Law in International Finance, by Alison R. Manzer, Suhuyini Abudulai, and Carla Potter, (978-0-7798-2173-0), Chapter 6 "Regulatory and Market Issues in International Finance", Supplemental Materials to Chapter 6 "Blockchain and Smart Contracts: Improving the Future of Trade Finance", by Rajdeep Ghosh. Reproduced by permission of Thomson Reuters Canada Limited.

SUPPLEMENTAL MATERIALS TO CHAPTER 6

Blockchain and Smart Contracts: Improving the Future of Trade Finance*

ABSTRACT

Blockchain is a phenomenal technological development with the power to significantly disrupt many economic sectors, including cross-border trade and trade finance. Blockchain has many possible angles to play around with and offers an exhaustive list of solutions and potential use cases in the trade finance industry. The main question is: Can blockchain help improve trade finance? This paper analyzes the "if and how" of blockchain's role in bringing transparency in financing through the demonstration of a simulated trade finance transaction on a blockchain-based platform. We shall learn about how blockchain helps us adapt to changing global markets and creates safer trading routes. We shall also cover some of the current blockchain-based trade finance initiatives around the globe. This paper refers to blockchain technology as "blockchain", and refers to a network based on the technology as "the blockchain", "a blockchain", "network", or "platform."

INTRODUCTION

Trade finance is a type of credit offered to business entities by financial institutions and private specialist financiers, to mitigate

* Written by Rajdeep Ghosh.

risk in transactions.[1] Business entities rely on financial products enabled by trade finance to facilitate their transactional scope and reach. According to the World Trade Organization's ("WTO") estimate, the majority of transnational trade is dependent on some trade finance arrangement.[2] Businesses have to make provisions for all sorts of risks in cross-border trade. Creating or expanding trading channels across the border, lengthens the supply chains and opens up firms to additional risks and costs. Banks and other financing entities come into this scenario to absorb some risks, act as trustee and finance a transaction. This credit arrangement helps businesses optimize financial exposure, manage cash flow, and gradually close the gap between initial investments and realized returns. In exchange for facilitating trust, financiers charge a fee to shoulder any risk that may occur. The concept behind financing a transaction is the provision of this assurance.[3]

Trade finance can be broken down into four elements: information, payments, financing, and risk mitigation. It involves issuing letters of credit ("LC"), factoring, export credit, lending and insurance.[4] Trade finance is exceptionally critical for developing economies because it is a major driving force behind the continuous development of national and international supply chain systems. It acts as a catalyst for growth by reducing risks and developing trust between trading partners.[5]

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1 R3, "Can Blockchain Future-proof Supply Chains? A Brexit Case Study", R3 Global Trade Strategy Forum (January 2019), online: < https://www.r3.com/wp-content/uploads/2019/01/R3_Brexit_SupplyChain-1-1.pdf > .

2 World Trade Organization, "Trade finance", *World Trade Organization Information Centre*, online: < https://www.wto.org/english/thewto_e/coher_e/tr_finance_e.htm > .

3 Stefan Dab, Sukand Ramachandran, Rajiv Chandna, Ravi Hanspal, Alenka Grealish, and Maarten Peeters, "Digital Revolution in Trade Finance", Boston Consulting Group (August 30, 2016), online: < https://www.bcg.com/publications/2016/digital-revolution-trade-finance.aspx > .

4 Luke Parker, "Bank of America Merrill Lynch explores using a blockchain for trade finance", *Brave New Coin* (March 1, 2016), online: < http://bravenewcoin.com/news/bank-of-america-merrill-lynch-explores-using-a-blockchain-for-trade-finance/ > .

5 Alexander Malaket, *Financing Trade and International Supply Chains: Commerce Across Borders, Finance Across Frontiers* (London: Routledge, 2016).

Business entities develop trust by repeatedly transacting with known business partners and keeping a clean record on file. Ensuring compliance and obeying applicable trade agreements helps businesses protect their global brand reputation and secure better financing in the future. Cross-border trade can be rather expensive due to burdensome customs processes and the number of government agencies and private entities involved.[6] Bureaucracy and paperwork further increase actual trading costs.[7] As demonstrated later in this paper, trade finance documentation stored on a blockchain network has the advantage of being accessible to all parties in a transaction, which eliminates the problems of document sharing and transparency. Some of the benefits brought by Blockchain are quick credit risk assessments, instant data exchange, efficient verification of documents through smart contracts and, lastly, record reconciliation.[8]

THE DIGITIZATION OF TRADE FINANCE

A 2017 report by the International Chamber of Commerce ("ICC") submits that current trade finance processes are cumbersome, expensive, error-prone, and susceptible to fraud due to paper-based processes and lack of communication between the parties in a transaction.[9] A future towards complete end-to-end digitization of trade finance is likely to increase trust between transacting parties and reduce global commercial costs, delays and errors.[10] In June 2016, the UN Economic and Social Com-

6 Jae Young Choi, "A Survey of Single Window Implementation", World Customs Organization Research Paper No. 17 (August 2011), online: < http://citeseerx.ist.psu.edu/viewdoc/download?doi = 10.1.1.696.1904&rep = rep1&type = pdf > .

7 World Trade Organization, "Trade Report 2015: Speeding up Trade – Benefits and Challenges of Implementing the WTO Trade Facilitation Agreement" (Geneva, Switzerland: WTO Publications, 2015).

8 Maria Letizia Perugini and Paolo Dal Checco, "Smart Contracts: A Preliminary Evaluation", *Social Science Research Network* (2015).

9 Alexander Malaket, Dominic Broom, Mark Evans, Dave Meynell, Oliver Paul, Dan Taylor and Jun Xu, "Rethinking Trade & Finance: An ICC Private Sector Development Perspective" (Paris: International Chamber of Commerce Banking Commission, July 2017), online: < https://cdn.iccwbo.org/content/uploads/sites/3/2017/06/2017-rethinking-trade-finance.pdf > .

mission for Asia and the Pacific ("UNESCAP") declared the recognition of trade data and documents in electronic format among members in Asia and the Pacific to facilitate paperless trade across international borders. In the last few years, some innovative trade finance technologies have been considered by banks such as MT798 trade envelope,[11] business payment obligation ("BPO"),[12] electronic bills of lading,[13] and blockchain (and other distributed ledger technologies). Although electronic storage of documentation reduces processing costs and increases security and traceability, issues may still arise if the transactional data is spread across multiple systems.[14] Blockchain's transparent and decentralized single-window trading platform has prompted state and non-state actors to examine the technology further for increasing business process efficiency.[15] This technology can streamline cumbersome trade finance processes that have been a deterrent to international trade finance for ages. Financial institutions like banks are also trying to reduce their operational costs and increase efficiency by switching to digital documentation.[16] Hence, banks, technology firms, and blockchain start-ups are now collaborating and developing practical end-use cases in trade finance.[17]

There is a growing demand to integrate blockchain technology with government services, especially in developing countries. Governments and businesses around the world see many opportunities in blockchain as a facilitator and accelerator of cross-

10 World Trade Organization, "Trade Report 2015", *supra*, footnote 7.

11 "Drive trade digitisation: MT 798", SWIFT, online: < https://www.swift.com/our-solutions/corporates/drive-trade-digitisation/mt-798 > .

12 "Bank payment obligation", SWIFT, online: < https://www.swift.com/our-solutions/corporates/drive-trade-digitisation/bank-payment-obligation > .

13 Stephen Tricks and Robert Parson, "The legal status of electronic bills of lading", International Chamber of Commerce and Clyde & Co. LLP (2018), online: < https://iccwbo.org/publication/legal-status-electronic-bills-lading/ > .

14 Dab, *et al.*, *supra*, footnote 3.

15 R. Jesse McWaters, "The Future of Financial Infrastructure: An ambitious look at how blockchain can reshape financial services", World Economic Forum (August 2016).

