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Curb Your Enthusiasm: The Real Implications of Blockchain in the Legal Industry

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CURB YOUR ENTHUSIASM: THE REAL IMPLICATIONS OF BLOCKCHAIN IN THE LEGAL INDUSTRY

JUSTIN EVANS

I. INTRODUCTION

Blockchain has become a buzz word in the innovation community over the past few years.[1] Normally, the legal industry is slow to innovate, but this is not the case with the blockchain technology bandwagon.[2] In fact, legal professionals

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[1] Robert Ambrogi, *In Legal, Blockchain Is The New Black*, ABOVE THE LAW, (Aug. 28, 2017), https://abovethelaw.com/2017/08/in-legal-blockchain-is-the-new-black [hereinafter *The New Black*].

[2] Erik Mankin, *Innovation in Practice: Why It's So Hard,* AM. BAR ASS'N., https://www.americanbar.org/publications/law_practice_home/law_practice_archive/lpm_magazine_articles_v32_is8_

and technologist have been leading the hype for potential blockchain applications that will revolutionize law. Technologists within law firms have convinced several firms to devote their resources to creating their own blockchain, with the thought that it will give them a technological advantage over competing firms.[3] In fact, several law firms have come together to join resources to create the Global Legal Blockchain Consortium to help "drive the adoption and standardization of blockchain in the legal industry, with the larger goal of improving the security and interoperability of the global legal technology ecosystem."[4]

Legal innovators hypothesize that blockchain and smart contracts will be used to revolutionize legal practice as we know it.[5] Blockchain and smart contracts are expected to be used for several legal sectors including: intellectual property, property, public records, land registry, and contracts.[6] In fact, the state of Illinois developed and finished its pilot study to test the use of blockchain for recording and retaining its land records.[7] Delaware, the capital of corporate law, now allows the retaining of shareholder lists, storing of corporate records, and trading of securities on blockchain.[8] Though blockchain has multiple potential applications in multiple sectors within the legal industry, the most promising is smart contracts.[9]

To help implement smart contracts, members of the legal community have begun to work with the local state government to craft legislation that allows for the expansion of blockchain and smart contract use. In February, Arizona passed a bill that gave legal validity to signatures recorded blockchains and smart contracts.[10] The Arizona law mirrors that of Vermont and Nevada, each of which also passed legislation to give smart contracts validity in a court of law when recorded on the blockchain.[11] Nevada, however, went a step further by enacting a bill that prohibits a local government from: "(1) imposing a tax or fee on the use of a blockchain; (2) requiring a certificate, license or permit to use a blockchain; and (3) imposing any other requirement relating to the use of a blockchain."[12]

Implementation of new legal technology seems promising and could be as transformative as the use of email was to the legal profession.[13] Before we adopt

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an4.html.

[3] *The New Black*, *supra* note 1.

[4] Robert Ambrogi, *Consortium Formed to Drive Blockchain Adoption in Legal Industry*, L. SITES BLOG (Aug. 17, 2017), https://www.lawsitesblog.com/2017/08/consortium-formed-drive-blockchain-adoption-legal-industry.html.

[5] *The New Black*, *supra* note 1.

[6] *Id.*

[7] H.J. Res. 25, 100th Gen. Assemb. Reg. Sess. (Ill. 2017).

[8] S.B. 69, 149th Gen. Assemb. Reg. Sess. (Del. 2017).

[9] Rob Marvin, *Blockchain in 2017: The Year of Smart Contracts*, PC MAG. (Dec. 12, 2016, 2:48 PM), https://www.pcmag.com/article/350088/blockchain-in-2017-the-year-of-smart-contracts.

[10] ARIZ. REV. STAT. ANN. § 44-7061 (2018).

[11] VT. STAT. ANN. tit. 12 § 1913 (2018).

[12] S.B. 398 Leg. 79th. Sess. (Nev. 2017).

[13] Sally Kane, *10 Trends Reshaping the Legal Industry*, THE BALANCE (May 15, 2017),

the new legal technology, we should always ask ourselves two critical questions: 1) whether the use of the new technology will help maintain or improve our service to our clients, and 2) whether we are adding value to our clients by using the new technology.

This Comment is organized as follows: Part II examines the issues with the current state of contracting and elucidates potential sectors of the legal industry where the implementation of smart contracts would be of best use for attorneys and their clients.[14] Part III examines the implementation of smart contracts, and how it will help attorneys add value for clients by helping attorneys work more effectively and efficiently.[15]

Part IV of this paper explains why the use of smart contracts should be augmented with artificial intelligence (AI) to assist with the validity of the contracts.[16] Part V of this paper examines the creation of a new type of lawyer that technologists and corporate clients will need to assist with understanding the risk associated with the technology and the laws that govern it.[17] Finally, in Part VI, this Comment examines potential client areas that could benefit from the use of smart contracts to save money and increase efficiency.[18]

II. Issues With The Current State Of Contracting: Dumb Contracts

A contract is a covenant or agreement between two or more persons, with a lawful consideration or cause.[19] Contract documents identify the contracting parties that are subject to the promises defined therein. Generally, contract agreements also define the consideration for those promises, and a set of clauses such as date of delivery and penalties for non-performance. A problem with standard contracts is that they often lack sufficient details about the actual process in which the transaction should be carried out, which often results in friction amongst the contracting parties.[20] Friction that results from the ambiguity of a contract can often ruin business relationships and lead to costly conflict resolutions.[21] Bringing contracting disputes to court presents new potential problems, such as enforceability and cost.[22] In fact, it is reported that "U.S. corporations pay more than $20

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https://www.thebalance.com/trends-reshaping-legal-industry-2164337.

[14] *See infra* Part II.

[15] *See infra* Part III.

[16] *See infra* Part IV.

[17] *See infra* Part V.

[18] *See infra* Part VI.

[19] *What is CONTRACT?*, BLACK'S LAW DICTIONARY, https://www. thelawdictionary.org/contract/, (last visited Sept. 26, 2018).

[20] Tara Naughter, *Smart Contracts Vs. Traditional Contracts*, CONTRACT WORKS (Mar. 17, 2017), https://www.contractworks.com/blog/smart-contracts-vs.-traditional-contracts.

[21] *Id.*

[22] *Id.*

billion a year to litigation attorneys—an alarming fact that distracts our attention from other and often more important business costs of litigating our disputes."[23]

A potential solution to issues that plague paper contracts (dumb contracts) is the use of smart contracts, which would elucidate enforceability and an understanding of contracting terms.[24] Smart contracts are self-executing electronic contracts that are coded on the blockchain between members of the blockchain community.[25] Smart contracts are an automated computer process that is coded to receive inputs from both parties and facilitates and to verify or enforce the negotiation or performance of that contract as defined by predetermined instructions.[26]

Smart contracts will also decrease potential legal exposures in transacting by allowing for contract drafters to include automatic remedies for non-performance by either side, and for issues such as delivery of damaged products. The use of smart contracts will also allow for the inclusion of code that triggers arbitration if both parties are in dispute. The arbitration mechanism could be structured similarly to that of eBay, which allows both sides to provide evidence of their dispute to an arbiter, who would settle disputes in real time. Using an arbitrator over the court system will result in lower legal fees.

Dumb contracts are very similar to computer code in that both "tend to follow a logical if-this-then-that format, just like code ('if side a fulfills such and such conditions, side b is obliged to this and that'), paper contracts [can] be replaced with computer programs which automatically execute the terms of an agreement."[27] Because smart contracts are code-based, they are therefore accurate and free of potential misinterpretation.[28] This is not the case for dumb contracts, which often rely on judges for clarification of the obligations of each party.[29] Dumb contracts void of a court's enforcement, which may be difficult when contracting internationally, are not worth the paper on which they are printed.[30] Smart contracts, however, can have pre-programmed instructions that guarantee performance from both parties without the use of the court system.[31]

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[23] John R. Allison, *Five Ways to Keep Disputes Out of Court*, HARV. BUS. REV. (Jan. 1990), https://hbr.org/1990/01/five-ways-to-keep-disputes-out-of-court.

