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While technologies evolve, international laws with ancient roots must be updated, in order to better suit the needs of a modern world. One new technology which has sent shockwaves into international and domestic law, is blockchain and its applicability to many facets of domestic and international business. This Comment analyzes how the letters of credit and international sales transactions would be impacted if the Uniform Customs and Practices published by the International Chamber of Commerce were to adopt blockchain technology. More specifically, the Comment analyzes how smart contracts would instill the same amount of trust on both sides of a transaction, as would a letter of credit.

I. INTRODUCTION

Since the industrial revolution, technology has rapidly improved at a rate greater than the rate law has developed. The increase in globalization fueled by the catalyst of technology has increased the rate in which globalization has occurred. The United States has been slow in adopting international laws which regulate the use of certain instruments in international commerce. One of these instruments is the letter of credit. Customs for let-

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ters of credit were first passed by the International Chamber of Commerce (ICC) in 1933.[1] It took the United States nineteen more years to adopt parts of the Uniform Customs and Practice for Commercial Documentary Credits (UCP) into domestic law through the Uniform Commercial Code (UCC). There is, however, one technology which neither the ICC nor the United States could have predicted would render the provisions they made to the letter of credit useless—blockchain technology and the rise of "smart contracts."[2]

Blockchain technology first debuted through the rise of Bitcoin in 2008.[3] Back then, the only use for blockchain was to verify the amounts that each individual had in the ledger. The computer that was able to solve the problem of how much each person had in their ledger was awarded a fraction of a Bitcoin; however, to receive this quasi-monetary award, a certain percentage of computers had to verify that the ledger the first computer solved was correct. When the ledger was verified, the first computer got Bitcoin and the solution to the ledger problem got added to the chain of solutions of the ledger. Hence the name of blockchain is what it is, a block of transactions in a chain of transactions that are verified.[4]

Since blockchain's first social experiment in 2008,[5] it has increased in power and uses. The latest variation of blockchain, which allows smart contracts, can be found on Ethereum Blockchain, the leader in smart contracts.[6] This use of the technology has allowed computers to verify certain transactions between private parties, and if a certain block of transactions is verified, then money is released between two parties in a transaction within the block of transactions. The verifications of sellers and buyers with the blockchain technology is what some have coined "smart contracts."[7] Smart contracts are an area of law that has not been analyzed in respect to the UCP 600 and letters of credit.

Letters of credit are ancient areas of sales transactions which have been analyzed by international organizations to create a uniform system of transactions.[8] A commercial letter of credit shifts the risk of payment from the seller to the buyer by retaining a bank of the buyer's choosing to pay on drafts that the seller provides to the buyer's bank.[9]

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1. INT'L CHAMBER OF COMMERCE, *infra* note 27.
2. *See* Ameer Rosic, *Smart Contracts: The Blockchain Technology That Will Replace Lawyers*, BLOCKGEEKS, https://blockgeeks.com/guides/smart-contracts/ [https://perma.cc/FYM2-C2QW].
3. Marr, *infra* note 93.
4. *See* McKinlay et. al., *infra* note 121.
5. Marr, *infra* note 93.
6. ICO RATING, *infra* note 103.
7. Rosic, *supra* note 2.
8. Trimble, *infra* note 32.
9. International Business Planning, *infra* note 62.

This area of law, which is regulated by the ICC through the UCP 600 and was codified in Article 5 of the UCC,[10] will become antiquated and rendered moot within the next decade, as the use of blockchain technology can do the same job of adding confidence to a transaction, without the need or use of buyers and sellers retaining banks for transactions. Within the next ten years, the use of blockchain technologies will eliminate a large portion of international law.[11] Additionally, investment banks will also see their income from letters of credit decrease as blockchain would be able to do their job more efficiently without the additional costs of retaining the issuing bank.[12] Investment banks will, however, recover these losses through the gains they realize through implementing blockchain technology.[13]

II. INTERNATIONAL SALES TRANSACTIONS

When entering into an international sale of goods, there are three separate documents to the transaction: the sales contract, the bill of lading, and the letter of credit.[14] These three separate documents are generally governed by three separate treaties of law.

First, the sale of goods is governed by the United Nations Convention on Contracts for the International Sale of Goods (CISG).[15] The caveat to the CISG is that both contracting states must be a part of the convention.[16] As of December 29, 2015, "UNCITRAL reports that eighty-four States have adopted the CISG."[17] Of the eighty-four States that have adopted some form of the CISG, all of the "G8 Countries" have adopted the CISG.[18] The

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10. U.C.C. § 5-102 (AM. LAW INST. & UNIF. LAW COMM'N 2018).

11. *See* Riccardo de Caria, A *Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities,* UNCITRAL, http://www.uncitral.org/pdf/english/congress/Papers_for_Programme/5-DE_CARIA-A_Digital_Revolution_in_International_Trade.pdf [https://perma.cc/2KD9-C9F5].

12. *See* Nezih Akbas, *The Blockchain Letter of Credit Will Revolutionize Shipping*, MORE THAN SHIPPING (Nov. 14, 2018), https://www.morethanshipping.com/the-blockchain-letter-of-credit-will-revolutionize-shipping/ [https://perma.cc/7XKG-Q2QE].

13. *See* Perez, *infra* note 152.

14. *See* Jeremiah J. Spires, *Doing Business in the United States*, § 34.02 (Matthew Bender, Rev. Ed.).

15. United Nations Convention on Contracts for the International Sale of Goods, Apr. 10, 1980, 149 U.N.T.S. 3, http://www.uncitral.org/uncitral/en/uncitral_texts/sale_goods/1980CISG.html [https://perma.cc/CL5H-G9TX].

16. *See Id.* at art. 1.

17. Albert H. Kritzer, *CISG: Table of Contracting States*, PACE LAW INST. OF INT'L COMMERCE, https://www.cisg.law.pace.edu/cisg/countries/cntries.html.

18. *Id.*

sales contract under the CISG mirrors some of United States' contract law, in which there is an offer and acceptance and certain rules on what is consideration.[19] While the principles are like United States' contract law, the actual use of the principles varies greatly.

Next, an international bill of lading. A bill of lading is an instrument which details who bears the risk of the goods in transit and at which points of the shipping process.[20] A bill of lading in the United States to a foreign state, or a foreign state to the United States, is governed by the 1936 Carriage of Goods by Sea Act (COGSA).[21] Under COGSA, an ocean carrier may limit "its liability to $500 per package."[22] This limited liability to shipping companies can create a massive disparity when goods are destroyed in transit, as $500 per package limit is a considerably low amount.[23] While this paper will be focused on transactions between United States companies and other foreign companies, it is worth noting that the United States' COGSA was based on international rules called the Hague Rules, agreed to by sixty-six countries that were present at the Brussels Convention for the Unification of Certain Rules Relating to Bills of Lading.[24] To this day, foreign companies that do not ship to or from the United States, but to or from separate foreign countries which are a part of the United Nations, are almost always evoking the use of the Hague-Visby Rules.[25]

Last, is the letter of credit which is governed between two domestic parties under Article 5 of the UCC,[26] or the UCP published by the ICC.[27] While UCC Article 5 may extend to international businesses through the evoking of the code through a contract, the UCP 600 usually tends to govern international sales transactions between a domestic company and a foreign company.[28]

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19. *See generally Elements of a Contract*, UNIV. N.M. JUD. EDU. CENTER, http://jec.unm.edu/education/online-training/contract-law-tutorial/contract -fundamentals-part-2 [https://perma.cc/2D3J-32HV].

20. *See* Tradelinks Resources, *Bill of Lading: Types of Bill of Lading & Bill of Lading Samples*, YOUTUBE (Dec. 27, 2017), https://www.youtube.com/watch?v=reAjDV9j09g.

21. *See* Carriage of Goods by Sea Act, 46 U.S.C. § 1301 (1936). *See also* Carriage of Goods by Sea Act, 46 U.S.C. § 30701 (1936).

22. *Id.*

23. *See* Vimar Seguros Y Reaseguros v. M/V Sky Reefer, 515 U.S. 528 (1995).

24. *Id.*

25. *See Hague-Visby Rules*, ADMIRALTYLAW.COM, http://www.admiraltylaw.com/statutes/hague.php [https://perma.cc/XYM9-U927].

26. *See* U.C.C. §§ 5-101-118 (AM. LAW. INST. & UNIF. LAW COMM'N 2018).