16 Parker, *supra*, footnote 4.

17 Deloitte, "How Blockchain Can Reshape Trade Finance", online: < https://www2.deloitte.com/content/dam/Deloitte/global/Documents/grid/trade-finance-placemat.pdf > .

border trade. The ICC reported that the secure, fully digitized process offered by blockchain has an immense potential to improve trade finance and make it affordable for small and medium-sized enterprises ("SMEs").[18] In January 2019, the Society for Worldwide Interbank Financial Telecommunication ("SWIFT"), has reported the integration of the SWIFT payment platform with blockchain technology and explored possible options in trade finance.[19] To promote economic development, intergovernmental organizations such as the UN and the World Trade Organization have encouraged investment in new technologies. Technologies like Open-Source Software ("OSS"), Cloud Computing ("cloud"), Artificial Intelligence ("AI"), and Internet of Things ("IoT") paved the way for recent commercial developments.[20] The real potential of these technologies lies in their combined interaction with blockchain to permanently change the way trade finance transactions are facilitated.[21]

BACKGROUND — THE RELEVANCE OF BLOCKCHAIN AND DISTRIBUTED LEDGER TECHNOLOGY

(a) Introduction to Blockchain

Blockchain is a rather remarkable commercial breakthrough in technology as it enables two or more entities to interact and transact with each other while efficiently exercising their rights and obligations. It is based on the computing principles of a

18 *Ibid.*

19 Marie Huillet, "SWIFT CEO Reveals Plans to Launch PoC Gateway With Blockchain Consortium R3 Tech", *Cointelegraph* (January 30, 2019), online: < https://ca.finance.yahoo.com/news/swift-ceo-reveals-plans-integrate-105700990.html > .

20 "ICC Global Survey 2018: Securing Future Growth", International Chamber of Commerce (Paris: ICC, 2018), online: < https://iccwbo.org/publication/global-trade-securing-future-growth/#section–download > .

21 Mark Walport, "Distributed Ledger Technology: beyond block chain", U.K. Government Office for Science (2016), online: < https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf > .

network created using distributed ledger technology (''DLT'').[22] DLT allows the creation and operation of a shared online ledger with customized access controls depending on the type of participants and transactions. In its purest form, blockchain is an electronic ledger that is distributed using a compilation of proven cryptographic technologies, which updates real-time and simultaneously shares all updates with everyone involved.

Blockchain can be used by enterprises as a standalone technology. There are no mandatory requirements demanding it to be used along with alternative currencies such as Bitcoin. Blockchain can support large commercial transactions and is immune to security threats. The first time the world heard about blockchain was back in 2008 when Satoshi Nakamoto came up with the whitepaper on a new kind of currency called Bitcoin, which covered the research and development of blockchain technology.[23] It has a decentralized server and is supported by distributed networking systems. Since blockchain can directly effect the way transactions take place, it holds excellent leverage for widespread commercialization in finance, accounting, taxation, and supply chain, among others. Real-world transactional costs on a blockchain are low because parties can transact without intermediaries and third-parties.[24]

(b) A Brief Explanation of Blockchain Technology

As the name suggests, Blockchain is a type of DLT comprised of blocks of information. Each party in a blockchain is a node, and

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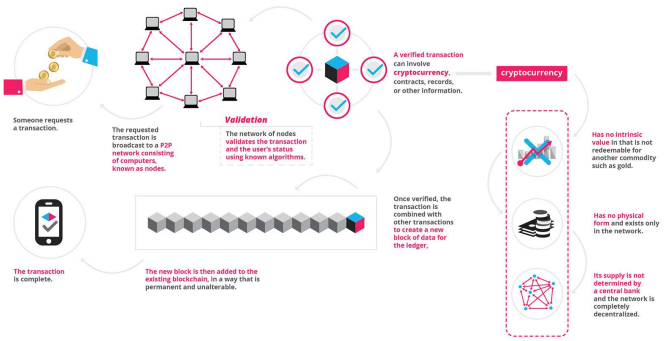
22 *Investopedia.com* defines DLT as: ''A distributed ledger is a database that is consensually shared and synchronized across multiple sites, institutions or geographies. It allows transactions to have public 'witnesses', thereby making a cyberattack more difficult. The participant at each node of the network can access the recordings shared across that network and can own an identical copy of it.'' See Christina Majaski, ''Distributed Ledgers'', *Investopedia.com* (April 26, 2019), online: < https://www.investopedia.com/terms/d/distributed-ledgers.asp > .

23 S. Nakamoto, ''Bitcoin: A Peer-to-Peer Electronic Cash System'' (2008), online: < www.bitcoin.org/bitcoin.pdf > .

24 ''OECD Blockchain Primer'', online: < www.oecd.org/finance/OECD-Blockchain-Primer.pdf > .

each step of a transaction is a block. Every block in a blockchain is a time-stamped record of every step of a transaction and is managed by a network of computers. As a transaction progresses, new blocks are chained to the last block.[25] Hence, the term blockchain. Every node on a blockchain network has a complete copy of the entire database or ledger, and any changes made by a node must be approved and validated by the other parties. A blockchain-based network is characteristically immutable because blocks cannot be deleted or modified in any way. This nature of immutability corresponds to the technology's primary goal, *i.e.*, communication transparency. Blockchain's tenet lies in reducing bureaucracy, cutting through outdated and inefficient business models, and creating direct channels of control in a transaction.[26] Since it is a distributed ledger, all the nodes of the network maintain the settlement accounts with other banks. Encryption and hashing the transaction details decimates the possibility of data modification.[27]

Figure 1[28]



In *public blockchains*, platform management is diversified. All transactions are public, so individual users are likely to maintain

25 Aaron Grinhaus, *A Practical Guide to Smart Contracts and Blockchain Law* (Toronto: LexisNexis, 2019). See p. 81.

26 Roman Beck, Jacob Stenum Czepluch, Nikolaj Lollike, and Simon Malone, "Blockchain – The gateway to trust-free cryptographic transactions", AIES eLibrary Research Paper 153 (2016).

27 Jake Goldenfein and Andrea Leiter, "Legal Engineering on the Blockchain: 'Smart Contracts' as Legal Conduct" (July 2018), 29 Law Critique 141.

28 Blockgeeks: < https://blockgeeks.com/ > .

anonymity. These individuals can validate transactions to determine which blocks get added to the overall chain. In *private blockchains*, one trusted entity creates, manages and all the transactions on a network. The trusted entity can accept or decline actions on a blockchain network, validate permission clearances, and change terms and conditions.[29] Large cross-border transactions have many steps involving a diverse range of parties like corporations, banks, factors, escrow accounts, insurance providers, and governments. Some steps have restricted access to pre-set parties. Let us assume a scenario where there are five parties in a private blockchain. Out of those five parties, Party 1 is the trusted entity who wants to share a purchase receipt with Parties 2 and 4. Parties 3 and 5 are not privy to this receipt. Party 1 can arrange the network in a way that only Parties 2 and 4 can read the shared receipt. This selective-sharing feature of private blockchains is highly relevant in trade finance since there are many steps involved.[30]

(c) The Relevance of Smart Contracts

One of the best use cases of blockchain technology is its application in smart contracts. Smart contracts are pre-programmed self-executing software code embedded into a blockchain network[31] to enhance its functionality. Smart Contracts can be created using high-level programming languages like "Solidity",[32]

29 BitFury Group and Jeff Garzik, "Public versus Private Blockchains", White Paper (October 20, 2015), online: < https://bitfury.com/content/downloads/public-vs-private-pt1-1.pdf > .

30 Vitalik Buterin, "On Public and Private Blockchains" (August 6, 2015), online: < https://blog.ethereum.org/2015/08/07/on-public-and-private-blockchains/ > .

31 Deloitte, "Blockchain: Legal implications, questions, opportunities and risks", March 2018), online: < https://info.deloitte.com/rs/231-YWE-658/images/Blockchain%20WP%20March%202018_.pdf > .