[24] Naughter, *supra* note 20.

[25] *Id.*

[26] Cheng Lim et al., *Smart Contracts: Bridging the Gap Between Expectation and Reality*, UNIV. OXFORD BUS. L. BLOG (July 11, 2016), https://www.law.ox.ac.uk/business-law-blog/blog/2016/07/smart-contracts-bridging-gap-between-expectation-and-reality.

[27] *How to Make Smart Contracts Worthy of Their Name Using Artificial Intelligence*, AGRELLO (May 4, 2017), https://blog.agrello.org/how-to-make-smart-contracts-worthy-of-their-name-using-artificial-intelligence-3a90e4dd3c47 (quoting Nick Szabo) [hereinafter AGRELLO].

[28] Naughter, *supra* note 20.

[29] *Id.*

[30] *Id.*

[31] *Id.*

Dumb contracts often present jurisdictional conflicts amongst the contracting parties, with both parties fighting for a venue that is more favorable to their position.[32] Smart contracts would alleviate this issue by allowing both contracting parties to pre-select which jurisdictional law will govern the contract and enforce it.[33] In situations where the code does not perform as intended by the parties or there is a disagreement amongst the parties, there needs to be specialized judges, mediators, or arbitrators who understand contract law and technology to help assist with resolutions of issues or disputes.[34] Smart contracts will also remove the biases that come with the traditional court process such as race and economics, by allowing both contracting parties the option of having a judge, mediation, or arbitration automatically chosen.[35]

Smart contracts will revolutionize the way parties handle contract disputes by providing an automatic remedy or automatically trigger dispute resolution services.[36] Before a smart contract is active, both parties will agree to an automatic remedy, a full refund or full refund plus penalty, in case of failed performance.[37] If a contracting party has performed as specified in the contract, and the other contracting party refuses to perform, the smart contract will automatically pay the performing party.[38] If the non-performing party disagrees with the remedy, it can appeal to the dispute resolution services.[39]

The smart contract's dispute resolution could be similar to that of eBay's SquareTrade approach to transaction disputes. The dispute resolution system will offer two services: a free web-based forum which allows users to attempt to resolve their differences on their own or, if necessary, the use of a professional mediator.[40] Once a claim is submitted to the smart contract, it will notify both parties and then schedule a time for the parties to communicate directly on an automated web-based platform to seek a potential resolution.[41] If both parties are unable to reach a resolution, an arbitrator will be notified and will resolve the dispute.[42] Smart contracts have the ability to remove the dispute over the jurisdiction of international contracting parties by allowing for disputes to be resolved in the automated web-based platform.[43]

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[32] *Id.*

[33] *Id.*

[34] *Id.*

[35] *Id.*

[36] *Id.*

[37] *Id.*

[38] *Id.*

[39] *Id.*

[40] *Dispute Resolution Overview*, EBAY, https://pages.ebay.com/services/buyandsell/disputeres.html.

[41] *Id.*

[42] *Id.*

[43] Beth Trent & Colin Rule, *Online Dispute Resolution and the future of the law*, INSIDECOUNSEL (Sept. 1, 2015), https://www.lexology.com/library/document.ashx?g=6534ffb3-5168-4ed0-85d4-2b8291774fca.

The removal of centralized authorities of governance allows for minimal delays and bureaucratic inefficiencies that occur when resolving conflicts with local and foreign courts.[44] A decentralized system will allow for greater access to justice, equality, and fair outcomes in contract disputes.[45] It is known that institutional entities with better access to resources consistently obtain better outcomes in contracting disputes.[46] The use of decentralized systems for contracting disputes will better posit individuals with smaller wallets when in contract disputes.[47] Decentralized systems will allow those individuals with less resources to overcome the barrier to justice by augmenting their ability to access a court.

> In the United States, there is no right to counsel in civil disputes. Each year as many as 80% of low-income people who face civil legal problems that can threaten home, family stability and livelihood are unable to obtain assistance in resolving their problems. Meaning a majority of low to moderate-income Americans are left to face their legal problems alone.[48]

A smart contracts dispute resolution system can even the playing field for both contracting parties by narrowing the focus of the dispute to only the facts surrounding the dispute, rather than outside factors like resources.[49] The dispute resolution system gives both parties more control over the potential outcome of the dispute by allowing them a greater role in the dispute resolution.[50] The use of the dispute resolution system will allow both parties to solve a matter within months or weeks, whereas courts often may take a year.[51] If the resolution of the dispute is vital to a small business, it may not have a year to wait for a judge to rule in its favor.[52] The dispute resolution system will also save contracting parties

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[44] KAROLINA MANIA, ONLINE DISPUTE RESOLUTION: THE FUTURE OF JUSTICE 76–86 (Elsevier, 1st ed. 2015).

[45] *Id.*

[46] *Id.*

[47] *Id.*

[48] Lindsey Frischer, *How to Leverage Legal Technology and Bridge the Justice Gap*, ROSS INTELLIGENCE, https://rossintelligence.com/leverage-legal-technology-bridge-justice-gap/ (Jan. 9, 2017).

[49] *See* David L. Evans & India Johnson, *The Top 10 Ways to Make Arbitration Faster and More Cost Effective*, AM. ARB. ASS'N (Oct. 14, 2017), https://www.adr.org/sites/default/files/document_rep ository/The%20Top%20Ten%20Ways%20to%20Make%20Arbitration%20Faster%20and%20More %20Cost%20Effective.pdf. Forty experienced arbitrators from across the United States were asked what ten things they would tell CEOs and CFOs in order to maximize the benefits of commercial arbitration. *Id.* The arbitrators represent a broad range of legal and business experience throughout the spectrum of commercial and governmental law. *Id.* Experience as an arbitrator ranged from two years to forty years. *Id.*

[50] *Id.*

[51] *See* Allison, *supra* note 23.

[52] *See id.*

money by allowing both parties to resolve the dispute without having to pay attorneys' fees, court fees, experts' fees, and other costs associated with litigation.[53] The dispute resolution system will enable both contracting parties to preserve their business relationship by allowing parties to work together to resolve disputes rather than resorting to the adversarial and hostile litigation approach.[54] Smart contracts' dispute resolution system is not aimed at replacing the court system, but rather is aimed at helping to reduce the number of cases pending in small claims and trial courts.

III. BLOCKCHAIN AND SMART CONTRACTS

A blockchain is a decentralized virtual ledger of transactions that are distributed amongst a network of computers (nodes).[55] For a transaction to be uploaded to the blockchain, each node would have to mathematically verify that the transaction was truly using the Elliptic Curve Digital Signature (ECDS) algorithm,[56] a mathematical formula used by network computers to verify each transaction.[57] Each party who adds a transaction to the blockchain pays a nominal fee for the computer node that first verifies its transaction. The computer with the most computing power will be the first to solve the algorithm, and receives the nominal fee for its contribution.[58] Once the algorithm is proven to be correct by 51 percent of the other nodes, it is then uploaded to the blockchain.[59] The blockchain is updated every ten minutes.[60]

> As a decentralized ledger, blockchain is not regulated by a single entity; rather, the decentralized ledger is regulated by a community of individuals, who prevent entries from being modified or removed from the blockchain database. Individuals who contribute to the blockchain's computing power are given a unique identifier that allows for tracking of entries added to the blockchain database.[61]

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[53] *World's First Smart Contract Based Arbitration Proceedings Conducted*, TRUSTNODES (July 17, 2017, 2:42 PM), http://www.trustnodes.com/2017/07/17/worlds-first-smart-contract-based-arbitration-proceedings-conducted.

