

THE ONGOING SPECULATION ABOUT SMART CONTRACTS: SMART ENOUGH TO REPLACE THIRD PARTY ARBITRATORS, OR IS “SMART” JUST A MISNOMER?

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I. INTRODUCTION

The propagation and quantity of published articles in news outlets about blockchain and the potential benefits that it could furnish to consumers is unparalleled. Blockchain technology has been rapidly evolving and has the potential to fundamentally change business models in the near future.¹ Blockchain is a distributed ledger technology that is creating new foundations for the economic system through the use of smart contracts and cryptocurrencies.² A good indication of the amount of faith and effort going into the study of the impact of blockchain is seen in the resources that have been allocated towards the research and funding for blockchain startup companies. Reports delineate that “financial and tech firms invested an estimate[d] \$1.4 billion dollars in blockchain in 2016 with an increase to \$2.1 billion dollars in 2018.”³ There has also been a significant rise in venture capital investment in blockchain and crypto-firms, which resulted in raising \$3.9 billion in venture capital in 2018 alone.⁴ These numbers validate just how much work has been devoted in order to figure out this advancing platform of electronic contracts. A glimmer of hope that

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¹ Kevin Bell, *How is Blockchain Transforming Business Models?*, OCTOS GLOBAL (Jan. 25, 2018), <https://octosglobal.com/how-is-blockchain-transforming-business-models> (suggesting that “[e]nhanced security, accountability and transparency being the core benefits of blockchain technology, it is fast replacing the traditional business models.”).

² *Id.*

³ Paul Dughi, *A Simple Explanation of How Blockchain Works*, MISSION.ORG (Feb. 3, 2018), <https://medium.com/the-mission/a-simple-explanation-on-how-blockchain-works-e52f75da6e9a>.

⁴ Marie Huillet, *Venture Capital Investment in Blockchain and Crypto up 280% in 2018, Report Shows*, COINTELEGRAPH.COM (Oct. 2, 2018), <https://cointelegraph.com/news/venture-capital-investment-in-blockchain-and-crypto-up-280-in-2018-report-shows>.

blockchain will momentarily minimize risks through improved methods for conducting secure transactions is enlaced in the budding daily research.

Through key features that build trust, such as transparency of the elements that are part of the exchanges and decentralization, a rise in the trading of cryptocurrencies is imminent.⁵ The ledgers are considered to be decentralized because transactions are stored on thousands of different computers that are all connected to a singular common network on the Internet.⁶ This constantly growing technology challenges the traditional viewpoints of how capital is raised and how monetary value is transmitted. Although some of the advantages are undisputed, it is nevertheless a risky endeavor to apply this technology when dealing with sums that are millions or even billions of dollars. Smart contracts are still evolving and therefore it is probable that on occasion, they could be susceptible to security breaches or could exhibit improper configuration glitches due to administrative failure.⁷

With each passing day, blockchain is becoming more sophisticated. However, that should not eliminate the need for physical human third party intermediaries. An unavoidable dilemma arises when using artificial intelligence. Smart contracts can be superiorly coded if more data is provided to augment the artificial intelligence.⁸ Nonetheless, the consequences that arise by having those two elements entwined and working together, is a decrease in the need for human involvement. The mechanism behind the coding of blockchain is: upon the completion of one event, a predetermined trigger will make certain subsequent events occur; thus, there is a belief that there is no need for third party mediators to actually be involved.⁹ Even though there is no denying that there is room for human error, there is also a possibility of computer

⁵ Victor Tangermann, *Here's Why The Blockchain Might Change the Future (And Why It May Not Live Up To the Hype)*, FUTURISM.COM (July 5, 2018), <https://futurism.com/blockchain-future-pros-cons>.

⁶ Dughi, *supra* note 3.

⁷ *Blockchain Risk Management: Risk Functions Need to Play an Active Role in Shaping Blockchain Strategy*, DELOITTE (2017), <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-risk-management.pdf>.

⁸ *Combining Blockchain and AI to Make Smart Contracts Smarter*, GLOBAL LEGAL BLOCKCHAIN CONSORTIUM (NOV. 27, 2017), <https://legalconsortium.org/uncategorized/combining-blockchain-and-ai-to-make-smart-contracts-smarter>.

⁹ Universa, *How Smart Contracts Will Kill Bureaucracy*, MEDIUM (NOV. 20, 2017), <https://medium.com/universablockchain/how-smart-contracts-will-kill-bureaucracy-c22a48e2e60> (“Since crypto economy is based on elimination of mediators, increase in popularity of cryptocurrency leads to the increase in popularity of smart contracts.”).

error when coding complex agreements. This can be especially prevalent in the field of smart contracts, since the space is not fully evolved yet as a result of constant changing developments in technology.

Although there is unmatched publicity about blockchain all over the world, the purpose of this Note is to provide a narrower insight into the fundamental importance of blockchain to the evolution of smart contracts. It will also introduce a proposition that oracles should be granted the authority to serve as arbitrators in mandatory Online Dispute Resolution (“ODR”) and advise a step-by-step process to achieve that end. Section II of this Note will explore the background information and intricacies of blockchain technology, along with the realm of the purposes of smart contracts. It will also attempt to explain the benefits of either having mandatory arbitration or mediation implemented. Section III is a discussion of whether smart contracts should be equated with traditional contracts and the multifaceted uses that they provide. Section IV will propose ODR as the most reasonable and beneficial option for obtaining a legal equitable solution in the case of a breach in smart contracts. In conclusion, Section V briefly reiterates the main points of the Note and the overall benefits of ODR.

II. BACKGROUND

A. *What is Distributed Ledger Technology?*

One significant characteristic of blockchain is that it is a distributed ledger that uses “independent computers (referred to as nodes) to record, share and synchronize transactions in their respective electronic ledgers (instead of keeping data centralized as in a traditional ledger).”¹⁰ This founds a peer-to-peer network where each respective user can hold a copy of the blockchain, which in turn establishes security and trust, since no single individual can make alterations to the blockchain without first getting authorization from the other parties.¹¹ It is referred to as “distributed” and sometimes “decentralized” because no central

¹⁰ *Blockchain & Distributed Ledger Technology (DLT)*, WBG (Apr. 12, 2018), <https://www.worldbank.org/en/topic/financialsector/brief/blockchain-dlt>.

¹¹ Bryce Suzuki et al., *Blockchain: How It Will Change Your Legal Practice*, ARIZ. ATT’Y (Feb. 2018).

party is responsible for the ledger.¹² The groups of participants that jointly manage the ledger all have access to the public domain transcription of any of the modifications that are done to the blockchain.¹³ More often this is known and referred to as the public blockchain where anyone can create and view the transactions.¹⁴

Regardless of whether the blockchain is public or private, it has previously faced unexpected consequences, such as a rise in trading large amounts of Bitcoin (blockchain's virtual currency) for illegal goods on the black market.¹⁵ Those who succeed in piercing through the blockchain security veil have the ability to conduct financial crimes such as money laundering, or even go to the extremes of moving money around for terrorist financing.¹⁶ The nature of how cryptocurrency works on the blockchain can provide an outlet of moving money in a concealed manner.¹⁷ Unfortunately, despite numerous breakthroughs, our technologically advanced society will always run the risk of cyber security hacking by individuals who can exploit the blockchain due to the "limited regulation and uncertainty of the regulatory environment."¹⁸

1. Case Looks at How Distributed Ledger Technology Failed

It is important to take a look at a well-known case about the nefarious Ross Ulbricht, which highlighted what the consequences of accepting Bitcoin payment on the black market can hold.¹⁹ Ulbricht was the creator and operator of the dark marketplace known as the "Silk Road" which was primarily used for anonymous drug trafficking.²⁰ At Ulbricht's trial in Manhattan's U.S. District Court for the Southern District of New York, Judge Forrest showed no mercy and sentenced Ulbricht to life in prison without possibility of

¹² *Application of Distributed Ledger Technology to Financial Services Regulation and Compliance*, PRAC. L. FIN. Practice Note w-012-5296 [hereinafter "*Application*"].

¹³ *Id.*

¹⁴ Allison Berke, *How Safe Are Blockchains? It Depends.*, HARV. BUS. REV. (Mar. 7, 2017), <https://hbr.org/2017/03/how-safe-are-blockchains-it-depends>.

¹⁵ *Id.*

¹⁶ Alma Angotti & Anne Marie Minogue, *Risks and rewards: Blockchain, cryptocurrency and vulnerability to money laundering, terrorist financing and tax evasion*, 25 No. 01WJDER 01 (Nov. 29, 2018).