32 Massimo Bartoletti and Livio Pompianu, *An Empirical Analysis of Smart Contracts: Platforms, Applications, and Design Patterns*, in M. Brenner, K. Rohloff, J. Bonneau, A. Miller, P.Y.A. Ryan, V. Teague, A. Bracciali, M. Sala, F. Pintore, and M. Jakobsson, eds., *Financial Cryptography and Data Security* (Berlin: Springer International Publishing, 2017), Lecture Notes in Computer Science, vol. 10323, online: < https://link.springer.com/chapter/10.1007/978-3-319-70278-0_31 > .

Javascript, Python, PHP *et al.*,[33] and are based on "if/then" algorithms that automatically implements certain actions on fulfilment of pre-set conditions.[34] These contracts are designed to automatically track and detect the rights and obligations of the parties throughout a transaction.[35] The automated nature of smart contracts as intelligent digital agreements makes them a particularly attractive tool for optimizing trade finance transactions.[36] Using smart contracts in a blockchain-based trade finance network is a great way to leverage blockchain's automation features. These digitally coded contracts can expedite the financing process by providing a quick verification of letters of credit and guarantees and helping the transaction progress without additional supervision.[37]

In a simplified example, Company A has to transfer funds to the bank account of Company B using a blockchain-based platform. Each party shall have a software node acting as its "window" to the blockchain-based platform.[38] A smart contract will be generated containing all the terms and conditions agreed upon between the two parties. Once Company B fulfils its obligations through its node, the smart contract will automatically release the funds into Company B's bank account and instantly notify all the parties, without the need for further actions.[39] Through a popular

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33 See Mix, "These are the top 10 programming languages in blockchain", *HardFork* (May 24, 2019), online: <https://thenextweb.com/hardfork/2019/05/24/javascript-programming-java-cryptocurrency/>; and Mehedi Hasan, "Best Blockchain Programming Language: Top 15 Reviewed for Blockchain Programmer", *UbuntuPIT*, online: <https://www.ubuntupit.com/best-blockchain-programming-language-top-15-reviewed-for-blockchain-programmer/>.

34 Kevin Delmolino, Mitchell Arnett, Ahmed. Kosba, Andrew Miller, and Elaine Shi, "Step by Step Towards Creating a Safe Smart Contract: Lessons and Insights from a Cryptocurrency Lab", Cryptology ePrint Archive (November 18, 2015), online: <https://eprint.iacr.org/2015/460.pdf>.

35 Lauren Henry Scholz, "Algorithmic Contracts" (2017), 20 Stan. Tech. L. Rev. 128, online: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2747701>.

36 *Ibid.*

37 Grinhaus, *et al.*, *supra*, footnote 25, pp. 142-147.

38 Goldenfein and Leiter, *supra*, footnote 27.

39 Stefan Grundmann and Philipp Hacker, "Digital Technology as a Challenge to European Contract Law: From the Existing to the Future Architecture" (2017), 13 Eur. Rev. Contract L. 255.

computing method called application programming interface ("API"),[40] smart contracts can be integrated with other software and technologies for greater integration. A smart insurance contract, for example, can track the operating temperature of shipped products. The moment the operating temperature exceeds a certain threshold, the insurance claim is automatically triggered and sends an inspection request to a pre-selected party.[41]

THE ROLE OF BLOCKCHAIN IN IMPROVING TRADE FINANCE TRANSACTIONS

Blockchain's transparent and immutable nature corresponds to scalable use cases for utilization by businesses and governments. It simplifies communication through real-time updates of each step of a transaction involving many parties such as banks, agents, and governments. Using blockchain, parties can digitally verify, validate, sign, and authorize a contract entirely on the blockchain network using their respective nodes. Each step of a transaction is permanently digitally documented on a blockchain, which makes record-keeping easier and faster.[42] Following are some of the more advanced ways in which blockchain plays a role in mitigating risks and improving trade finance:

(a) Cashflow, Information and Record Management

Cashflow management is an essential part of importing goods. Buyers coordinate with and depend on factoring entities, lenders, and trade credit financiers before finalizing a transaction. Poor

40 *Merriam-Webster* defines "application programming interface" as: "a set of rules that allows programmers to develop software for a particular operating system without having to be completely familiar with that operating system", *Merriam-Webster.com* (2019), online: < https://www.merriam-webster.-com > .

41 Karen E.C. Levy, "Book-Smart, Not Street-Smart: Blockchain-Based Smart Contracts and The Social Workings of Law" (2017), 3 Engaging Sci., Tech. & Society 1, pp. 1-15.

42 Edward Elgar, Research Handbook on Digital Transformations, 2016. Available at: < https://ssrn.com/abstract = 2662660 > .

management of cash flow results in failed transactions and may even lead to insolvency. Blockchain can improve the collection, sharing, and synchronization of information between buyers, sellers, factors, and credit insurers, which can enhance the general structural process of trade finance. Parties in a blockchain network can exchange information and allow verifiable access to concerned stake-holders. Information on a blockchain network is automatically updated as parties submit relevant documents. Subsequently, all the other parties will get notified about the change and receive a copy of the updated information. Unlike a traditional trade finance system, the parties in a blockchain-based trade finance transaction (such as the importer, exporter, factors, banks, shipping, and customs) are not required to independently maintain their database because the network automatically replicates uploaded information across all available nodes.

Documents stored on a platform can be reviewed and authenticated in real-time. A single block can contain all required documentation in digital form, and, since the blocks update automatically, transactions are settled quicker, which increases transparency and releases capital instantly.[43] Paper-based bills of lading require verification to ensure price and shipment accuracy. Tracking all bills of lading on the blockchain lowers the risk of double-spending or fraud. Along with the new documentation required for each step in a transaction, all the documents and information previously uploaded can be easily viewed and verified on the blockchain. This easy and quick verification method reduces time and saves money for both the transacting parties and their respective banks. In the context of archival science, blockchain's immutability makes it a valuable record-keeping technology.[44] Out of all of its use cases, being able to pull up past transactional data at the click of a button, offers a lasting solution to usage, storage, control and maintenance of records. A blockchain network's record-keeping features raise opinions about the

43 Victoria Lemieux, "Blockchain for Recordkeeping; Help or Hype?", Social Sciences and Humanities Research Council of Canada /University of British Columbia (October 2016), online: <http://blogs.ubc.ca/recordsinthechain/files/2018/06/FinalReport_Volume1.pdf>.

44 Don Tapscott and Alex Tapscott; "Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business, and the World" (New York: Portfolio/Penguin, 2016).

legal recognition of such archived information and if such records can be used as legally binding evidence in case a deal goes south.[45]

(b) Combating Trade Fraud and Improving Transparency

The WTO Trade Facilitation Agreement 2013 embodies the simplification of import, export, and transit procedures with the use of electronic data exchange.[46] The finance sector has a lot to gain from investing in a blockchain-based transactional system. Banks provide a variety of trade finance services, including LCs and hedging products. Many stake-holders, such as customs authorities, insurance providers, shipping companies, and factoring entities, also play essential roles in trade finance transactions. Sometimes, banks face significant challenges and fall victim to trade fraud.[47] Online records are much easier to verify and are less susceptible to fraud. Using enterprise blockchain networks, banks can now partner up with customs, insurers, shippers, and other parties and integrate all processes into a single platform for everyone's convenience.[48] Indeed, with blockchain, the time-consuming work of inputting, processing, recording, and modifying corporate transactional data would become digitally recorded and streamlined. A trade finance consortium can be created to integrate the platform with existing IT systems.[49] The next step

45 Lemieux, *supra*, footnote 43.

46 World Trade Organization, "Trade facilitation", *World Trade Organization Information Centre*, online: <https://www.wto.org/english/news_e/brief_tradefa_e.htm>.