[54] Evans & Johnson, *supra* note 49.

[55] Michael McDonald, *Lawyers And Bitcoin And Blockchain*, ABOVE THE LAW (Jun. 25, 2017), https://abovethelaw.com/2017/07/lawyers-and-bitcoin.

[56] *Id.*

[57] Di Wang, *Secure Implementation of ECDSA Signatures in Bitcoin*, UNIV. COLLEGE LONDON 10 (Sept. 17, 2014), http://www.nicolascourtois.com/bitcoin/thesis_Di_Wang.pdf.

[58] McDonald, *supra* note 55.

[59] SEAN BENNETT, BLOCKCHAINS: A GUIDE TO UNDERSTANDING BLOCKCHAINS (2017).

[60] Chris Herd, *Cryptominers Earn $125,000 Every 10 Minutes—Here's How you Could Start Mining Today*, HACKERMOON (Nov. 27, 2017), https://hackernoon.com/cryptominers-earn-85-000-every-10-minutes-heres-how-you-could-start-mining-today-5bb0f9d56801.

[61] Justin Evans, *Blockchain Can Revolutionize the Patenting of Inventions?*, INTELLECTUALLYJAY (Apr. 15, 2017), https://www.intellectuallyjay.com/2017/04/blockchain-can-re

Members of the blockchain community are assigned unique identifying numbers to allow them to contract with each other.[62] Because the blockchain is a distributed ledger, it is publicly accessible to those who are interested in reviewing a copy of the entry.[63] Blockchain, therefore, promotes transparency, authentication, and auditing within the blockchain community.[64]

The most exciting part of the potential use of blockchain within the legal industry will be the use of smart contracts.[65] Smart contracts are exciting to technologists and attorneys because they allow for the automatic performance of both parties upon the completion of a pre-arranged obligation, which allows for better enforcement of the contracts.[66] Because smart contracts are built on the backbone of the blockchain, which is decentralized and immutable, these contracts are also unchangeable.[67]

"Smart contracts help clients exchange money, property, shares, or anything of value in a transparent, conflict-free way while avoiding the services of a middleman."[68] Smart contracts would also allow two private citizens or two attorneys acting on behalf of their clients to form a contract by coding the terms of the contract into the blockchain.[69] Contracts coded on blockchain will function similarly to a vending machine transaction.[70] This means that once party A selects and inserts payment into the vending machine (smart contract), the vending machine will automatically trigger the performance of party B to release the desired diet cola (real estate deed, patent license, etc.).

What if, however, the machine gave someone a Mountain Dew instead of a diet cola? The smart contract would allow for the attorney or private citizen to code an automatic remedy for not completing the tasks defined in the contract.[71] Sticking with the above example, if the vending machine provided you with a Mountain Dew, you would submit the mistake and would be instantly reimbursed, or a new diet cola would be provided. The buyer would be required to return the Mountain Dew to the seller. This method would save the buyer from having to go to the side of the vending machine to locate the number for reimbursements, which often results in the buyer being out of a dollar or waiting around for a reimbursement.

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volutionize-patenting-inventions/.

[62] *Id.*

[63] *Id.*

[64] McDonald, *supra* note 55.

[65] *Id.*

[66] Xavier Beauchamp-Tremblay, *How Far Are Lawyers From Drafting Smart Contracts?*, SLAW (Aug. 3, 2017), http://www.slaw.ca/2017/08/03/how-far-are-lawyers-from-drafting-smart-contracts.

[67] Evans & Johnson, *supra* note 49.

[68] *Id.*

[69] Beauchamp-Tremblay, *supra* note 69.

[70] Evans & Johnson, *supra* note 49.

[71] *Id.*

Since the implementation of the internet, several industries have experienced innovation, such as shopping.[72] The number of online shoppers has dramatically increased over the years, as indicated by the growing number of packages that shipping corporations deliver daily.[73] Craigslist was one of the first websites on the internet that facilitated both buyers and sellers for the sale of goods.[74] Though Craigslist helped with the facilitation of the communication, it did not regulate the payments, leaving buyers vulnerable to scammers selling faulty goods.[75]

A party who wishes to pay for something online must reveal their personal information, which increases their vulnerability to fraud and hacking.[76] Amazon and eBay have since provided a way for online shoppers to transact in a more secure and convenient manner.[77] Centralized entities, like Amazon or eBay, leave individuals with limited control over a potential data breach because shoppers must rely on these trusted third parties to protect their data.[78] Centralized entities are a target for hackers because they provide a single entry to a warehouse of shoppers' digital information.[79] Once a hacker has penetrated Amazon's or eBay's system, he or she has access to all of the buyers' and sellers' personal information.[80]

Smart contracts will allow for individuals to regain power over their digital identity because blockchain requires verification of each transaction by each node in the system, thereby making attempts to hack a single point of entry unsuccessful.[81] The blockchain is more secure than the above platforms because each party on the blockchain possesses a unique identifying number that is only accessible to them.[82] These unique identifying numbers are more secure than a credit card number because unlike Amazon, eBay, and Equifax, blockchain is distributed and immutable.[83]

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[72] Brad Tuttle, *8 Amazing Things People Said When Online Shopping Was Born 20 Years Ago*, MONEY MAG. (Aug. 14, 2014), http://time.com/money/3108995/online-shopping-history-anniversary.

[73] Andrew Soergel, *As Online Sales Boom, Is Brick-and-Mortar on the Way Out?*, US NEWS (Dec. 20, 2016, 12:46 PM), https://www.usnews.com/news/articles/2016-12-20/with-online-sales-booming-is-brick-and-mortar-on-the-way-out.

[74] Dylan Tweney, *How Craig Newmark Built Craigslist With "No Vision Whatsoever"*, WIRED (June 05, 2007, 4:05 PM), https://www.wired.com/2007/06/no_vision_whats.

[75] *Craigslist Scams And Fraud: The Ultimate Guide*, FRAUD GUIDES (Sept. 07, 2017), https://www.fraudguides.com/internet/craigslist.

[76] Joshua A.T. Fairfield, *Smart Contracts, Bitcoin Bots, and Consumer Protection*, 71 WASH. & LEE L. REV. ONLINE 36 (2014), http://scholarlycommons.law.wlu.edu/wlulr-online/vol71/iss2/3.

[77] *Id.*

[78] *Id.*

[79] *Id.*

[80] *Id.*

[81] Elaine Ou, *The Equifax Hack Didn't Have to Be This Bad*, BLOOMBERG (Sept. 8, 2017, 10:15AM), https://www.bloomberg.com/view/articles/2017-09-08/the-equifax-hack-didn-t-have-to-be-this-bad.

[82] *Id.*

[83] *Id.*

IV. THE LIMITATIONS OF SMART CONTRACTS AND THE TOOLS THAT MAKE THEM SMARTER

Smart contracts allow transactions between members in a blockchain system, however, these smart contracts themselves are not actual contracts.[84] Standard contracts require an offer, acceptance, and consideration to be bound to the contract.[85] Smart contracts, as they are now, do not meet these criteria because they lack an offer and do not contain an acceptance and willingness to be bound by the agreements of the smart contract.[86] Are smart contracts valid agreements?

