

UNLOCKING THE POTENTIAL OF BLOCKCHAIN TECHNOLOGY FOR SECURED PAYMENTS IN INTERNATIONAL COMMERCIAL TRANSACTIONS

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Abstract:

The globalisation of commerce has highlighted the need for more efficient and secure payment systems in international trade. Traditional payment mechanisms such as letters of credit often face challenges related to trust, inefficiency, and security. Blockchain technology, as a form of distributed ledger technology (DLT), seemingly offers a groundbreaking alternative with its core features of decentralisation, transparency, and immutability. This paper investigates the potential of blockchain technology to revolutionise secured payments in international commercial transactions. By analysing its distinctive attributes and legal implications, the study highlights how blockchain can address the limitations of conventional payment methods. While the integration of blockchain into international trade finance presents certain challenges, including jurisdictional and technological constraints, its transformative potential is undeniable. The research concludes by emphasising the need for appropriate safeguards and infrastructural support to harness the full benefits of blockchain for global commerce.

1. INTRODUCTION

International trade has generally increased in recent years, with a trend towards growth that is mostly attributed to globalisation.¹ A shift like this necessitates a search for methods to improve the effectiveness of operations within the global trade

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¹ Marius-R zvan Surugiu & Camelia Surugiu, *International Trade, Globalization and Economic Interdependence between European Countries: Implications for Businesses and Marketing Framework*, 32 PROCEDIA ECON. & FIN. 131, 131 (2015).

2 Georgis Dimitropoulos, *The Law of Blockchain*, 95 WASH. L. REV. 1117, 1119 (2020).

community. As traditional payment systems struggle to meet the evolving demands of a global marketplace, ‘Distributed Ledger Technology’ (DLT) or ‘blockchain’ has seemingly emerged as a disruptive technology with the potential to revolutionise the way financial transactions are conducted.² This research paper delves into the untapped potential of blockchain technology and its implications for ensuring secured payments in international commercial transactions.

The advantages of blockchain technology extend far beyond its most well-known application: cryptocurrency. While a variety of configurations exist, blockchain technology generally manifests as a decentralised and immutable ledger that records and verifies transactions, without the need for intermediaries, in a transparent and secure manner. As a class of technology, its inherent features – such as transparency, immutability, and decentralisation – may address the challenges of trust, security, and efficiency that often plague international commercial payments.

With a particular focus on its legal significance for secured payments in international contracts of sale, this paper explores the advantages of blockchain technology as a disruptive force in the global financial landscape. By examining its unique characteristics, this research reveals how blockchain technology can enhance the security, reliability, and efficiency of payment processes in international commercial transactions.⁶

1.1 STATUS QUO

The emergence of blockchain technology within the legal domain has the potential to cause significant disruptions, particularly in the realm of international trade finance and letters of credit. This disruptive potential stems from the technology’s capability to transform conventional processes involving secured payments for international commercial sale transactions. Currently, the prevalent method for conducting such payments involves the utilisation of documentary letters of credit, which entails multiple steps, paperwork, and actors that often result in delays and complications.⁴ Moreover, international sales contracts commonly adhere to traditional contracting methods that may no longer align with the ongoing technological revolution. To adapt to this changing landscape, the integration of blockchain technology can play a pivotal role in modernizing payment systems within international sales contracts.⁵ Consequently,

3 Dakota A. Larson, *Mitigating Risky Business: Modernizing Letters of Credit with Blockchain, Smart Contracts and the Internet of Things*, 4 MICH. ST. L. REV. 929, 964 (2018).

4 Matthieu Crozet et al., *International Trade and Letters of Credit: A Double-Edged Sword in Times of Crises*, 70 IMF ECON. REV. 185, 189 (2022).

5 See Larson, *supra* note 3, at 958.

6 See Larson, *supra* note 3, at 959.

blockchain technology holds a key to revitalizing and augmenting the effectiveness of letters of credit and other aspects of international commercial transactions.⁶

2. GENERAL ADVANTAGES OF BLOCKCHAIN

2.1. IMMUTABILITY

Blockchain technology is well suited to international commercial transactions due to its immutable nature.⁷ Here, the notion of immutability is that once a transaction has been successfully confirmed and added to the blockchain, it becomes difficult to change or remove. This is said to be a core feature of blockchain technology.⁸ It should be noted that true ‘immutability’ may be unachievable, as there have been isolated instances where blockchain entries have been effectively reversed.⁹ However, these instances often leave behind signs of tampering. Therefore, rather than being referred to as immutable or tamper-resistant, blockchains are more accurately described as ‘tamper-evident’ structures.¹⁰ Blocks of data may involve ‘proof of work’ consensus algorithms that help to mitigate tampering with the information in the blocks on the chain.¹¹ For example, a work of proof mechanism combined with the creative use of hashing, can provide blockchain technology with its security.