47 Marc Auboin, "Improving the Availability of Trade Finance in Developing Countries: An Assessment of Remaining Gaps", World Trade Organization Staff Working Paper ERSD-2015-06 (June 18, 2015), online: <https://www.wto.org/english/res_e/reser_e/ersd201506_e.htm>.

48 Sen Ganesh and Thomas Olsen, "Rebooting a Digital Solution to Trade Finance" (Bain & Co. and HSBC, 2018), online: <https://www.bain.com/contentassets/76b3b4d02ec74c7ab32376ceea689c32/bain_brief_rebooting_a_digital_solution_to_trade_finance.pdf>.

49 HSBC, "HSBC and ING carry out blockchain trade finance transaction", *FinExtra* (November 5, 2018), online: <https://www.finextra.com/pressarticle/76237/hsbc-and-ing-carry-out-blockchain-trade-finance-transaction>.

forward is to standardize trade data and data exchange protocols to achieve seamless systems integration at an international level.[50]

OECD's Global Blockchain Directorate representative, Loretta Joseph, has reiterated the effects of the blockchain revolution and stated that it reduces the number of intermediaries and improves transparency. According to her, the blockchain revolution is in perfect alignment with the digitization of the global economy due to its effortless help in streamlining trade finance and ensuring compliance.[51] In November 2018, the German Government announced the use of blockchain to fight tax evasion schemes because it believed DLT would bring transparency and prevent fraud. This initiative took place in the wake of the European CumEx-Files Tax Fraud scheme uncovered in 2012.[52] Paper-based trade finance has a higher likelihood of being susceptible to fraud because it lacks transparency. This lack of transparency allows fraudsters to try and secure financing from banks through re-usage of invoices. A significant example of this issue is a Standard Chartered bank being deceived of their money.[53] Blockchain networks are information-intensive and register data about parties involved, transaction date, price and other variables relevant to legal and industrial standards. Such networks promise a high level of trust, security, accountability, and transparency to their users, due to being decentralized and immutable.[54]

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50 Alisa DiCaprio and Benjamin Jessel, "Can Blockchain Make Trade Finance More Inclusive?", *R3 Reports* (March 20, 2018), online: < https://www.r3.com/wp-content/uploads/2018/07/Can-Blockchain-Make-Trade-Finance-More-Inclusive-1.pdf > .

51 "Summary Record of OECD-ADBI 18th Roundtable on Capital Market and Financial Reform in Asia ('Tokyo Roundtable')", ADB Institute and Organisation for Economic Co-operation and Development (March 2018), online: < http://www.oecd.org/daf/fin/financial-markets/Summary%20record.pdf > .

52 John Schranz, "Cum-ex tax fraud scandal: MEPs call for inquiry, justice, and stronger tax authorities", European Parliament Press Release (November 29, 2018), online: < http://www.europarl.europa.eu/news/en/press-room/20181120IPR19552/cum-ex-tax-fraud-meps-call-for-inquiry-justice-and-stronger-tax-authorities > .

53 Liyan Qi and Enda Curran, "China Uncovers Almost $10 Billion in Fraudulent Trade-Financing Deals", *Wall Street Journal* (September 25, 2014), online: < http://www.wsj.com/articles/china-uncovers-more-than-10-billion-in-fraudulent-trade-financing-deals-1411620122 > .

54 Jørgen Svennevik Notland and Anders Viet Hua, "Project Thesis: Block-

Timely collection and remittance of overseas funds are crucial steps in trade finance transactions, and overdue payables result in interest charges. Management, issuance, and authentication of receivables and invoices using blockchain applications make these processes quick and efficient. Indeed, unpaid invoices that are meant to be sold can be uploaded to the trade finance platform. Once payment has been made, the network automatically updates itself to reflect the latest amount paid or due. This functionality ensures that invoices, once settled, need not be audited again because the transactional history will be available on the network.[55] This availability ensures transparency and allows factoring companies to verify invoices, audit clients and process payments.

(c) Creating Safer Trading Routes, Increasing Communication between Stake-holders and Helping SMEs

Historically speaking, trade finance has always depended on paper-based documentation and on the proactive contribution of multiple intermediaries and stake-holders to facilitate trade. For small traders, international trade can be a risky business. Contrary to domestic trade, it is normal for traders to make provisions for long delays and risks between production and payment. Hence, many SMEs, especially in developing nations, have to include a higher cost of getting credit support when it comes to trading across the border.[56] According to the Asian Development Bank's data in 2017 on "Trade Finance Gaps, Growth, and Jobs Survey", SMEs often face bottlenecks in securing finance due to lack of information and "know your customer" ("KYC") con-

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chain enabled Trust & Transparency in supply chains", Thesis, Faculty of Social Science and Technology Management Department of Industrial Economics and Technology Management, NTNU School of Entrepreneurship (February 2017), online: < https://www.researchgate.net/publication/313309221_Project_Thesis_Blockchain_enabled_Trust_Transparency_in_-supply_chains > .

55 Kevin Werbach, "Trust, But Verify: Why the Blockchain Needs the Law" (2018), 33 Berkeley Tech. L.J. 487.

56 R3, *supra*, footnote 1.

cerns. Using blockchain, all required information can easily be made available due to immutability, which facilitates the information management process. With all the available data, KYC and other compliances become quick and easy. Blockchain also facilitates efficient data exchange between parties due to the shared digital access to online documentation.[57]

Blockchain can enhance communication and efficiency in cross-border transactions involving multiple parties. This enhancement can be done through processing and exchanging information with all authorized parties in a secure real-time manner. Processes can also be automated by using smart contracts, thereby minimizing coordination costs and delays.[58] The blockchain trade finance platform will reflect the change of ownership in traded goods, and the proof of ownership will be provided on the network once the goods reach the importing party. In combination with IoT and embedded smart contracts, blockchain, can reduce costs, improve processes and link all stake-holders, such as carriers, customers and banks across the distribution chain. The development of such platforms could have a significant impact on trade finance and transform international trade of products. This transformation significantly improves speed and coordination while reducing the chances of data manipulation.[59]

(d) Combating financial crises and adapting to Changing Global Markets

The 2008 financial crisis ended a long period of strong growth in world trade, both in volume and value. The WTO's statistics show that, in 2009, international exports dropped 12% and global gross

57 Alisa DiCaprio, Kijin Kim, and Steven Beck, "2017 Trade Finance Gaps, Growth, and Jobs Survey", *ADB Briefs* (September 2017), online: <http://dx.doi.org/10.22617/BRF178995-2>.

58 M. Orcutt, "States that are passing laws to govern 'smart contracts' have no idea what they're doing", *MIT Technology Review* (March 29, 2018), online: <https://www.technologyreview.com/s/610718/states-that-are-passing-laws-to-govern-smart-contracts-have-no-idea-whattheyre-doing/>.

59 J.M. Lipshaw, "The Persistence of 'Dumb' Contracts" (2019), Stanford J. Blockchain L. & Pol'y, online: <https://stanford-jblp.pubpub.org/pub/persistence-dumb-contracts>.

domestic product ("GDP") fell by 2%. More recently, the Eurozone crisis has acted as a considerable drag on global trade.[60] The Brexit referendum in the U.K. in 2017, has created significant uncertainty in the continuous flow of supply chain finance. Many businesses in the EU are wary of products originating from the United Kingdom due to impending changes in current tariffs and regulations.[61] There are also concerns about potential fluctuations in the volume and quantity of British products. In long supply chains like this one, buyers do not always have complete information about all the suppliers, which can affect risk assessment and KYC by banks. This lack of information may lead to rejection of LC applications. Some buyers prefer their suppliers to hold additional inventory for continuous, uninterrupted supply and manufacturing processes. Suppliers agreeing to amass additional inventory naturally demand more working capital to keep a check on rising account receivables.[62] Blockchain can help to soften the impact of jurisdictional changes and political disruptions on transacting parties by continuously monitoring manufacturing data to detect potential supply chain deficiencies. Blockchain can help in inventory management by providing timely updates, and smart contracts can generate invoices immediately when the additional inventory is ready for dispatch.