Smart contracts are currently immutable, unchangeable, and rely heavily on the developer of the contract, "which gives developers more power than attorneys ." This means that errors that are made cannot be changed, rendering the contract voidable since it does not reflect the intentions of both contracting parties. AI could be used to translate user input into complex smart contract code, analyze the smart contract for a better course of action, and create a legal document that can be presented in court if needed.

Parties that use smart contracts also rely heavily on developers to draft their contracts, resulting in immutable and irrevocable contracts that may contain errors.[87] For developers to ensure that their code is trustworthy and debugged, the development cost of such a system would cost millions of dollars.[88] Smart contracts do not account for business relationships because they are concrete and do not allow for the flexibility that corporations need.[89] Corporations need to be able to amend contracts with suppliers and independent contractors based on market fluctuations.[90] If corporations were forced to be locked into agreements formed by smart contracts, it would ruin business relationships. [91]

Instead, corporations need to be able to provide their contract with continual input on market fluctuations, quality of performance, and sensor systems that track performance.[92] Smarter contracts would be ideal for business transactions that occur between parties of limited or no trust. AI would provide suppliers and

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[84] *Smart Contracts: The Blockchain Technology That Will Replace Lawyers*, BLOCK GEEKS (Mar. 2018, 12:15PM), https://blockchainatberkeley.blog/should-smart-contracts-be-legally-enforcea ble-599b69f73aea.

[85] Andrew Glidden, Should Smart Contracts Be Legally-Enforceable? (Sept. 2017, 12:15PM), https://www.contractworks.com/blog/smart-contracts-vs.-traditional-contracts.

[86] *Id.*

[87] Ambrogi, *supra* note 1.

[88] *Id.*

[89] *Id.*

[90] *Id.*

[91] *Id.*

[92] Bernard Marr, *Predictive Analytics And Machine Learning AI In The Retail Supply Chain*, FORBES (Sept. 12, 2017, 12:28 AM), https://www.forbes.com/sites/bernardmarr/2017/09/12/predictiv e-analytics-and-machine-learning-ai-in-the-retail-supply-chain/#191703242c7d.

consumers with real-time tracking capability.[93] AI can also be designed to function as a virtual concierge for the intake of client terms as well as the preparation of the initial smart contract.[94] The system would compare the current contract to similar contracts on the blockchain to ensure that standard contract terms are included in the agreement and would highlight terms used that courts no longer consider valid.[95] When negotiating terms with the other party, the system would also have the capacity to provide alternative contract provisions from similar contracts on the blockchain or in its repository of negotiated terms on the blockchain.[96]

Having a repository of prior contracts allows for firms and legal departments to harness information from the contract on the client's legal obligations, rights, remedies, and previous business decisions that may be useful in future contracting.[97] AI will be the most useful for updating the repository with terms that the court has deemed valid or invalid, discontinuing the use of unenforceable terms.[98] Harnessing information from prior contracts can reduce potential risk for companies.[99] Repositories reduce potential risk by allowing corporations to standardize their contracting system to include language that outside firms have helped develop.[100]

"Artificial Intelligence is a branch of computer science that deals with the simulation of human intelligence processes by machines. This process includes acquiring information and rules for using the information, using the rules to reach approximate or definite conclusions, and self-correction."[101] The current view of AI by legal professionals is that AI will decrease the number of legal jobs.[102] Interestingly, if firms were to practice proper collection and analysis of data, firms would be better equipped to allocate resources and therefore could free up billions

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[93] *Id.*

[94] Alexandra Kugusheva, *Smart Contracts for Robots and Artificial Intelligence (AI)*, MEDIUM (Feb. 20, 2017), https://medium.com/@kugusha/smart-contracts-for-robots-and-artificial-intelligence-ai-3a7e2e40c6eb.

[95] Mary Juetten, *Legal Technology and Smart Contracts: Contract as Code (Part I)*, FORBES (Aug. 16, 2017, 8:00 AM), https://www.forbes.com/sites/maryjuetten/2017/08/16/legal-technology-and-smart-contracts-contract-as-code-part-i/#5000e3b18b24.

[96] *Id.*

[97] *Id.*

[98] Beverly Rich, *How AI is Changing Contracts*, HARV. BUS. REV. (Feb. 12, 2018), https://hbr.org/2018/02/how-ai-is-changing-contracts.

[99] *Id.*

[100] Mary Juetten, *Legal Technology and Smart Contracts: Open Source and Industry Source (Part III)*, FORBES (Aug. 30, 2017), https://www.forbes.com/sites/maryjuetten/2017/08/30/legal-technology-and-smart-contracts-open-source-and-industry-source-part-iii/.

[101] Justin Evans, *Why Law Students Should Embrace Artificial Intelligence*, INTELLECTUALLYJAY (Sept. 20, 2017), https://www.intellectuallyjay.com/2017/09/law-students-embrace-artificial-intelligence/.

[102] Lohr, *supra* note 111.

of dollars.[103] Firms could, therefore, use these savings to invest in their work-force.[104]

Surprisingly, the concept of AI is not completely new to the legal industry.[105] In fact, AI has been used by legal professionals for first-pass document review, contract management, and mining documents in electronic discovery.[106] AI has the potential to revolutionize the legal industry through contract drafting.[107] Law firms can use AI to data mine contracts to standardize their contracts, decreasing risk exposure for clients.[108]

The use of AI in smart contracting could make legal departments and firms more efficient and help advise clients of legal risk exposures.[109] Legal staff who review contracts are more likely to be error-prone than a computer program and could potentially miss areas that open a client up to potential liability or other risks.[110] Attorneys have different standards for what they believe belongs in a contract, and, unfortunately, the only way to determine whether an attorney is correct is through litigation.[111] Using AI, attorneys can have their smart contracts reviewed and analyzed for these potential legal issues.[112]

AI could provide attorneys with relevant information on contract terms, therefore allowing them to focus their review on more significant clauses.[113] In addition, AI could be used to ensure that the smart contract does not have hidden obligations, legal exposures, or other liabilities for the client by highlighting unusual terms in the contract as compared to other contracts on the blockchain.[114] Legal compliance is an ever-changing area of law, and AI could be used to ensure that smart contracts are adhering to guidelines set by legislation such as Dodd–Frank or the EU's General Data Protection Regulation (GDPR).[115] AI also has the capability of predictive technology; the ability to analyze past contract disputes

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[103] *Id.*

[104] *See* Kevin D. Ashley, *Teaching Law and Digital Age Legal Practice with an AI and Law Seminar*, 88 CHI.-KENT L. REV. 783 (2013).

[105] Lohr, *supra* note 111.

[106] Ashley, *supra* note 104 at 784–85.

[107] *Id.* at 807.

[108] *Id.* at 788.

[109] Jane Croft, *Artificial Intelligence Closes in on the Work of Junior Lawyers*, FIN. TIMES (May 4, 2017), https://www.ft.com/content/f809870c-26a1-11e7-8691-d5f7e0cd0a16.

[110] *Id.*

[111] Lohr, *supra* note 111.

[112] *Id.*

[113] *Id.*

[114] Evan Weinberger, *'Smart Contracts' Won't Eliminate Need For Lawyers*, LAW360 (Apr. 6, 2017), https://www.law360.com/articles/637833.

[115] *EU General Data Protection Regulation, - Key Changes*, DLA PIPER https://www.dlapiper.com/en-/uk/focus/eu-data-protection-regulation/key-changes.

provides unique and comprehensive insights into potential clauses that decrease legal exposure.[116]

A. *Educating Smart Contracts To Be Smarter Contracts*

The process of educating programs using AI is called machine learning.[117] To explain the process in the simplest of terms, one can think about the education of a child.[118] The education of smarter contracts is very similar to the education of a young child.[119] Instead of providing the system with pictures or spelling words to educate it, the system is provided with a data set of previous smart contracts or contracts that have been uploaded to the system.[120] Next, the system is tested with a similar contract to determine its efficiency at identifying missing clauses or potential areas of legal exposure.[121] The system's performance is then "graded" and provided with input to help improve its performance on future tests.[122] Effectively educating the system with input requires the "teacher" to take the same test beforehand and compare it to the issues that were found by the system.[123] The more of these tests and data sets that the system sees, the more accurate the system will become at issue spotting.