Additionally, and interrelated, blockchain's security can be attributed to its decentralised nature, as it is not managed by a single entity.¹² It would be nearly impossible to successfully alter a blockchain without altering every block in the chain, performing a new proof of work for every block, and seizing control of most of the peer-to-peer network.

7 Carla L. Reyes, *Conceptualizing Cryptolaw*, 96 NEB. L. REV. 384, 390 (2017).

8 Eugenia Politou et al., *Blockchain Mutability: Challenges and Proposed Solutions*, 9 IEE TRANSACTIONS ON EMERGING TOPICS IN COMPUTING 1, 5 (2019).

9 In a Distributed Automated Organisation (“DAO”) hack in 2016, a hacker gained access to 3.6 million dollars of Ethereum (“ETH”) cryptocurrency, which at the time was the equivalent of 50 million United States dollars, by taking advantage of a flaw in the coding of the Ethereum-based application, not Ethereum itself.

10 Politou, *supra* note 8, at 5.

11 Kevin Werbach, *Trustless Trust*, SSRN ELEC. J. 1, 26 (2016); *see also* Nicolas Houy, *It Will Cost You Nothing to "Kill" a Proof-of-Stake Crypto-Currency*, 34(2) SSRN ELECT. J. 1038, 1040 (2014).

12 Sheikh M. Idrees et al., *Security Aspects of Blockchain Technology Intended for Industrial Applications*, 10 ELECT. 1, 26 (2021).

13 Umesh Bodkhe et al., *Blockchain for Industry 4.0: A Comprehensive Review*, 99 IEEE ACCESS 1, 2 (2020).

Furthermore, in contrast to the central registry concept, there isn't a single point of failure or vulnerability.¹³ As a result, distributed ledger data is impervious to manipulation. The security and integrity of data are improved by resistance to censorship and manipulation. The approach also reduces costs that would be incurred in creating and maintaining backup databases under the central registry model.¹⁴

2.2. STORAGE/DOCUMENTARY MANAGEMENT

It is well known that international commercial transactions involve significant documentation due to the nature of international commercial trade. With numerous forms of documentation comes multiple phases of correspondence amongst parties involved in the transaction. The use of blockchain technology provides an advantage as it offers an efficient way to organise and store immutable copies of documents.¹⁵

2.3. TRUSTLESS TECHNOLOGY

The use of blockchain technology may be helpful in international commercial transactions as it is a trustless technology. The term 'trustless' in this context refers to the notion that, conceivably for the first time, value exchanges across a network system can be monitored, enforced, and validated without the involvement of a central authority figure or trusted third party, like financing institutions in cases of letters of credit.¹⁶ Owing to the programmable character of blockchain technology, smart contracts can be enabled and these can also operate without centralised institutions. For these reasons, minimal trust is required.¹⁷ Traders in international commercial transactions generally do not have mutual trust, especially regarding payment issues. Therefore, the use of financial technology such as blockchain and smart contracts aid in ensuring transparency throughout commercial transactions.¹⁸

2.4 COST EFFECTIVE

Blockchain is a technology that is not bound by borders, and it can offer a quicker, less expensive infrastructure for transferring units of value.¹⁹ It is argued that as a

¹⁴ Koji Takahashi, *Blockchain Technology for Letters of Credit and Escrow Arrangements*, 135 BANKING L. J. 89, 89–90 (2021).

¹⁵ *Id.* at 94.

¹⁶ Primavera De Filippi et al., *Blockchain as a confidence machine: The problem of trust and challenges of governance*, 62 TECH. IN SOC. 1, 6 (2020).

¹⁷ Trevor I. Kiviat, *Beyond Bitcoin: Issues in Regulating Blockchain Transactions*, 65 DUKE L. REV. 569, 570 (2015).

¹⁸ See Larson, *supra* note 3, at 956.

¹⁹ See Kiviat, *supra* note 17, at 569–70.

²⁰ Kiviat, *supra* note 17, at 574.

substitute for the frequently expensive and delayed money transfers, there are math-based "cryptocurrencies" like bitcoin, which are based on blockchain technology that can be used.²⁰

Blockchain technology is considered disruptive as it helps to eliminate costs associated with 'middlemen'. Traditionally, intermediaries can be involved to build confidence and lower risk between the parties involved in a cross-border transaction.²¹ Conventional payment methods are broadly secure for international transactions, but they are expensive and cumbersome. Due to the system's extensive network of intermediaries, there are commissions and transaction fees to be paid that significantly increase costs.