(e) Efficiency in KYC and Other Compliance Verification

Blockchain networks can store, record, and transmit a massive quantity of data. Banks can request access to that data and instantly verify all of it. Banks can also have their own private and permissioned blockchain network where businesses can upload the details on the blockchain. Banks have to spend a lot of resources to keep track of regulatory changes, conduct due diligence and verify the KYC compliance of new clients. This requirement makes the client onboarding a long process.[63] The delay can be

60 "World Trade Organization International Trade Statistics" (2015), online: <https://www.wto.org/english/res_e/statis_e/its2015_e/its15_highlights_e.pdf>.

61 R3, *supra*, footnote 1.

62 *Ibid.*

attributed to the usage of paper-based business invoices, insurance and AML/ATF compliance documentation. A blockchain network's end-to-end electronic verification of documents makes compliance verification seamless and instant. Also, the KYC audit performed by one bank can be shared with other banks. According to the Fintech 2.0 report by Santander, blockchain technology can potentially reduce banks' yearly infrastructure costs by almost USD$20 billion.[64] Decentralized Applications ("DApps") embedded on a blockchain network can substantially enhance the technology with analytics and automation tools so that the system can automatically sift through all of the data and flag any non-compliant data on the network.[65]

Blockchain applications can submit requests for advance customs clearances and reduce the need for manual verification.[66] Import and export information in a blockchain will contain details such as country of origin, port, shipping method, destination port, and customs reports.[67] All shipping data can be securely stored in a permitted ledger on the blockchain. This data shall remain accessible to authorized stake-holders, including all customs offices located in the territory, throughout its validity period, thereby facilitating the customs clearance process. This accessibility optimizes risk assessments since customs documents submitted via

63 L.T. LaCapra and David Henry, "JPMorgan to spend $4 billion on compliance and risk controls - WSJ", *Reuters* (September 12, 2013), online: <https://uk.reuters.com/article/uk-usa-jpmorgan-risk/jpmorgan-to-spend-4-billion-on-compliance-and-risk-controls-wsj-idUK-BRE98C01S20130913>.

64 "The Fintech 2.0 Paper: Rebooting financial services" (Oliver Wyman, Anthemis Group, and Santander Innoventures, 2015), online: <https://www.finextra.com/finextra-downloads/newsdocs/the%20fintech%202%200%20paper.pdf>.

65 Shermin Voshmgir , "Decentralized Applications – dApps", Blockchainhub Berlin, online: <https://blockchainhub.net/decentralized-applications-dapps/>.

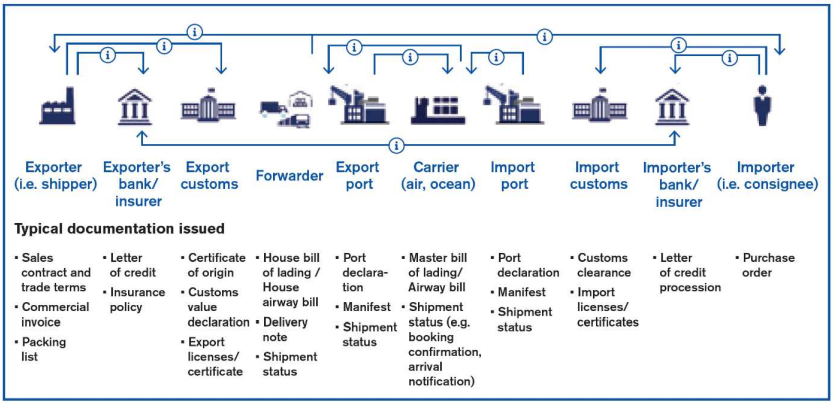
66 Importers or exporters can request such decisions about the classification, origin or customs value of the goods intended for importation or exportation. Advance rulings facilitate the release and clearance process, as they guarantee that specific critical assessments are already made. Article 3 of the TFA lays down specific disciplines on advance rulings.

67 See International Telecommunication Union (ITU), "Focus Group on Application of Distributed Ledger Technology", online: <https://www.itu.int/en/ITU-T/focusgroups/dlt/Pages/default.aspx>.

the system would be evaluated immediately and automatically based on pre-determined selected criteria encoded in a smart contract.[68] A recent real-world example of this was performed by the customs authority of the Republic of Korea, who signed a memorandum of understanding (''MoU'') with e-commerce firms. This MoU was signed to speed up customs clearance of e-commerce goods and generate automated customs clearance reports to prevent fraud and smuggling.[69]

A STEP-BY-STEP BREAKDOWN OF A SIMULATED TRADE FINANCE TRANSACTION ON A BLOCKCHAIN NETWORK

Figure 2[70]



68 Z. Saadaoui, ''Digitization of ATA Carnets: How the Blockchain Could Enhance Trust'' (October 2018), 87 *WCO News* 56.

69 Samburaj Das, ''Korea Customs Service to Pilot Blockchain-Based Import Customs Platform'', CCN (June 6, 2018) online: <https://www.ccn.com/korea-customs-service-blockchainBlockchaincustoms-clearance-platform/>.

70 Typical list of documentation in a trade finance transaction. Emmanuelle Ganne, ''Can Blockchain revolutionize international trade?'' (Geneva: World Trade Organization, 2018), online: <https://www.wto.org/english/res_e/booksp_e/blockchainrev18_e.pdf>, p. 18.

Blockchain's structural integrity is crucial to tamper-proof record-keeping. The network's transactions would consist of cryptographically linked blocks. These blocks sequentially store all transactional events and create an audit trail of all data exchange.[71] In a large transaction, the administrative procedures can be complicated due to a multitude of stake-holders. Most stake-holders agree that procedural automation and paperwork simplification are vital to long-term trade finance facilitation. Smart contracts play a vital role in automating certain steps in a financial transaction. The following is a simulation of the steps in a typical cross-border finance transaction in a blockchain-based system with embedded smart contracts:

Step-1: Usage of Trade Finance Blockchain Platform to Interact with Trading Partners

(a) The first step in a trade finance transaction is finding the right business enterprise to transact with. A blockchain network can be used as a marketplace where buyers and sellers outline their capabilities and requirements.
(b) Businesses from all over the globe can come together on an enterprise blockchain platform to look for a specific niche area and choose the best possible trading partner. Finding a potential partner would be relatively more straightforward since blockchain enables peer-to-peer network connection. Then, a matching engine can connect parties.
(c) Buying and selling needs vary across different industries and different enterprises, so connecting with the most suitable partner is the key to long-term trade relations.
(d) Interested businesses looking to transact with a potential overseas trading partner can easily exchange and finalize the Request for Information ("RFI"), Request for Proposal ("RFP") and Request for Quote ("RFQ") on the blockchain itself so the records can be accessed at any time later on.
(e) In essence, this immutability and transparency help parties build long-term trust.[72]

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71 Sheila Warren, Christoph Wolff, and Nadia Hewett, "Inclusive Deployment of Blockchain for Supply Chains" (Geneva: World Economic Forum, March 2019), online: < http://www3.weforum.org/docs/WEF_Introduction_to_-Blockchain_for_Supply_Chains.pdf > .

72 Grinhaus, *supra*, footnote 25.

Step-2: Creation of Smart Contract and Confirmation of an Order[73]

(a) Once the price is negotiated, and the deliverables are listed, the contractual terms are finalized, and applicable laws are identified (such as domestic contract law, CISG,[74] or ICC Model Contract rules).
(b) Since everything on the blockchain is permanently recorded, the parties can review the information at a later time.
(c) A smart contract verifies the AML/ATF compliance requirements of all the transacting parties.[75]
(d) After exchanging all legally required information, the seller uploads the transaction invoice onto the network.
(e) The buyer gets a notification about the invoice and can approve or reject it. The invoice becomes available for financing only after successful approval.
(f) Once the purchase order is finalized, the sales agreement is executed through the smart contract and shared with the buyer's bank, replacing traditional paper contracts.[76]
(g) From now on, both parties shall be able to view the contract in real-time and check transactional updates.[77]

Step-3: Financing of a Buyer's Account Payables and Seller's Account Receivables

(a) The seller sends a credit limit request to its preferred insurer depending on its projections.
(b) The insurer can choose to reject, approve, or partially approve the seller's credit limit request.