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ Stan Higgins, *Ross Ulbricht Drops Claim to Millions Raised in Silk Road Bitcoin Auctions*, COINDESK (Oct. 2, 2017), <https://www.coindesk.com/ross-ulbricht-drops-claim-millions-raised-silk-road-bitcoin-auctions>.

²⁰ *Id.*

parole, which subsequently shut down this illegal online drug market.²¹

The predicament for regulators and government agencies is that initially they had to rely on existing laws to govern any involvement with blockchain.²² Those rules are not consistent with blockchain and the cryptocurrency space because they were not drafted to encompass such a system.²³ Although regulation of blockchain and Bitcoin imposes hardships on regulators due to inaccessibility and inconsistency, law enforcement makes sure that prosecution of those individuals who cause harm is pursued.

It is not far-fetched to reason that a sentence as severe as the one imposed on Ross Ulbricht continues to serve as a deterrent to other impending hacking and narcotics distribution schemes. Some even argue that despite the negative exploitation of Bitcoin to further crime, the example of the Silk Road demonstrates the sought-after value of decentralized currency.²⁴ The real-life scenario proves that through the underlying mechanism of blockchain, the virtual currency was successful in trading valued product between consumers on a global scale.²⁵ Nevertheless, it is not to say that the problem of using blockchain to further crimes has been completely eradicated. Just by virtue of the yearly technological developments, hackers are inherently becoming more sophisticated and are more capable of manipulating the system.

2. Public Blockchain vs. Private Blockchain

Traditionally, to avoid situations like hacking, fraud, and black markets altogether, it is more common to deal with private blockchain and distributed ledgers in financial contexts. This is due to the fact that “private blockchains give their operators control over who can read the ledger of verified transactions, who can submit transactions, and who can verify them.”²⁶ Thus, access is

²¹ Sam Thielman, *Silk Road operator Ross Ulbricht sentenced to life in prison*, THE GUARDIAN (May 29, 2015), <https://www.theguardian.com/technology/2015/may/29/silk-road-ross-ulbricht-sentenced>. See also Higgins, *supra* note 17 (“the US Court of Appeals for the Second Circuit issued a 139-page decision that rejected the claim by Ulbricht that he had been given an unfair trial as well as an overly harsh sentence.” This shows how serious of a crime the court held it to be).

²² Agnotti & Minogue, *supra* note 16.

²³ *Id.*

²⁴ David Adler, *Silk Road: Dark Side of Cryptocurrencies*, FORDHAM J. OF CORP. AND FIN. L. BLOG (Feb. 21, 2018), <https://news.law.fordham.edu/jcfl/2018/02/21/silk-road-the-dark-side-of-cryptocurrency>.

²⁵ *Id.*

²⁶ Berke, *supra* note 14.

granted only to trusted parties to the transaction and the operators retain control over the nodes and the amount of access that is granted to them.²⁷ Research shows that on an annual basis, almost 45% of participants in the financial industry are subject to economic crimes and are at a high risk of falling prey to scams, particularly as seen in stock exchanges or money transfer services.²⁸ The majority of banking structures across the globe operate on open systems, meaning that all the sensitive customer information that the banks amass is on the public internet.²⁹ However, the real concerns lay in keeping this information private and eliminating the central points of failure. If this information were to switch to the public blockchain, it would be dispersed through distributed nodes as a strategy of keeping risks lower and reducing possibilities of breaking through the firewall security to gain access to the information.³⁰

An alternative appealing factor of the distributed ledger for financial institutions is the efficiency and ease of how information can be transferred through the network. There has been a push for financial firms to have strict “Know Your Client” (“KYC”) regulations and requirements to adequately satisfy due diligence compliance for customers.³¹ However, obtaining such detailed background information on each and every customer comes at a high cost. The yearly spending estimate for such firms is between \$60 million and \$500 million, depending on the size of the institution, to adhere to those regulations.³² A Thomson Reuters global survey conveyed that financial institutions with approximately \$10 billion in revenue spent on average \$150 million on enforcing KYC compliance procedures in 2017.³³ Blockchain technology could in fact reduce a majority of these administration costs by having banks share all their gathered information on certain customers

²⁷ *Id.* (“Private blockchain operators can control who is allowed to operate a node, as well as how those nodes are connected; a node with more connections will receive information faster.”).

²⁸ Swati Goyal, *Private Blockchain vs Bank: Differences with the Banking System and the Revolutionary Potential*, 101 *BLOCKCHAINS* (June 8, 2018), <https://101blockchains.com/private-blockchain-vs-bank>.

²⁹ JOSIAS N. DEWEY ET AL., *THE BLOCKCHAIN: A GUIDE FOR LEGAL AND BUSINESS PROFESSIONALS* (Thomson Reuters 2016).

³⁰ Goyal, *supra* note 28.

³¹ *Id.*

³² *Id.*

³³ *Thomson Reuters 2017 Global KYC Surveys Attest to Even Greater Compliance Pain Points*, THOMSON REUTERS (Oct. 26, 2017), <https://www.thomsonreuters.com/en/press-releases/2017/october/thomson-reuters-2017-global-kyc-surveys-attest-to-even-greater-compliance-pain-points.html>.

when needed. This rapid technique of exchanging information on a public platform could eliminate the unnecessary duplicate background checks resulting in a reduction of costs.³⁴

B. *Blockchain is Used for More Than Just Bitcoin*

It is a frequent misconception that the terms “blockchain” and “cryptocurrency,” such as Bitcoin, are interchangeable. Although Bitcoin is transferred through a blockchain, blockchain is a much larger umbrella term and the potential of this technology has been extending significantly beyond payment methods. Almost ten years after Bitcoin’s release in 2009,³⁵ blockchain is currently able to allow individuals to, “directly exchange anything of value, without intermediaries. . . and can even be a digital representation of a physical item such as a diamond.”³⁶ The breadth of areas that blockchain has spread to includes online charity organizations like BitGive—which provides users with a trustworthy transparent global network where donors can give contributions to big name charities without the fears of being scammed with fake websites and hackers.³⁷ Even a name-brand company such as Spotify has used blockchain to simplify the way they can “better connect artists and licensing agreements with the tracks on Spotify’s service.”³⁸ To find a solution to one of the largest disputes in the music indus-

³⁴ To get a better understanding of the importance and overall effect of a public blockchain, see the definition of a “public blockchain” by Vitalik Buterin, the founder of Ethereum, a public blockchain computing platform. Vitalik Buterin, *On Public and Private Blockchains*, ETHEREUM BLOG (Aug. 6, 2015), <https://blog.ethereum.org/2015/08/07/on-public-and-private-blockchains> (“A public blockchain is a blockchain that anyone in the world can read, anyone in the world can send transactions to and expect to see them included if they are valid, and anyone in the world can participate in the *consensus process*—the process for determining what blocks get added to the chain and what the current state is. As a substitute for centralized or quasi-centralized trust, public blockchains are secured by *cryptoeconomics*—the combination of economic incentives and cryptographic verification using mechanisms such as proof of work or proof of stake, following a general principle that the degree to which someone can have an influence in the consensus process is proportional to the quantity of economic resources that they can bring to bear. These blockchains are generally considered to be ‘fully decentralized.’”).

³⁵ Arjun Kharpal, *Everything You Need to Know About the Blockchain*, CNBC (June 18, 2018, 12:00 AM), <https://www.cnbc.com/2018/06/18/blockchain-what-is-it-and-how-does-it-work.html>.

³⁶ Suzuki et al., *supra* note 11.

³⁷ Bernard Marr, *30+ Real Examples of Blockchain Technology in Practice*, FORBES (May 14, 2018, 01:38 AM), <https://www.forbes.com/sites/bernardmarr/2018/05/14/30-real-examples-of-blockchain-technology-in-practice/#809670a740de>.

³⁸ *Id.*

try, Spotify purchased a blockchain company, Mediachain, with the intent to smooth over the relationship between artists and the colossal music platforms such as themselves or Soundcloud.³⁹ The theory is that blockchain can provide automation of royalty payments and consequently bridge the gap between money wrongfully allocated amongst artists, publishing companies, and streaming platforms.⁴⁰ These examples show just how versatile blockchain will be when applied to different areas after distilling through the experimentation stages of the program.