Expanding on this point, the current payment system used in international commercial transactions imposes the use of mediators and intermediaries. To make a payment, a participant must go through several authorisations and intermediaries, including the payment gateway, exchange mode, and issuer, among others. Despite being in charge of upholding the legitimacy of payments, intermediaries present certain shortcomings, like charging for their services and lengthening the duration of transactions.²²

Using a blockchain-based system, international trading parties can conduct business at a distance, without having to pay third parties to enforce their agreements with decentralised smart contracts. This way, assets and transactional data can be securely maintained and tracked using blockchain technology, minimising the reliance on traditional intermediaries.²³

For instance, banks like Westpac teamed up with Ripple in blockchain projects. Westpac is considered as one of the "big four" banks in Australia.²⁴ To facilitate speedy and secure cross-border payments, several banks and businesses intend to use blockchain payment systems. It could be advantageous for the international trade and commerce law community to not be left behind with such an evolving technology.

21 Brooks B. Basaran & Mahmood Bagheri, *The Relevance of "Trust and Confidence" in Financial Markets to the Information Production Role of Banks*, 11 EUR. J. OF RISK REGUL. 650, 651 (2020).

22 Nikhil Patel, *International Trade Finance and the Cost Channel of Monetary Policy in Open Economics*, 70 ICJB 117, 119–20 (2021).

23 Like financing institutions in letters of credit, *see* Discussion § 3.5.

24 Staff Writer at Westpac Group, *Towards a 'blockchain' future*, WESTPAC GROUP (Dec. 15, 2016, 12:35PM), <https://www.westpac.com.au/news/in-depth/2016/12/towards-a-blockchain-future/>.

25 WESTPAC GROUP, WESTPAC 2022 ANNUAL REPORT (2022), available at <https://www.westpac.com.au/>

2.5 INTERNATIONAL CONTRACT OF SALE

An international contract of sale is an agreement between a seller and a buyer for the sale of goods.²⁵ The United Nations Convention on Contracts for the International Sale of Goods (Vienna 1980), (“CISG”) is the widely used convention for international contracts of sale. From article 1(1) of the Convention, it can be drawn that an international contract of sale is one in which goods are sold “between parties whose places of business are in different States”,²⁶ “when the States are Contracting States”²⁷ or “when the rules of private international law lead to the application of the law of a Contracting State.”²⁸ An international contract of sale outlines the parties' respective rights, responsibilities, obligations, and remedies for breach.²⁹ The parties can either be an importer/buyer or an exporter/seller. Lastly, it is of utmost importance that the contract includes conditions of payment so as to avoid foreseeable disputes. Thus, parties may elect to use blockchain payment system to effect payment.

2.6 BLOCKCHAIN-BASED PAYMENT SYSTEM

Effecting payment in international contracts of sale via use of blockchain technology is a relatively less complicated process. Use of the Stellar Blockchain payment system demonstrates how a transaction could take place. Stellar, operating since 2015,³⁰ is a blockchain-based payment network that links individuals and financial institutions, enabling quick and inexpensive cross-border payments.³¹ The network links the businesses in international commercial transactions to financing institutions more quickly and less expensive.³² As an open-source network that can enable cross-border payments, Stellar makes use of Lumens (“XLM”) as its native cryptocurrency to facilitate payment transfers.

content/dam/public/wbc/documents/pdf/aw/ic/WBC_2022_Annual_Report.pdf.

26 United Nations Convention on Contracts for the International Sale of Goods (“CISG”), Art. 1(1).

27 CISG, Art. 1(1)(a).

28 CISG, Art. 1(1)(b).

29 CISG, Art. 4.

30 Marta Lokhava et al., *Fast and secure global payments with Stellar*, SOSP '19 Proceedings of the 27th ACM Symposium on Operating Systems Principles 80, 88 (2019).

31 Nida Khan et al., *Feasibility of Stellar as a Blockchain-based Micropayment System*, Conference: The 2nd International Conference on Smart BlockChain, SmartBlock 2019 at 1 (2019).

32 *Id.* at 2.

33 See Khan et al., *supra* note 31, at 4.

Example:

ABC is company that is domiciled, resident and carries out its business in Mombasa, Kenya. Company DEF is domiciled, resident and carries out its business in Johannesburg. ABC is the seller and DEF is the buyer.

ABC and DEF enter into an international contract of sale for liquor. DEF has to make payment of KES 8000000 to ABC before delivery can be affected. Thus, performance of the contract is subject to ABC receiving payment of the goods. DEF will send a payment of KES 8000000 from their bank in Johannesburg to ABC's bank in Mombasa. The seller's bank in Mombasa will then receive a transaction request of KES 8000000, and this will be approved after confirmation with ABC.

After the bank in Mombasa has approved the request, the buyer's bank in Johannesburg will receive the transaction's approval, and KES 8000000 will be deducted from DEF's account. The amount deducted will then be converted to Stellar Lumens (XLM) and it will pass to the Stellar network. It should be noted that when the money is deducted from the buyer's account, it will be in the South African Rand (ZAR). The Stellar network offers a distributed currency exchange that offers the best exchange rate for a particular fiat currency.³³ The XLM will then be converted from the South African Rand to the Kenyan Shilling (KES) at the best exchange rate (assumed to be better than traditional rates offered by the banks). The money, now in Kenya Shilling, will then be credited to ABC's bank account.