27. *See ICC Uniform Customs and Practice for Documentary Credits*, INT'L CHAMBER OF COMMERCE (July 1, 2007), http://store.iccwbo.org/icc-uniform-customs-and-practice-for-documentary-credits [https://perma.cc/44RJ-GX44].

28. *See* TRADE FIN. GLOB., *infra* note 55.

A. HISTORY OF THE THREE CATEGORIES

International sales transactions have ancient roots, as humans created barter economies,[29] and as economies of scale[30] rose with the first ancient cities back in 6000 B.C. by Mesopotamian tribes.[31] Documenting sales has been claimed to reach back to ancient Egypt with cuneiform tablets,[32] however, most evidence for the first main stream use of documentary sales transactions stems from fourteenth century in Italy.[33] The early Italian documentary sales were between "merchant-bankers of Venice, Genoa, Florence, and other commercial cities of Europe freely used letters of credit."[34] Two centuries later, documenting shipping transactions and who bears the risk came into common use.[35] "Most… [bills of lading] merely recited the quantity of packages or [number of] bales [being] shipped."[36] The bill of lading was originally used to help keep shipper's records more clear.[37] Since the inception of the United States, a great deal of law has surrounded bills of lading and the accompanying sales contracts. As the industrial revolution took hold in the United States, there was an increase in gross domestic product, which was fueled by the trade surplus the United States experienced.[38] While the Industrial Revolution created vast amount of exports, European nations experienced the same growth within their use of interna-

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29. *See* Tejvan Pettinger, *Barter Economy*, ECON. HELP (Nov. 28, 2016), https://www.economicshelp.org/blog/glossary/barter-economy/ [https://perma.cc/NE88-52WJ].

30. *See* Will Kenton, *Economies of Scale*, INVESTOPEDIA (May 20, 2019), https://www.investopedia.com/terms/e/economiesofscale.asp [https://perma.cc/H8MX-H3ZP].

31. *See Barter System History: The Past and Present*, INTUIT MINT, https://www.mint.com/barter-system-history-the-past-and-present [https://perma.cc/F2FF-XGSJ].

32. Rufus James Trimble, *The Law Merchant and the Letter of Credit*, 61 HARV. L. REV. 981, 984 (1948). *See also Letters of Credit—Negotiable Instruments*, 36 YALE L. J. 245, 248-49 (1926) (stating letters of credit were developed by early merchants doing international trade).

33. Rufus James Trimble, *The Law Merchant and the Letter of Credit*, 61 HARV. L. REV. 981, 985 (1948).

34. *Id.*

35. Daniel E Murray, *History and Development of the Bill of Lading*, 37 U. MIAMI L.
REV. 689 (1983).

36. *Id.*

37. *Id.*

38. Gregory Clark et. al., *Made in America? The New World, The Old, and the Industrial Revolution* (Nat'l Bureau of Econ. Research, Working Paper No. 14077, 2008), http://economics.ucdavis.edu/people/amtaylor/files/w14077.pdf [https://perma.cc/T83A-S9LW].

tional trade (like Italy in the 19th century).[39] As trade continued to increase rapidly, countries and private individuals started to create rules of how to standardize the practice of international trade and shipment of goods.[40] Prior to the 1930's, private parties negotiated how letters of credit should be handled. This would increase the time and cost of each transaction, as each one would have to be agreed to on both sides of the transaction. The letter of credit in the United States, prior to any domestic rules, was treated "[h]istorically and traditionally . . . [as] an international rather than a national device."[41] A group of bankers in 1920 came together to establish a set of rules for commercial credit, as there was an increase in international sales transactions. After the first World War, the United States enacted legislation to allow domestic banks "engaging in foreign banking to issue letters of credit"[42] and "accept time bills of exchange,"[43] which "has been interpreted to include the issuance of letters of credit."[44] This followed the regulations published by the New York Bankers Commercial Credit Conference of 1920, where a group of bankers and steamboat operators discussed "received for shipment" bills of lading.[45] The proceedings of the conference created approximately 35,000 regulations, of which all were adopted by the United States Foreign Trade Council.[46] These regulations however had no effect of standardizing the letter of credit, as Omer Hershey writes:

> [Letters of credit] may be mere informal advices, or more or less formal authorizations from a purchaser to draw on certain bankers here or abroad, or directions to given bankers to accept vendor drafts on certain conditions, or sometimes they are merely requests to negotiate the sale of such drafts. . . . The conditions and provisions of these letters vary with the exigencies of each case, and no very definite

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39. Giovanni Federico & Antonio Tena Junguito, *The Ripples of the Industrial Revolution: exports, economic growth, and regional integration in Italy in the early 19th century* (Universidad Madrid, Working Paper No. 13-02, 2013), https://core.ac.uk/download/pdf/29404141.pdf [https://perma.cc/VJ7G-E2X6].

40. *Id.*

41. Horace M. Chadsey, *Practical Effect of the Uniform Commercial Code on Documentary Letter of Credit*, 102 U. PA. L. REV. 618, 619 (1954).

42. 12 U.S.C. § 615 (1946).

43. . 12 U.S.C. §§ 372-373 (1946).

44. . Chadsey, *supra* note 41, at n.1 (1954).

45. . Wilbert Ward, *American Acceptance Council to Continue the Word of the Bankers Commercial Credit Conference*, 4 ACCEPTANCE BULL. OF THE AM. ACCEPTANCE COUNS. 6 (1922).

46. *Id.*

> or uniform rules of construction, either in practice or in our courts, seem yet to have been attained.[47]

This lack of uniformity along with the groundwork laid by the New York Bankers Commercial Credit Conference of 1920 paved the way for the ICC to comprise "a more ambitious and comprehensive tabulation of customs and practices."[48] In 1933, the ICC created a set of rules to harmonize this area of law. The UCP was adopted by American banks by 1938,[49] and was codified by the United States as Uniform Customs on January 1, 1952, in UCC § 5-102, comment four.[50] Article 5 section 102 of the UCC contains definitions of different terms used for letters of credit. Comment four states, "[t]he practice of making letters of credit available by 'deferred payment undertaking' as now provided in UCP 500 has grown up in other countries and spread to the United States."[51] The definition of "'honor' will accommodate that practice."[52] In October of 1995, Article 5 of the UCC was revised to include more respect to international customs from the ICC and UNCINTRAL.[53] Through these revisions, letters of credit referenced in Article 5 of the UCC is closer to the UCP and international letter of credit in documentary sales transactions law.

On July 1, 2007, the sixth iteration of the UCP was published by the ICC.[54] The ICC's UCP 600 is applied to 175 countries around the world.[55] With the publication of the UCP 600 on July 1, 2017, the ICC also released a supplement to the UCP 600 called the eUCP.[56] The eUCP was the first attempt of the ICC to address the rapid pace of computer transactions. However, neither the eUCP nor the UCP 600 could have ever predicted how advanced technology would come just a decade after they had been published. The institute of international banking law and practice stated that

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47. Omer F. Hershey, *Letters of Credit*, 32 HARV. L. REV. 1 (1918).
48. Murray, *supra* note 35, at 619.
49. *Id.*
50. *Id.*
51. U.C.C. § 5-102, cmt. 4 (AM. LAW. INST. & UNIF. LAW COMM'N 2018).
52. U.C.C. § 5-102 (AM. LAW. INST. & UNIF. LAW COMM'N 2018).
53. *See* James Barnes, *Internationalization of Revised UCC Article 5 (Letters of Credit)*, 16 NW. J. INT'L L. & BUS. 215 (1996).
54. INT'L CHAMBER OF COMMERCE, *supra* note 27.
55. *UCP 600 and Letters of Credit*, TRADE FIN. GLOB., https://www.tradefinanceglobal.com/letters-of-credit/ucp-600/ [https://perma.cc/P8KJ-N83F].
56. *eUCP V1.1 Supplement to UCP 600*, KU LEUVEN LAW, https://www.law.kuleuven.be/personal/mstorme/eUCPV1.pdf [https://perma.cc/2SLS-NPZD].

the ICC is updating the eUCP as of January 24, 2018.[57] None of the eUCP has been codified into the UCC. The Uniform Electronic Transactions Act ("UETA") adopted some parts of the eUCP in article 3 of the UCC.[58] Evidence of parts of the eUCP finding their way into United States law in the UETA.[59] These electronic transactions laws, however, will need to be amended – both the eUCP and the UETA – as technology has far outpaced the regulations for international sales transactions and the increasing pace of electronic global transactions.[60]

B. WHAT IS A LETTER OF CREDIT AND WHY DO THEY MATTER?

When two parties engage in an international sale of goods, they more often than not exchange documents consisting of the three documents discussed above. This type of transaction is called a documentary sale.[61] "A letter of credit is a document issued by a bank indicating that it will honor drafts against document when presented by a designated beneficiary under that letter of credit for a stated purpose and in accordance with stipulated terms and conditions."[62] There are three parties to the letter of credit transaction: the seller which benefits from the credit arrangement with the bank, the buyer which must apply to the bank for the letter of credit, and the bank who issues the letter of credit. Letters of credit are unlike any other financial instrument, as "the letter of credit constitutes an independent direct obligation of a financial institution."[63] This means that in the event that the buyer does not have enough money to cover the transaction, the seller is not affected, since the bank is personally liable for the debt.[64] Due to the riskiness of the business to the bank, there is a doctrine in law which purports strict compliance with the letter of credit on any drafts against the letter.[65]

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57. *ICC Resumes eURC Development and eUPC Update,* INST. OF INT'L BANKING LAW & PRACTICE (Jan. 24, 2018), http://iiblp.org/icc-banking-commission-digitization/ [https://perma.cc/JQ4D-2VVP].