During the growth of blockchain technology this past year, a new trend evolved in the financial context: crypto lending for loans. The Loan Syndications and Trading Association (“LSTA”), the leading advocate for the U.S. syndicated loan market since 1995,⁴¹ “helps to bring together loan market participants, provides market research, and is active in influencing compliance procedures and industry regulations.”⁴² The LSTA is regarded as the expert organization in the loan market space.⁴³ After extensive thought and research they have confirmed that they are optimistic that blockchain and smart contracts could revolutionize lending.⁴⁴ However, there are drawbacks because not every aspect of the contract could be subject to coding.⁴⁵ A typical credit agreement between two parties detailing the terms of the loan usually is around 150 to 200 pages long.⁴⁶ Many terms are subject to specific covenants,⁴⁷ and thus encrypting a computer code of all the necessary agreements could run into difficulties when executed. Although it might seem to be appealing, an automated self-executing contract is not the ideal scenario for transactions such as these.

³⁹ Tim Prentiss, *Blockchain: The Music Industry’s Newest Savior*, ETHNews (Aug. 11, 2018, 9:00 AM), <https://www.ethnews.com/blockchain-the-music-industrys-newest-savior>.

⁴⁰ *Id.*

⁴¹ LSTA, *About*, <https://www.lsta.org/about> (last visited Oct. 13, 2018).

⁴² *Loan Syndication*, INVESTOPEDIA, <https://www.investopedia.com/terms/l/loansyndication.asp> (last visited Oct. 13, 2018).

⁴³ Bridget K. Marsh, *Expert Q&A on US Loan Market Hot Topics*, Practical Law Article w-016-8185.

⁴⁴ *Id.*

⁴⁵ *Id.* “Although the typical syndicated loan agreement is a complex instrument that cannot be reduced simply to computer code, there are aspects of it which do lend themselves to coding.”

⁴⁶ See *Credit Agreement*, SEC, <https://www.sec.gov/Archives/edgar/data/849869/000119312511206284/dex101.htm> (last visited Oct. 13, 2018).

⁴⁷ *Id.*

C. *What is a Smart Contract?*

Surprisingly, despite the technological sophistication necessary for implementation, smart contracts are not a new concept and were actually proposed by Nick Szabo in 1994, over a decade before the blockchain boom.⁴⁸ Envisioning that the world would drastically change because of the developments in cyberspace, the computer scientist began his seminal work. With the help of algorithms that cryptographers can navigate and program, Szabo proposed that it is possible to shift a traditional contract to a digital platform of coding and online execution.⁴⁹ These contracts are considered as “self-executing electronic instructions drafted in computer code,”⁵⁰ where the self-execution will occur when the predetermined terms in the agreement are met.⁵¹ Szabo wrote that based on standard contract practice and economic theories in common law, there are four basic objectives to a smart contract: observability, verifiability, privity, and enforceability.⁵² Observability refers to the transparency of the performances promised of each party to the contract.⁵³ Verifiability is a necessary element for an arbitrator or mediator to know whether there has been an intentional breach of contract or full performance.⁵⁴ Privity in smart contracts entails a more vigorous standard than traditional privity and is a principle where “control over the data and performance of the contract should be distributed among the parties” to the extent necessary to receive performance of the contract.⁵⁵ Finally, enforceability will be satisfied if verifiability is met.⁵⁶

Most scholars use the controversial, yet straightforward, example of a vending machine to demonstrate the mechanism behind a

⁴⁸ *Smart Contracts*, INVESTOPEDIA, <https://www.investopedia.com/terms/s/smart-contracts.asp> (last visited Oct. 14, 2018).

⁴⁹ Nick Szabo, *Smart Contracts*, (1996) (Re-write of the article that appeared in *Entropy* #16), https://www.alamut.com/subj/economics/nick_szabo/smartContracts.html.

⁵⁰ Reggie O’Shields, *Smart Contracts: Legal Agreements for the Blockchain*, 21 N.C. BANKING INST. 177, 179 (2017).

⁵¹ Nigel Gopie, *What are Smart Contracts on Blockchain?*, IBM (July 2, 2018), <https://www.ibm.com/blogs/blockchain/2018/07/what-are-smart-contracts-on-blockchain>.

⁵² Cryptofuse, *The Legendary Nick Szabo: Bitgold, Smart Contracts, Cryptocurrency and Blockchain Story*, MEDIUM (Sept. 2, 2018), <https://medium.com/@cryptofuse/the-legendary-nick-szabo-bitgold-smart-contracts-cryptocurrency-and-blockchain-story-3523db6766a3>.

⁵³ *Id.*

⁵⁴ *Id.* (“Observability and verifiability can also include the ability to differentiate between intentional violations of the contract and good faith errors.”).

⁵⁵ *Id.*

⁵⁶ *Id.*

smart contract.⁵⁷ The machine is coded in such a way that, “after money is deposited and a selection is made, delivery of the purchased item is irrevocably triggered.”⁵⁸ There is no middleman who is accepting the money and then handing over the purchased item in exchange.⁵⁹ The mechanism that has been programmed is just an “if, then” code which executes itself.⁶⁰ *If* the money is inserted and a selection is made, *then* the machine should dispense the product that the consumer purchased.⁶¹ This “if, then” code is the basic foundation of the smart contract—a contract that exists as a digital code on the blockchain that will trigger an event after a condition is met instead of a traditional agreement between two parties. The advantage is that all the participants to the smart contract are certain of the predetermined outcome of the agreement without the additional involvement of a third-party intermediary.⁶²

As with the earlier example of loan trading, the LSTA believes that with the help of smart contracts, settlements for loan trading can be significantly sped up.⁶³ Since every loan agreement has different terms, the LSTA proposes that it is vital to have a standardized document to create less room for coding error.⁶⁴ With a standard agreement that implements a significant portion of boilerplate language, the four objectives to the smart contract—observability, verifiability, privity, and enforceability—will be easier to implement.⁶⁵ By not altering the framework of the contract, the potential scope in the agreement that can be subject to the coding error is significantly reduced.

D. *What Are Oracles?*

Blockchain and smart contract backers are adamant about trying to eliminate as much contact and reliance on intermediaries as possible, but, smart contracts are inherently about trusting others. To be initially programmed, the smart contract has to receive information from a trustworthy source about the state of the world

⁵⁷ Susan George, *Smart Contracts Tools for Transactional Lawyers*, 81 *TEX. B. J.* 403 (2018).

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² Gopie, *supra* note 51.

⁶³ Marsh, *supra* note 43.

⁶⁴ *Id.*

⁶⁵ Szabo, *supra* note 49.

outside of the smart contract itself.⁶⁶ This can be done with the help of oracles, which are “trusted data feeds that send information into the smart contract, removing the need for smart contracts to directly access information outside their network,”⁶⁷ and attest to the necessary facts that are needed for the contract.⁶⁸ A simple way to envision this mechanism is through picturing another hypothetical situation where a smart contract is created for a Last Will and Testament. For the distribution of testator’s estate to go into effect, the trigger event has to be the death of the individual.⁶⁹ The oracle agent has to verify this real-world occurrence outside of the blockchain, find out if the person in question did in fact die, and submit this information back to the smart contract that the condition of death has either been met or not. Once the triggering event necessary, that death has indeed occurred, is confirmed by the oracle and reported back to the algorithm of the smart contract, subsequent terms in the Will in the form of the smart contract should unravel. In practice, administering an estate through this method is in fact an extremely complex process because of additional moving components. Other steps need to be considered such as filing tax returns and releasing the money from an escrow account.

Oracles can be presented in a vast array of possibilities, and people have a broad conception of what an oracle can be. Conventionally, oracles are external digital agents,⁷⁰ but a theory that has been circulated for the future is that some oracles could be human beings who are designated as a third party who inputs information.⁷¹ An external digital agent is identified as “a web service that provides information in a format suitable for smart contracts to consume.”⁷² If the oracle is a human, then commonly the agents are financial services providers who have a deeper understanding of the underlying transaction.⁷³ It is beneficial to have a financial provider so the oracle can be knowledgeable in the space and sup-

⁶⁶ Tristan Winters, *Ripple Labs CTO Designs Smart Contracts*, BITCOIN MAG. (July 25, 2014), <https://bitcoinmagazine.com/articles/ripple-labs-cto-designs-smart-contracts-1406322122>.

⁶⁷ J. Slobodnik, *How Oracles Connect Smart Contracts to the Real World*, MEDIUM (Feb. 2, 2018), <https://medium.com/bethereum/how-oracles-connect-smart-contracts-to-the-real-world-a56d3ed6a507>.

⁶⁸ Winters, *supra* note 66.

⁶⁹ *Id.*

⁷⁰ Alan Cohn et al., *Smart After All: Blockchain, Smart Contracts, Parametric Insurance, and Smart Energy Grids*, 1 GEO. L. TECH. REV. 273, 282–83 (2017).

