PERMISSIONED BLOCKCHAINS & SMART CONTRACTS: THE SMARTER WAY TO PROTECT INTELLECTUAL PROPERTY

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TABLE OF CONTENTS

I. INTRODUCTION

Blockchain is the new buzzword of not just the technology industry, but seemingly the entire world. Most people associate blockchain with

cryptocurrencies such as Bitcoin and Ethereum. The uses of blockchain technology go far beyond the cryptocurrency world and can benefit many different industries. This Commentary examines how permissioned blockchain and smart contracts benefit the intellectual property ("IP") industry. The use of smart contracts would increase IP holders, and potential buyers or licensees, establish and enforce IP agreements, and track licensing agreements for IP deals.[1]

II. BACKGROUND

A. What is a Permissioned Blockchain?

A private and permissioned blockchain would be most appealing to corporations, investors, or anyone participating in a business transaction.[2] A permissioned blockchain works essentially the same way a public blockchain does, however, it limits a user's access to information on the chain.[3] Only those trusted parties, who are preselected by a "central authority or consortium," are permitted to join the blockchain.[4] Those trusted parties are the only users allowed to take part in the transactions and gain access to the information on the blockchain.[5] If all of the parties involved agree to store their information on the private blockchain, then the parties can have full transparency in their business deals.[6] After this initial agreement, the parties next configure the terms

1. Birgit Clark, *Blockchain and IP Law: A Match made in Crypto Heaven?*, WIPO MAGAZINE (Feb. 2018), https://www.wipo.int/wipo_magazine/en/2018/01/article_0005.html. A Smart Contract is defined as

A self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralized blockchain network. The code controls the execution, and transactions are trackable and irreversible. Jake Frankenfield, *Smart Contracts*, INVESTOPEDIA (Oct. 8, 2019) https://www.investopedia.com/terms/s/smart-contracts.asp.

2. *See generally* James A. Cox, *Introduction to Blockchain Technology, in* ABA SEC. OF SCI. & TECH. L., BLOCKCHAIN FOR BUSINESS LAWYERS 1, 17–18 (James A. Cox & Mark W. Rasmussen eds., 2018).

3. *See id.* at 16–17 ("A permissioned blockchain simplifies some of the problems confronted by the developers of public blockchains."). While private blockchains would be able to keep some or all information private, permissioned blockchain platforms are more appropriate when "the functionality involves commercially or personally sensitive information . . . ." *Id.* at 17.

4. PRIMAVERA DE FILIPPI & AARON WRIGHT, BLOCKCHAIN AND THE LAW: THE RULE OF CODE 31 (2018) (explaining that a permissioned blockchain is not open for anyone to join).

5. DANIEL DRESCHER, BLOCKCHAIN BASICS: A NON-TECHNICAL INTRODUCTION IN 25 STEPS 322–33 (2017); *see also* DE FILIPPI & WRIGHT, *supra* note 4, at 31.

6. *See* DE FILIPPI & WRIGHT, *supra* note 4, at 37 (stating that because the blockchain requires digital signatures for every participant, the digital signatures essentially "serve[] as evidence that an account initiated a transaction, narrowing the ability of the holder of a

and conditions to use in drafting an agreeable and final smart contract.[7] The parties can then "memorialize all or part of their understanding in smart contract code, which is triggered by digitally signed blockchain-based transactions."[8] This process allows the operational aspects of the contract, which would be better suited as a smart contract, to be transferred into code, thereby becoming automatically enforceable.[9]

The benefits of using a smart contract on a permissioned based blockchain are that the smart contract is self-enforcing, it cuts down on costs, and it increases good behavior in business dealings.[10] Due to the self-enforcing nature of the smart contract on the permissioned blockchain, the parties do not have to waste time monitoring the obligations in the contract.[11] A permissioned blockchain mandates fairness in business dealings because the blockchain is "resilient and tamper resistant," and holds the parties accountable to the agreed upon terms of the contract.[12] The parties engaging in business do not need to trust one another because they can trust the code, and if one party does not perform, then that party will not receive the funds agreed upon.[13] The automated nature of smart contracts reduces the need for a "middleman" and cuts costs by automating the process.[14] Due to the immutability of smart contract code, it "narrow[s] opportunities for parties to engage in self-dealing or opportunistic behavior by modifying the code embodying their arrangement."[15] For these reasons, corporations and intellectual property holders would benefit from using blockchain technology, either on their own or through the use of an established blockchain platform.

blockchain-based account to refute the fact that a transaction occurred . . . ."). The blockchain's immutability while containing all requisite transactional information ensures transparency in business transactions. *Id.* at 37–38.