58. BAFT, et al., *Code is not Law: The Legal Background for Trade Finance Using Blockchain,* BAFT (July 6, 2018), https://baft.org/docs/default-source/default-document-library/joint-dlt-report-2018-final-code-is-not-law.pdf?sfvrsn=2 [https://perma.cc/P83S-DEH2].

59. Federal Electronic Signatures in Global National Commerce Act*,* 15 U.S.C. §§ 7001-7006 (2000).

60. BAFT, *supra* note 58.

61. Griffin Pivateau, *The documentary sale used in the international sale of goods*, YOUTUBE (Oct.7, 2015), https://www.youtube.com/watch?v=mMQXHGIe3N4.

62. 1 International Business Planning: Law and Taxation § 6.04 (Matthew Bender, Rev. Ed.). *See also* Bank of Am. v. U.S., 680 F.2d 142 (Ct. Cl. 1982).

63. *Id.*

64. *Id.*

65. *See generally* Dr. Rosmawani Che Hashim, *Principle of Strict Compliance in Letter of Credit (LC): Towards a Proper Standard of Compliance*, UNIV. OF MINN.,

When the ICC published the UCP 600, they cited that seventy percent of the documents that were presented under letters of credit were being rejected on the first presentation to the bank.[66] The only exception to the strict compliance doctrine on conforming documents is if there is a local custom which is accepted.[67] The strict compliance doctrine, however, does set out a need for the seller to explicitly state what they are selling and to make sure their goods conform perfectly to the letter of credit to draft documents against. Courts often state that the independence of a bank's obligation under the letter of credit should not be extended to a seller when they are committing fraudulent activities.[68] It should be noted that there has been a problem of fraud in letter of credit law.[69]

The strict compliance principle also is coupled with the independence principle of letters of credit. The independence principle states that each part of the international sale is separate from the letter of credit.[70] The independence principle "provides that letters of credit impose obligations on participating parties independent of the contacts underlying them."[71] Therefore, a bank does not have to worry about the contract that two parties made with each other. The only instrument that the bank will rely on to release funding is the letter of credit that is established between the buyer and the buyer's bank. The UCP 600 section 5 states, "[b]anks deal with documents and not with goods, services, or performance to which the documents may relate."[72]

This means that the bill of lading and the sales contract cannot be invoked for a bank to pay out on a draft against it. The letter of credit is its own legally distinct document.[73]

The letter of credit has advantages for both the seller and the buyer, but they have one downside: they cost a considerable amount. "[T]he bank can ordinarily range from one to three percent (on a per annum basis) of the

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https://umexpert.um.edu.my/file/publication/00008256_97294.pdf [https://perma.cc/6BFV-3E96].

66. *See* International Business Planning, *supra* note 62.

67. *See* Dixon, Irmao & Cia, Ltd. v. Chase Nat. Bank, 144 F.2d 759 (2d Cir. 1944), *cert. denied*, 324 U.S. 850 (1944).

68. Sztejn v. J. Henry Schroder Banking Corp., 31 N.Y.S. 2d 631 (N.Y. Sup. Ct. 1941).

69. *See generally* Ross P. Buckley & Xiang Gao, *The Development of the Fraud Rule in Letter of Credit Law: The Journey So Far and the Road Ahead*, 23 U. PA. J. INT'L ECON. L. 663 (2002).

70. Michael Gruson and Hartwin Bungert, *Letters of Credit: The Independence Principle Vindicated*, 113 BANKING L. J. 614 (1996).

71. Semetex Corp. v. UBAF Arab Am. Bank, 853 F. Supp. 759 (S.D.N.Y. 1994). *See also* UCP 600 § 4(a).

72. UCP 600 § 5.

73. Alvin L. Arnold, *Letters of Credit: Fraud and the Independence Principle*, 39 No. 6 Mortg. & Real Estate Execs. Report 4 (May 15, 2006).

amount of the credit [extended]."[74] The advantages for the exporter is that the risk for the buyer being insolvent is shifted to the bank.[75] The advantage for the buyer is that the bank will refuse to release payment until the seller "has explicitly complied with the terms specified in the letter of credit."[76]

III. AN OVERVIEW OF BLOCKCHAIN[77]

Blockchain is the forefront of the fourth industrial revolution.[78] The first three had been driven by "rapid advances in automation and connectivity, starting with technologies that launched the First Industrial Revolution . . . to the exponential increases in computing power of the recent decades."[79] The first industrial revolution was powered by the creation of mechanical production and steam powered energy in 1784.[80] The second came around the turn of the twentieth century when electricity and mass production gained popularity.[81] The last revolution was in 1969, with the rise of home electronics and internet technology.[82] This fourth industrial revolution is driven by big data and artificial intelligence.[83]

This fourth industrial revolution is also driven by extreme automation and connectivity.[84] The best example of this extreme automation and connectivity is blockchain. Blockchain is a term which, "refers to a system that has numerous components which when operating in conjunction with each other, can solve incredible problems across a broad array of industries."[85] The best way to think of blockchain is to think of it as a ledger.[86] However, this ledger, unlike a bank or other record keeping center, does not have one

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74. Bender, *supra* note 62.

75. *Id.*

76. *Id.*

77. Institute for the Future, *Understand the Blockchain in Two Minutes*, YOUTUBE (Apr. 18, 2016), https://www.youtube.com/watch?v=r43LhSUUGTQ [https://perma.cc/NT8X-KTX9].

78. *Extreme automation and connectivity: The global, regional, and investment implications of the Fourth Industrial Revolution*, UNITED BANK OF SWITZERLAND, at 3 (Jan. 2016), http://www.tadviser.ru/images/b/b7/Extreme_automation_and_connectivity_The_global%2C_regional%2C_and_investment_implications_of_the_Fourth_Industrial_Revolution.pdf [https://perma.cc/H5FW-AT8P].

79. *Id.*

80. *Id.* at 4.

81. *Id.*

82. *Id.* at 9.

83. UNITED BANK OF SWITZERLAND, *supra* note 78.

84. *Id.* at 12.

85. SHAWN S. AMUIAL, JOSIAS N. DEWEY, & JEFFREY R. SEUL, THE BLOCKCHAIN: A GUIDE FOR LEGAL AND BUSINESS PROFESSIONALS § 1:2 The Basics: What is a blockchain, and how does it work? (Oct. 2016).