⁷¹ Winters, *supra* note 66.

⁷² Gary Johnson, *Planning the Future: Blockchain Technology and the Insurance Industry*, 12 No. 4 In-House Def. Q. 73 (West).

⁷³ *Id.*

plement the necessary information such as interest rates, commodity prices, or the sought-after index price in a loan trade or any other monetary transaction.⁷⁴ In the context of smart contracts, oracles are entrusted with a superior role and greater responsibilities in order to adequately provide for the contract. Their roles go beyond just securing outside information because they are also delegated with the code execution of the agreed-upon contract.⁷⁵ After the information is received and verified, the oracle agent creates a link between the digital asset and the physical asset that is in the real world.⁷⁶ The fear of having possession of the agreed upon transaction in the smart contract without actual possession in the real world is thus eliminated with the report from the trusted third party oracle who either confirms or denies that there is a congruence between the physical and the digital world.⁷⁷

In the digital space, oracles can be analogous to the role of judges in the courtroom because the oracles are there to monitor and impose subjectivity and judgment.⁷⁸ This is significant to the online contract because the underlying notion of the smart contract is that there will be no modifications after it is finalized.⁷⁹ But, if unforeseen circumstances occur, instead of creating a whole new contract, the oracle could in theory be granted the power to utilize their legal/mediator role to slightly alter the terms without creating an unnecessary sequence of events of terminating one contract and implementing a slightly different other one.

E. *Different Alternative Dispute Resolution Methods*

The United States is one of the most litigious societies in the world. Research shows that in 2016, an estimate of \$429 billion was spent on tort litigation costs and on compensation paid in lawsuits.⁸⁰ To combat this custom, different outlets of dispute resolu-

⁷⁴ *Application*, *supra* note 12.

⁷⁵ Winters, *supra* note 66.

⁷⁶ Jimmy Song, *The Truth about Smart Contracts*, MEDIUM (June 11, 2018), <https://medium.com/@jimmysong/the-truth-about-smart-contracts-ae825271811f>.

⁷⁷ *Id.* (“There is a need for the digital world to ‘know’ about the physical world. This is known as the ‘Oracle Problem.’”).

⁷⁸ *Id.*

⁷⁹ Scott A. McKinney et al., *Smart Contracts, Blockchain, and the Next Frontier of Transactional Law*, 13 WASH. J. L. TECH. & ARTS, 313, 329 (2018).

⁸⁰ U.S. Chamber Institute for Legal Reform, *Costs and Compensation of the U.S. Tort System*, (Oct. 2018), https://www.instituteforlegalreform.com/uploads/sites/1/Tort_costs_paper_FINAL_WEB.pdf.

tion were established to provide quarreling parties an alternative process that resulted in other than going to court for trial in order to resolve their conflicts.⁸¹ Alternative dispute resolution, or “ADR,” is frequently a cheaper and quicker option than having a conventional court proceeding where a judge and jury decide the outcome of the issue.⁸²

1. Conventional Arbitration and Mediation

Unlike litigation, arbitration is a less formal version of a trial proceeding.⁸³ During an arbitration proceeding, respective parties are granted the permission to make opening statements and present evidence to the arbitrator if found necessary.⁸⁴ An arbitrator is granted the tribunal powers to settle the dispute that has been brought forth, but in no way are the arbitrators bestowed with the powers equivalent to those of a judge.⁸⁵ Mediation has the same goal as arbitration—to provide a fair resolution of the issues at hand. The main difference is that the mediator serves as a neutral third party who is facilitating a negotiation between two parties.⁸⁶ Distinct from arbitrators, mediators do not have the ability to make a decision, “issue orders, find fault, or make determinations,”⁸⁷ but are hired to aid the parties in reaching an equitable settlement. Mediation is more informal because it does not take place in a court and there is no opposing counsel present to cross-examine.⁸⁸ Mediation is often recommended and encouraged where parties have had an ongoing relationship and the mediator can draw on the prior and continuing experiences of the respective parties.⁸⁹ In this manner, the aid that the mediator provides is based on the understood rapport of the parties. It is likely that mediation will be unsuccessful if the parties are not willing to be guided towards agreeing upon an equitable solution without outside enforcement and are lacking an effective channel of com-

⁸¹ *Dispute Resolution Processes*, A.B.A. https://www.americanbar.org/groups/dispute_resolution/resources/DisputeResolutionProcesses (last visited Nov. 26, 2019).

⁸² *Id.*

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ 21 SAMUEL WILLISTON & RICHARD A. LORD, *A TREATISE ON THE LAW OF CONTRACTS* § 57:25 (4th ed. 1993).

⁸⁶ *Difference between Arbitration and Mediation*, B.C. INT’L COM. ARB. CTR., <http://bcicac.com/about/what-is-mediationarbitration/difference-between-arbitration-and-mediation> (last visited Nov. 26, 2019).

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ *Id.*

munication.⁹⁰ When dealing with the technology sector, a more informal proceeding such as arbitration or mediation might serve as a better option than litigation in order to put the parties more at ease. Since the day-to-day lifestyle of people who work in tech companies encompasses a more relaxed environment, ADR seems appropriate. That being said, technology firms are not known to be any less litigious than other disputants.

2. Advances in Online Dispute Resolution

To accommodate our cyberspace world, technology has made it possible to resolve legal disputes in an online forum.⁹¹ Online dispute resolution (“ODR”), is another form of ADR and encompasses both arbitration and mediation.⁹² Mediation over the internet can save the parties thousands of dollars if chosen over traditional litigation.⁹³ Skeptics argue that providing this mediation online is not as successful since it poses a hardship for parties to develop a relationship and eliminates any physical contact where one typically gauges emotions of the adversary.⁹⁴ Technology provides us with multifaceted uses and characterizes ODR systems into two different forms: synchronous and asynchronous communication.⁹⁵ Synchronous communication allows people to communicate in real time, meaning that the communication between the parties involved is immediate.⁹⁶ When people are using Skype or an electronic chat room, the communication is transmitted instantaneously.⁹⁷ On the other hand, asynchronous communication (such as e-mail) relays information in an intermittent manner,

⁹⁰ Jack G. Marcil & Nicholas D. Thornton, *Avoiding Pitfalls: Common Reasons for Mediation Failure and Solutions for Success*, 84 N.D. L. REV. 861 (2008).

⁹¹ Richard Birke & Louise Ellen Teitz, *The Path that Brought America to Uniform Laws and Mediation in Cyberspace*, 50 AM. J. COMP. L. 181, 206 (“Since in our technology driven work business transactions have “ventured into cyberspace, it was natural that the mechanisms to resolve disputes would follow the source of disputes into the new medium.”).

⁹² *Id.*

⁹³ Joseph W. Goodman, *The Pros and Cons of Online Dispute Resolution: An Assessment of Cyber-Mediation Websites*, <https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1073&context=dltr> (last visited Nov. 26, 2019).

⁹⁴ Birke & Teitz, *supra* note 91 at 211 (A common question that is asked is if, “loss of personal contact mean loss of personality, reputation, and confidence, all important to mediation?”).

⁹⁵ Karolina Mania, *Online Dispute Resolution: The Future of Justice*, 1 INT’L COMP. JURIS. 76, 78–79 (2015), <https://www3.mruni.eu/ojs/international-comparative-jurisprudence/article/view/4392/4120>.

⁹⁶ Hon. Frank G. Evans et. al., *Enhancing Worldwide Understanding Through ODR: Designing Effective Protocols for Online Communications*, 38 U. TOL. L. REV. 423, 432 (2006).

⁹⁷ Mania, *supra* note 95 at 80.

meaning that the communications are not exchanged at the same time.⁹⁸ The time lag of asynchronous communication has both an advantage and a drawback. Not having an instant, direct communication can be a strategic technique, allowing the parties to truly formulate their thoughts and decide with precision how they want to respond to their adversaries.⁹⁹ However, there could be significant time lost and potential deals forfeited as a result of patiently waiting for a response.

Although ODR functions without in-person meetings and can be accomplished exclusively through Internet technology, videoconferencing options are available for synchronous communication purposes.¹⁰⁰ Despite it not being as engaging in comparison to sitting with someone who is physically in the same room as you, one can still gauge emotions and reactions through the video conference call. A major advantage of communicating through the online forum is geographic flexibility.¹⁰¹ As this Note mentioned previously, blockchain's distributed ledger technology creates networks on personal computers anywhere in the world.¹⁰² When parties engage in a financial transaction, it is not uncommon for them to be located at different ends of the country or even the world. Thus, ODR is particularly convenient if the parties are conflicted over jurisdictional issues since they will not need to spend extra finances and resources on traveling to a different jurisdiction. Even if the disputing parties are located in the same area, their need to schedule the time, place, and dates for mediation is eliminated through asynchronous communication and through maintaining constant access to the online platform.