7. *Id.* at 74.

8. *Id.*

9. *Id.* at 77. Certain aspects of a contract, such as the "exchange of value or the transfer of title to a digitally represented asset," can be entered in as code, while other portions of the contract that are not as "clear-cut" would not be suitable for a smart contract. *Id.*

10. *See id.* at 80–82.

11. *Id.* at 80.

12. *Id.* at 81.

13. *See id.* at 80–81.

14. Larry Myler, *Reducing Roadblocks: How B2B Companies Can Benefit From Smart Contracts*, FORBES (Dec. 15, 2017), https://www.forbes.com/sites/larrymyler/2017/12/15/reducing-roadblocks-how-b2b-companies-can-benefit-from-smart-contracts/#3f7bd6645c65.

15. *Id.* at 81.

B. Resolving the Inflexible Nature of Smart Contracts

When the technology for smart contracts first came out, one of the major drawbacks was inflexibility.[16] Because smart contracts are written in code, they are considered "inflexible" due to their "unmodifiable" nature once created.[17] Although it is true that smart contracts cannot be changed because of their immutable nature, parties can still elect to create a new smart contract should their needs change.[18]

Another problem with inflexibility is that smart contracts require "explicit" and "precise" language that removes the flexibility of performance-based contracts.[19] One way to fix the inflexibility of the precise language of smart contracts is to include the use of oracles.[20] An oracle is a trusted third party that has the ability to adjust the performance obligations of a contract as needed.[21] Oracles are described as a "bridge that can digest external and non-deterministic information into a format that a blockchain can understand and execute particular conditions with."[22] The main benefit of an oracle is that it can allow a smart contract to respond to changes in "near real time."[23] Incorporating an oracle enables adjustments needed in performance obligations.[24] The use of an oracle to account for real world disruptions greatly increases the flexibility of the smart contract code.

16. Jeremy M. Sklaroff, Comment, *Smart Contracts and the Cost of Inflexibility*, 166 U. PA. L. REV. 263, 263–64 (2017).

17. *Id.* at 267, 273.

18. Merunas Grincalaitis, *Can a Smart Contract be upgraded/modified? Is CPU mining even worth the Ether? The Top questions answered here…*, MEDIUM (Feb. 6, 2018), https://medium.com/ethereum-developers/can-a-smart-contract-be-upgraded-modified-1393e9b507a. Smart contract creators could "update the code" by creating an "intermediary Smart Contract that will hold the address of the active Smart Contract." *Id.* Then, "all the calls and transactions will be redirected to the active version with the function delegatecall." *Id.* The other option would be to create a completely new smart contract based off of whatever aspects of the agreement the users would like to carry forward. *Id.*

19. Sklaroff, *supra* note 16, at 277.

20. DE FILIPPI & WRIGHT, *supra* note 4, at 75.

21. *Id.*

22. Brian Curran, *What are Oracles? Smart Contracts, Chainlink & "The Oracle Problem,"* BLOCKONOMI (Jan. 30, 2019), https://blockonomi.com/oracles-guide/.

23. Aaron Wright, *"Smart Contracts" & Legal Enforceability*, CARDOZO BLOCKCHAIN PROJECT, Oct. 16, 2018, at 6. Oracles can also be used in more experimental ways for dispute resolution or private arbitration systems, referred to as "judge-as-a-Service or arbitration-as-a-Service." *Id.*

24. *Id.* ("Oracles can be individuals or programs that store and transmit information from the outside world, thereby providing a means for blockchain-based systems to interact with real-world persons and potentially react to external events.").

Another solution for inflexibility of smart contracts is to create a hybrid contract.[25] With hybrid contracts, parties can agree to incorporate part of the contract into smart code, such as the parts of the contract written in definite terms of performance, and leave out the more ambiguous terms from being translated into code.[26] Another way parties can utilize a hybrid agreement is to create a "master agreement[] written in traditional legal prose."[27] In the master agreement, the parties specify and agree to the aspects of the contract to be written into code, and stipulate that the smart code qualifies as a valid writing that is part of their agreement.[28] This requires parties to agree and sign off to both versions of the contract.[29] It is important that the plain text in the hybrid contract "clearly specif[ies] the smart contract code" and the aspects of the agreement not being transformed into code, to ensure the full understanding of the parties.[30] This specificity is necessary in the event of a breach of contract or where either party seeks redress from the courts or an arbitrator.