The Mombasa and Johannesburg banks act as anchors in this Stellar network. Anchors are essential for converting fiat currency into cryptocurrencies and acting as a link between the parties involved in the international commercial transaction and the Stellar network.³⁴ Generally financial institutions and banks like the example given above act as anchors as they are trustworthy. Ultimately, this example lucidly demonstrates how the use of blockchain technology can simplify the payment process. On top of simplifying secured payments, blockchain technology also offers a number of advantages specifically in the area of international commercial transactions.

³⁴ Laura Grassi et al., *Do we still need financial intermediation? The case of decentralized finance – DeFi*, 19 QUALITATIVE RSCH. IN ACCT. & MGMT. 1, 7 (2022).

³⁵ MIZUHO FINANCIAL GROUP, *Conclusion of trade transaction using blockchain and distributed ledger*

3. LEGAL SIGNIFICANCE OF BLOCKCHAIN TECHNOLOGY

The legal significance of blockchain technology refers to the potential impact and implications that blockchain technology has on the legal landscape, particularly in international commercial transactions.

3.1 MIZUHO CASE STUDY

On 6 July 2017, Japanese banking group, Mizuho and Sompo Japan Nipponkoa Insurance Incorporated completed a cross-border commercial transaction between Japan and Australia making use of distributed ledger technology, a blockchain-based network.³⁵ In contrast to traditional commercial deals, which take many days to complete, a contract involving the Japanese giant Marubeni Corporation and Sompo Japan Nipponkoa Insurance was concluded in under two hours.³⁶ The buyer from Japan and seller from Australia were entities of Marubeni. A blockchain-based digital model was used to coordinate the entire trade-related procedure, including issuing the letter of credit to distributing trade paperwork.

The platform used to conduct the transaction was IBM's Hyperledger Fabric platform: an open enterprise-grade distributed ledger platform that has privacy controls that enable only the data to be shared to be distributed amongst the participants.³⁷ A contract of sale was entered into between Marubeni Japan (seller/exporter) and Marubeni Australia (buyer/importer). The buyer requested for a letter of credit issuance from their bank, Mizuho Australia. The buyer's bank issued the letter of credit to the seller's bank, Mizuho Japan. The seller's bank then advised Marubeni Japan of the letter of credit; upon this advice, the goods were then shipped to the buyer. The seller went on to register trade documents, and then received a receipt of payment. The exporter had to digitalize the export and shipping documents, and then uploaded them to the blockchain platform, thus sharing them with the financial institution and other parties involved.³⁸

³⁵ technology –Collaborative effort with general trading and insurance companies (July 7, 2017), <https://www.mizuhogroup.com/news/2017/07/conclusion-of-trade-transaction.html>.

³⁶ *Id.*

³⁷ MIZUHO FINANCIAL GROUP, *Mizuho Embarks on Project with IBM Japan to Conduct Actual Trade Transactions Using Blockchain* (Apr. 26, 2017), <https://www.mizuhogroup.com/news/2017/04/fintech-mizuho-embarks-on-project-with-ibm-japan-to-conduct-actual-trade-transactions-using-blockchain.html>.

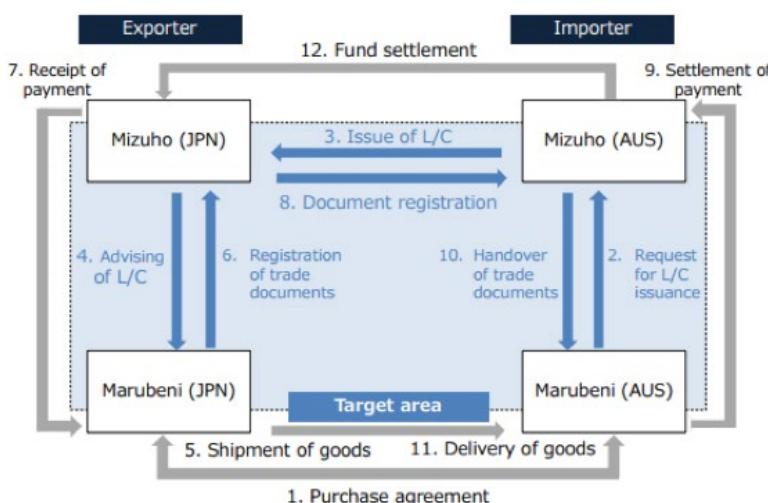
³⁸ Antony Peyton, *Mizuho trials Australia-Japan trade transaction on blockchain*, FINTECH FUTURES (July 17, 2017), <https://www.fintechfutures.com/2017/07/mizuho-trials-australia-japan-trade-transaction-on-blockchain/>.

³⁹ See Mizuho Financial Group, *supra* note 37.