Some websites are currently operating to provide "fully automated cyber-negotiation" services, simply understood as mediation over the internet, to those who are negotiating on monetary settlements.¹⁰³ One website, Cybersettle, created a platform on which an aggrieved party can file a claim against another party, typically an insurance company, through their secure website.¹⁰⁴ The filing party states the amount they would want from the settlement and

⁹⁸ *Id.*

⁹⁹ Evans, *supra* note 96.

¹⁰⁰ ABA Task Force on Electronic Commerce and Alternative Dispute Resolution, *What is Online Dispute Resolution? A Guide for Consumers*, at 2 (Mar. 2002), https://www.americanbar.org/content/dam/aba/migrated/2011_build/dispute_resolution/consumerodr.authcheckdam.pdf.

¹⁰¹ *Id.* at 1.

¹⁰² *Supra* note 10.

¹⁰³ Goodman, *supra* note 93 at 2.

¹⁰⁴ *Id.*

creates a deadline.¹⁰⁵ The website will consequently generate an email informing the other party that a claim has been filed and propose the filing party's settlement offer.¹⁰⁶ This blind bidding process can go back and forth three times, and each time the system will contact the parties and inform them if they are in the range of settlement.¹⁰⁷ From a business and legal prospective, proponents of the fully automated cyber-negotiation method must not understand the all-around implications of selecting such a system for a smart contract transaction. Fully automated systems can only be successful when the only issue left to resolve is the amount of settlement.¹⁰⁸ In a secured lending transaction or a real estate contract, more nuances arise other than resolving the amount of a settlement. Thus, even though the parties to the smart contract may want to circumvent the court system, an automated cyber-negotiation will not prove to be beneficial to either of the parties.

Another option in cyber-mediation is using sophisticated settlement software in combination with a neutral third-party facilitator.¹⁰⁹ Although not without fault or hindrances, this ODR method of incorporating a mediator is more promising. JAMS, a global customized dispute resolution supplier, acknowledges the apprehension that comes with high value dealings and became the first platform to provide and promote the use of ADR in disputes that stem from blockchain and smart contract transactions.¹¹⁰

¹⁰⁵ *Id.* at 2.

¹⁰⁶ *Id.* at 3.

¹⁰⁷ *Id.* at 3.

¹⁰⁸ *Id.* at 10. "In fact, for fully automated cyber-mediation to work properly, it would seem that the parties would need to have undertaken initial discussions, agreed to the basic facts surrounding the dispute and have determined that one of the parties is responsible for damages . . . Limiting the final stage of negotiations to determining a dollar figure for compensation seemingly leaves out the possibility for innovative, interest-oriented, out-of-the-box negotiating that is the hallmark of many successful negotiations."

¹⁰⁹ Goodman, *supra* note 93 at 4.

¹¹⁰ JAMS, *JAMS Launches Smart Contracts, Blockchain, and Cryptocurrencies Practice*, (Sept. 5, 2018), <https://www.jamsadr.com/news/2018/jams-launches-smart-contracts-blockchain-and-cryptocurrencies-practice> ("Owing to the nature of how smart contracts are executed, JAMS identified the need for rules and clauses developed specifically for disputes arising from smart contract transactions and is collaborating with the Accord Project to develop a common implementation for such rules and clauses across distributed ledgers.").

III. DISCUSSION

A. *Should Smart Contracts be Considered Traditional Contracts And be Executed Under Contract Law?*

United States contract law varies state by state but is standardized nationwide when it involves the sale of goods due to the adoption of the Uniform Commercial Code. However, there are four factors that are usually necessary for a court to hold a contract legally binding: offer, acceptance, intent, and consideration between the parties.¹¹¹ Some argue that it is simple to track these four factors in a smart contract as well.¹¹² Parties show their acceptance, intent, and mutual assent when they sign the contract by utilizing their private key cryptographic signatures.¹¹³ Once the pre-coded conditions are completed and trigger certain clauses, potential problems can arise. When there is contractual litigation, courts give great deference to longstanding principles such as good faith efforts, estoppel, or partial performance. Unfortunately, those principles will be impossible to apply to an executed smart contract since the content is irreversible.¹¹⁴ The content is considered irreversible because the core idea of the smart contract is for parties to receive the predetermined outcome without altering the terms.¹¹⁵ Furthermore, if the courts want to find out which party to the contract erroneously disrupted the coding, the pseudo-anonymity of the users in the blockchain poses as a veil for the courts. Courts will be unable to rectify the results without piercing the blockchain veil and disregarding the fundamental rationality of a smart contract, since the only viable solution is to discover the identity through forensic techniques or go back into the pre-coded agreement and alter the outcome.¹¹⁶

Scholars argue that the digital nature of smart contracts provides several benefits over traditional contracts.¹¹⁷ One argument

¹¹¹ *Elements of a Contract*, USLEGAL, <https://contracts.uslegal.com/elements-of-a-contract/> (last visited Nov. 5, 2018).

¹¹² *Can a Smart Contract Be Considered a Legal Contract According to U.S. Contract Law?*, BITRATES (Aug. 13, 2018), <https://www.bitrates.com/news/p/can-a-smart-contract-be-considered-a-legal-contract-according-to-us-contract-law>.

¹¹³ *Id.*

¹¹⁴ Jeanne L. Schroeder, *Sense, Sensibility and Smart Contracts: A View From a Contract*, NYC BAR 13 (2018).

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ Cohn et al., *supra* note 70.

is that there will always be a finalized single digital copy that is permanently stored, unlike a paper one that can easily be destroyed.¹¹⁸ On occasion, accidents have occurred where two different versions of a paper contract exists, resulting in severe consequences. Often seen in property transactions, situations occur where there are multiple deeds to a house or two versions of a will, which leaves the parties uncertain as to which contract will prevail. However, the digital versions are written and approved by the parties and “will be executed precisely by computers when necessary.”¹¹⁹ Another argument in favor of smart contracts is that they intrinsically eliminate the problem of “parol evidence,” which is commonly encountered in contract law.¹²⁰ The parol evidence rule states that no extrinsic evidence of oral terms will be admitted to contradict the terms of a contract if the parties to a contract intended the written agreement to be “the final and complete expression of the terms of their agreement.”¹²¹ By not allowing outside terms to influence the contract following the signatures that effect the contract, the pressure to play detective and figure out which party is telling a more compelling, truthful story—and which party is just trying to circumvent the system in their favor—is eliminated.

The few exceptions to the parol evidence rule that allow external evidence to be introduced in the disputes are as follows: if the contract happened to be ambiguous with respect to the parties’ intent, if there was fraud or duress, or if there were complications with the consideration.¹²² If any of those criteria are met, then the parties are able to dispute the terms.¹²³ Since a smart contract cannot apply external information and can only apply the terms that have been coded, disputes over an exception to the parol evidence rule will be slim to none.¹²⁴ Unincorporated issues will not be subject to the exception because it is clear that there has been a

¹¹⁸ *Id.*

¹¹⁹ *Id.* at 281.

¹²⁰ *Id.*

¹²¹ Rick J. Norman, *Introduction of Evidence Over Parol Evidence Rule Objection*, 36 AM. JUR. PROOF OF FACTS 3d 331 (Originally published in 1996, Nov. 2018 update); *see also* Cardozo Blockchain Project, *Smart Contracts and Legal Enforceability: Research Report #2*, (Oct. 16, 2018) (“Where traditional legal agreements and agreements relying on smart contracts differ is how smart contracts handle performance obligations. With contracts that only rely on natural language provisions, each party to the contract is responsible for performing contractual obligations and can choose to halt their performance at any time.”).

¹²² *Parol Evidence Rule*, LEGAL DICTIONARY, <https://legaldictionary.net/parol-evidence-rule/>.

¹²³ *Id.*

¹²⁴ *See* Cohn et al., *supra* note 70.

thorough review of the blockchain code.¹²⁵ This reasoning demonstrates that unlike the situations found when executing a traditional contract, smart contracts encompass concrete ideas and do not stimulate unwanted disputes about adding verbal terms.