C. Flaws with the Current Method of Protecting Intellectual Property Rights

A current issue for inventors seeking protection of their intellectual property rights is how complex the process is.[31] One concern with copyrighted works is that if there is more than one author, it can be very

25. DE FILIPPI & WRIGHT, *supra* note 4, at 76–78 (describing the need for hybrid agreements due to contracts having provisions that can be easily coded, and other provisions which require "open-ended terms" that cannot be coded).

26. *See id*. at 77–78.

27. *Id*. at 80.

28. *Id*.

29. *Id*. at 78 (stating that agreeing to a hybrid agreement, "allows natural-language agreements and smart contracts to work hand-in-hand to memorialize the parties' intent."). Hybrid agreements provide parties with "the advantages of both legal agreements and code-based rules." *Id*.

30. Stuart D. Levi & Alex B. Lipton, *An Introduction to Smart Contracts and Their Potential and Inherent Limitations*, HARV. L. SCH. F. ON CORP. GOVERNANCE AND FIN. REG. (May 26, 2018), https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/.

31. Mary Juetten, *Blockchain And IP: A Likely Marriage*, FORBES (July 19, 2018, 8:15 AM), https://www.forbes.com/sites/maryjuetten/2018/07/19/blockchain-and-ip-a-likely-marriage/#5b27dad1312a (detailing the complexity in obtaining and securing intellectual property rights). "Protecting IP in all its forms can be highly complex and many innovators cannot help but feel overwhelmed with that challenge." *Id*.; *see also* NPER, http://nper.io/En (last visited Nov. 11, 2019). NPER is a company that uses blockchain to protect intellectual property rights and "implements a global IP platform on blockchain main network, . . . records information of IP on distributed ledger, and solves opaqueness issue, which is the chronic problem of IP industry." *Id*.

difficult to determine ownership.[32] Despite the enactment of the Digital Millennium Copyright Act ("DMCA") in 1998,[33] online infringement is still a "chronic" issue for copyright owners due to the "antiquated" way the courts handle infringement cases.[34] Another big issue for intellectual property holders is having to protect intellectual property against theft while still being able to license the property to others.[35] Intellectual property holders are forced into a balancing act of wanting to obtain the full benefits of their IP while also ensuring that they can follow properly protect it as well. Through the use of blockchain technology, IP holders can better address these issues.

III. WHAT CHANGES NEED TO BE MADE TO ADDRESS THE NEW TECHNOLOGY

A. Proposed Changes to the Uniform Commercial Code and Restatement of Contracts (Second)

It is important that both the Uniform Commercial Code ("UCC") and the Restatement of Contracts (Second) make amendments to include blockchain technology and smart contracts.[36] Although courts should construe smart contracts to meet the requirements delineated under the statute of frauds and contract law, drafting amendments that directly include the use of smart contracts would remove any ambiguity in their legality.[37] The lack of ambiguity would incentivize contracting parties to

32. *See* Jessie Willms, *Is Blockchain-Powered Copyright Protection Possible?*, BITCOIN MAG. (Aug. 9, 2016), https://bitcoinmagazine.com/articles/is-blockchain-powered-copyright-protection-possible-1470758430/.

33. U.S. COPYRIGHT OFFICE, SUMMARY: THE DIGITAL MILLENNIUM COPYRIGHT ACT OF 1998 (Dec. 1998), https://www.copyright.gov/legislation/dmca.pdf (detailing that the act was "signed into law by President Clinton on October 28, 1998" to implement standards of treaties the United States entered). The Act also "addresses a number of other significant copyright-related issues." *Id.*

34. Mark Schultz, *Digital age changes all the rules on intellectual property*, THE HILL (Nov. 6, 2017, 1:50 PM), https://thehill.com/opinion/finance/358963-digital-age-changes-all-the-rules-on-intellectual-property.

35. *See* David Turner, *Why Protecting Intellectual Property Is So Hard and How Po.et Can Help*, MEDIUM (July 6, 2018), https://blog.po.et/why-protecting-intellectual-property-is-so-hard-and-how-po-et-can-help-1c8435e2e64e.

36. *See* USLEGAL, *Elements Of A Contract*, https://contracts.uslegal.com/elements-of-a-contract/ (last visited Dec. 23, 2019) (listing the elements of a contract as "(1) offer; (2) acceptance; (3) consideration; (4) mutuality of obligation; (5) competency and capacity; and, in certain circumstances, (6) a written instrument.").