The seller's bank went on to register the documents with the buyer's bank. Marubeni Australia settled payment with their bank, and the trade documents were handed over to them. After the trade documents were handed over, the goods were delivered to the buyer. Lastly, the buyer's bank settled the funds with the seller's bank.³⁹ This saw the conclusion of the international contract of sale of goods transaction between Marubeni Japan and Marubeni Australia over a blockchain-enabled digital platform.

Below is the diagram of transactions from the Mizuho blockchain project.⁴⁰

Diagram of Transaction



The project revealed a number of benefits. The first benefit was the shorter delivery time for trade documents.⁴¹ This process would typically take a number of days and was reduced to two hours. Secondly, there was a reduction of labour and other costs as well as time spent on document creation and transmission through document digitalisation.⁴² Lastly, there was increased transparency by disclosure of transaction information to all parties.⁴³ For this purpose, as previously mentioned, some blockchain tools allow for the generation of smart contracts, which can be used to facilitate, verify, and enforce transactions.⁴⁴

40 *Id.*

41 *Id.*

42 *Id.*

43 *Id.*

44 Lennart Ante, *Smart contracts on the blockchain – A bibliometric analysis and review*, 57 TELEMATICS & INFORMATICS 1, 3 (2021).

45 Justin Evans, *Curb Your Enthusiasm: The Real Implications of Blockchain in the Legal Industry*, 11 J. Bus.

3.2 BLOCKCHAIN TECHNOLOGY AND SMART CONTRACTS

It is argued that the most promising aspect of blockchain technology is smart contracts.⁴⁵ A smart contract is a self-executing digital contract that is written in code and shared among blockchain community members,⁴⁶ and may be a solution to issues associated with paper contracts. Smart contracts enable automated computer procedures that are programmed to accept input from parties on the blockchain and to authenticate or enforce the negotiation or execution of the contract in accordance with established instructions.⁴⁷

The decentralised, immutable nature of blockchain that serves as the foundation for smart contracts makes it impossible for them to be altered.⁴⁸ Due to the blockchain need that every transaction be verified by every node in the network, efforts to hack a single point of entry will be unsuccessful.⁴⁹

3.3 HOW A SMART CONTRACT WILL WORK IN AN INTERNATIONAL COMMERCIAL TRANSACTION

Suppose parties ABC (seller, resident and domiciled in Mombasa) and DEF (buyer, resident and domiciled in Johannesburg) enter into a contract of sale of liquor. A blockchain-enabled smart contract is used by the parties to negotiate even on new terms and this is done automatically as parties would have listed their requirements. Once the terms have been agreed on, DEF is required to make the payment, which is affected via a blockchain network. If payment is received, then delivery of the liquor takes place, ensuring that payment is guaranteed when terms are agreed upon.

The smart contract can go as far as including processed of official government controls and trade operations. For example, this smart contract will have a condition stating that once relevant documents like sanitary and phytosanitary certificates, insurance documents and invoices are complied with and verified, the liquor can be cleared by customs.

45 ENTREPRENEURSHIP & L. 273, 274 (2018).

46 See Larson, *supra* note 3, at 963.

47 See Evans, *supra* note 45, at 276.

48 *Id.* at 280.

49 *Id.* at 281.

50 Gregory Klass, *Introduction to Philosophical Foundations of Contract Law in Philosophical Foundations of*

Adding on, international commercial transactions do not always have the same courier transporting the goods from buyer to seller. In this instance, the liquor will be shipped by a Mombasa courier X from the Port of Mombasa, Kenya to the Port of Durban, South Africa. The liquor will be handed over to a South African courier once all customs are cleared. The condition on the smart contract will thus state that, if goods have arrived at port and customs officials have cleared them, then courier Y from Durban is to take goods and deliver them to their final destination in Johannesburg. Parties involved in the transaction will have real-time access to the whole process as they would have representative nodes on the blockchain. Thus, processes from negotiating the contract of sale to delivery at the final destination can be done using a blockchain-based smart contract.

3.3.1 THE CONTRACTUAL AGREEMENT

Traditional Position

A contract of sale has its foundation in the notion of obligations.⁵⁰ The seller is obligated to make the goods available, and the buyer is obligated to pay the seller. Other parties such as the courier, government and financing institutions are also required to fulfil obligations. The fulfilment of these obligations is dependent on performance. For example, if the seller does not make the goods available to the courier for shipment, the courier will not be able to perform, thus no payment from the purchaser. Such an instance may trigger a dispute amongst the parties involved in the international commercial transaction, necessitating dispute resolution.

Use of Smart Contract

As seen above, the traditional contract of sale is quite similar to the way in which computer code functions. If the seller provides the goods, then the buyer effects payment. Computer code can follow a “if-then” logic.⁵¹ In this way, international contracts of sale drafted in paper form can be complemented or even replaced by computable approaches in form of blockchain-enabled smart contracts that automatically carry out the conditions agreed in the contract of sale.