86. *Id.*

location but rather is decentralized.[87] Blockchain achieves its decentralized ledger by keeping its transactions on several thousand different "nodes" which contain "a complete history of every transaction completed on a particular blockchain beginning with the first transactions that were processed into the first block" of the chain, the 'genesis block.'[88]

The question then becomes, how can one trust the blockchain if it is on several nodes, and does not have a centralized ledger? Blockchain answered this question by instituting a tool called the "protocol."[89] The protocol is a set of rules which the whole network operates.[90] The protocol is "embodied in the computer code that one downloaded onto their computer."[91] Therefore, a "*network* of computers all running a common software application . . . must come to agreement upon whether a change to the blockchain should be made, and if so, what the change should be."[92]

The first technology to debut the blockchain was a cryptocurrency released in 2008, called Bitcoin.[93] This "purely peer-to-peer version of electronic cash" used a decentralized ledger of transactions, and quickly it became the most widely used cryptocurrency.[94] While Bitcoin was the first public application of blockchain technology, it had limited functionality as it was only a platform which kept track of currency and failed to do what blockchains can do today. Satoshi Nakamoto's Bitcoin cryptocurrency has a current market capitalization of more than 60 billion.[95]

While Bitcoin was the first public application of blockchain, there were four other major innovations that followed it.[96] These innovations were the implementation of blockchain to other areas, the rise of the smart contract, the implementation of new protocols, and the implementation of scaling.[97]

After Bitcoin became a successful endeavor, the second innovation that followed Bitcoin was the "realization that the underlying technology

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87. *See* Cherry Reynard, *The 10 most popular cryptocurrencies in 2018*, TELEGRAPH (May 25, 2018), https://www.telegraph.co.uk/technology/digital-money/top-10-popular-cryptocurrencies-2018/ [https://perma.cc/YJ4T-E43A].

88. AMUIAL ET. AL., *supra* note 85.

89. *Id.*

90. *Id.*

91. *Id.*

92. *Id.*

93. Bernard Marr, *A Very Brief History of Blockchain Technology Everyone Should Read*, FORBES (Feb. 16, 2018), https://www.forbes.com/sites/bernardmarr/2018/02/16/a-very-brief-history-of-blockchain-technology-everyone-should-read/#6f190d7d7bc4 [https://perma.cc/2G5N-BAVM].

94. . *Id.*

95. *Bitcoin Price*, DIGITALCOIN https://digitalcoinprice.com/coins/bitcoin [https://perma.cc/4TQC-5RBR].

96. Marr, *supra* note 93.

97. *Id.*

that operated bitcoin could be separated from the currency and used for all kinds of other interorganizational cooperation."[98] It is estimated that fifteen percent of large banks will implement blockchain technology.[99] Furthermore, "IBM says that 66% of banks expect to have blockchain in commercial production and at scale" within four years.[100]

Realizing the benefits of what blockchain technology could provide Vatalik Buterin created the Ethereum blockchain, which was the third innovation of blockchain technology.[101] The Ethereum Blockchain was not just a ledger for currency, but allowed computer programs "that allowed financial instruments, like loans or bonds, to be represented, rather than only the cash-like tokens of the bitcoin."[102] Today, many smart contracts are run through different platforms, however Ethereum is the dominate platform on which individuals make smart contracts.[103] These "smart contracts" are instruments which could usurp the current regulations for international sales. Smart contracts are blockchains "also capable of carrying data in the form of arguments, which means that the platform can be programmed to take specific actions once certain conditions are met."[104] There are "three basic elements of a smart contract: (i) the proposed transaction . . . would involve more than the simple transfer from virtual currency from one party to another, (ii) the transaction involves two or more parties, and (iii) the implementation of the transaction is autonomous."[105] The elements of the smart contract are greatly different than the elements of a regular contract,[106] however, there are still ways that one may enforce a smart contract, such as expanding contract principles[107] or evoking principles of estoppel or unjust enrichment.[108]

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98. Vinay Gupta, *A Brief History of Blockchain*, HARV. BUS. REV. (Feb. 28, 2017), https://hbr.org/2017/02/a-brief-history-of-blockchain [https://perma.cc/EV2A-NJKR].

99. Lucinda Shen, *Blockchian Will Be Used by 15% of Big Banks By 2017*, Fortune (Sept. 28, 2016), http://fortune.com/2016/09/28/blockchain-banks-2017/ [https://perma.cc/AYZ5-C5HX].

100. . *Id.*

101. Gupta, *supra* note 98.

102. *Id.*

103. *See Smart Contract Platforms Review*, ICO RATING (Sept. 24, 2018), https://icorating.com/report/smart-contract-platforms-review/ [https://perma.cc/T8FM-U3WS].

104. Tsui S. Ng, *Blockchain and Beyond: Smart Contracts*, AM. B. ASS'N (Sept. 19, 2018), https://www.americanbar.org/groups/business_law/publications/blt/2017/09/09_ng/ [https://perma.cc/2SXD-TTFU].

105. AMUIAL ET. AL., *supra* note 85, at § 2:2.

106. O'Gorman, *infra* note 136, at 1055.

107. Stanley, *infra* note 117.

108. *See* TIMOTHY MURRAY ET AL, CORBIN ON CONTRACTS § 8.12 (3d ed. Matthew Bender 2015); *see also* RESTATEMENT (THIRD) OF CONTRACTS: RESTITUTION AND UNJUST ENRICHMENT §1.

The fourth innovation is the implementation of the "proof of stake" which would take over the "proof of work" current security.[109] The "proof of work" security system is the one that many individuals in cryptocurrency are familiar with. The "proof of work" system issues individuals cryptocurrency if they successfully "mine" a block of transactions.[110] There are two concerns with this approach. The first is that some cryptocurrency, like Bitcoin, has a controlled supply of Bitcoins and therefore could be mined until there is no incentive on the primary market to continue mining. The second, is that "proof of work" could be used by a malicious actor to pass blocks in a blockchain that would not traditionally match with the protocol.[111] A miner would be able to do this if they colluded with "a sufficient number of mining nodes whereby they could crowd out other miners . . . and manipulate the ledger for their own interest."[112] The "proof of stake" model does not weigh each node equally, but uses "different methods and mathematical models used to determine the specific methodology . . . but the general idea is to allocate it generally based on the relative loss each node would suffer as a result of a network failure or breach."[113] This innovation is being adopted across different blockchains and appears to be successful, as large blockchain cryptocurrencies have adopted the "proof of stake" method over the "proof of work" method.[114]

The newest innovation to blockchain technology is the implementation of scaling.[115] While the idea has not been fully enacted, Harvard Business Review states that "[a] scaled blockchain is expected to be fast enough to power the internet of things and go head-to-head with the major payment middlemen . . . of the banking world" such as VISA or SWIFT.[116] While all these innovations are working toward expanding the technology that is blockchain, the implementation of the third innovation with the smart contracts has created questions of the legality of the smart contracts and if they are legally binding.[117] More broadly, there have been mass inquiries into the

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109. Marr, *supra* note 93.

110. AMUIAL ET. AL., *supra* note 85, at § 1:6.

111. *Id.*

112. *Id.*

113. *Id.*

114. *See* Jake Frankenfield, *Proof of Stake (PoS)*, INVESTOPEDIA (July 30, 2018), https://www.investopedia.com/terms/p/proof-stake-pos.asp [https://perma.cc/59Z2-HFTS] (stating that Bitcoin and Ethereum have adopted Proof of Stake); *The Rising trend in Proof of Stake adoption*, MEDIUM (Apr. 9, 2018), https://medium.com/@poolofstake/the-rising-trend-of-proof-of-stake-adoption-f02e7669b095 [https://perma.cc/9TKQ-UK7W] (stating that the adoption of Proof of Stake is rapidly growing).

115. Marr, *supra* note 93.

116. Gupta, *supra* note 98.

117. *See* Aaron Stanley, *Can Code Really Be Law? New Report Clarifies Smart Contract Misconceptions*, FORBES (Sept. 27, 2018),

legal implications of the adoption of blockchain within various industries.[118]

A. LEGAL QUESTIONS TO BLOCKCHAIN

There are looming legal questions when it comes to blockchain technology as it is applied to everyday tasks. As to smart contracts, "[i]n the future, litigation attorneys may no longer be litigating the 'four corners' of the contract, but rather expanding into the intent of the [computer] code."[119] States like Arizona and Tennessee have given implications that they may respect smart contracts in blockchain by evoking the Uniform Electronic Signatures Act and the Electronic Signatures in Global Commerce Act.[120] Moreover, questions linger on the legal implications of blockchain such as the lack of jurisdiction, the liability of blockchain technology, enforceability of smart contracts, and implications to due diligence.[121] These legal issues to blockchain technology will need to be addressed by law makers and the courts before businesses can realize the full potential of the technology, the risk may be too high for some businesses to take on.[122]

Since blockchain crosses different jurisdictions with its thousands of nodes, the question becomes who and where should an individual bring a suit, if there is a legal challenge to a blockchain.[123] The three keys to bringing a suit are personal jurisdiction, venue, and subject matter jurisdiction. While it is often difficult to satisfy these three elements, the difficulty substantially increases when a blockchain "cross[es] jurisdictional boundaries as the nodes on a blockchain can be located anywhere around the world."[124] A simple solution to the personal jurisdiction of individuals who represent the nodes would be to allow suits relating to blockchain to have nationwide service of process. However, it would be difficult to prove which defendant in the blockchain had minimum contacts with another state. When suing the decentralized autonomous organization (DAO) itself, one would be able to

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https://www.forbes.com/sites/astanley/2018/09/27/can-code-really-be-law-new-report-clarifies-smart-contract-misconceptions/#5dddbc2134e2 [https://perma.cc/82XE-JHTJ].

