been fixed in any definite medium of expression now known or later to be developed from which it can be perceived, reproduced or otherwise communicated either directly or with the aid of machine or device. The court in *Donoghue v. Allied Newspaper Ltd*[42] further reiterates the principle that a work must be fixed in a material form if it is to enjoy copyright, and states that there is no copyright in an idea or ideas.

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[36] Oyewunmi A. O, Nigerian Law of Intellectual Property(Unilag Press,2015)45
[37] Desmond O. Oriakhogba and Ifeoluwa A. Olubiyi, Intellectual Property Nigeria (1st edn, Paclerd Press Limited 2021), 223
[38] 2000 SCC 66 (CA)
[39] Copyright Act 2004, Section 1(1)
[40] Copyright Act 2004, Section 39(1)
[41] Copyright Act 2004, Section 51
[42] 83(1938) CH 106 at 109

As it relates to originality, section 1(2)(a) of the act provides that for a literary, artistic or musical work to be eligible for protection, such work must pass the originality test. It provides that such work shall not be eligible for copyright unless sufficient effort has been expended on making the work to give it an original character. Pearce L.J in *Ladroke (Football) Ltd v. Williams Hill (Football Ltd)*,[43] explained that the question as to whether the plaintiffs are entitled to copyright in their coupon depends on whether it is an original literary work. The term "original," on the other hand, does not require original or inventive thought, but only that the work not be copied and originate from the author. Originality means the work must be the author's intellectual creation.

A trademark is word, letter, label, numeral, colour, signature, device or any combinations of words, letters, labels, signatures that identify and distinguish the source of the goods or services of one manufacturer from those of others in the course of trade.[44] The act further provides that in order for a trademark to be protected it must be registered.[45]

A trademark is a distinctive sign which allows consumers to easily identify the particular goods or services that a company provides.[46] A trademark is a sign capable of distinguishing the goods or services of one enterprise from those of other enterprises. Trademarks date back to ancient times when artisans used to put their signature or "mark" on their products.[47] Trademarks, then, refer to phrases, words, or symbols that distinguish the source of a product or services of one party from another. For example, the Nike symbol which nearly all could easily recognize and identify is a type of trademark. The act provides for the register of a trademark to be kept under the control and management of the register and divided into part A and part B, marks registered under part A are those which are inherently distinctive while those registered under part B are marks that are capable of being distinctive in the future through prolonged use. The Act under section 23 provides for the duration for the registration and renewal of a trademark for 7 years which starts from the marks registration date and can be renewed for a total period of 14 years.

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[43] (1964) 1WLR 273
[44] Trade Marks Act 1965, section 67
[45] Trade Marks Act 1965, section 3
[46] "What Are the 4 Types of Intellectual Property Rights?" (BrewerLongDecember 4, 2020) <https://brewerlong.com/information/business-law/four-types-of-intellectual-property/> accessed August 20, 2021
[47] "What Is Intellectual Property (IP)?" (WIPO) <https://www.wipo.int/about-ip/en/> accessed August 20, 2021

Trade secrets are the secrets of a business. They are proprietary systems, formulas, strategies, or other information that is confidential and is not meant for unauthorized commercial use by others. This is a critical form of protection that can help businesses to gain a competitive advantage[48]. Although intellectual property rights protection may seem to provide a minimum amount of protection, when they are utilized wisely, they can maximize the benefit and value of a creation and enable world-changing technology to be developed, protected, and monetized. Examples of trade secrets include recipes for certain foods and beverages (like Coca-Cola cookies or Sprite), new inventions, software, processes, and even different marketing strategies. It is said that only a few persons in the whole Coca-Cola Company know the formula for making the drink. When a person or business holds a trade secret protection, others cannot copy or steal the idea. In order to establish information as a "trade secret," and to incur the legal protections associated with trade secrets, businesses must actively behave in a manner that demonstrates their desire to protect the information. The adage "information is power" is relevant to the concept of trade secrets since its strategic use gives competitive advantage and the creation of a market niche.[49] Article 39(2) of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) provides that natural and legal persons shall have the possibility of preventing information lawfully within their control from being disclosed to, acquired by, or used by others without their consent in a manner contrary to honest commercial practices so long as such information:

(a) is secret in the sense that it is not, as a body or in the precise configuration and assembly of its components, generally known among or readily accessible to persons within the circles that normally deal with the kind of information in question;

(b) has commercial value because it is secret; and

(c) has been subject to reasonable steps under the circumstances, by the person lawfully in control of the information, to keep it secret.