V. SMARTER CONTRACTS WILL REQUIRE A NEW TYPE OF ATTORNEY

The use of smart contracts will not be the end of attorneys, but rather will create a new type of attorney.[124] AI and smart contracts will perform mundane and administrative legal tasks in a matter of seconds, freeing up attorneys and paralegals for higher-level work.[125] "'[W]e will see a rise of more jobs in the legal market' as a result of AI . . . ."[126] "At the firms where ROSS, an advanced legal research tool, is at, we see more work being done, more clients being able to be

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[116] Beverly Rich, *How AI Is Changing Contracts*, HARV. BUS. REV. (Mar. 17, 2018, 8:50 AM), https://hbr.org/2018/02/how-ai-is-changing-contracts.

[117] Lohr, *supra* note 111.

[118] Jason Tanz, *Soon We Won't Program Computers. We'll Train Them Like Dogs*, WIRED (May 17, 2016, 6:50 AM), https://www.wired.com/2016/05/the-end-of-code.

[119] *Id.*

[120] *Id.*

[121] *Id.*

[122] *Id.*

[123] *Id.*

[124] Mary Juetten, *The Future Of Legal Tech: It's Not As Scary As Lawyers Think*, FORBES (Feb. 19, 2015, 10:00 AM), https://www.forbes.com/sites/maryjuetten/2015/02/19/legal-tech-or-tech-legal/#2c62c94d257d.

[125] *Id.*

[126] Dan Mangan, *Lawyers could be the next profession to be replaced by computers*, CNBC (Feb. 15, 2017, 4:10 PM), https://www.cnbc.com/2017/02/17/lawyers-could-be-replaced-by-artificial-intelligence.html (cleaned up).

served, and therefore not a decrease in staff, but an increase in productivity and output."[127]

Clients cannot be left at the mercy of developers who do not understand the legal system to draft their legal contracts. Smarter contracts will require specialized attorneys who not only understand the technology but also the laws that govern them.[128] AI will be used to draft and review the initial version of the contract, and a specialized attorney will ensure that the client is not open to any potential risk when compared to other contracts on the blockchain or to the company's internal contracts.[129]

Specialized attorneys, technologists, and state and federal governments need to continue their partnership as blockchain and smart contracts are implemented. Several states have already passed legislation that protects and guides the implementation of blockchain. Many states see the importance of teaming with experts after watching New York fail to develop legislation for bitcoin technology properly.[130] The New York State Department of Financial Services passed regulations that limited the bitcoin activity for New York and New York residents.[131] The application required a hefty fee and a strenuous application process, which resulted in a mass exodus of bitcoin start-ups.[132] Because the fields of AI and smart contracts are in their early stages, there are not many meaningful AI-based, smart-contracts-related laws or standards for developers to adhere to. As a result, firms and legal departments will be required to develop their own guidelines and best practices for how employees will use AI for smart contracting. Legislators and regulators must develop a better understanding of AI and smart contracts' potential impact so that they can better develop policies for citizens, corporations, and other government branches.

VI. SMART CONTRACTS ARE BEGINNING TO REVOLUTIONIZE THE WAY LAW FIRM CLIENTS DO BUSINESS

A. Smarter Contracts Have Become An Investor's Best Friend

Delaware's new statute made it legal for corporations to use blockchain for stock trading and record keeping.[133] In creating the bill, the state worked closely

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[127] *Id.*

[128] Naughter, *supra* note 20.

[129] Juetten, *supra* note 124.

[130] Michael del Castillo, *The 'Great Bitcoin Exodus' has totally changed New York's bitcoin ecosystem*, N.Y. BUS. J. (Aug. 12, 2015), https://www.bizjounals.com/newyork/news/2015/08/12/the -great-bitcoin-exodus-has-totally-changed-new.html.

[131] *Id.*

[132] *Id.* ("While we're sure that the protection from New York law enforcement is valuable, it comes at a price that exceeds the market opportunity of servicing New York residents. . . . Therefore, we have no option but to withdraw our service from the state."). *Id.*

[133] S.B. 69, 149th Gen. Assemb. Reg. Sess. (Del. 2017)

with attorneys at Cooley Law and Symbiont to develop not only legislation but also a plan going forward for corporations.[134] Symbiont is a technology corporation that has the goal of "bridging the gap between the emerging blockchain ecosystem and Wall Street."[135] Symbiont's technology allows corporations to convert their financial instruments to programming language.[136] It also fully digitizes them onto a distributed ledger.[137]

Smart contracts are helping corporations to elucidate ownership records more effectively because these records are now fully digitized and continuously maintained and updated on the blockchain.[138] Blockchain also allows for financial securities to be owned directly by the stockholder rather than indirectly in a street name, the name of the broker who handled the buy.[139] Another area where blockchain will prove to be of use is in the automation of corporate administrative tasks, like filing, documentation, reporting, and other communications between issuers, regulators, and investors.[140] The use of blockchain and smart contracts will help to eliminate the time spent by corporations managing these tasks and the human errors that could result from such tasks.[141] Blockchain and smart contracts will allow for the simplification of capitalization table management for private corporations, and can enable direct interaction between a stock issuer and investor.[142] By implementing smart contracts, corporations will not only be able to make dividend payments to the investors automatically, but will also enable stock splits and more accurate proxy voting.[143]

If any corporation shall be authorized to issue more than 1 class of stock or more than 1 series of any class, the powers, designations, preferences and relative, participating, optional, or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights shall be set forth in full or summarized on the face or back of the certificate which the corporation shall issue to represent such class or series of stock.

[134] Jeff John Roberts, *Companies Can Put Shareholders on a Blockchain Starting Today*, FORTUNE (Aug. 1, 2017), http://fortune.com/2017/08/01/blockchain-shareholders-law/.

[135] *Symbiont 'Smart Securities™' technology secures backing by an all-star lineup of financial leaders*, CISION (June 9, 2015), https://www.prnewswire.com/news-releases/symbiont-smart-securities-funding-announcement-strategy-300096175.html.

[136] *Technology*, SYMBIONT, https://symbiont.io/technology/ (last visited Feb. 26, 2018).

[137] *See* Marvin, *supra* note 9.

[138] *See* SYMBIONT, *supra* note 135.

[139] *Id.*

[140] *See* Marvin, *supra* note 9.

[141] *Id.*

[142] *See* SYMBIONT, *supra* note 135.

[143] *See* Marvin, *supra* note 9.

B. Smarter Contracts Will Revolutionize International Transactions

Smart contracts enable built-in features, such as automated payments, that are coded into the contract and therefore executable upon performance by either party.[144] Smart contract automation reduces the legal exposure by guaranteeing the performance of both parties.[145] The use of digital contracting such as smart contract has the potential to reduce legal exposures and would be beneficial for international buyers, suppliers, and financial institutions.