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73 *Ibid.*, pp. 142-143.
74 *United Nations Convention on Contracts for the International Sale of Goods 1980* (Vienna, April 11, 1980), 1489 U.N.T.S. 3.
75 Grinhaus, *supra*, footnote 25, pp. 142-151.
76 R3 and Norton Rose Fulbright (2017), "Can smart contracts be legally binding contracts", R3 and Norton Rose Fulbright White Paper (November 2016), online: <https://www.nortonrosefulbright.com/en-us/knowledge/publications/a90a5588/can-smart-contracts-be-legally-binding-contracts>.
77 Lata Varghese and Rashi Goyal, "How Blockchain Can Revitalize Trade Finance (Part 1)" Cognizant (August 2017), online: <https://www.cognizant.com/whitepapers/how-blockchain-can-revitalize-trade-finance-part1-codex2766.pdf>.

(c) Once a credit limit is approved, a smart contract is created representing the Trade Credit Insurance ("TCI") policy. At this point, the seller can submit the invoice to a factoring entity for approval of the financing and progress to the next step.

(d) Since the buyer's bank and the seller's bank are also on the blockchain network along with all the other parties, they can also view the natural progression of the smart contract.

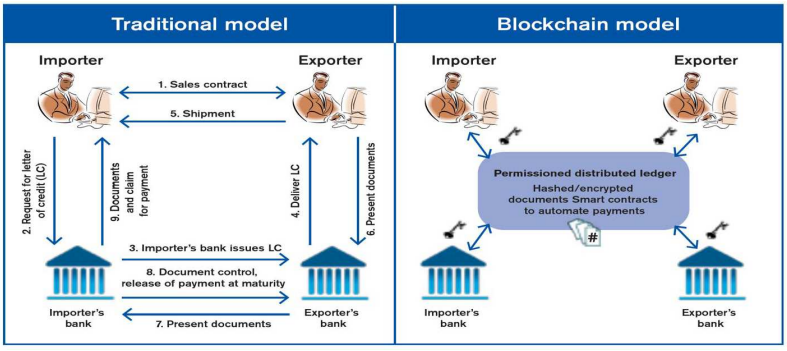
(e) The buyer submits the LC application on the blockchain for approval by the bank. The buyer's bank receives a request for approval of the LC. Once checked and approved, the seller's bank gets a notification.[78]

(f) When all the conditions are met, the smart contract can settle the payment (from the buyer's bank account to the seller's bank account) on the blockchain itself (if arranged so).[79]

(g) Depending on the seller's business arrangement, the seller may choose to sell their invoices to a factoring company and speed up the process for receivable financing.

(h) The seller's bank has to approve the LC. If and when approved, the seller can view and fulfill the LC requirements on the blockchain, just like the buyer.[80]

Figure 3[81]



78 *Ibid.*

79 Delmolino, *et al.*, *supra*, footnote 34.

80 Lata Varghese and Rashi Goyal, "Blockchain for Trade Finance: Payment Method Automation (Part 2)", Cognizant (October 2017), online: <https://www.cognizant.com/whitepapers/blockchain-for-trade-finance-payment-method-automation-part-2-codex3071.pdf>.

81 Ganne, *supra*, footnote 70, p. 23.

Step-4: Shipment and Tracking of Goods

(a) At the time of dispatching the shipment, the seller would add the export data and attach digital images of required transit and customs clearance documents such as the bill of lading, certificates, (certificate of origin, phytosanitary certificate) and other documents related to customs clearance, freight, shipping, and logistics.
(b) Once these documents are approved and validated by the other parties (including the banks), these would automatically be stored on the blockchain.
(c) Once the customs agent of the exporting country finishes inspection, the digital authorization of approval can be given on the blockchain along with details.
(d) The shipment can be fitted with an IoT and GPS based tracker so that the parties can check the progress of the shipment. Depending on the arrangement, there can be specialized trackers fitted to monitor the operating temperature of the goods.[82]

Step-5: Confirmation of a Transaction

(a) The goods reach the port of entry, where customs valuation, declaration, and assessment of the type of product take place.
(b) Authorities cross-check the product category and any associated certificates (*e.g.*, phytosanitary certificate).[83]
(c) Customs agents clear the goods for entry and hand them over to the buyer or buyer's agent and signs the bill of exchange. At this point, a digital acknowledgment will be made by the importer by the smart contract.
(d) Once the shipment reaches the buyer, the smart contract notifies all the parties and updates the shipping company for confirmation.
(e) The buyer's bank peruses its data and verifies LC requirements, flagging any discrepancies for review by the buyer.[84]

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82 *Ibid.*
83 Ray August, Don Mayer and Michael Bixby, *International Business Law*, 6th ed. (Harlow, U.K.: Pearson Education Ltd., 2013).
84 *Ibid.*

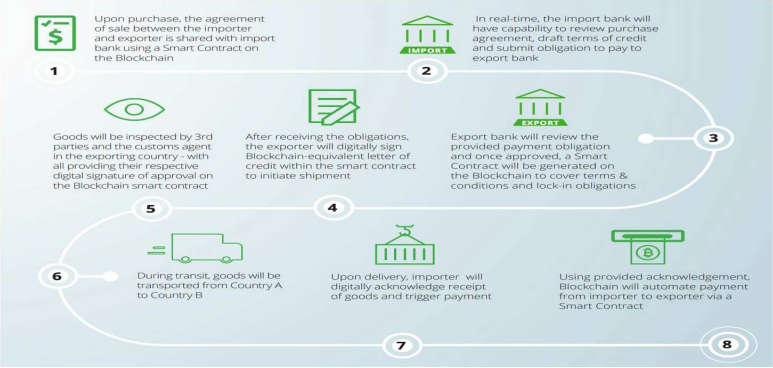
(f) If and when approved, the smart contract changes the LC status on the blockchain as complete and notifies the buyer for settlement.[85]
(g) In case of discrepancies, the buyer can review the export documents on the blockchain and approve or reject them.
(h) Once the buyer is satisfied with the authenticity of all documents on the blockchain, it will confirm the trade in the smart contract.[86]

Step-6: Payment Obligations

(a) All the parties get notified about the successful acceptance of the delivery by the buyer.
(b) The smart contract would automatically release the funds into the seller's bank account and notify all the parties like usual.[87]
(c) Lastly, the smart contract would communicate the conclusion of the transaction to all the parties and present further reminders later for any updates.
(d) In case of a dispute, the smart contract platform can be programmed to present options to choose the type of complaint to be filed against any of the parties.[88]

85 James Canham and Jorien Kerstens, "Blockchain: Mapping New Trade Routes To Trust", (London: Accenture Consulting, 2018), online: < https://www.accenture.com/_acnmedia/PDF-79/accenture-blockchain-mapping-trade-routes-to-trust.pdf > .
86 *Ibid.*
87 Delmolino, *et al.*, *supra*, footnote 34.
88 *Ibid.*

Figure 4[89]



As observed from the step-by-step breakdown above, each stakeholder has instant access to any information as soon as it is created or finalized, which improves the efficiency and reduces the costs of the whole process. Lowering consulting costs enables SMEs to get a more level playing field with larger enterprises, allowing faster growth activities through increased competition. As transactions become more complex with more parties involved, DLTs would increase the scalability of adding more stakeholders and ensuring their rights are transparently protected.[90]