37. It can be argued that the UCC would cover smart contracts and hybrid contracts already, thanks to precedents like *Crabtree v. Elizabeth Arden Sales Corp.*, 305 N.Y. 48 (1953). The *Crabtree* majority concluded that the "pieced together" contract was legally binding. *Id.* at 54, 57–58. This precedent could be used to prove the enforceability of future

use smart contracts. When creating a smart contract, the creator and the potential buyer must negotiate terms and come to an agreement before drafting the final contract.[38] Once they have agreed on the terms of the sale, the agreement would be memorialized in the smart contract code.[39] If both parties accept the terms and sign off on the agreement, the smart contract would then become automatically enforced once the terms are met.[40] The consideration element of contract law is still met because in order for the business owner to obtain the product, he must pay the agreed upon amount of money.[41] Once the funds are given, the design will become the property of the purchaser.[42] Once the draft is finalized, it can be transformed into code by a programmer and become automatically enforceable.[43]

B. State and Federal Government Looking to Future by Creating and Proposing Statutes

So far, there have been two United States House Bills introduced to the House of Representatives and seven individual State bills enacted regarding smart contracts.[44] The proposed House Bill 7002 seeks to extend the applicability of the Global and National Commerce Act to include electronic signatures and smart contracts.[45] House Resolution 1108 was also presented to show that Congress is showing its support for

hybrid contracts, which are, by definition, more than one piece of documentation. *Id.* at 56–57.

38. DE FILIPPI & WRIGHT, *supra* note 4, at 74.

39. *Id.*

40. *Id.* at 74–75.

41. *See id.* at 78.

42. *See id.*

43. *See id.* at 74–75.

44. *See, e.g.*, Heather Morton, *Blockchain State Legislation*, NAT'L CONFERENCE OF STATE LEGISLATURES (Mar. 28, 2019), http://www.ncsl.org/research/financial-services-and-commerce/the-fundamentals-of-risk-management-and-insurance-viewed-through-the-lens-of-emerging-technology-webinar.aspx.

45. H.R. 7002, 115th Cong., 2d Sess. (2018) (defining a smart contract as "a computer program that reflects an agreement, in whole or in part, between two or more parties to execute transactions automatically based on the occurrence of agreed-upon events."); *see also* Press Release, Congressman David Schweikert, Congressman David Schweikert Introduces Two Blockchain Related Bills, H.Res 1108 and H.R. 7002 (Oct. 2, 2018) (on file with author) (stating that House Bill 7002 would "provide clarity to the application of existing law during a time when several states have already enacted conflicting legislation regarding the validity of electronic signatures, records, and smart contracts using blockchain."). Enacting House Bill 7002 would give "clarification [that] will enable the technology to grow and reach its potential." *Id.*

research into and development of blockchain technology and smart contracts, among other things.[46]

Because the proposed legislations are moving slowly on the federal level, some states have decided to take initiative and enact their own legislation. For example, Arizona enacted a statute recognizing smart contracts and allowing them to exist in commerce—granting smart contracts the same legal effect, validity, and enforceability as traditional contracts.[47] Tennessee also enacted its own statute giving smart contracts the same legal effect and weight as traditional contracts in commerce.[48]

Other states should follow and change their own contract laws to incorporate blockchain and smart contract technology to allow for better commerce and business dealing.[49] The benefit of legally recognizing smart contracts is that smart contracts take "legal and contractual provisions" and "automatically execute[]" them using code.[50] State contract law could also benefit from the immutability aspect of smart contracts, which holds parties to their word and decreases the possibility of "self-dealing or opportunistic behavior."[51]

IV. BENEFITS OF SMART CONTRACTS TO INTELLECTUAL PROPERTY

A. Smart Contracts can be Adjudicated and Enforced in the Same

46. H.R. Res. 1108, 115th Cong., 2d Sess. (2018); *see also* Schweikert, *supra* note 45 (stating that House Resolution 1108 "seeks to increase research and show Congress's support for an 'innovation friendly' regulatory approach of blockchain technology."). House Resolution 1108 was presented with the hope that it "will increase the support and growth of the technology's implementation in the public and private sector to improve overall privacy, transparency, and efficiency." *Id.*

47. ARIZ. REV. STAT. ANN. § 44-7061 (LexisNexis 2019) (defining smart contract and recognizing its existence in commerce). Arizona's statute also provides that a "contract relating to a transaction may not be denied legal effect, validity or enforceability solely because that contract contains a smart contract term." § 44-7061(C).