A letter of credit transaction is a method of payment that is often used in international trade, in which two corporations seek to engage in business but are unfamiliar with each other due to the geographic separation.[146] After the parties negotiate a sales contract, the buyer goes to its bank and asks for a letter of credit for the amount of the contract.[147] The bank verifies the company's ability to pay for the items in the contract and provides a letter of credit to pay the seller.[148] Once the seller receives the letter of credit, it takes the letter of credit to its bank for payment.[149] The bank validates the letter of credit with the buyer's bank before releasing funds.[150] Once the seller's bank verifies the letter of credit, it pays the seller the funds from the letter of credit.[151] In return, the seller ships the items that were agreed upon in the contract to the buyer.[152]

The traditional process for issuing a letter of credit is both time-consuming and costly due to the required paperwork and coordination that must occur between both financial institutions.[153] The current system requires physical document management from each member in the transaction that could lead to a delay in the shipment of the goods.[154] The seller would be restricted until it has documentation from its financial institution confirming the validation of funds.[155] Because each step requires substantial documentation, it opens up the transaction to a higher likelihood of fraud from international buyers or errors from the financial institution.[156]

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[144] Lohr, *supra* note 111.

[145] *Id.*

[146] *Difficulties and problems with Letters of Credit*, TRADE FIN. GLOBAL, https://www.tradefinanceglobal.com/letters-of-credit/problems-with-lcs (last visited Feb. 19, 2018).

[147] *Letters of Credit*, TRADE FIN. GLOBAL, https://www.tradefinanceglobal.com/letters-of-credit (last visited Feb. 19, 2018).

[148] *Id.*

[149] *Id.*

[150] *Id.*

[151] *Id.*

[152] Weinberger, *supra* note 114.

[153] *Id.*

[154] *Id.*

[155] *Id.*

[156] *Id.*

The use of smart contracts would streamline the letter of credit process, allowing for same-day transactions and same-day settlements.[157] Smart contracts would transform the process in which the letter of credit transactions are conducted by removing the need for validation from both party's foreign financial institutions, resulting in a decrease in the overall approval and payment duration.[158] Once performance from the buyer is initiated with the delivery and acceptance of the goods by the port officers, the seller would automatically be paid for the goods rather than waiting days to months for delivery.[159] If the buyer is unsatisfied with the goods upon arrival, that buyer may trigger a refund and return of damaged or the wrong goods.[160]

How many letters of credits will a bank allow if both the buyer and seller were engaged with a number of these transactions at the same time? The use of smart contracts would allow for companies to contract with as many parties as their ledger on the blockchain allows, and to do so with confidence that they would receive their goods or money from the agreement.[161]

What if the buyer is not satisfied with the goods upon arrival? Smart contracts decrease the overall legal exposures associated with transacting with international corporations or new consumers by allowing for contract drafters to include automatic remedies for non-performance by either party for issues such as delivery of damaged products.[162] Automatic remedies can vary from returned payment or specific performance plus additional damages for non-performance.[163] The AI contract drafter could also code a trigger for arbitration into the smart contract if a dispute arises under the contract.[164] The arbitration mechanism could be structured similarly to that eBay's mechanism, which was described above. The arbiter could settle disputes in real time and for a lower cost than litigation.[165]

C. Smart Contracts Will Improve Artists' And Inventors' Intellectual Property Rights

Blockchain has the potential to change the way the music industry approaches copyrights.[166] Smart contracts will change the way artists contract with managers

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[157] Croft, *supra* note 109.

[158] *Id.*

[159] Joe McKendrick, *Why Blockchain May Be Your Next Supply Chain*, FORBES (Apr. 21, 2017, 1:07 PM), https://www.forbes.com/sites/joemckendrick/2017/04/21/why-blockchain-may-be-your-next-supply-chain/#62c84da313cf.

[160] *See id.*

[161] *Id.*

[162] Croft, *supra* note 109.

[163] *Id.*

[164] *Difficulties and problems with Letters of Credit*, *supra* note 146.

[165] *Id.*

[166] Thomas Vidal, *Harnessing Blockchain to Manage IP Assets*, CORPORATE COUNSEL (Mar. 20, 2017), http://www.law.com/insidecounsel/2017/03/20/harnessing-blockchain-to-manage-ip-assets.

and record labels, the way royalties are paid to the artist, and the way fans interact with music.[167] International traders are not the only parties that can benefit from the transparency of smart contracts, in fact, musicians have historically suffered from contracting issues with venues, managers, and their record label.[168] In 2017, there were several biographical films on artists with financial issues linked to a peculiar affinity for financial calamity and contracting terms.[169] Tupac, TLC, and NWA are among several famous musicians who faced contracting issues with managers and record labels.[170] Smart contracts would help musicians by providing more transparency and by decreasing piracy problems and feuds over the fair distribution of profits.[171]

Using smart contracts, an artist would have the ability to link the unique ID associated with each of his or her songs to the blockchain and to the respective smart contract. The song is not only uniquely identifiable but is also time stamped and effectively unalterable.[172] The tracking of copyrighted material helps combat piracy because each song would have metadata containing ownership information.[173] Smart contracts ensure that the correct parties are paid for the use of content and would reduce the amount of digital content being downloaded, copied, and modified by users.[174] Smarter contracts would allow for micropayments. Instead of the revenue from album sales going to a single entity, profits would be broken up by the instructions in the smart contract and paid accordingly. Smarter contracts would also connect musicians with their fans and allow fans to buy music directly. Musicians would be paid a higher amount of the revenue compared to the current system, in which purchasing platforms are taking a hefty amount of the proceeds to connect fans to the music.[175]

Blockchain is a particular type of disruption that has the potential to greatly benefit the entertainment industry by significantly decreasing transaction and rights management costs and improving the ability to enforce IP rights. *Id.*

[167] Jesper Sellin, *Blockchain Technology Expected to Strongly Impact the IP Industry*, LEXOLOGY (Aug. 18, 2017), https://www.lexology.com/library/detail.aspx?g=a1461135-598b-4c3c-811c-73ac70c3f67b.

[168] *Id.*

[169] Mark Stuart Gill, *Tupac's Missing Millions* (July 25, 1997), http://truthabouttupac.com/profiles/blogs/tupac-s-official-contract-with-death-row-records-confirmed-by. Tupac contracted with Interscope, a contract which Suge Knight helped him get out of during his prison stay. *Id.* In order for him to obtain bail, Tupac signed a contract with Suge Knight's record label Death Row. *Id.* After his passing, Tupac's mother sued Suge Knight for breach of the contracting terms. *Id.*

[170] ALL EYEZ ON ME (Morgan Creek Productions 2017), STRAIGHT OUTTA COMPTON (Legendary Pictures, New Line Cinema 2015) CRAZYSEXYCOOL: THE TLC STORY (VH1 Productions 2013).

[171] McKendrick, *supra* note 159.

[172] *Id.*

[173] Vidal, *supra* note 166.

[174] *Id.*

[175] *Id.*

Blockchain and smarter contracts can also streamline the patenting process while allowing inventors to use smart contracts to patent and license their inventions to other parties.[176] Blockchain provides an opportunity to streamline a timely and costly patent process by providing the United States Patent and Trademark Office (USPTO) with a more in-depth patent searching database, the inventors with a better way of contracting with patent agents, and the inventors with a more secure way of protecting their patents.[177] On March 16, 2013, the United States patent system switched from first to invent to first to file, which now means that the first inventor to file a patent for an invention has priority over other inventors of the same invention.[178] Smart contracts could help inventors who fear that they maybe scooped on their patents, by time stamping the initial disclosure of their invention to their patent agent when both parties start contracting on blockchain.[179] After the implementation of the Inventors Act, America no longer accepts claims of being the first to invent but rather the first to file with the USPTO.[180] This serves as evidence that the inventor was the first person to disclose, which could be used as prior art against a competitor or protection if the patent is challenged.[181]

A patent blockchain would provide a database for patents globally by opening searches of patents in America and abroad, without having to search for patents at each countries' patent office.[182] Patent offices around the world would upload all of their current patents to a shared blockchain, decreasing the amount of time spent on investigating prior art.[183] A patent blockchain would also allow global access to prior art, resulting in a decrease in patent searching cost and the time that a patent examiner spends on a patent.[184] Inventors, patent agents, and the USPTO examiners conduct prior art searches to determine whether an invention is (1) novel, (2) non-obvious, and (3) useful.[185] Current prior art searches take inventors, patent agents, and examiners about one to three weeks to conduct.[186]

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[176] *Id.*

[177] ARIZ. REV. STAT. ANN. § 44-7061 (2018).