B. *Jurisdictional Issue for Smart Contracts*

The assumption is that the mechanics of blockchain and smart contracts create a more affordable and efficient way of settling contracts; however, encountering hardships along the way is not implausible. By limiting the need for third party mediators and leaning on the blockchain technology, parties can run into unpleasant situations in instances when the programmed conditions do not pan out as intended. One pressing issue that has not been concretely answered yet is what choice of law will govern in legal proceedings dealing with a smart contract. Since the distributed ledger technology is not centralized and the nodes are dispersed across the nation and even throughout the world, jurisdictional challenges arise.¹²⁶ One party can be in the United States while the other user can be in a completely different country. Furthermore, one might not even be able to tell which party violated the self-executing contract. Settling the issue of which jurisdiction will have precedence over the case will be time-consuming and at times nearly impossible to find the identity of a party because of the anonymity of the blockchain users.¹²⁷ However, since financial transactions are usually dealt with through a private blockchain and not a public, the identities of the parties should be easier to establish.

The ambiguities of jurisdiction could be avoided altogether if mandatory online dispute resolution is implemented. There is a strong uncertainty in the blockchain community over whether the law applies to this online platform considering there are almost non-existing court decisions, lack of regulatory guidance, and an overall ambiguity over jurisdictional grounds.¹²⁸ Although reme-

¹²⁵ *Id.*

¹²⁶ *Application, supra* note 12.

¹²⁷ *Id.*

¹²⁸ Determining the proper jurisdiction that is applicable is vital in settling the dispute between the parties. Since the online platform has no geographical boundaries, debates continue to ensue over which path is proper. See Wulf A. Kaal & Craig Calcaterra, *Crypto Transaction Dispute Resolution*, 73 *BUS. LAW* 109, 135–36 (2017-2018) (“Some analysts argue that because the smart contract replaces the existing legal contract in some circumstances, the smart contract will be governed by the same legal principles as the existing legal contract. Others argue that the

dies have been proposed to combat the grey zone of jurisdiction, ideas have been split and most of the proponents are not necessarily fully knowledgeable about the law.¹²⁹ If the online mediation is mandatory, then the parties are, “bind[ing] themselves to resolution through an agreement,”¹³⁰ and hence, the looming question of which court shall impose jurisdiction over the matter is circumvented. The laws of a particular state that the parties agreed to at the onset will govern, but there will be no motions to dismiss based on lack of venue.¹³¹

C. *Unsuccessful Trends with Blockchain Technology and the Implemented Prevention Measures*

As glamorous and convincing as some of the arguments for blockchain and smart contracts can be, these two systems are not immune to the possibility of problems, such as was seen in the Silk Road scenario discussed earlier.¹³² Smart contracts are susceptible to hackers that can steal information and extract money that is allocated towards the enforcement of the contract.¹³³ While there has been an increasing demand to get rid of lawyers as the intermediaries, the alleged parties to the contract are the ones responsible for setting up their own contracts.¹³⁴ It is extremely common for people to reuse passwords for their online accounts, which is one of the biggest failures in the crypto economy.¹³⁵ This overall carelessness and unawareness of certain aspects of the online technology space will also lead them to disregard negligent website operators and fall victim to phishing scams.¹³⁶

breaching party may not live in an area where the courts have jurisdiction; thus, the breaching party cannot be liable. In that case, assuming the operator knows identities of contracting parties, the operator of the blockchain platform should have a legal obligation to identify who the breaching party was and serve as the counterparty in a dispute scenario. These experts argue the operator of the blockchain should establish governing rules of the blockchain and specifications for dispute resolution.”).

¹²⁹ *Id.*

¹³⁰ Goodman, *supra* note 93 at 9.

¹³¹ Kaal & Calcaterra, *supra* note 128.

¹³² Higgins, *supra* note 19.

¹³³ *Id.*

¹³⁴ James Risberg, *Yes, the Blockchain Can Be Hacked*, COIN CENTRAL (May 7, 2018), <https://coincentral.com/blockchain-hacks/>.

¹³⁵ *Id.*

¹³⁶ *Id.*

At the end of 2018, the Commodities Futures Trading Commission (“CFTC”) won a court victory against Patrick McDonnell and CabbageTech, a virtual currency trader and his company.¹³⁷ In *CFTC v. McDonnell*, the court held that McDonnell “engaged in a deceptive and fraudulent virtual currency scheme to induce customers to send money and virtual currencies to CDM.”¹³⁸ CDM, or Coin Drop Markets, is the fictitious company that was used to scam customers that wrongfully received \$292,693.54 dollars through fraudulent virtual currency transfers in the span of five months.¹³⁹ This is just one of the examples of how other users of blockchain can take advantage of the anonymity aspect to scam other consumers into believing they are transferring money through a trusted source. The CFTC released a Congressional Quarterly Roll Call to advise consumers to obtain counsel when dealing with smart contracts.¹⁴⁰ It is important to be certain if the contract is subject to CFTC regulations and jurisdiction because compliance with additional regulations could be necessary.¹⁴¹ The announcement also warns about the potential of cyber security risks.¹⁴²

On September 25, 2017, the U.S. Securities and Exchange Commission (“SEC”), announced that they were beginning a new enforcement initiative to combat cyber-based threats.¹⁴³ The SEC has always ensured the protection of investors in public companies but has been faced with tribulations once market manipulation became prevalent through cyber platforms.¹⁴⁴ This initiative was the

¹³⁷ *Commodity Futures Trading Comm’n v. McDonnell*, 332 F. Supp. 3d 641, 727 (E.D.N.Y. 2018) (“There can be no more fundamental omission than the Defendants’ failure to disclose that they had no intent to provide the services promised, but rather, that they were executing a fraudulent scheme to misappropriate customer assets and intended to continue to do so.”).

¹³⁸ JD Alois, *CFTC Wins Big Court Victory in CabbageTech / Coin Drop Markets Fraud Trial Involving Virtual Currencies Including Bitcoin*, CROWDFUND INSIDER (Aug. 24, 2018), <https://www.crowdfundinsider.com/2018/08/138248-cftc-wins-big-court-victory-in-cabbagetech-fraud-trial-involving-virtual-currencies-including-bitcoin>.

¹³⁹ *CFTC v. McDonnell*, 332 F. Supp. 3d 641.

¹⁴⁰ Chris Marquette, *CFTC examines smart contract benefits, risks*, CQ ROLL CALL WASHINGTON SECURITIES ENFORCEMENT & LITIGATION BRIEFING (Nov. 27, 2018).

¹⁴¹ *Id.*

¹⁴² *Id.* (“The agency identified several risks, saying smart contracts could unlawfully circumvent rules and protections, diminish transparency and accountability, and impair market integrity. And it warned that a smart contract may fall under legal requirements, such as the Commodity Exchange Act and others.”).

¹⁴³ Press Release, U.S. SECURITIES AND EXCHANGE COMMISSION, SEC Announces Enforcement Initiatives to Combat Cyber-Based Threats and Protect Retail Investors, <https://www.sec.gov/news/press-release/2017-176>.

¹⁴⁴ *Id.*

creation of the Cyber Unit which is currently tasked with targeting any cyber-related misconduct, including violations involved with distributed ledger technology and initial coin offerings.¹⁴⁵ The SEC's website provides a spotlight page offering tips and information on what to look out for to spot misconduct.¹⁴⁶ The SEC is actively enforcing trading suspensions and taking other necessary regulatory actions.¹⁴⁷

IV. PROPOSAL

A. *Mandatory Online Dispute Resolution with a Third Party Arbitrator*

After careful consideration and analysis of the burgeoning discussions about smart contracts, I propose that the most viable solution to settling smart contracts disputes is enforcing mandatory online dispute resolution with human oracles serving as the third-party arbitrators. As was formerly mentioned, due to the jurisdictional complications that blockchain elicits, litigating issues in the courtroom would often be a burdensome and ineffective option.¹⁴⁸ Thus, there is a benefit to mandating self-enforced dispute resolution, which would initiate an arbitration process in the smart contract itself by sending an electronic notice to both parties.

A few companies have been working to create the correct technology and online platforms to foster smart legal agreements.¹⁴⁹ One such company, OpenLaw, has refined a blockchain-based arbitration system that they named "OpenCourt."¹⁵⁰ The

¹⁴⁵ *Id.*

¹⁴⁶ U.S. SECURITIES AND EXCHANGE COMMISSION, Spotlight on Cybersecurity, the SEC and You, <https://www.sec.gov/spotlight/cybersecurity>.

¹⁴⁷ *Id.*

¹⁴⁸ Kaal & Calcaterra, *supra* note 128.

¹⁴⁹ *About*, OPENLAW, <https://openlaw.io/about> (last visited Feb. 8, 2019).