Contract Law, in *PHILOSOPHICAL FOUNDATION OF CONTRACT LAW* 1, 2 (Gregory Klass et al. ed., 2014).

51 Fabio Bassan & Maddalena Rabitti, *From smart legal contracts to contracts on blockchain: An empirical investigation*, 55 Computer Law & Security Review 1, 3 (2024).

52 See Evans, *supra* note 45, at 277.

53 *Id.*

In the event of dispute, traditional contracts usually depend on judges to interpret the contract and clarify each party's obligations.⁵² It is argued that contracts of sale without the enforcement of the court are "not worth the paper on which they are printed".⁵³ Obtaining enforcement of an obligation via the court system may be challenging especially when contracts are of an international nature. However, if parties make use of a smart contract, instructions can be pre-programmed, thus guaranteeing performance from parties to the transaction without using court services.⁵⁴ Additionally, due to the code-based nature of smart contracts, they are thus accurate, and potential misinterpretation is done away with, hence litigation can be minimised.⁵⁵

As noted, although disputes are inevitable when it comes to international commercial transactions, the use of smart contracts may offer a cheaper method of dispute resolution. Smart contracts allow for parties to the international commercial transaction to include automatic remedies for non-performance when drafting the contract. For example, if delivery is not affected by the set date, an automated remedy kicks in and reduces the likelihood of legal exposure to international trading businesses.

However, the downside of this is that it is not always clear-cut when it comes to such relations. There might be many reasonable reasons for the failure of delivery.

Adding to this point, when litigating with international contracting parties, there is often a dispute over jurisdiction. The use of smart contracts could be advantageous, as it allows for dispute resolution over an automated web-based platform.⁵⁶ When resolving disputes with local and foreign courts, the elimination of centralized governing authorities allows for the least amount of delays and bureaucratic inefficiencies.⁵⁷ Decentralisation of dispute resolution provides for better access to justice, equality, and fair resolutions.⁵⁸ It is common knowledge that parties within a transaction who have access to better resources often get favourable outcomes when it comes to disputes surrounding the contract, putting smaller institutional entities at a disadvantage.⁵⁹

54 *Id.*

55 See Evans, *supra* note 45, at 276.

56 See Evans, *supra* note 45, at 277.

57 Karolina Mania, *Online dispute resolution: The future of justice*, 1(1) INT'L COMPAR. JURIS. 76, 76–77 (2015).

58 *Id.*; see also Evans, *supra* note 45, at 278.

59 See Mania, *supra* note 57, at 78; see also Evans, *supra* note 45, at 278.

60 Gregory Benson Jr., *Implications of Adopting Blockchain Technology on International Sales Transactions*,

Courts are often clogged with backlog and small businesses cannot afford to have disputes prolonged. The use of smart contract dispute resolution allows transacting parties to solve an issue within weeks or months as opposed to the court procedures that may take years.⁶⁰ Dispute resolution via smart contract saves on costs associated with litigation such as expert fees, attorney fees, and court fees, amongst others.⁶¹ Avoiding dealing with court systems leads to efficiency and levelling of playing fields in cross-border transactions.⁶²

Moreover, contracting parties to international commercial transactions will be able to maintain their business connection by using the dispute resolution mechanism, which enables parties to work together to address conflicts rather than using an aggressive and hostile legal approach.⁶³ However, it should be noted that the dispute resolution offered by the blockchains' smart contract is not intended to replace the court system, but rather to assist in lessening the load on courts, especially with trial courts and small claims.⁶⁴

3.4 ARE SMART CONTRACTS, CONTRACTS?

A major problem posed by smart contracts is that they are arguably not truly 'contracts'. A contract of sale generally requires elements of offer, acceptance, and consideration/consensus for it to be legally binding to parties to the contract. Smart contracts lack elements of offer, acceptance, and the intention of being bound by the terms of the smart contract. *Prima facie*, smart contracts seemingly do not meet the characteristics of a binding contractual agreement. thus, an issue of enforceability of smart contracts arises looking through the lens of the conventional definition of a contract.⁶⁸

39(3) N. ILL. UNIV. L. REV. 486, 507 (2019).

61 *World's First Smart Contract Based Arbitration Proceedings Conducted*, TRUSTNODES (Jul. 17, 2017), <https://www.trustnodes.com/2017/07/17/worlds-first-smart-contract-based-arbitration-proceedings-conducted>.

62 *See* Evans, *supra* note 45, at 278.

63 *Id.* at 279.

64 *Id.*

65 *Id.* at 282.

66 Jonathan Herpy, *Smart Contracts And The Law: What You Need To Know*, FORBES (Mar. 17, 2022, 09:45AM), <https://www.forbes.com/councils/forbesbusinesscouncil/2022/03/17/smart-contracts-and-the-law-what-you-need-to-know/>; *see also* Evans, *supra* note 45, at 282.