48. TENN. CODE ANN. § 47-10-202 (2019).

49. *See generally* Roger Aitken, *'I Fought The Law' & Blockchain Won: Smart Contracts For Businesses Handling Legal Have Conviction*, FORBES (Sept. 1, 2018, 02:29PM), https://www.forbes.com/sites/rogeraitken/2018/09/01/i-fought-the-law-blockchain-won-smart-contracts-for-businesses-handling-legal-have-conviction/#359e67a47f4c (stating that a benefit of states adopting blockchain technology laws is that the "blockchain-based platforms could even take some of the load off the justice system by providing alternative venues for parties to settle.").

50. DE FILIPPI & WRIGHT, *supra* note 4, at 194.

51. *Id.* at 81.

Manner as Traditional Contracts

The fact that smart contracts are drafted digitally—as opposed to traditionally drafted, physical contracts—should not create issues with relation to contract law. In 2000, the United States amended its code and introduced the acceptance of electronic signatures as valid in an effort to remove any barriers to commerce.[52] With the Uniform Electronic Transactions Act and the Electronic Signatures in Global and National Commerce Act, courts would be unable to deny the legal effect (of smart contracts), as long as the parties manifested an intent to be bound by the agreement.[53] Courts in the United States look at the intent of the parties in a contract and, therefore, with smart contracts, if a dispute does occur, the court will accordingly look to "infer the parties' intent to be contractually bound."[54]

If an owner of intellectual property uses a permission blockchain platform to create a smart contract, the owner can set up all of the necessary details to protect his or her IP rights.[55] If one party did not perform as agreed, or if he or she broke one of the agreed upon terms, it is still a written contract on which a court could rely.[56] One of the benefits of using a blockchain is that it is immutable once a transaction is finalized; therefore, any relevant information that was previously hashed into the blockchain would still be available for discovery purposes.[57]

B. Blockchain and Smart Contracts can Better Enforce Federal

52. 15 U.S.C.S. §§ 7001—7031 (2019).

53. DE FILIPPI & WRIGHT, *supra* note 4, at 79.

54. *Id.* at 78–79 (detailing that smart contracts, like traditional contracts, still require parties to reach a "meeting of the minds" with the intent to be contractually bound not unlike those required of traditional contracts). Because smart contracts consist of the basic elements of traditional contracts, courts would still be able to adjudicate any disputes while using traditional contract laws. *Id.* at 79.

55. Clark, *supra* note 1 ("Smart contracts could be used to establish and enforce IP agreements such as licenses and allow the transmission of payments in real time to IP owners.").

56. *See generally* DE FILIPPI & WRIGHT, *supra* note 4, at 78–79 (describing how U.S. courts can still adjudicate and have the same jurisdiction over smart contracts as they do with traditional contracts).

57. *See generally id.* at 199 (describing how governments can also benefit from the use of the information stored on a blockchain "[b]ecause a blockchain can serve as a certified audit trail of transactions [and] the technology could enable governmental authorities to verify ex-post that a private actor has complied with the law.").

Protections of Intellectual Property

With the ever-growing world of digital and technological advances, a new way to protect intellectual property rights is by using blockchain technology and smart contracts.[58] Intellectual property theft is a major problem facing IP owners, leading companies to lose out on millions of dollars.[59] Research has shown that "IP infringement costs the average company almost $102 million in revenue per year . . . ."[60] Data shows that the average patent "litigation costs $950K . . . and . . . lasts between 1 and 2 years."[61] One reason intellectual property owners have such a hard time protecting property is because the Digital Millennium Copyright Act ("DMCA") is outdated and is no longer the fast-acting fix for patent infringement that it once was.[62]

By storing IP information on a blockchain, the IP owner would be able to show proof of ownership with an immutable time stamp, along with details of who is authorized to work with the property.[63] The smart contract allows for the IP owner to have, first, an immutable and time stamped agreement to the nondisclosure agreement ("NDA"),[64] and second, an automatically enforcing contract for the transactions.[65] The

58. *See* Clark, *supra* note 1; *see also* Andrew Rossow, *How Can We Make Intellectual Property Rights 'Smarter' With The Blockchain*?, FORBES (Jul. 24, 2018, 08:44AM), https://www.forbes.com/sites/andrewrossow/2018/07/24/how-can-we-make-intellectual-property-rights-smarter-with-the-blockchain/#51e8bf0685ec.