¹⁵⁰ *OpenCourt: Legally Enforceable Blockchain-Based Arbitration*, MEDIUM (Oct. 18, 2018), <https://media.consensus.net/opencourt-legally-enforceable-blockchain-based-arbitration-3d7147dbb56f> ("This initial version of the OpenCourt system is implemented in Solidity and works through a lightweight programmatic interface. Any smart contract can rely on the OpenCourt system to easily incorporate a dispute resolution procedure by using Solidity's ability to implement an interface that the OpenCourt library will provide and then "registering" itself with the OpenCourt dispute resolution smart contract on the blockchain. Once configured, OpenCourt will send the smart contract notice of a confirmed dispute once invoked. The smart contract will then transfer any identified digital assets to a virtual escrow account, thus locking these assets until an arbitral decision is reached.").

method of notifying the parties once a dispute arises is to send a notice through the OpenCourt platform.¹⁵¹ The electronic signatures serve as proof that both the parties acknowledged that in the case of a functionality problem with the contract, a pre-determined trigger would send a signal that online arbitration has been initiated.¹⁵² Once again, although OpenCourt seems like it could be an easy solution for trying to implement ODR, there is nevertheless a disconnect. To grasp the core functionality of the smart contract, understanding traditional contract concepts is vital. When a New York law firm was immersed in attempting to remove many of the meticulous manual steps to make the transition from a traditional contract to a smart contract, the lawyers acknowledged that there was “a big divide.”¹⁵³ They realized that, “the programmers think in terms of bits and bytes, while the contracting parties have been doing these types of agreements for years,” and thus there is a large misunderstanding amongst the programmers on one side and the lawyers on the receiving end.¹⁵⁴ To circumvent this fundamental problem, a heightened functional approach is vital to create transparency. The idealistic outcome would result in a space where lawyers could present their expertise regarding drafting and negotiating deals, which would buttress the technical coding expertise of the programmers.¹⁵⁵

It is fundamental to examine what the process of an online dispute entails. There are approximately four stages to go through.¹⁵⁶ First, a case is initiated when one of the parties to the impending dispute files a complaint on one of the accessible ODR platforms.¹⁵⁷ After this complaint is filed, “the receiving party is notified and prompted to take part in the resolution procedure.”¹⁵⁸ To give a fair advantage to the receiving party, such party is able to state their own position, thoughts regarding the alleged complaint, and the potential reimbursement with which they would be com-

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ Rebecca Campbell, *New York City Law Firm Experiments with Blockchain Smart Contracts*, CCN (Feb. 6, 2017), <https://www.ccn.com/new-york-city-law-firm-experiments-blockchain-smart-contracts>.

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ John Chopyk, *Serving Justice Online: Online Dispute Resolution as an Alternative to Traditional Litigation*, LAWLESS.TECH (Sept. 11, 2018), <https://lawless.tech/serving-justice-online-online-dispute-resolution-as-an-alternative-to-traditional-litigation>.

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

fortable settling.¹⁵⁹ Inherently, there are two ways that this dispute can end: either the counterparty agrees and the dispute is settled right away or the other party profoundly disagrees with the complaint.¹⁶⁰ If there is a disagreement, which is usually the case, then both parties enter a communication stage and involve a third party conciliator.¹⁶¹

In ODR, there are two distinct approaches in the communication stage: automated negotiation and facilitated negotiation.¹⁶² ODR websites have the option of delivering an “automated resolution,” a complete software based solution, to negotiating parties who are not interested in pursuing the aid of a third party mediator.¹⁶³ Instead, the automated resolution technique only requires the disputing parties to submit their prospective settlement proposals and counterproposals into an online platform, eliminating the need to communicate directly altogether.¹⁶⁴ This approach is also known as double blind bidding, referencing how neither party is aware of what the other one is proposing.¹⁶⁵

A contract is an understanding of the parties and thus it is very common to have open terms left unresolved to provide parties the opportunity to negotiate during the duration of the contract. In a smart contract, when all the terms are coded at the beginning, there is no possibility of leaving open terms which can be concerning for the parties.¹⁶⁶ Contrary to popular belief, having ambiguous terms in a contract should not brand it as an incomplete and an

¹⁵⁹ *Id.*

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² David Lipsky & Ariel Avgar, *Online Dispute Resolution Through The Lens of Bargaining and Negotiation Theory: Toward an Integrated Model*, 38(1) UNIV. OF TOLEDO L. REV. 47 (2006).

¹⁶³ *Id.*

¹⁶⁴ *Id.* at 60.

¹⁶⁵ Ayelet Sela, *Can Computers Be Fair? How Automated and Human-Powered Online Dispute Resolution Affect Procedural Justice in Mediation and Arbitration*, 33 OHIO ST. J. ON DISP. RESOL. 91, 103–04 (2018) (“*CyberSettle*, *SmartSettle*, *One* and the *Freelancer ODR* system perform this service for single-issue monetary disputes; *Fair Outcomes’ Adjusted Winner* process employs a similar mechanism for multi-issue disputes. In blind-bidding processes, parties submit several settlement proposals (typically three); the ODR system sequentially checks the proposals against each other to detect a monetary range of possible agreement; if matched proposals fall within this range, the algorithm yields a final award by splitting the difference. On some platforms, all proposals are confidential; on others, only the reservation/acceptance point is confidential.”).

¹⁶⁶ See Schroeder *supra* note 114 (“As such, a contract written in code would *not* accurately represent the agreement of the parties and could hinder beneficial renegotiation and informal modification of contract terms if circumstances change or unanticipated contingencies occur.”).

unenforceable agreement. In fact, it is the outcome of “the logically inevitable openness of all human interrelations,” which makes it so common and even at times necessary to leave room for slight modifications.¹⁶⁷ With the implementation of a third-party mediator, this problem can potentially be alleviated.

Facilitated negotiation is a more realistic approach to solving the convoluted matter of settling a smart contract dispute. Unlike the automated technique, facilitated negotiation has an additional layer of a third party mediator who is guiding the negotiation process once a problem arises and creates a structural outline for the disputants to reach a satisfying endpoint.¹⁶⁸ Nevertheless, the one focal problem with this approach is that it does not provide a comprehensive solution to combating the difficulties that arise when a financial transaction through a smart contract is not self-executing because of a default on a pre-coded term. This stems from the limited power that the facilitator can provide in an online negotiation—which is solely advising and determining the process of the facilitation and not exhibiting a “determinative role on the content of the matters discussed or the outcome of the process.”¹⁶⁹ Consequently, a mediator won’t suffice and instead the facilitator should be granted the powers of an arbitrator.

In the facilitated approach, if the mediator were granted the powers of an arbitrator, the lawyer serving as the facilitator would be able to provide concrete advice and have the authority and knowledge to alter the terms of the contract to reach the original predetermined outcome. Thus, when the “self-execution” does not pan out because it is nearly impossible to encompass every possible covenant, the facilitator in that situation will not merely have a neutral standpoint. For example, IHS Markit, a leading global information provider in areas that mold the technology network,¹⁷⁰ reported that just the syndicated loan market alone issues loans worth over \$1 trillion annually.¹⁷¹ Working with such an enormous amount of money through smart contracts should raise a few con-

¹⁶⁷ *Id.*

¹⁶⁸ Suzanne Van Arsdale, *User Protections in Online Dispute Resolution*, 21 HARV. NEGOT. L. REV. 107, 112 (2015).

¹⁶⁹ *Dispute Resolution Terms*, NAT’L ALTERNATIVE DISP. RESOL. ADVISORY COUNCIL, 7, <https://www.ag.gov.au/LegalSystem/AlternateDisputeResolution/Documents/NADRAC%20Publications/Dispute%20Resolution%20Terms.PDF> (last visited Jan. 28, 2019).

¹⁷⁰ IHS MARKIT TECHNOLOGY, <https://technology.ihs.com/> (last visited Oct. 14, 2018).

¹⁷¹ Ian Allison, *IHS Markit Has a Plan to Tokenize a \$1 Trillion Loan Market*, COINDESK (May 28, 2018), <https://www.coindesk.com/ihs-markit-plan-tokenize-1-trillion-syndicated-loan-market/>.

cerns and precautions in the event that rectification will be needed. Problems such as these can be eliminated if there were to be a third-party oracle entrusted as an arbitrator to oversee the duration of the whole self-executing smart contract and provide guidance when necessary. As a result, courts will theoretically not be burdened with putting together the puzzle and tracking what went wrong with whom and at which point.