[178] Gene Quinn, *First to File Means File First! The Risk of Not Immediately Filing a Patent Application*, IPWATCHDOG (Jan. 9, 2016), http://www.ipwatchdog.com/2016/01/09/first-to-file-means-file-first-filing-a-patent-application/id=64809. Stated another way, if two individuals invented the same business method, but inventor A invented six months prior to inventor B, but inventor B files for the invention first, inventor B would receive the patent over inventor A. *Id.*

[179] *Id.*

[180] First Inventor to File (FITF) Resources, USPTO (Sept. 26, 2018), https://www.uspto.gov/patent/first-inventor-file-fitf-resources.

[181] *Id.*

[182] § 44-7061.

[183] Allison, *supra* note 23.

[184] *Id.*

[185] *Id.*

[186] *Id.*

Use of artificial intelligence on blockchain would obtain the same number of results, if not more, in a matter of minutes.[187]

The use of blockchain for patents not only streamlines the process for inventors but also provides inventors with a unique opportunity. Blockchain has the capacity of cutting the number of litigation cases by preventing duplication of similar patents.[188] "Inventors will now be able to effectively search for infringers of their patents using artificial intelligence and blockchain technology."[189] Inventors could use AI to conduct an initial analysis of potential infringing patents.[190] The results from this search would be sent to a patent attorney of the inventor's choosing.[191] If an infringement is found, inventors would have an opportunity to license their patents with the use of smart contracts.[192]

D. Smart Contracts Will Digitize The Buying And Selling Of Real Estate

After the passage of the blockchain bill by the Illinois government, Chicago's Cook County conducted a study with real estate tech startup Velox.re.[193] Chicago's Cook County Recorder's office is one of the largest offices of its kind in the United States and the first to conduct such a study.[194] Cook County implemented a blockchain for transferring and tracking property titles and other public records.[195] Blockchain was chosen for its immutability—allowing for permanent public records, paperless land transfers, and reduced cost for digitalization of current records.[196] Blockchain eliminates the need for a grantor and grantee to use intermediaries such as brokers, government property databases, title companies, escrow companies, inspectors and appraisers, and a public notary, according to the International Blockchain Real Estate Association (IBREA).[197] Blockchain can decentralize deeds storage, which is currently paper-based and centralized in each county.[198] Buyers will no longer have to rely on local attorneys to inspect deeds, but would instead be able to inspect titles from around the globe in real-time.[199]

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[187] John Mirkovic, *Blockchain Cook County—Distributed Ledgers for Land Records*, ILL. BLOCKCHAIN INITIATIVE (May 31, 2017), https://illinoisblockchain.tech/blockchain-cook-county-final-report-1f56ab3bf89.

[188] *Id.*

[189] *Id.*

[190] *See id.*

[191] *Id.*

[192] *Id.*

[193] Mirkovic, *supra* note 187.

[194] *Id.*

[195] *Id.*

[196] *Id.*

[197] Marian McPherson, *Is 2016 the year of bitcoin and blockchain for real estate?*, INMAN (May 10, 2016), https://www.inman.com/2016/05/10/is-2016-the-year-of-bitcoin-and-blockchain-for-real-estate.

[198] *Id.*

[199] Quinn, *supra* note 178.

Blockchain has more to offer than recording and conveying property; smart contracts can be used in conjunction with Bitcoin, Blockchain escrow, or other forms of currency to purchase and sell real estate.[200] Before purchasing real estate, realtors on behalf of their clients or the clients themselves could search the land deeds on blockchain to confirm that the grantor has a legal right to convey the property.[201] When the legal right to convey is confirmed, grantor and grantee would have the ability to enter into a smart contract for the sale of said real estate.[202] Recently, legislation in multiple states recognized documents validated with digital signatures.[203] To satisfy the notary, each party could meet at the closing table or use eNotary's video conference software.[204] Once the notary has been satisfied, the grantor sends the signed e-deed to the grantee.[205] Conveyances that are properly formatted are recorded into the public record on blockchain by the Recorder's Office.[206]

E. Smart Contracts Will Reduce Counterfeiting and Hacking in the Healthcare Industry

The pharmaceutical industry will benefit from the application of smart contracts, which could be used for the management of a pharmaceutical supply chain through which patient medication can be monitored.[207] "According to the International AntiCounterfeiting Coalition Inc. [(IACC)], counterfeiting costs American pharmaceutical businesses between $200–250 billion a year."[208] The IACC, along with consumers, found that therapeutics manufactured by counterfeiters do not contain the appropriate amounts of active ingredients in medicines, which smart contracts could address.[209] Consumers need reassurance from the pharmaceutical industry that the drugs they are taking contain the proper active ingredients and

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[200] Mirkovic, *supra* note 187.

[201] *Id.*

[202] *Id.*

[203] H.R.J. Res. 25, 100th Gen. Assemb., Reg. Sess. (Ill. 2017).

[204] *Virginia-eNotary*, IDENTRUST, https://www.identrust.com/virginia/enotary.html (last visited Feb. 26, 2018).

[205] Alex Norta, *Designing a Smart-Contract Application Layer for Transacting Decentralized Autonomous Organizations*, ICACDS (Nov. 2016), https://www.researchgate.net/publication/308986 556.

[206] Ragnar Lifthrasir, *Permissionless Real Estate Title Transfers on the Bitcoin Blockchain in the USA!—Cook County Blockchain Pilot Program Report*, MEDIUM (June 28, 2017) https://medium.com/@RagnarLifthrasir/permissionless-real-estate-title-transfers-on-the-bitcoin-blockchain-in-the-usa-5d9c39139292.

[207] Gene Quinn, *Counterfeiting Costs US Businesses $200 Billion Annually*, IPWATCHDOG (Aug. 30, 2010), http://www.ipwatchdog.com/2010/08/30/counterfeiting-costs-us-businesses/id=12336.

[208] *Id.*

[209] *Id.*

appropriate proportions as approved by the FDA.[210] Smart contracts would allow patients to order their therapeutics directly from the pharmaceutical manufacturer.[211] Smart contracts allow for self-reporting, proving the authenticity of a drug at every stage of its manufacture, delivery, and eventual consumption.[212] Patients would be able to track their therapeutics from the manufacturer to their home, providing more transparency and confidence.[213]

Smart contracts provide an opportunity for physicians and their patients to contract and share information more securely. Physicians and consumers using smart contracts would have the ability to share digital patient charts more easily without the fear of hacking.[214] Ransomware is one of many hacking techniques that has plagued not only law firms, but also their healthcare clients.[215] In fact, recent hacks have left vulnerable, confidential information, like medical records, in the hands of hackers.[216] The current security systems in hospitals are outdated and could benefit from the immutability of blockchain technology.[217]

F. Smart Contracts Will Promote Better Health and Trust in the Insurance Industry

Smart contracts provide insurance companies with an opportunity to innovate their approach to insurance policies, resulting in the reduction of administrative and management costs.[218] Insurance policies are paper contracts between the insurer and the insured, which describe "the claims which the insurer is legally required to pay. In exchange for an initial payment, known as the premium, the insurer promises to pay for loss caused by perils covered under the" insurance policy.[219] The conditions of the contract are often unclear, as insurance companies

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[210] *Trek Therapeutics to Test Blockchain-Based Smart Contracts for Clinical Supply Chain Safety*, PHARMTECH.COM (Aug. 16, 2017), http://www.pharmtech.com/trek-therapeutics-test-blockchain-based-smart-contracts-clinical-supply-chain-safety.