59. Joakim Hjønnevåg, *Can Blockchain Protect Intellectual Property?*, HACKERNOON (Aug. 20, 2018), https://hackernoon.com/can-blockchain-protect-intellectual-property-6c46c6a09dfa.

60. *Id*.

61. Gau Bodepudi, *Debunking the IPR Myth of Nominal Impact to Overall Costs*, IP WATCHDOG (Mar. 8, 2018) https://www.ipwatchdog.com/2018/03/08/debunking-ipr-myth-nominal-impact-costs/id=94230/.

62. *See* DE FILIPPI & WRIGHT, *supra* note 4, at 123 (regarding the DMCA notice and takedown remedy for intellectual property infringement.; *see also* Schultz, *supra* note 34 (stating that in 1998, the digital world and the technology that we have today was not around, which made notice and takedown remedies more feasible). Online infringement today is a chronic issue and for example, Google received over 900 million takedown requests for infringement purposes in 2016 alone. *Id.*

63. Clark, *supra* note 1.

64. *See* Juetten, *supra* note 31 (detailing how the benefits of using blockchain technology to protect IP rights are that "artists will receive proof for the actual application of their copyrights and companies can be assured that confidential data is safely stored and any access to it by third parties is protected through NDAs"); *see also* Clark, *supra* note 1 (stating that "[c]onfidentiality concerns on the side of the IP owners could be addressed by an opt-in scheme.").

65. MARK GATES, BLOCKCHAIN: ULTIMATE GUIDE TO UNDERSTANDING BLOCKCHAIN, BITCOIN, CRYPTOCURRENCY, SMART CONTRACTS, AND THE FUTURE OF MONEY 72 (2017) (stating that smart contracts "automatically verify, execute, and enforce the contract based on the terms written in the code.").

smart contract should be judicially acceptable and enforced in the United States due to the common law understanding that a contract can be either express or implied.[66] Although the full contract may not be written in the smart code chain, having the operational aspects of the contract in the smart contract better enforces the transaction with little oversight.[67] Blockchain and smart contracts would decrease the need for litigation regarding infringement or intellectual property theft due to their binding and automatic nature.[68] Transactions would occur much faster between parties, and overall good faith dealing would be enforced through the use of smart contracts.[69]

V. BENEFITS OF PERMISSIONED BLOCKCHAIN

In IP law, one of the most important aspects of protecting your rights as an owner is to show, first, that you are in fact the *original* owner, and second, that only the people who are authorized by a license are able to use your protected work.[70] As previously stated, there are already laws in place that grant IP owners certain rights and afford those owners various means for redress.[71] Blockchain technology can assist courts and IP owners in matters of theft with its immutable ledger of information of transactions regarding the specific protected work.[72]

A. Benefits of Blockchain and Smart Contracts for Copyright Protection

Courts and the IP owners would be better able to determine who is the original author and/or owner of a protected work by looking at the time stamp on the distributed ledger.[73] Once something is added on to a

66. *See* Board of Highway Comm'rs, Bloomington Twp., v. City of Bloomington, 253 Ill. 164, 171, (1911) ("By the common-law classification, every contract was either express or implied"); *see also* Parke-Hayden, Inc. v. Loews Theatre Mgmt. Corp., No. 91 CIV. 0215 (RWS), 1993 WL 287815, at *5 (S.D.N.Y. July 28, 1993), *aff'd sub nom.* Parke-Hayden, Inc. v. LOEWS Theatre Mgmt., 22 F.3d 1091 (2d Cir. 1994) ("There are three types of contract at common law: express, implied-in-fact, and quantum meruit or implied-in-law.").

67. *See* DE FILIPPI & WRIGHT, *supra* note 4, at 76–78.

68. *See* Wright, *supra* note 23.

69. *See* DE FILIPPI & WRIGHT, *supra* note 4, at 81 (stating that smart contracts decrease "the risk of opportunistic behavior . . . [and] open up new avenues for commercial relationships [by] potentially facilitating and increasing [a] range of economic activities between untrusting parties.").

70. *See* Baxter v. MCA, Inc., 812 F.2d 421, 423–24 (9th Cir. 1987).

71. *See supra* Part II.C.

72. *See* Clark, *supra* note 1 (describing how the benefits of having a distributed ledger would offer better protection for and defense of an owner's IP rights either in the "registry stage or in court.").