118. *See* Jenny Leung, *7 Legal Questions That Will Define Blockchain in 2019*, COINDESK (Jan. 3, 2019), https://www.coindesk.com/7-legal-questions-that-will-define-blockchain-in-2019 [https://perma.cc/R8XX-NN6P].

119. *Id.*

120. *See* Stanley, *supra* note 117.

121. John McKinlay et. al., *Blockchain: background, challenges, and legal issues*, DLA PIPER (Feb. 2, 2018), https://www.dlapiper.com/en/denmark/insights/publications/2017/06/blockchain-background-challenges-legal-issues/ [https://perma.cc/WJ4Z-SRM8].

122. *Id.*

123. *Id.*

124. *Id.*

sue an incorporated business under the current Federal Rules of Civil Procedure. However, if the company is not incorporated, issues that accompany filing suit can be resolved by finding members of the DAO and suing them personally or suing "the person or entity that first created the DAO."[125] Unlike normal companies and corporations, DAOs do not have the same legal powers, as they are not recognized as their own entity.[126] There is a question as to how a court would treat a DAO if it were ever sued, as courts will be "unlikely to allow the wholesale adoption of technology which bypasses established oversight."[127] While there are many solutions to this jurisdictional problem, law makers must take action to address these questions before there becomes a plethora of questions as to where a blockchain suit may be filed. While jurisdiction is a major issue, the other major issue is who bears risk and liability of the blockchain and at what stage of the blockchain process.

The attribution of risk and liability is another conundrum to solve, because the blockchain's functioning is impossible to stop.[128] Meaning, if there were to be a malfunction in a blockchain, blocks after the faulty block in the blockchain would compound that error, making it nearly irreversible.[129] Since the blockchain operates itself, the question becomes whether the company managing the platform would incur the liability of a self-functioning operation.[130] For liability in contract, "contract and a breach of the contract are required."[131] However, the defense for node operators for their liability in contract is that they "have no way of knowing to which use their fragmented contribution to the network is put."[132] This creates a situation where a node operator would be unaware that they have flawed a block in the blockchain. The problem compounds when another malicious node intentionally creates a flaw in a blockchain, and different node mistakenly compounds on the problem without knowing that the prior block in the blockchain was faulty.[133]

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125. Stephen D. Palley, *How to Sue a Decentralized Autonomous Organization*, COINDESK (Mar. 21, 2016), https://www.coindesk.com/how-to-sue-a-decentralized-autonomous-organization [https://perma.cc/55AV-UGNN].

126. McKinlay et. al., *supra* note 121.

127. *Id.*

128. *Id.*

129. *Id.*

130. *Id.*

131. Dirk A. Zetzsche, et al., *The Distributed Liability of Distributed Ledgers: Legal Risks of Blockchain*, UNIV. OF NEW S. WALES L., at 29 (2017), http://www5.austlii.edu.au/au/journals/UNSWLRS/2017/52.pdf [https://perma.cc/Q4GF-Q4XZ].

132. *Id.* at 33.

133. *Id.*

"Joint tortfeasors are two or more individuals with joint and several liability in tort for the same injury to the same person or property."[134] In both contract and tort, an individual without knowledge could be liable for the actions of the computations of their computer. As of now, there are no limiting statutes to the amount of liability a node has when creating the blockchain. The best way to solve this problem is to evoke a principle and agency relationship, where the principle is liable for the torts and contracts of its agents. This would place the liability with the DAO, and for the DAO to recover any damages it sustained in its own lawsuit, the DAO could attempt to trace the nodes to which created the faulty block in the blockchain.

There are enforceability questions when it comes to a "smart contract" within the traditional definition of a contract.[135] Smart contracts are not contracts in and of themselves, as contracts rely on the basic elements of offer, acceptance, and consideration.[136] However, some states have argued that the "Uniform Electronic Signatures Act[137] and Electronic Signatures in Global Commerce Act[138] 'already recognize, enable and validate the use of electronic signatures and electronic records when using a blockchain."[139] Miren Aparicio, a former World Bank consultant stated, "[t]he law is ready – we do not need specific legislation for the smart contracts by state law, under e-commerce laws."[140] However, due to the lack of statutory or common law, law firms have advised their clients to only enter into smart contracts that include a dispute resolution provision, "to reduce uncertainty and provide for a mechanism in the event of a dispute."[141] Before a contract is formed in traditional contract formation, lawyers perform due diligence to grasp "[t]he economics of the transaction . . . such as pricing, financing and structuring [the deal]."[142]

Traditional due diligence approaches need to be adapted, as the offerings on an open source blockchain platform will need to be understood by the lawyers to ensure that products are what the blockchain says it is.[143]

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134. *Id.*

135. McKinlay et. al., *supra* note 121.

136. *See* Daniel P. O'Gorman, *Redefining Offer in Contract Law*, 82 MISS. L.J. 1049, 1055 (2013); *see also* Stanley *supra* note 106.

137. *See U.S. Guide to Electronic Signatures: An overview of federal and state law*, ADOBE (Sept. 2017), https://acrobat.adobe.com/content/dam/doc-cloud/en/pdfs/adobe-sign-us-guide-e-signatures-wp-ue.pdf [https://perma.cc/34XX-EYH3] (stating that every state has adopted the "UETA" except Illinois, New York, and Washington).

138. 15 U.S.C. §§ 7001 – 7006, 7021, 7031 (2000).

139. Stanley, *supra* note 117.

140. *Id.*

141. McKinlay et. al., *supra* note 121.

142. DARACH CHAPMAN, DUE DILIGENCE IN MASSACHUSETTS, MASSACHUSETTS CONTINUING LEGAL EDUCATION, § 7.2.1 (ed. PricewaterhouseCoopers LLP 2000).

143. McKinlay et. al., *supra* note 121.

Public companies and private companies have increased their investments in blockchain; however, lawyers are not able to discern who has "ownership of data residing on decentralized ledger"[144] Additionally, transactional lawyers cannot discern who has the intellectual property at what point of the blockchain process.[145] These issues have created barriers to company acquisitions of blockchain start-ups and mergers and acquisitions of companies who have purchased these types of start-ups.[146]

B. APPLICATIONS OF BLOCKCHAIN

While the legal implications are being solved and dwindled down every day through different solutions, the applications of blockchain have expanded to an infinite amount of possibilities. The first application of blockchain was in 2008 when Satoshi Nakamoto released Bitcoin.[147] Today, blockchain can be extended to, but not limited to, financial markets, the legal industry, accounting, and governmental matters.[148]

Recently, the National Association of Securities Dealers Automated Quotations ("NASDAQ") has adopted blockchain technology to create the Linq system, "which allows companies to develop digitally represented shares that can be treated."[149] This technology will "increase the speed and reduce trading costs," but "blockchains would also benefit from more efficient and transparent proxy voting and dissemination of information to shareholders…."[150] JPMorgan Chase, Citigroup, and Credit Suisse are investing in this technology to lower their costs and create a more efficient trading platform.[151] This is due to the estimated savings of "infrastructural costs by $15-20bn a year by 2022."[152] Consumers also benefit from the implementation of blockchain technology, as the use of smart contract could "help eliminate today's paper-based appraisal and documentation processes, reducing the time involved in interacting with multiple agencies to verify applicant and property details…" in a mortgage transaction.[153] The

144. *Id.*
145. *Id.*
146. *Id.*
147. Marr, *supra* note 93.
148. McKinlay et. al., *supra* note 121.
149. AMUIAL ET. AL., *supra* note 85, at § 2:8.
150. *Id.*
151. Alex Tapscott & Don Tapscott, *How Blockchain Is Changing Finance*, HARV. BUS. REV. (Mar. 1, 2017), https://hbr.org/2017/03/how-blockchain-is-changing-finance [https://perma.cc/PM9S-VYHD].
152. Yessi B. Perez, *Santander: Blockchain Tech Can Save Banks $20 Billion a Year*, COINDESK (Jun. 16, 2015), https://www.coindesk.com/santander-blockchain-tech-can-save-banks-20-billion-a-year [https://perma.cc/76SD-WSP6].
153. Sakipada Maity, *Consumers set to save up to sixteen billion dollars on banking and insurance fees thanks to blockchain based smart contracts says Capgemini report*,

process is estimated to save consumers between "$480 and $960, or eleven to twenty-two percent on mortgage arrangement and account fees for consumers."[154] It is also estimated that the insurance costs for consumers, if financial institutions implemented blockchain technologies through smart contracts, are to be reduced by $21 billion in annual processing costs.[155]