[211] *Blockchain Smart Contracts for Supply Chains*, GLOBAL TRADE (July 24, 2017), http://www.globaltrademag.com/global-logistics/blockchain-smart-contracts-supply-chains.

[212] *See Trek Therapeutics*, *supra* note 210.

[213] *Id.*

[214] Brennan B., *Robomed - Blockchain Powered Medical Care Using Smart Contracts*, BLOCKCHAIN HEALTHCARE REV. (Oct. 2, 2017), http://blockchainhealthcarereview.com/robomed-blockchain-powered-medical-care-using-smart-contracts.

[215] Eliza Strickland, *5 Major Hospital Hacks: Horror Stories from the Cybersecurity Frontlines*, IEEE SPECTRUM (Mar. 15, 2016), https://spectrum.ieee.org/the-human-os/biomedical/devices/5-major-hospital-hacks-horror-stories-from-the-cyber-security-frontlines.

[216] *Id.*

[217] *Id.*

[218] *Smart Contracts in Insurance: A New Opportunity for Greater Efficiency*, APPLICATURE (Feb. 1, 2018), https://applicature.com/blog/smart-contracts-blockchain-insurance.

[219] Lukas K., *Insurance Policy as a Smart Contract. Fully Automated Process. Too Good to Be True?*, AIGANG (Jul. 13, 2017), https://medium.com/aigang-network/insurance-policy-as-a-smart-contract-fully-automated-process-too-good-to-be-true-39c613c18d8d.

want to pay for as few claims as possible.[220] The insured feel dissatisfied because of the lack of transparency in their agreements.[221] Insurers have to be selective on the claims that are paid out because sometimes consumers file false claims to obtain a payout from the insurer.[222] The current system leaves both sides dissatisfied and often brings both parties in front of a judge.[223]

Smart contracts provide an opportunity for both insurers and the insured to contract more transparently, which increases the satisfaction of both parties.[224] In fact, a French insurer, AXA has begun its use of smart contracts to store and process payouts for clients' claims.[225] AXA maintains that the use of smart contracts will improve relations with its clients by providing transparency and faster payouts by "streamlining the compensation process."[226] Once consumers choose AXA, the purchases are automatically recorded on the blockchain, and a smart contract is recorded between the parties.[227] If a claim is submitted and approved—this now being the source of delay and litigation—the smart contract will automatically pay the claimant.[228] If the insured party disagrees, a mediator or arbitrator would be notified and determine a fair value.[229] Smart contracts will also increase relations among the consumers by removing the insurer as the final determiner of claim payout.[230] This delegates the duty to an automated arbitrator.[231] Appointing an automatic arbitrator brings greater transparency to the claim process and affords claimants a greater role in the process.[232]

Health insurance corporations could use smart contracts as a mechanism to offer benefits to customers for living a healthier lifestyle.[233] The use of Fitbits and Apple Watches has increased over the recent years. In fact, Apple Watch sales have been projected to be up by fifty percent from last year.[234] Insurers can take a

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[220] *Id.*

[221] *Id.*

[222] *Id.*

[223] *Id.*

[224] *See Smart Contracts in Insurance*, *supra* note 218.

[225] Maria Terekhova, *AXA Turns to Smart Contracts for Flight-Delay Insurance*, BUS. INSIDER (Sept. 15, 2017), http://www.businessinsider.com/axa-turns-to-smart-contracts-for-flight-delay-insurance-2017-9.

[226] *Id.*

[227] *Id.*

[228] *Id.*

[229] Tom Maasland, *When Smart Contracts Go Bad – Perspectives on Loss & Liability*, BRAVE NEW COIN (Nov. 3, 2017), https://bravenewcoin.com/news/when-smart-contracts-go-bad-perspectives-on-loss-and-liability/.

[230] *Id.*

[231] *See* Terekhova, *supra* note 225.

[232] *Id.*

[233] Elizabeth Gurdus, *UnitedHealthcare and Fitbit to Pay Users up to $1,500 to Use Devices, Fitbit Co-Founder Says*, CNBC (Jan. 5, 2017), https://www.cnbc.com/2017/01/05/unitedhealthcare-and-fitbit-to-pay-users-up-to-1500-to-use-devices.html.

[234] Katie Roof, *Apple Watch Sales Up over 50% Since Last Year*, TECHCRUNCH (Aug. 1, 2017), https://techcrunch.com/2017/08/01/apple-watch-sales-up-over-50-since-last-year.

page from the Progressive Insurance playbook, which uses a vehicle plug-in to offer benefits for those who practice safe driving habits by uploading the information from Fitbits and Apple watches, with the insured's consent, to the smart contract.[235] United Health Care has started a program with its clients that rewards customers with over $1,500 in credits for activities completed on their Fitbits. United Health Care pays clients up to four dollars a day for completing daily fitness goals.[236] Information from Fitbits are uploaded to QualcommLife's 2net remote care cloud-based platform, which poses potential hacking issues.[237] By uploading this data directly to a smart contract on the blockchain, 21st century lawyers can provide clients with a much higher level of security by removing the number of entities with access to the client's data.[238] Each entity that has access to data creates a new point of entry for hackers. Because of blockchain's immutable nature, it makes for a more secure method for both parties.[239]

VI. CONCLUSION

Bitcoin, Bitcoin, Bitcoin! The digital currency has made headlines on a daily occurrence, but little of that has focused on the underlining blockchain applications such as smart contracts. The history of digital currency has yet to be determined, but blockchain is proving to be the revolutionary aspect of the two. Innovation experts from all fields are beginning to find potential uses for the blockchain technology. One new exciting use is the financial industry, where companies like Nasdaq have purchased their blockchain for faster secure trades. Innovation experts within the legal industry are finding potential uses for the technology as well. Uses of blockchain technology are now being developed and implemented in a range of legal sectors. The city of Chicago has implemented its own real estate blockchain.

Though blockchain technology is revolutionary, it is unlikely that it will be useful in all areas of law. As proposed, one potential area that it will be useful is with restoring trust in contracting. Smart contracts will restore faith in buyers and sellers, who no longer have to worry about misunderstandings or potential high legal costs for enforcing contracts. Because smart contracts are on the blockchain

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[235] *Snapshot Means BIG Discounts for Good Drivers*, PROGRESSIVE (2017), https://www.progressive. com/auto/discounts/snapshot/. "We've handed out over $600 million in discounts! Quote and get yours! . . . Snapshot is a program that personalizes your rate based on your ACTUAL driving. It's technically called usage-based insurance. That means you pay based on how and how much you drive instead of just traditional factors. It's simple. Drive safe and save. Drive extra safe and save even more." *Id.*

[236] *Id.*

[237] Cara McGoogan, *Fitbit Devices Can Be Hacked, Research Shows*, THE TELEGRAPH (Sept. 14, 2017), http://www.telegraph.co.uk/technology/2017/09/14/fitbit-devices-can-hacked-research-shows.

[238] *Id.*

[239] *Id.*

platform, it alleviates the possibility of hackers being able to hack a single point of entry like eBay or Amazon. Smart contracts will also allow for automatic remedies to be coded into their backbone and allow for both parties to select arbitration services before contracting, thus reducing potential legal expenses.