73. *See* Wright, *supra* note 23; DE FILIPPI & WRIGHT, *supra* note 4, at 81.

blockchain, it is permanently there and no changes can be made to it without the consensus of everyone else on the blockchain.[74] In cases related to the copyrights of music or pieces of art, copyright protection is automatically given once it is in tangible form.[75] With the use of blockchain technology, an author can show when the work was first published on the blockchain because every action and transaction on the blockchain is time stamped.[76] If there was a "smart IP registry," then a copyright or trademark holder would be able to show when the IP was "first applied for, registered, first used in trade; when a design, trademark or patent was licensed, [and] assigned . . . ."[77]

B. Benefits for Patent Protections

Patents and trade secret owners can greatly benefit from the use of smart contracts. One major issue inventors face while seeking patent protection is that it can take years for their patent to be approved and issued a valid patent number from the United States Patent and Trademark Office ("USPTO").[78] If the USPTO, either on its own or with other countries it has a treaty with, launched a blockchain for its registration process, it could help decrease the backlog. A blockchain platform would provide patent applicants with a "decentralized storage

74. SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM 3 (2008) (detailing the proof of work consensus in order to create a transaction in the blockchain). The blockchain hash works by a "proof-of-work" consensus, which is "essentially one-CPU-on-vote." *Id.* The majority of CPU nodes are the ones who create the hash for a block, which ends up on the chain of transactions. *Id.* A hacker wanting to change the information on a previous block would have a very difficult time trying to catch up to the other "honest" nodes in the network. *Id.* at 6; *see, e.g.*, Zulfikar Ramzan, *Bitcoin: Proof of Work*, KHAN ACADEMY, https://www.khanacademy.org/economics-finance-domain/core-finance/money-and-banking/bitcoin/v/bitcoin-proof-of-work (last viewed Feb. 24, 2019).

75. PAUL GOLDSTEIN & R. ANTHONY REESE, COPYRIGHT, PATENT, TRADEMARK, AND RELATED STATE DOCTRINES 716 (8th ed. 2016).

76. NAKAMOTO, *supra* note 74, at 2; *see* BERNSTEIN, https://www.bernstein.io (last visited Dec. 23, 2019). Bernstein is a blockchain platform service that allows inventors to upload their intellectual property and receive a time stamped certificate through their blockchain. *Id.* This would help inventors to prove when they created their work to fight copyright claims. *Id.*

77. Clark, *supra* note 1, at 3 ("The ability to track the entire life cycle of a right would have many benefits, including smoother IP right audits."). *Id.* Clark believes using blockchain would "simplify due diligence" for IP transactions. *Id.*

78. Katalyse.io, *How Blockchain will Disrupt Intellectual Property*, MEDIUM (Aug. 1, 2018), https://medium.com/coinmonks/how-blockchain-will-disrupt-intellectual-property-dfde59588ba7; *see USPTO Director Looks to Decrease Patent Backlog by Improving Workforce Efficiency*, FED. NEWS NETWORK (June 12, 2018, 9:37 AM), https://federalnewsnetwork.com/workforce/2018/06/an-inventor-himself-new-pto-director-prepares-to-sign-nations-10-millionth-patent/ (stating that at the time the USPTO's current patent backlog was about 540,000).

of data" that would reduce the "verification and approval time rate," and allow for "quicker access" to innovations for prior art search.[79] Blockchain would give the USPTO an easy way to time stamp its patent applications, which is necessary since the United States issues patents based off of a first-to-file system.[80] The USPTO could also use the blockchain to target counterfeiters and enforce the rights of the patent holder.[81] Studies have found that the potential uses of blockchain for the IP industry include "evidence of creatorship and provenance authentication, registering and clearing IP rights; controlling and tracking the distribution of (un)registered IP; providing evidence of genuine and/or first use in trade and/or commerce[,] . . . [and] authentication and provenance purposes in the detection and/or retrieval of counterfeit, stolen and parallel-imported goods."[82]

Inventors can protect their patented work on a blockchain by adding a non-disclosure agreement access key before continuing to the rest of the smart contract.[83] This would give the owner a time stamp and immutable data that provides proof of acceptance.[84] By using blockchain technology, intellectual property holders would be able to create a digital and immutable chain of ownership for their creation, minimizing possible infringements.[85] For example, if an intellectual property holder utilized

79. Katalyse.io, *supra* note 78; *see* Clark, *supra* note 1 (stating "distributed ledger technology could be used to publish technologies for defensive publication as prior art to prevent others from obtaining a patent over such technologies."). Having a blockchain of the prior art would streamline the patent process and would allow for a proof of creatorship for an inventor defending their patent. Clark, *supra* note 1.