While the cost savings in the finance industry could be vast, the legal field could also implement the technology with great success. "Historically, lawyers have been slow to adopt new technology . . . [b]lockchain seems to be different."[156] Some have attributed the development to the infringement on a large area of traditional business contracts while others attribute it to the cross of the interest in technology and the law.[157] The implications of blockchain on international documentary sales is addressed later, but the adoption of blockchain technologies could streamline corporate filings, accelerate dispute resolution, assist in criminal cases, provide evidence for intellectual property law suits,[158] streamline property transactions, and increase the efficiency in searching public land records.[159] In August 2017, Delaware General Corporate Law section 224 was amended to include the use of distributed ledgers or blockchain technology.[160] The specific language stated that the law is "recognizing the use of blockchain technology as a permissible method for creating and administering corporate records."[161] While Delaware has moved forward with blockchain technology, they are not the only state which is implementing blockchain technology. Wyoming has passed five bills[162] on blockchain and is pining to be the most blockchain friendly state in the United States.[163] Blockchain can also be

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CAPGEMINI (Oct. 11, 2016), https://www.capgemini.com/news/consumers-set-to-save-up-to-sixteen-billion-dollars-on-banking-and-insurance-fees-thanks-to/ [https://perma.cc/Y2WT-76DZ].

154. *Id.*

155. *Id.*

156. AMUIAL ET AL., *supra* note 85, at § 2:9.

157. *Id.*

158. Birgit Clark, *Blockchain and IP Law: A Match made in Crypto Heaven?* WORLD INTELL. PROP. ORG. (Feb. 2018), https://www.wipo.int/wipo_magazine/en/2018/01/article_0005.html [https://perma.cc/6G83-KM6U].

159. Jaliz Maldonado, *10 Ways Blockchain Technology Will Change The Legal Industry*, NAT'L L. REV. (Nov. 19, 2018), https://www.natlawreview.com/article/10-ways-blockchain-technology-will-change-legal-industry [https://perma.cc/FV4B-LFRM].

160. *Id.*

161. Spencer D. Klein & F. Dario de Martino, *Delaware Governor Signs Groudbreaking Blockchain Legislation into Law*, MORRISON FOERSTER (July 27, 2017), https://www.mofo.com/resources/publications/170727-delaware-blockchain-legislation.html [https://perma.cc/3AFW-DRAV].

162. *See* H.B.101, 2018 Leg., 64th Sess. (Wyo. 2018). *See also* WYO. STAT. ANN. § 17-16-140 (2018) *et seq*.

163. Maldonado, *supra* note 159.

implemented in dispute resolution by using smart contracts to resolve disputes. Two businesses have created this type of service where one "purchase[s] a token . . . [then] the funds go into the court that specializes in [the] area of expertise and location. Funds held in escrow are disbursed to the winning party."[164] Turning to the criminal side of law, many cases are thrown out of court due to the misplacement of evidence. Criminal law practices could implement blockchain systems that would give the public greater access to information; an auditable trail of amendments to documents, enhancement of record keeping, and more transparency between the government and the public.[165] The implementation of blockchain in criminal law would also allow interested parties in a case to be able to receive updates instantaneously while permissions to view records could be set at various levels.[166] For intellectual rights, there are four sites where registration of material can take place, which "prevent[ ] copyright infringement and enforce mitigation by providing a time-stamped copy of the work in question."[167] While this does not protect in the use of the copywritten material, it still has the impact of creating a strong prima facie case that the intellectual property belongs to whomever the proponent says it does. The last two areas that the blockchain would benefit in the legal world is in property transfers and public service records. Cook County, Illinois (the county which houses Chicago and its suburbs) implemented a blockchain program for transferring and tracking property titles.[168] The report stated that the "blockchain-powered real estate industry will require a lot of work and education, but the payoff appears to be worth the effort."[169] The report cited that the Great Chicago Fire caused a massive amount of damage to the historical land records of Cook County; however, this blockchain-based-system would prevent against any natural disaster.[170] Illinois used the same type of blockchain system for their public records as well.[171] The Illinois Blockchain Initiative is currently "exploring how blockchain might serve in

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164. *Id.*

165. *Id. See also Reforming justice for the digital age*, THE POLICE FOUND. (July 16, 2017), http://www.police-foundation.org.uk/publication/reforming-justice-for-the-digital-age/ [https://perma.cc/5MLL-ZASB].

166. Maldonado, *supra* note 159.

167. *Id.*

168. *Id.*

169. John Mirkovic, *Blockchain Pilot Program, Final Report*, RECORDER OF DEEDS COOK COUNTY, ILLINOIS (May 30, 2017), http://cookrecorder.com/wp-content/uploads/2016/11/Final-Report-CCRD-Blockchain-Pilot-Program-for-web.pdf [https://perma.cc/28KN-2STX].

170. *Id.*

171. *See Illinois Blockchain Initiative: Insights, Progress & Horizon Scanning*, MEDIUM (Mar. 23, 2017), https://illinoisblockchain.tech/illinois-blockchain-initiative-insights-progress-horizon-scanning-61e25a51e345 [https://perma.cc/QC3N-L8CC].

keeping records and delivering services."[172] If this technology worked as well as the Cook County records blockchain, Illinois will most likely be looking for even more places to implement blockchain technology, as the technology is "immutable, anonymous, unhackable, and decentralized . . . ."[173]

The implications of blockchain on the legal industry will create vast sweeping changes and streamline the different processes. The same type of streamlining could be seen in the field of accounting. Double entry accounting is "a fundamental concept underlying present-day bookkeeping and accounting, states that every financial transaction has equal and opposite effects in at least two different accounts."[174] With the use of blockchain technology, this present-day bookkeeping technique would be antiquated, as the technology makes "triple-entry" accounting possible in real time.[175] Triple-entry would add cryptography to traditional accounting ledgers.[176] Additionally, due to the immutable nature of the blockchain, it would be impossible to "cook the books" after the ledger has been passed through a block.[177] These blockchains would lead to greater efficiencies within a firm or business and could be quasi-public systems, as the individual node which works on the blockchain doesn't need to see the sensitive financial information to create the block.[178]

Another body which could adopt blockchain technology is the government. As stated above, Illinois, Delaware, and Wyoming have passed types of legislation that deal with blockchain. However, the benefits of the blockchain could extend to more than just small projects that they have implemented. The three benefits that governments could realize is the increased trust that citizens have with officials, the protection of sensitive data, and the reduction costs with improved efficiency.[179] The Pew Research Center on United States Politics and Policy has tracked the public's trust in the government from 1958 to 2017. At the time of the report, only eighteen percent of Americans stated that "they can trust the government in

172. Maldonado, *supra* note 159.

173. *Id.*

174. Adam Hayes, *Double Entry Definition*, INVESTOPEDIA (Apr. 23, 2019), https://www.investopedia.com/terms/d/double-entry.asp [https://perma.cc/72SC-AFZU].

175. AMUIAL ET AL., *supra* note 85, at § 2:10.

176. *Id.*

177. *Id.*

178. *Id.*

179. Kate Boeding et al., *3 Potential Benefits of Blockchain for Government*, BOOZ ALLEN HAMILTON (Feb. 18, 2019), https://www.boozallen.com/s/insight/blog/3-potential-benefits-of-government-blockchain.html [https://perma.cc/4ZAG-ZHLR].