[48] Desmond O. Oriakhogba and Ifeoluwa A. Olubiyi, Intellectual Property Nigeria (1st edn, Paclerd Press Limited 2021),99

[49] Desmond O. Oriakhogba and Ifeoluwa A. Olubiyi, Intellectual Property Nigeria (1st edn, Paclerd Press Limited 2021),100

Trade secrets are protected without official registration, however, an owner of a trade secret whose rights are breached may ask a court to ask against that individual and prevent them from using the trade secret.[50]

BLOCKCHAIN AND INTELLECTUAL PROPERTY RIGHTS

Blockchain technology is increasingly being applied to the protection of intellectual property rights due to its immutable, secure and tokenized nature. Conversely, IP rights is rising to the challenge of protecting blockchain by conferring property rights on owners of blockchain. This section shall examine the symbiotic relationship that exists between blockchain and IP rights.

ROLE OF BLOCKCHAIN IN THE PROTECTION OF INTELLECTUAL PROPERTY RIGHTS

Blockchain is useful in maintaining version control over digital assets. Digital assets such as patents, research publications and copyright have multiple versions during their lifetime and there is a need for a technology which provides linking of multiple versions of digital assets during its lifecycle. Blockchain technology can be used in such systems where one can link all the versions of their digital assets using blockchain's ledger technology and potentially use it as for end-to-end lifecycle maintenance of the asset.[51]

Blockchain is also necessary for the creation of smart contracts on intellectual property rights. A Smart contract is a computer program based on Blockchain technology that automatically gets executed whenever a predetermined condition is met in a transaction. In Intellectual property, transactions such as buying a patent involves many steps such as checking the assignment of the patent, checking the validity of the patent, negotiating the sale agreement, executing and paying the transaction and then finally inform all relevant patent offices of the transaction. All these steps can be simplified using smart contracts.[52]

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[50] (Obtaining IP Rights: Trade Secrets) <https://www.wipo.int/sme/en/obtain_ip_rights/trade_secrets.html> accessed August 20, 2021

[51] Prasad S, "The Future of Blockchain in Intellectual Property" (automation.com) <https://www.automation.com/en-us/articles/january-2021/the-future-of-blockchain-in-intellectual-property> accessed August 20, 2021

[52] ibid

Blockchain can serve as evidence of ownership, creation and title of works protected by intellectual property rights. The present IP system largely functions under a registration regime, whereby creators and innovators must apply to register a patent, trademark, industrial design and sometimes in certain jurisdictions copyright is also registered. This means there is little protection for owners of unregistered intellectual property rights. Blockchain with its decentralised and immutable ledger and record all registered and unregistered IP assets from the time of creation to the time of publication. Blockchain's time-stamped record and suitability features will help to provide evidence of the creatorship of unregistered IP assets.[53] WIPO PROOF is a global, online service that rapidly generates tamper-proof evidence proving your intellectual asset existed at a specific point in time, and that it has not been altered since then. The service creates a WIPO PROOF token – a date and time-stamped digital fingerprint of your intellectual asset, which can be used as evidence in the context of legal disputes.[54] This can be used to protect copyright works.

Blockchain is also useful in anti-counterfeiting measures and the enforcement of IP rights. One of the main reasons for the alarming increase in counterfeiting around the world is the lack of traceability of the source of IP products in the supply chain. When IP assets are recorded on the blockchain, the rate of counterfeiting should reduce significantly. The source (including the source of raw materials), manufacturing process, production time and process, shipping and movement of IP assets can all be verified on the blockchain. Only verified participants are given access to the supply chain. To prevent counterfeiting by tracing product supplies or shipping, manufacturers can add to their original IP products scannable blockchain-connected tags or tamper-proof seals, which allow them to trace any counterfeiters in the supply chain and enforce their rights against such counterfeiters.[55]

ROLE OF INTELLECTUAL PROPERTY RIGHTS IN THE PROTECTION OF BLOCKCHAIN TECHNOLOGY

[53] Christopher Heer and Sarah Halkyard -November 18 and others, "How Blockchain Can Help to Protect Intellectual Property in the Age of the Internet of Things" (IoT For AllNovember 19, 2020) <https://www.iotforall.com/blockchain-intellectual-property-iot> accessed August 20, 2021

[54] "New Wipo Service Provides Evidence of Intellectual Assets' Existence" (WIPO) <https://www.wipo.int/wipoproof/en/> accessed January 13, 2022

[55] "Blockchain & IP - Technology - India" (Welcome to Mondaq) <https://www.mondaq.com/india/fin-tech/767898/blockchain-ip> accessed August 20, 2021

Blockchain is protectable under intellectual property law in Nigeria through copyright, patents, trademarks and trade secrets law. Blockchain is a type of computer programme so it can be protected by the copyright.[56] Before a blockchain can be protected it must be fixed and original. A blockchain developer can enjoy copyright protection if it's fixed in any definite medium of expression now known or later to be developed from which it can be perceived, reproduced or otherwise communicated either directly or with the aid of machine or device as that is the legal requirement for the protection of copyright.[57]The said blockchain must pass the originality test, that is, sufficient effort has been expended on making the work to give it an original character.[58]