THE RECOGNITION OF BLOCKCHAIN AND RISE IN BLOCKCHAIN-BASED TRADE FINANCE INITIATIVES

(a) Recognition in Canada

The Bank of Canada, Payments Canada, and R3, a distributed database technology company, are collectively involved in a research initiative called Project Jasper "to understand how distributed ledger technology could transform the wholesale payments system."[91] Phases 1 and 2 of Project Jasper is now

89 Deloitte, *supra*, footnote 17.
90 Marco Iansiti and Karim R. Lakhani, "The Truth About Blockchain" (2017), 95 Harvard Bus. Rev. 118.

complete, and it focuses on exploring the clearance and settlement of high-value inter-financial institution payments using DLT.[92] Phase 1 of Project Jasper was developed on the Ethereum platform as the basis for the DLT, while Phase 2 utilized the "custom-designed R3 Corda platform."[93] In October 2017, Payments Canada, the Bank of Canada, and TMX Group announced a collaboration to integrate security and payment settlement platform based on distributed ledger technology.[94] In February 2018, the Canadian media outlet, *The Globe and Mail*, reported that the Ontario Securities Commission had approved the country's first blockchain stock trade fund[95] called Blockchain Technologies ETF.[96] Although the Canadian government allows the use of cryptocurrencies, it is not considered to be legal tender[97] so any usage of cryptocurrency for payment is treated as a barter transaction.[98] On August 24, 2017, the Canadian Securities Administrators ("CSA") published CSA Staff Notice 46-307 Cryptocurrency Offerings,[99] which describes the application of securities law requirements to initial coin offerings ("ICOs"), cryptocurrency investment funds, and the cryptocurrency exchanges.[100]

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91 Bank of Canada, "Fintech Experiments and Projects", online: < https://perma.cc/9F77-QHFN > .

92 Payments Canada, Bank of Canada and R3, "Project Jasper: A Canadian Experiment with Distributed Ledger Technology for Domestic Interbank Payments Settlement" (2017), online: < https://perma.cc/PH5V-UJLK > .

93 Andrea Schneider, "Project Jasper Update: White Paper Release and Phase 3 Announcement", *CyberLex* (October 31, 2017), online: < https://perma.cc/948N-6Z8S > .

94 "Payments Canada, Bank of Canada and TMX Group announce integrated securities and payment platform as next phase of Project Jasper", TMX News Release (October 17, 2017), online: < https://perma.cc/2B5Q-C65R > .

95 Blockchain Technologies ETF (HBLK.TO) "Stock price, quote, history and news", *Yahoo Finance*, online: < https://finance.yahoo.com/quote/HBLK.TO?p = HBLK.TO > .

96 Clare O'Hara, "OSC Approves Canada's First Blockchain ETF", *The Globe and Mail* (February 1, 2018), online: < https://perma.cc/V6TD-KZ5C > .

97 *Currency Act*, R.S.C., 1985, c. C-52, s. 8.

98 Lipshaw, *supra*, footnote 59.

99 Canadian Securities Administrators staff, "Cryptocurrency Offerings", CSA Staff Notice 46-307 (Ontario Securities Commission, August 24, 2017), online: < http://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170824_cryptocurrency-offerings.htm, archived at https://perma.cc/7XF6-3T3E > .

100 Canadian Securities Administrators, "Canadian Securities Regulators

(b) Global Recognition

Several jurisdictions now recognize the legal effectiveness of blockchain and smart contracts. Blockchain could improve the efficiency of inter-governmental processes, enhance inter-agency co-operation at the national and international level, and assist in managing multiple actors.[101] In November 2017, the monetary authorities of Hong Kong and Singapore stated that they were taking steps to create a trade finance platforms using blockchain technology to make cross-border trade and trade finance cheaper, safer, and more efficient.[102] In 2017, eight U.S. states were working on legislation that accepted the use of blockchain and cryptocurrencies, some of which are now applicable law.[103] In April 2018, Arizona signed the Corporations/Blockchain Technology bill House Bill 2603, which supports "signatures and records secured through blockchain technology and smart contracts."[104] In early 2018, Florida introduced a proposal to legalize blockchain signatures and smart contracts. Malta passed a law on distributed ledger technologies and virtual financial assets in July 2018 to promote Malta as a blockchain island.[105] France undertook initiatives to recognize financial instruments issued on blockchains in 2016 and enabled financial securities to be registered and transferred via DLT in 2017.[106] Another sig-

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Outline Securities Law Requirements that May Apply to Cryptocurrency Offerings", Press Release (August 24, 2017), online: < https://perma.cc/4KL4-YSEV > .

101 See World Trade Organization, "Trade facilitation", *supra*, footnote 46.

102 Monetary Authority of Singapore, "Singapore and Hong Kong launch a joint project on cross-border trade and trade finance platform", Media Release (November 15, 2017), online: < http://www.mas.gov.sg/News-and-Publications/Media-Releases/2017/Singapore-and-Hong-Kong-launch-a-joint-project-on-cross-border-trade-and-trade-finance-platform.aspx > .

103 Luke Parker, "US States working on blockchain legislation in 2017", *Brave New Coin* (April 1, 2017), online: < https://bravenewcoin.com/insights/us-states-working-on-blockchain-legislation-in-2017 > .

104 See State of Arizona, House of Representatives, Majority Research Staff, "Summary of Legislation 2018", online: < https://www.azleg.gov/alispdfs/53leg/2R/House/SummaryComplete.pdf > , at pp. 69-70.

105 A. Alexandre, "Malta Passes Blockchain Bills Into Law, 'Confirming Malta as the Blockchain Island'", *Cointelegraph* (July 5, 2018), online: < https://cointelegraph.com/news/malta-passes-blockchain-bills-into-law-confirming-malta-as-the-blockchain-island > .

nificant development was China's Supreme Court decision issued in September 2018 accepting blockchain data transmissions as binding evidence.[107] In the WTO Joint Declaration on Electronic Commerce, various proposals concerning blockchain were presented to the WTO. These proposals sought a framework for electronic contracting, electronic authentication encryption, e-payment, and data protection.[108]

The United Nations Trade Facilitation and Electronic Affairs Center (UN/CEFACT) has developed 40 recommendations for electronic data exchange.[109] In 2018, UN/CEFACT published a white paper on blockchain transactions to standardize business procedures and information flows.[110] The United Nations Commission on International Trade Law ("UNCITRAL") adopted the Model Law on Electronic Transferable Records on July 13, 2017, which prescribes conditions for utilization of DLTs to fulfil

106 See *Ordonnance n° 2017-1674 du 8 décembre 2017 relative à l'utilisation d'un dispositif d'enregistrement électronique partagé pour la représentation et la transmission de titres financiers*, online: < https://www.legifrance.gouv.fr/eli/ordonnance/2017/12/8/2017-1674/jo/texte > .

107 M. Huillet, "China's Supreme Court Rules That Blockchain Can Legally Authenticate Evidence", *Cointelegraph* (September 7, 2018), online: < https://cointelegraph.com/news/chinas-supreme-court-rules-that-blockchain-can-legally-authenticate-evidence > .

108 The Joint Initiative on E-commerce was launched on the margins of the eleventh WTO Ministerial Conference (MC11) in December 2017 by ministers representing 71 WTO members. In the statement, signatories agreed to initiate exploratory work together towards future WTO negotiations on trade-related aspects of electronic commerce. See in particular the proposals submitted by Brazil (WTO official document number JOB/GC/176), the European Union (WTO official document number JOB/GC/188), Japan (WTO official document numbers JOB/GC/177 and 180), New Zealand (WTO official document number JOB/GC/175), the Russian Federation (WTO official document number JOB/GC/181), Singapore (WTO official document number JOB/ GC/179) and the United States (JOB/GC/178).

109 See UN/CEFACT, "Recommendation 34: Data Simplification and Standardization for International Trade", *Trade Facilitation Implementation Guide* (ECE/TRADE/400) (Geneva: UN/CEFACT, December 2010), online: < http://tfig.unece.org/contents/recommendation-34.htm > .