Washington to do what is right."[180] The decentralization of data would better verify if the information that comes out of Washington D.C. is trustworthy. This type of technology could also protect sensitive data. In 2017, "143 million Americans were exposed in the 2017 Equifax database breach."[181] In 2015, "20 million records of past and present government employees were stolen from databases maintained by the Office of Personnel Management."[182] Governments have vast amounts of data that they have stored on secured servers and in paper in large vast file rooms. While the data on servers are at risk for potential hacking, the paper backlog also poses a problem when it comes to veterans waiting for their claims from the Veterans Affairs.[183] These two problems could be solved by digitizing records and keeping them in a blockchain, as the technology has "the potential to revolutionize the way [the United States] manage[s] online identity and access to the internet . . . ."[184] A major area that the United States could use blockchain technology is in the voting process,[185] to secure the amount of votes which has been cast between candidates, thus creating no doubt in the American public about the validity of elections.[186] While the implications of adding blockchain to voting could be its own article, the main benefit that governments could see if they adopted blockchain technology in their governmental processes would be the reduction of costs and improved efficiency of agencies.[187] Illinois has seen the benefits of adding blockchain to its process through the implementation in its land records[188] and its public rec-

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180. *Public Trust in Government: 1958-2017*, PEW RESEARCH CENTER (Dec. 14, 2017), http://www.people-press.org/2017/12/14/public-trust-in-government-1958-2017/ [https://perma.cc/2NYX-QMJT].

181. *Id.*

182. *Id.*

183. *See* Leo Shane III, *Watchdog report: The VA benefits backlog is higher than officials say*, MILITARYTIMES (Sept. 10, 2018), https://www.militarytimes.com/news/2018/09/10/watchdog-report-the-va-benefits-backlog-is-higher-than-officials-say/ [https://erma.cc/N348-KUF8].

184. Boeding et al., *supra* note 179.

185. *See* Mike Montgomery, *One Place Where Blockchain Could Really Help: Voting*, FORBES (Feb. 21, 2018), https://www.forbes.com/sites/mikemontgomery/2018/02/21/one-place-where-blockchain-could-really-help-voting/#2a552e82b892 [https://perma.cc/ZU2D-YQZK]; *Contra* Stephen Shankland, *No, blockchain isn't the answer to our voting system woes*, CNET (Nov. 5, 2018), https://www.cnet.com/news/blockchain-isnt-answer-to-voting-system-woes/ [https://perma.cc/T8H3-ZS27].

186. *See generally* Julia Azari, *What Happens If The Election Was A Froud? The Constitution Doesn't Say,* FIVETHIRTYEIGHT (July 6, 2017), https://fivethirtyeight.com/features/what-happens-if-the-election-was-a-fraud-the-constitution-doesnt-say/ [https://perma.cc/W9S3-2ZMW].

187. Boeding et al., *supra* note 179.

188. Mirkovic, *supra* note 169.

ords.[189] These processes also could lower the tax bill on Americans, as with greater efficiency and lower costs, the less the government needs from its citizens to run itself. The Treasury Department and General Services Administration implemented a blockchain to process incoming proposals from vendors which currently takes forty days to process.[190] A General Services Administration official stated that blockchain could lower the costs of analyzing a proposal by nearly eighty percent.[191]

While there are many applications that blockchain technology can be used for, it can be seen that the main place that it is used is to better organize information that has questions as to potential untrustworthiness of the information itself. The government has not yet passed any legislation trying to restrict the uses of blockchain. This is surprising as other countries have proposed regulations for blockchain,[192] however absent these regulations, it is a free market waiting for anyone to exploit the riches that are in the blockchain business.

IV. IMPACTS OF "SMART CONTRACTS" IN BLOCKCHAIN TECHNOLOGY ON INTERNATIONAL SALES TRANSACTIONS

With the rise of the "Smart Contracts" in blockchain technology, the letter of credit requirement needed in many international sales transactions will become antiquated and useless. Furthermore, this new technology will eliminate a profitable endeavor for investment banks, but investment banks will make more money by adopting blockchain than to continue operating without blockchain.[193] Banks have charged up to twenty-five percent of the full value of the letter of credit.[194] The UCP has already been affected by blockchain technologies, and the ICC is addressing what to do next with

189. *The Illinois Blockchain Initiative*, *supra* note 171.

190. Boeding et al., *supra* note 179.

191. *Id.*

192. *See* Abhimanyu Krishnan, *Italy Reveals First Set of Blockchain Regulations*, INVEST IN BLOCKCHAIN (Jan. 31, 2019), https://www.investinblockchain.com/italy-reveals-first-blockchain-regulation/ [https://perma.cc/2EM6-K3HH]; *See also* Max Mayer, *Policymakers In India Might Push For Cryptocurrency Regulations During Upcoming Blockchain Summit*, SMARTEREUM (Feb. 18, 2019), https://smartereum.com/47919/cryptocurrencies-in-india-policymakers-in-india-might-push-for-cryptocurrency-regulations-during-upcoming-blockchain-summit-blockchain-news-today/ [https://perma.cc/9U8H-MCMB].

193. *New ICC survey shows pace of trade finance digitalization*, INT'L CHAMB. COM. (May 23, 2018), https://iccwbo.org/media-wall/news-speeches/new-icc-survey-shows-pace-trade-finance-digitalisation/ [https://perma.cc/NTW5-FD4X].

194. *Pricing Schedule for Letters of Credit*, FHLBANK BOSTON (June 17, 2016), http://www.fhlbboston.com/downloads/productsandservices/creditproducts/loc_pricing_grid.pdf [https://perma.cc/EJ8J-37F7].

blockchain through its Cognitive Trade Advisor.[195] Meanwhile other individual countries are already preparing to find out how blockchain will govern in their country.[196] Unfortunately, the current UCP will not be able to address the problems that blockchain smart contracts pose; however, through another iteration of the UCP and eUCP the ICC may be able to address these modern-day issues.

The statistical rise of blockchain is evidenced through the ICC and its annual Global Survey which states that "60% of banks are moving toward digitalization, though only 9% say technology solutions have so far increased efficiency."[197] Thirty percent of respondents stated that their bank was less than two years away from implementing technology solutions, such as blockchain.[198] The impact of blockchain technologies is further evidenced by the increased amount of parcels that have arrived at the United States borders.[199] Over the last four years the incoming packages have tripled, and the increase can be traced to the implementation of blockchain technologies of shipping companies and the Trade Facilitation Agreement created in 2013 by the World Trade Organization,[200] which "reduced red tape and bureaucratic barriers to commerce."[201] While this technology is being used internationally, how has international law kept up with the implementation?

With three words, the previous question can be answered: it has not. However, the International Chamber of Commerce has commissioned a project called the Cognitive Trade Advisor.[202] As stated before, documentary sales transactions require three different contracts: (1) the sales contract, (2) the letter of credit for payment, and (3) the bill of lading and con-

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195. *ICC Launches Artificial Intelligence tool for Trade Negotiations*, INT'L CHAMBER OF COMM. (Apr. 10, 2018), http://www.iccbrasil.org/noticias/2018/10/4/icc-launches-itti-cta/ [https://perma.cc/2BXG-QF4P].

196. *See* DELOITTE, BREAKING BLOCKCHAIN OPEN 13 (2018) https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-2018-global-blockchain-survey-report.pdf [https://perma.cc/GX8J-GUCA].

197. *Id.*

198. *Id.*

199. *See* Aaron Stanley, *Supply Chain Titans, U.S. Chamber Eye Blockchain For Global Commerce*, FORBES (May 22, 2018), https://www.forbes.com/sites/astanley/2018/05/22/facilitate-trade-protect-consumers-supply-chain-titans-eye-blockchain-for-global-commerce/#158731b7534e [https://perma.cc/55DW-SCH3].

200. *Trade facilitation*, WORLD TRADE ORG. https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm [https://perma.cc/AW3R-8BTJ].

201. Stanley, *supra* note 199.

202. INT'L CHAMBER OF COM., *supra* note 195.

tract of affreightment for the transport of the goods.[203] Blockchain, through smart contracts, would be able to satisfy all three of these requirements by making simple "if-then statements"[204] in the computer code for which the transaction is being made. The International Chamber of Commerce launched its tool from the work of the Intelligent Technology and Trade Initiative, a project analyzing artificial intelligence and blockchain technologies on international trade.[205] The International Chamber of Commerce teamed up with the Intelligent Tech and Trade Initiative who paired with IBM to use artificial intelligence to shorten the time and improve productivity for trade negotiations.[206] The creation of the cognitive assistant which can understand all human languages shows that the ICC knows that there needs to be changes to international trade, and many expect the ICC to show this through a seventh iteration of the Uniform Customs and Practice.[207]

While some states in the United States are experimenting with blockchain technology, other governments have started to pass laws and have issued warnings about the use of blockchain technology pertaining to cryptocurrencies.[208] The European Union has held that it will not tax cryptocurrencies through the VAT tax.[209] Furthermore, it has issued a warning to individuals not to hold the volatile asset for any type of savings purposes.[210] But as to the regulation of blockchain itself, the European Union has not addressed the issue. Meanwhile, Singapore has launched a blockchain-based eCertificate of Origin, thereby lowering insurance costs and helping customs and border controls apply tariffs more smoothly.[211]

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203. *See Generally Documentary Collection*, INVESTOPEDIA (Apr. 10, 2019) https://www.investopedia.com/terms/d/documentary-collection.asp [https://perma.cc/GQ7G-ZVUC].