67 *See* Evans, *supra* note 45, at 282.

68 Daniel P. O'Gorman, *Redefining Offer in Contract Law*, 82(6) Miss. L. J. 1049, 1055 (2013).

69 *See* Benson, *supra* note 60, at 501.

Furthermore, lawyers have a duty of due diligence when it comes to traditional contracts, and this is seemingly absent with smart contracts. Prior formation of a traditional contract, lawyers ought to perform due diligence with regard to the structuring of the transaction.⁶⁹ Traditional due diligence methods must be modified since the open-source blockchain model's offers must be comprehended by lawyers to confirm that the products correspond to what the blockchain claims they are.⁷⁰

Yet, in a decentralised ledger system, it is difficult for international commercial lawyers to ascertain ownership of data. Commercial lawyers are also unable to determine who owns intellectual property at any given stage of the blockchain process.⁷¹ These problems have made it more difficult for businesses involved in international contracts of sale to acquire blockchain start-ups and integrate with other businesses that have already done so.⁷²

3.4.1 IMMUTABILITY

A question thus arises as to whether smart contracts can qualify as valid agreements. As noted earlier, smart contracts are unchangeable, immutable and rely heavily on the programmer or one responsible for developing the contract. Thus, developers of the smart contract platform apparently have more power than the legal practitioners.

A drawback of smart contracts' immutability is that it may not accurately reflect the parties' intentions in an international commercial contract of sale transaction. Therefore, the contract would be rendered voidable as true intention of parties will not be reflected.⁷³

The immutability of smart contracts means the lack of flexibility of the contract. business entities need flexibility when partaking in cross-border sale transactions. Due to the concrete nature of smart contracts, they do not take into account business ties which are very important when conducting business.⁷⁴ Companies must have the flexibility to alter agreements with suppliers and independent contractors in

70 John McKinlay et al., *Blockchain: background, challenges, and legal issues*, DLA PIPER (Feb. 2, 2018), <https://www.dlapiper.com/en/insights/publications/2017/06/blockchain-background-challenges-legal-issues>.

71 Benson *supra* note 60, at 502.

72 *Id.*

73 See Evans, *supra* note 45, at 282.

74 Andrew Glidden, *Should Smart Contracts be Legally-Enforceable?*, MEDIUM (Feb. 27, 2018), <https://medium.com/blockchain-at-berkeley/should-smart-contracts-be-legally-enforceable-599b69f73aea>.

75 See Evans, *supra* note 45, at 282.

response to changes in the market.⁷⁵ Relationships in the business world would be ruined if companies were obligated to submit contracts created by smart contracts.⁷⁶ This then calls for technology experts and lawyers to work together to come up with means to develop and integrate solutions to facilitate the cancellation and reversal of payments. Despite these challenges, the benefits of blockchain-based smart contracts clearly outweigh their drawbacks, making their adoption in international commerce desirable.

3.5 BLOCKCHAIN AND LETTERS OF CREDIT

When dealing with an international sale of goods transaction, three main separate documents are involved in this transaction and these are; the sales contract, the bill of lading, and the letter of credit.⁷⁷ A bill of lading is a document that specifies the party bearing risk for the goods while they are in transit and at which times during the shipping procedure.⁷⁸

A letter of credit commits an issuing bank to pay the agreed-upon sum to the seller on behalf of the buyer, upon receipt of the supporting documentation specified in the letter of credit.⁷⁹ The International Chamber of Commerce Uniform Customs and Practice for Documentary Credits oversees letters of credit used in international transactions. The current functioning of letters of credit is not so much favourable. For instance, the seller has to wait for a considerable amount of time before receiving payment because the bank cannot release funds without proper documentation. This documentation often takes time to be delivered, and it could contain errors, thus increasing delays in finalising the international sale. The bank is contractually obliged to pay for the entire or remaining balance of the transaction if the buyer is unable to make a payment on it.⁸⁰ Due to obstacles like distance, different state regulations, and the challenge of getting to know each party personally, letters of credit are a crucial part of international trade. This is because banks often act as the financing institutions, and they are trusted.

76 *Id.*

77 See Benson, *supra* note 60, at 488.

78 *Id.* at 489.

79 Lowell J. Mooney & Mark S. Blodgett, *Letters of credit in the global economy: Implications for international trade*, 4(2) J. OF INT'L ACCT., AUDITING & TAX'N 175, 176 (1995).

80 *Id.*

81 See Larson, *supra* note 3, at 930.

International traders traditionally make use of letters of credit to facilitate international commercial transactions.⁸¹ Letters of credit are an essential trade finance instrument especially for parties that do not trust one another.⁸² For example, a seller might not be willing to ship goods without the security that the purchaser will pay. Likewise, a purchaser might not want to make payment without confirmation that the seller has shipped the correct/proper goods.⁸³ A letter of credit thus enters the transaction acting as an intermediary between the purchaser and seller. Thus, mitigating the risk in the international sale transaction as the bank assumes the responsibility of paying the exporter.