It grants authors or creators the exclusive right to produce, distribute, assign, license or do other things with the work.[59]Most blockchains are open, source codes used in writing blockchain applications or programs may be protected by copyright.[60] Particularly for blockchain developers building innovations for enterprise and governments, copyright ensures that they enjoy protection to their works and can sue for damages in the event of any infringements.[61] However, under its copyright notification system and upon application, the Nigerian Copyright Commission provides a certificate as proof of copyright ownership. [62]

Blockchain developers can obtain patents for their innovations if such innovations are new, inventive and capable of industrial application[63] and to protect the functionality of the software programs an inventor should seek patent protection. In Nigeria, as in most jurisdictions, a patent is granted for 20 years,[64] to enable the inventor to profit from its inventive effort. A blockchain patent holder may choose either to use the patented technology itself or to license it to a user or other users.[65] With a patent, a blockchain developer has a competitive edge. Without a patent, an

[56] Copy Right Act , Section 39
[57] Copy Right Act , Section 1(2)
[58] Copy Right Act , Section 1(2)(a)
[59] Copy Right Act, Section 11
[60] "Nigeria Blockchain Comparative Guide - Chapter 7-Intellectual Property" (Welcome to Mondaq) <https://www.mondaq.com/guides/results/14/156/all/7/nigeria-blockchain-intellectual-property> accessed August 20, 2021
[61] Copy Right Act, Section 15
[62] Copyright Act, Section 34(3)(e)& (f)
[63] Patents and Designs Act 1970, Section 1
[64] Patents and Designs Act 1970, Section 7(1)
[65] Patents and Designs Act 1970, Section 23

inventor has no legal right to sue for damages in the event of infringement.[66] In Nigeria software patent is not provided for in the Patent and Designs act but is provide for in the United States.

Blockchain developers can use trademarks to protect brand power and secure brand value[67] as trademarks protect distinctive names, logos, slogans and other words or combinations of letters used in connection with blockchain products or services.[68] In Nigeria, trademarks may be registered or unregistered. While registered trademarks are protected under the Trademarks Act, unregistered marks are protected under the common law principle of passing off. Brand protection when well aligned with business goals and growth strategy can significantly support business growth and increase brand value. Blockchain developers that get trademarks right as well as their entire IP strategy will have a sharper competitive edge when it comes to business growth and expansion, partnerships and collaborations, and marketing and sales.[69]

Particularly when patent protection is unavailable or unsuitable, valuable commercial or technical information may be protected through trade secrets. Blockchain developers can leverage trade secrets for competitiveness.[70] With trade secrets, blockchain developers can protect blockchain programmes, algorithms, network configurations, data structures and source code. A blockchain developer can enjoy this protection if such information: (a) is secret, (b) has commercial value because it is secret; and (c) has been subject to reasonable steps under the circumstances, by the person lawfully in control of the information, to keep it secret.[71] Having protected the trade secret, a blockchain developer can prevent its unauthorized disclosure. In Nigeria, there is no trade secret legislation. Therefore, protection through trade secrets in Nigeria is limited to persons that are party to a contract such as a non-disclosure agreement.[72]

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[66] Patents and Designs Act 1970, Section 25(2)

[67] Scott B, "Intellectual Property Protection for Software Rights in Nigeria - Intellectual Property - Nigeria" (Welcome to MondaqJuly 29, 2019) <https://www.mondaq.com/nigeria/trademark/830390/intellectual-property-protection-for-software-rights-in-nigeria> accessed August 20, 2021

[68] Trade Marks Act 1965, section 67

[69] ibid

[70] Jegede OJ, "Overview of Software Protection in Nigeria - Intellectual Property - Nigeria" (Welcome to Mondaq September 30, 2020) <https://www.mondaq.com/nigeria/trademark/989070/overview-of-software-protection-in-nigeria> accessed August 20, 2021

[71] The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), Article 39(2)

[72] Jegede OJ, "Overview of Software Protection in Nigeria - Intellectual Property - Nigeria" (Welcome to Mondaq September 30, 2020) <https://www.mondaq.com/nigeria/trademark/989070/overview-of-software-protection-in-nigeria> accessed August 20, 2021

CHALLENGES OF BLOCKCHAIN

Despite its usefulness in the protection of IPR and vice versa, there are certain limiting factors to the blockchain technology effectively protecting IP rights or in IP rights protecting blockhain. The principal challenge for associated with blockchain, is a lack of awareness of the technology and a widespread lack of understanding of how it works. Many people do not understand what blockchain is or its nature. This has a lot to do with the dominance of technicians in the blockchain area.[73] There is a need to improve the user experience for those not technically minded to ascertain what IP rights they have as regards blockchain technology.