204. DiscreteTangents, *What is an* "*if-then*" *Statement?*, YOUTUBE (July 10, 2015), https://www.youtube.com/watch?v=zQ_LCmlCftc [https://perma.cc/WC36-WN9T].

205. *ICC Launches Artificial Intelligence Tool for Trade Negotiations*, INTELLIGENT TECH & TRADE INITIATIVE (Jan 10, 2018), https://itti-global.org/icc-launches-artificial-intelligence-tool-for-trade-negotiations/ [https://perma.cc/3NVT-W9U8].

206. *Id.*

207. Civelek et al., *Blockchain Technology and Final Challenge for Paperless Foreign Trade*, 15 EURASIAN BUS. & ECON. J. 1 (July 2018).

208. *Regulation of Cryptocurrency Around the World*, LIB. OF CONG., https://www.loc.gov/law/help/cryptocurrency/world-survey.php#eu%20members [https://perma.cc/KLK9-HZQS].

209. *Id.*

210. *Id.*

211. Gabriel Olano, *Singapore International Chamber of Commerce launches blockchain-based trade certificate*, INSURANCE BUSINESS ASIA (May 10, 2018), https://www.insurancebusinessmag.com/asia/news/breaking-news/singapore-international-chamber-of-commerce-launches-blockchainbased-trade-certificate-100167.aspx [https://perma.cc/W78N-JJMJ].

There are wide ranging possibilities for the adoption of blockchain technology into the law and banking industry, even if they do phase out letters of credit and many large portions of documentary sales. Technology journalist Jonas DeMuro states that blockchain could be its own area of law.[212] Additionally, DeMuro states that blockchain technology could affect property law, chain of custody in criminal law, and create more trust in financial transactions.[213] This also includes divorce proceedings and wills.[214]

This type of technology will have to be addressed in a new iteration of the UCP, most likely called the UCP 700 or a new version of the eUCP called the eUCP 2.0. The new version of the UCP will have to address the implementation of blockchain technology. One option is that the new UCP will keep the letter of credit requirement; however, the cost of the letter of credit would be considerably less for the buyer of the goods, as blockchain technology would streamline the process. Another option is that the UCP would fully adopt the blockchain technology and provide, that instead of retaining an issuing bank, the two parties may enter into a smart contract on a platform which supports the facilitation of blockchain. Where the UCP would benefit in this option, is that they could implement rules on how and where dispute resolutions would be heard.

IV. CONCLUSION

Moving forward, the ICC through the UCP and the United States through the UCC must take steps to prepare themselves and their court systems to handle the new lawsuits that are soon to be entering their courts. Article Five of the UCC may provide some guidance with negotiable instruments and letters of credit with the impacts of blockchain in the legal field. However, the challenges by states on what constitutes a contract will be pushing the boundaries of the UCC. Therefore, legislation should be passed or amended to address the implementation of blockchain technology in America.

The next step in blockchain technology is to make a hybrid of smart contracts and Ricardian contracts so that the contracts are not limited to just financial transactions, could expand to the liability of parties, and could even include signatures of both parties.[215] This new type of contract law

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212. Jonas DeMuro, *7 ways blockchain will change the legal industry forever*, TECHRADAR (Jan. 18, 2018), https://www.techradar.com/news/7-ways-blockchain-will-change-the-legal-industry-forever [https://perma.cc/3QSQ-W3E4].

213. *Id.*

214. *Id.*

215. Diederick Cardon, *Ricardian contracts—legally binding agreements on the blockchain*, MEDIUM (Nov. 30, 2017), https://medium.com/ltonetwork/ricardian-contracts-

will affect the international sale of goods like never before, and this type of contract will need to be addressed through multilateral and bilateral treaties. Domestically, Cardon claims that these hybrid types of contracts are currently binding in the United States; however, there is not an expansive amount of law that references these types of contracts.[216]

There would be less inefficiencies if blockchain were to be adopted to letters of credit as there would be less contractual ambiguities, less delays of payment from contract errors, and it would reduce the amount of miscellaneous fees associated with international business.[217] As stated above, for a buyers bank to forward funds to the seller, the seller must provide documents which strictly comply with the letter of credit provided.[218] Simple ambiguities which draw on the bank's digression present major problems in international sales transactions. Industry estimates reflect that 80% of all letters of credit "documents contain discrepancies when presented to banks."[219] Additionally, the more that data mismatches the letter of credit, errors hold up payment from the exporter. According to the ICC "70% of documents presented for letter of credit evaluation are rejected on first presentation."[220] Additionally, there are more overhead considerations with letters of credit, such as the average time for a letter of credit being seven to ten days, or the average cost for the issuance of a letter of credit as $250.[221] All of these intricacies with the letter of credit would be subjugated if blockchain were introduced with smart contracts to international sales transactions. A survey of businesses in the United States conducted, found seventy-seven percent of its respondents expect blockchain to be in their processes as soon as 2020.[222] While blockchain would alleviate the three concerns previously mentioned by having the buyer and seller act with each other, there is an alternative where the buyer and seller have a contract with each other for the sales contract; however, the letter of credit could be handled in a smart contract with the issuing bank and the seller. This type of transaction would defeat the cost savings of the buyer and seller working

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legally-binding-agreements-on-the-blockchain-4c103f120707 [https://perma.cc/GS4A-8RW7].

216. *Id.*

217. Rashi Goyal & Lata Varghese, *Blockchain for Trade Finance: Payment Method Automation (Part 2)*, COGNIZANT (Oct. 2017), https://www.cognizant.com/whitepapers/blockchain-for-trade-finance-payment-method-automation-part-2-codex3071.pdf [https://perma.cc/ZK42-3HLK].

218. Hashim, *supra* note 65.

219. *Id.*

220. *Id.*

221. *Id.*

222. INT'L CHAMB. COM. BANKING COMM., RETHINKING TRADE & FINANCE 33 (July 2017), https://cdn.iccwbo.org/content/uploads/sites/3/2017/06/2017-rethinking-trade-finance.pdf [https://perma.cc/GR6C-SVXR].

with each other. Additionally, blockchain is adding trust to the transaction. So, why would there need to be a bank to issue funds if the blockchain could verify the transaction and verify that the buyer had adequate funds to perform the contract? This question might give rise to standby letters of credit, as to make sure that the buyers do not go "belly up" during the transaction. However, the implementation of blockchain on international sales transactions will eliminate the letter of credit requirement, as the both sides of the transaction will be verified through the blockchain technology, and a sale will only occur if all conditions of the smart contract are met.

While emerging technologies rear their head in everyday life, lawmakers will act to regulate their activities. The question becomes what, if any, laws should be enacted to make sure that blockchain smart contracts do not harm anyone who uses them. The UCP 600 "at least one original of each document stipulated in the credit must be presented."[223] However, "the eUCP provides that this requirement is satisfied simply by presenting one electronic record."[224] The traditional way of issuing letters of credit and how the letter of credit is drawn upon has major implications on how much fraud is entered into the system. Fraud in connection with letters of credit is such a vastly large problem that the United States Federal Bureau of Investigation has a whole section about it on their website under common fraud schemes.[225] The amount of distrust in the system will be eliminated with the implementation of smart contracts, as nodes are working constantly to verify all aspects of transactions.

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223. *ICC Uniform Customs and Practice for Documentary Credits art. 17*, INT'L CHAMBER COM. (July 1, 2007), http://static.elmercurio.cl/Documentos/Campo/2011/09/06/2011090611422.pdf [https://perma.cc/S4M6-Z8K6].

224. Koji Takahashi, *Blockchain Technology for Letters of Credit and Escrow Arrangements,* 135 THE BANKING L. J. 89, 94 (Feb. 2018).

225. *See Letter of Credit Fraud,* FEDERAL BUREAU OF INVESTIGATION, https://www.fbi.gov/scams-and-safety/common-fraud-schemes/letter-of-credit-fraud [https://perma.cc/R2QD-48JH].