80. *See First Inventor to File (FITF) Resources*, U.S. PATENT AND TRADEMARK OFFICE (last updated Feb. 5, 2016, 11:01 AM), https://www.uspto.gov/patent/first-inventor-file-fitf-resources; *see also* John Villasenor, *March 16, 2013: The United States Transitions to a 'First-Inventor-to-File' Patent System*, FORBES (Mar. 11, 2013, 11:54 PM), https://www.forbes.com/sites/johnvillasenor/2013/03/11/march-16-2013-america-transitions-to-a-first-inventor-to-file-patent-system/#dc117cf3324b ("Under first-to-file, an inventor who does not take prompt action to protect his or her invention faces a higher risk that a later inventor will end up holding the associated U.S. patent rights.").

81. *See* Gönenç Gürkaynak et al., *Intellectual Property Law and Practice in the Blockchain Realm*, 34 COMPUT. L. & SEC. REV. 847, 854 (2018); *see also* Clark, *supra* note 1 ("'[S]mart IP registries' in the form of a centralized solution run by the IP office as an accountable authority . . . would create an immutable record of events in the life of a registered IP right.").

82. Clark, *supra* note 1.

83. *See* Juetten, *supra* note 31 (interviewing Dominik Thor and his project, Vaultitude, where he states how Blockchain technology can assist with the "safe and easy exchange of confidential information by placing non-disclosure agreements (NDAs) on the Blockchain").

84. *See* DE FILIPPI & WRIGHT, *supra* note 4, at 74–76.

85. *See* Rossow, *supra* note 58 (explaining how this chain of ownership "allows for the general public to be the judge as to the strength and value of any particular work-something far beyond what the USPTO is capable of doing through its traditional application process.").

the Vaultitude platform,[86] he would be able to ensure that his IP stored on the blockchain was secure by requiring anyone who wants to gain access to the information to first sign a non-disclosure agreement, which is then time stamped onto the hash of the block chain.[87]

C. Benefits for Startup Companies

Startup companies would also find greater protections and accountability for their transactions with the use of smart contracts. By utilizing smart contracts, startup companies would be able to ensure that they get payments on time and could cut out intermediaries, which are traditionally costly.[88] A startup company that holds copyrighted material or patented material would want to ensure that whichever platform they use to get their product in the market would also have the highest amount of protection. If the startup company had their product or business plan information recorded onto a permissioned blockchain, they would be able to decide which vendors or potential licensees could have access to certain information within the private blockchain.[89] By having their company or product information stored onto a blockchain, all future transactions would be time stamped to show who has access to certain material and when those individuals were able to gain access.[90]

VI. CONCLUSION

By adopting rules and statutes that recognize smart contracts and blockchain technology, the intellectual property industry would be able to stay up to date with the ever-changing digital world. Legally recognizing smart contracts would allow for increased efficiency and transparency. Blockchain platforms already exist and were created

86. *See generally* VAULTITUDE, https://www.ipchaindatabase.com/ (last visited Feb. 16, 2020, 6:46 PM).

87. *See generally* Juetten, *supra* note 31.

88. Roger Aitken, *Smart Contracts on the Blockchain: Can Businesses Reap the Benefits?*, FORBES (Nov. 21, 2017, 11:20 AM), https://www.forbes.com/sites/rogeraitken/2017/11/21/smart-contracts-on-the-blockchain-can-businesses-reap-the-benefits/#7c5170371074.

89. Cox, *supra* note 2, at 16–17 (detailing how parties on a private blockchain are able to "keep private some or all information," and that the "operators of a network can choose to limit access to identified, authorized parties over private communication channels . . . ."); *see also* Anant Kadiyala, *Nuances Between Permissionless and Permissioned Blockchains*, MEDIUM (Feb. 17, 2018), https://medium.com/@akadiyala/nuances-between-permissionless-and-permissioned-blockchains-f5b566f5d483.

90. .NAKAMOTO, *supra* note 74, at 2 (describing how bitcoin works through a peer-to-peer decentralized distributing system and "[t]he timestamp proves that the data must have existed at the time . . . in order to get into the hash.").

specifically to help intellectual property holders protect their rights, while also facilitating the use of smart contracts for transactions. The United States would, therefore, benefit by adopting blockchain and smart contract technology into their contract and IP laws, which would in turn lead to growth in the IP market.