110 United Nations Centre for Trade Facilitation and Electronic Business, Blockchain Project Team, "Blockchain White Paper: White Paper on the Technical Applications of Blockchain to UN/CEFACT Deliverables", UN/CEFACT Draft White Paper (April 30, 2018).

legal obligations on electronic records like promissory notes and tax receipts.[111] UNCITRAL also legally deemed blockchain data to meet paper-based, written, and signed requirements per the technological neutrality principle enshrined in its Model Law on Electronic Commerce (1996 and 1998), Model Law on Electronic Signatures (2001), and the Convention on the Use of Electrical Communications on International Agreements (2005).[112]

(c) Blockchain-Based Trade Finance Initiatives Around the Globe

There is a plethora of trade finance projects and initiatives being developed based on blockchain and other DLTs. All of them employ different creative approaches, but they all aim to replace traditional trade finance processes and automate some steps in international trade. One notable example is We.trade, which is a joint venture owned by nine European banks that offers a blockchain platform designed to connect buyers, sellers, and banks, and facilitate and finance trade for SMEs.[113] Another great example is Project Voltron, a trade finance blockchain collaborating with CryptoBLK based on R3 Corda with support from 12 banks across Canada, United States, Japan, Thailand, and many other nations. Marco Polo is a trade finance project involving a blockchain start-up, a technology provider, and a group of banks, backup from R3 Corda and TradeIX.[114] Other known examples are Batavia, HKTFP, and Komgo. Batavia is developed by a consortium of international banks and a technology supplier. Like all the other great projects in this domain, Batavia offers an open ecosystem where parties can find relevant

111 United Nations Information Service (UNIS) (2017), "UN Commission on International Trade Law adopts the UNCITRAL Model Law on Electronic Transferable Records", UNIS Press Release (July 17, 2017), online: < http://www.unis.unvienna.org/unis/en/pressrels/2017/unisl251.html > .

112 K. Takahashi, "Blockchain Technology for Letters of Credit and Escrow Arrangements" (2018), 135 Banking L.J. 89.

113 "The Platform", We.trade, online: < https://www.we-trade.com/the-platform > .

114 Oliver Belin, "Leading global banks together with TradeIX and R3 pilot blockchain trade finance solution", *MarcoPolo* (February 21, 2018), online: < https://www.marcopolo.finance/press-release-february-2018/ > .

partners for trade.[115] Hong Kong Monetary Authority collaborated with Bank of China, and HSBC, among others, and created a trade finance platform called HKTFP using Hyperledger Fabric.[116]

A variety of banks and other financial institutions have already started employing proprietary blockchain networks for trade finance purposes. For example, Japan's Mizuho bank recently completed one of the first trade finance transactions between Japan and Australia with some technical support from IBM. HSBC bank employed its blockchain platform for a soybean-trade between Argentina and Malaysia.[117] Barclays partnered up with Wave to work on a trade finance blockchain platform using SWIFT for the payment of funds. People's Bank of China is another example of a trade finance blockchain platform with considerable concern for the environment of the typical trade business. Canada's Scotiabank is collaborating with AlphaPoint's blockchain platform with functions like digitization of assets, managing pre and post-trade paperwork, and new trade venues. Thailand's Kbank and Dubai Trade and Customs have partnered with IBM's Hyperledger solution to simplify the provision of letters of guarantee in the import-export industry. India's ICICI Bank added over 250 companies to its blockchain trade finance platform for domestic and international trade and has successfully completed a variety of trade finance transactions through the platform, including payments to domestic vendors.[118]

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115 "First Pilot Client Transactions Successfully Executed on Batavia Global Trade Finance Platform", *IBM Newsroom*, online: <http://newsroom.ibm.com/announcements?item=122895>.

116 Carrie Lam, "Unlock Growth with Innovation", *News.gov.hk* (January 15, 2018), online: <https://www.news.gov.hk/eng/2018/01/20180115/20180115_113108_368.html>.

117 Sumeet Chatterjee, "HSBC says performs first trade finance deal using single blockchain system", *Reuters* (May 13, 2018), online: <https://www.reuters.com/article/us-hsbc-blockchain/hsbc-says-performs-first-trade-finance-transaction-using-blockchain-idUSKCN1IF01X>.

118 ICICI Bank, "ICICI Bank on-boards over 250 corporates on its blockchain platform for trade finance", ICICI Bank News Release (April 17, 2018) online: <https://www.icicibank.com/aboutus/article.page?identifier=-news-icici-bank-onboards-over-250-corporates-on-its-blockchain-platform-for-trade-finance-20181704141936142>.

CONCLUSION

The world of trade finance has been taken by storm with the introduction of blockchain. As mentioned before in this paper, many financial institutions are partnering with each other and creating projects aimed at developing blockchain networks for trade finance transactions.[119] Blockchain and DLT make it easy for us to imagine and implement scalable channels of communication and provides the panacea for streamlining trade finance. It is indeed amazing how this technology developed over just a decade. As evidenced in this paper, blockchain has many promising benefits in the world of trade finance, supply chain, and banking. Developments in blockchain promise better integration between governments, banks and businesses. Many financial institutions and smaller private financers are looking at innovative blockchain-based solutions to offer better financial services.[120] In 2017, blockchain's venture capital financing increased steadily to $1 billion, tripling patent applications in 2018.[121] The *Harvard Business Review* has famously said that "the blockchain will do to the financial system what the internet did to the media."[122] Not only does the blockchain move value, but it also integrates several elements elegantly and efficiently, resulting in more competitive services at a lower cost.[123]

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119 Karl Finders, "Barclays uses blockchain for trade finance transactions", *Computer Weekly* (September 7, 2016), online: < https://www.computerweekly.com/news/450303841/Barclays-uses-blockchain-for-trade-finance-transactions > .

120 Anonymous, "Growth Trends in Supply Chain Finance", *Finyear*, (March 13, 2012), online: < https://www.finyear.com/Growth-Trends-in-Supply-Chain-Finance_a21965.html > .

121 L. Noonan, "China leads blockchain patent applications", *The Financial Times* (March 25, 2018), online: < https://www.ft.com/content/197db4c8-2e92-11e8-9b4b-bc4b9f08f381 > .

122 Joichi Ito, Neha Narula, and Robleh Ali, "The Blockchain Will do to the Financial System What the Internet Did to Media", *Harvard Business Review* (March 8, 2017), online: < https://hbr.org/2017/03/the-blockchain-will-do-to-banks-and-law-firms-what-the-internet-did-to-media > .

123 Julian Skan, James Dickerson and Samad Masood, "The Future of Fintech and Banking: Digitally Disrupted or Reimagined?", *Accenture* (2015), online: < https://www.accenture.com/_acnmedia/accenture/conversion-assets/dotcom/documents/global/pdf/dualpub_11/accenture-future-fintech-banking.pdf > .

The Economist has named blockchain as a highly resilient "trust machine"[124] distributing various encryption techniques.[125] It is interesting to note that blockchain is just one type of DLT, which compiles transactions in chained blocks. There are other forms of DLTs being currently developed for commercialization such as IOTA,[126] DAG,[127] Holochain,[128] Ripple,[129] and Hashgraph,[130] which employ a mix of cryptographic technologies.[131] Those technologies are different from the concept of blocks.[132] The smart contracts created using these DLTs would likely be more advanced, with the capacity to conduct a higher volume of complex transactions per second. It is necessary to build a bridge between technologists and businesses to facilitate the implementation of new technologies because all technology investments must eventually convert into tangible business results. However, it is important to remember that blockchain is not just another "technology-next-door". It is a revolution and a phenomenon of change and disruption. If we appropriately invest in it, harness it, and integrate it with across different economic sectors, it can significantly accelerate the growth of global markets. At this point, one can safely assume that the possibilities are unfathomably endless.

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