In recent years, blockchain technology has emerged and developed much more quickly than anticipated and there are numerous applications of this technology that are creating new grey areas in light of the existing and inadequate regulations. IP rights regimes are completely tied to jurisdictions. Blockchain keeps records in diverse systems across all participants in the blockchain. Where participants cut across different jurisdictions, it is indeterminable and this presents a challenge in terms of IP rights enforcement.[74]

The anonymous feature of the blockchain technology can attract not only experts but also criminal-minded persons. This is because the nature of the network is decentralized so that no one can know the true identity of participants. This makes cryptocurrencies the primary target used as a currency in the black market and the dark web.[75] An example is the use of various cryptocurrencies to carry out illegal transactions on the Darknet. The only way to cope up with this is to stop the criminal connection is by implementing better blockchain regulations.[76]

The massive size of blockchain databases presents scalability issues, which can be a challenge when speed is vital to a transaction. In reality, blockchains work fine for a small number of users. But when a mass integration takes place it is difficult to maintain and some blockchain solutions consume too much energy. When the user number increase on the network, the transitions take

[73] Meijer C, "Remaining Challenges of Blockchain Adoption and Possible Solutions" (Finextra ResearchFebruary 29, 2020) <https://www.finextra.com/blogposting/18496/remaining-challenges-of-blockchain-adoption-and-possible-solutions> accessed August 20, 2021

[74] Iredale G, "What Are the Different Types of Blockchain Technology?" (101 BlockchainsNovember 3, 2021) <https://101blockchains.com/types-of-blockchain/> accessed August 20, 2021

[75] Ibid

[76] ibid

longer to process. As a result, the transactions cost is higher than usual, and this also restricts more users on the network.[77]

Despite a wide variety of networks that exist, there is no universal standard yet for blockchain technology. The lack of standardization raises issues such as interoperability, increased costs, and difficult mechanisms, making mass adoption an impossible task. As blockchain technology follows no standard version, it is acting as a barrier for the entry of new developers and investors as well as their rights can be infringed on.[78]

The immutability of blockchain also creates a major problem for IPR since it cannot be edited or modified even where there was an error in the information that was inputted. It is therefore essential that the information entered is 100% accurate. Where the private key used to access the blockchain is lost, it is impossible to get access to the blockchain network.

CONCLUSION

Blockchain has a host of benefits, for example, costly and time-consuming disputes can arise over who created a particular invention. This could be easily resolved if inventors registered their innovations to a blockchain and any debate over who first came up with the idea or invention could then be solved through the timestamp. Blockchain technology provides records of IP assets owned by businesses across the world. Licensing agreements can be created and recorded via smart contracts, paving the way for a real-time ledger. Similarly, if used as a means to register works, it could provide authors with irrefutable evidence of ownership. Blockchain can also be used to identify counterfeit goods by attaching blockchain tags to them. The ability to track the entire lifecycle of goods has multiple benefits (ie, smoother audits of IP rights) particularly in jurisdictions where proof of first/genuine use is crucial. Nigeria operates a registration system of protecting IP rights and as such it would be good to have such a technology incorporated into our IP protection regime to make it faster and less burdensome. Blockchain is a good technological advancement that can aid IP offices in carrying out their day-to-day activities. Nevertheless, there is a need to improve on the challenges of blockchain technology.

[77] ibid

[78] Sharma TK, "5 Key Challenges for Blockchain Adoption in 2020" (Blockchain CouncilMarch 26, 2020) <https://www.blockchain-council.org/blockchain/5-key-challenges-for-blockchain-adoption-in-2020/> accessed August 20, 2021

RECOMMENDATIONS

Although the court in some jurisdictions allow blockchain as evidence, its full adoption into law is still far off. Many jurisdictions will therefore need to catch up with this technological development in accepting evidence recorded in blockchain in the resolution of disputes.

The awareness and understanding of blockchain technology needs to be improved not only among IP experts and stakeholders but generally in the legal and judicial environment and even by the general populace. The more knowledge of this field grows and its acceptance increases in the society, the more IP and other aspects of the society can benefit from it.

While blockchain technology has promising applications in the field of intellectual property, its widespread adoption could be slowed by the lack of clear rules governing how it can be used and what should happen in the event of a dispute. There should be a generally accepted rules laid out for countries to follow by international bodies like the World Intellectual Property Organization and this can then be used as guide to establish the appropriate jurisdiction and law to apply when a dispute occurs in the use of blockchain in the area of intellectual property right. It is important to note that there is a new digital tool from the World Intellectual Property Organization (WIPO) known as WIPO PROOF and it uses digital date-and-time-stamping technology, which allows creators to obtain a unique “fingerprint” for their file that records the critical date of existence. This can be used to confirm the creation of a file at a particular point in time. However, this timestamp performs a formalistic function as opposed to having substantive registration effect.