One drawback to ODR is that since there is no reliance on the courts or official enforcement authorities, there can be problems of prompt enforcement.¹⁷² Meaning, there needs to be a system enforcing when exactly the mandated mediation has to begin or else either one of the parties can continue postponing of their own volition.

B. *The Oracle Should Assume the Role of the Arbitrator*

Let us delve into a scenario in which problems can arise because there is disconnect between the contract code and common real-life circumstances. A borrower of a loan can leverage crypto currency assets and use them as collateral for a fiat loan.¹⁷³ If a borrower defaults on such a loan, then the lender will be able to recover the fiat that they gave by selling the crypto collateral that was exchanged for the loan.¹⁷⁴ In theory, the blockchain-backed lending is on track to be revolutionary despite the hesitation to universally accept cryptocurrency.¹⁷⁵ Although it is a secure network, and for most of the transactions one can see the parties that are involved, problems are likely to arise. For example, if a party misses a payment by just a few hours or a day, the slight delay can terminate the whole agreement and the lenders will have trouble continuing the transaction. Most secured lenders do not want to foreclose on their loans, but if we reach a point in the future where an automated smart contract is not properly coded, that could be the potential outcome. It would be disheartening to have the entire deal freeze or be terminated on the account of a minor problem that could be rationally resolved. Thus, to avoid unfortunate

¹⁷² Pietro Ortolani, *Self-Enforcing Online Dispute Resolution: Lessons from Bitcoin*, 36 OXFORD J. LEGAL STUD., 595, (2016), <https://academic.oup.com/ojls/article/36/3/595/1752378>.

¹⁷³ *How Does a Crypto Backed Loan Work?*, BLOCKFI, <https://blockfi.com/cryptoasset-loans/>.

¹⁷⁴ *Id.*

¹⁷⁵ Yoav Vilner, *4 Reasons Cryptocurrency Still Hasn't Gone Mainstream*, CNBC (May 3, 2018), <https://www.cnbc.com/2018/05/03/yoav-vilner-4-reasons-cryptocurrency-still-isnt-mainstream.html>.

situations like these, it is necessary for a trusted third-party oracle serving as an arbitrator to be present and account for certain situations that could arise because of unforeseen circumstances.

In the situation at hand, the smart contract would have to have a mediator appointed at the beginning since it needs to be programmed beforehand to state that mandatory arbitration is a term that is triggered if certain conditions are not met. Some argue that the unappealing aspect of having online arbitration for smart contracts is that in the end, human interaction is still being circumvented and that is not in the best interest of the parties. Since all of the proceedings in an online arbitration are conducted online, “[o]nline mediation may not effectively capture the various needs, interests, motivations and emotions of the parties involved.”¹⁷⁶ Nevertheless, my proposition is that a trustworthy third party oracle agent, who has been involved in the contract from the formation and is aware of the terms and the parties involved, should manage the ODR. With this method, the trust between the parties and the oracle is established from the onset of the transaction, which minimizes the natural apprehensions that the oracle might “disappear with any assets the contract controls or collude with any of the contracting parties.”¹⁷⁷ Thus, the concerns that utilizing an online outlet will diminish human interaction and interests are not warranted.

C. *Proposed Mechanics to Trigger an Online Arbitration Process*

Contracts are relationships between legal actors who enter into an agreement for the purpose of either receiving or delivering the agreed upon deal. At their core, smart contracts are intended for the same purposes and in some scenarios, it would be detrimental to solely rely upon the automated component. Each party wants the sale to actually occur, thus having a “self-executing” con-

¹⁷⁶ Derric Yeoh, *Is Online Dispute Resolution the Future of Alternative Dispute Resolution?*, KLUWER ARB. BLOG (Mar. 29, 2018), <http://arbitrationblog.kluwerarbitration.com/2018/03/29/online-dispute-resolution-future-alternative-dispute-resolution> (“The effectiveness of communication at the mediation is also highly dependent on the parties’ literary skills in expressing themselves over email. The largely asynchronous nature of online mediation may also be detrimental to the mediation process, as it breaks the momentum that a long and uninterrupted mediation session can bring.”).

¹⁷⁷ Alec Liu, *Smart Oracles: Building Business Logic with Smart Contracts*, RIPPLE (July 16, 2014), <https://ripple.com/insights/smart-oracles-building-business-logic-with-smart-contracts>.

tract that can terminate due to a coding error, or a malfunction in the trigger events, is not in the parties' best interests. In traditional settings, if a problem arises and the relationship between the parties breaks down, the individuals or their legal counsel turn to the language of the contract to mitigate the issues. In the smart contract space, if a glitch is encountered, it is feasible to assume that the parties would also like to see the bargained-for outcomes performed. Therefore, automation of the smart contracts is not desired but instead, as discussed previously, the proposal is to enforce mandatory ODR with oracles serving as the third-party arbitrators.

The oracle is necessary for the formation of the smart contract since they provide the core information. This person would already be familiar with the case/transaction at hand and would be someone that the parties trusted. I propose that the oracle should be someone from the legal profession and a licensed arbitrator. The first step would be to provide notice to the parties that arbitration has been initiated and the ongoing contract is suspended. This can also occur by having one of the parties initiate the dispute, in which case the contract will stop executing and the oracle/arbitrator is invited to begin working on mitigating the setbacks. The arbitrator will notify the other party, either through a platform such as OpenCourt, or even more simply, an e-mail.¹⁷⁸ The next stage is to have a continuous communication portal to which only the arbitrator and the parties have access. The following crucial aspect is to cut out the steps where the parties are obeying the orders that the arbitrator gives, but instead, the computer program itself and the contract will comply with the demands of the arbitrator. The idea behind this is that in the situation where a payment is ordered to be released to one of the parties, the party should not have to go contact the bank itself, but the contract notifies and gives the order to the bank automatically after the oracle resolves the issue. Another mechanical step would be to have the contract confirm with the bank any issues instead of getting the validation from the party. Finally, the arbitrator would communicate back to the parties the update on the issue and the measures that were suggested to resolve the matter.

One other step needs to be tackled if we truly want the contract to still be an automated smart contract with the proposed mandatory arbitrator. At the preliminary stages of the contract, both parties should agree upon and "deposit into the contract itself as a virtual escrow account cryptocurrency equal to the maximum

¹⁷⁸ See generally, *supra* note 150.

amount that either might be expected to pay at settlement.”¹⁷⁹ This correlates with the proposed step above that the computer program and the contract will adhere to the directions of the arbitrator. If there is an allocated amount escrowed on the smart contract, all the arbitrator needs to do is direct a release of that money to the receiving party. A method such as this will simplify the decision-making process and provide the arbitrator the authority to execute the judgement. Thus, one of the parties will circumvent the need of executing an enforcement remedy to obtain the monetary judgment, or whatever else that party might be owed.

No matter the numerous arguments put forth that smart contracts are self-sufficient to the extent of eliminating human intermediaries, it is simply not feasible.

V. CONCLUSION

Blockchain technology has visibly changed the market for contracts, and even though proponents want to believe the best in smart contracts, they can still benefit significantly from ODR. In conclusion, the approach using formal logic and algorithms is not always the best outcome. At times, contractual terms are complicated enough that involvement of human judgment is necessary.¹⁸⁰ Having an oracle as an arbitrator would be essential when dealing with monetary transactions through a smart contract. There is no denying the fact that technology is evolving daily, and new ideas and mechanisms are formed to try to simplify contracts. However, that does not mean that these contracts should be taking the place of third-party arbitrators. Contracts are complicated and require a lot of back and forth human interaction. Thus, even in smart contracts that have the potential for massive transactional efficiencies, there must be a way to work in and initiate mandatory online arbitration. Once it has been figured out when the arbitration should be initiated and how mechanically it should work, it would be safer for parties to enter into serious financial contracts without the fear of potentially losing millions or billions of dollars due to a coding error. As the aforementioned researched showed, it might even be impossible at times to litigate cases dealing with smart contracts due to the coded nature of them.

¹⁷⁹ Schroeder, *supra* note 114.

¹⁸⁰ Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 DUKE L. J. 313, 365 (2017).

One needs to know that even with smart contracts, there is no way of getting around the actual law. Although blockchain-based smart contracts have evolved to become models of legal efficiency because of their self-enforcing nature, it must be noted that they are still real contracts and will be enforceable under existing law.¹⁸¹ Despite their inherent nature and purpose of reducing the need for complex court litigation, a proposed mandatory online dispute resolution with a lawyer as an oracle will hopefully eliminate a sizable amount of risks that go hand in hand with the intricacies of self-enforcing terms.

¹⁸¹ See generally Kaal & Calcaterra, *supra* note 128.