The purchaser is required to provide proof showing that the goods have been shipped and that they meet the standards highlighted in the letter of credit, to effect payment from the bank.⁸⁴

A letter of credit has been seen to be equally favourable for all parties within the transaction.⁸⁵ Although payment may be specified against a time draft, in most cases, the purchaser is often a risk as the seller is generally paid before goods reach the purchaser.⁸⁶ Therefore, adopting blockchain technology in dealing with letters of credit may seemingly solve this problem.

3.6. HOW LETTERS OF CREDIT WORK

Letters of credit transaction consist of three parties. The first party is the buyer, also known as the applicant, as they apply to the bank for the letter of credit. The second party is the seller, also known as the beneficiary, as they benefit from the credit arrangement with the financing institution. The third party is the bank which is the financial institution issuing the letter of credit.⁸⁷ To be able to assess whether blockchain technology is useful in the letters of credit transactions context, there must be a breakdown of the steps in this transaction.

82 See Larson, *supra* note 3, at 931, 955.

83 See Larson, *supra* note 3, at 931.

84 John F. Dolan, *Insolvency in Letter of Credit Transactions—Part I*, 132 BANKING L. J. 195, 195-196 (2015).

85 See Larson, *supra* note 3, at 932.

86 *Id.*

87 See Benson, *supra* note 60, at 493.

3.6.1 STAGE 1 - ISSUANCE

A letter of credit starts off with an application to the issuer by the applicant (buyer). The applicant makes a formal application to the financial institution, including the applicant and beneficiary's desired terms.⁸⁸ Basic details like the amount of the letter of credit and the paperwork the beneficiary must submit in order to initiate payment against the letter of credit must be provided during this stage.⁸⁹ There are several documents often required for the letter of credit, some of which are; a bill of lading, insurance certificate, certificate of inspection certificate of origin and a commercial invoice, amongst others.⁹⁰ It is lucid that this initial application requires a number of details, hence accuracy is of utmost importance to prevent future disputes.⁹¹

After receiving the application for the letter of credit, the issuer has the task of drafting the letter of credit. Nowadays, the dematerialisation of this stage of the letter of credit is a common practice.⁹²

Advantages of Using Blockchain During Stage 1

The current electronic method used in this stage often takes several days to arrive at the exporter from the issue of a letter of credit until the information. However, it is argued that by sharing information across a blockchain platform parties involved in the sales transaction would be able to immediately browse the information.⁹³

Takahashi is sceptical of the above advantage assertion. Takahashi is of the view that other forms of electronic communication can also be as instant as blockchain technology. Thus, the assertion of swift notification through blockchain is not as real as it is presented to be.

88 See Larson, *supra* note 3, at 941.

89 *Id.* at 942.

90 See Larson, *supra* note 3, at 942.

91 Michael Sandler & Barbara Di Ferrante, *Primer on Trade Finance: Export Drafts, Letters of Credit, and Banker's Acceptances*, 11 N.C. J. INT'L L. 613, 619, 624 (1986) (stating that to be effective, a modification to an irrevocable letter of credit requires the consent of all parties).

92 See Takahashi, *supra* note 14, at 92.

93 See above discussion on the Mizuho case study under 3.1, this was one of the benefits drawn from the project.

94 See Larson, *supra* note 3, at 942.

3.6.2. STAGE 2 - DOCUMENTARY COMPLIANCE PRESENTATION

Traditional Practice

The issuer must receive all the trade documentation as provided for in the letter of credit from the "presenter", which is frequently the beneficiary, at the same time and before the letter of credit expires.⁹⁴ The issuer assesses whether the document is *prima facie* in accordance with the letter of credit's provisions. The Uniform Commercial Code ("UCC") refers to this as the "strict compliance" principle.⁹⁵ The issuer has a finite, "reasonable" period, which is not to exceed seven business days under the UCC,⁹⁶ or up to five business days under the UCP, after obtaining the necessary documentation from the beneficiary to assess compliance or noncompliance and notify the presenter.⁹⁷

The amount of documentation the issuer must review is one of several factors that determine what is reasonable.⁹⁸ If any differences exist between the documents presented and the letter of credit requirements, the issuer either "honours" the presentation of compliant documents or notifies the presenter.⁹⁹

Unlike the first stage, de-materialisation is not widely accepted in the topical practice of this stage.¹⁰⁰ Although electronic presentations take place every now and then, generally, paper presentations are still prevalent.¹⁰¹

Advantages of Using Blockchain Technology

The distributed ledger technology feature of blockchain appears to be advantageous in the arena of the presentation of documents.¹⁰² Article 17(a) of the UCP 600 provides that, "at least one original of each document stipulated in the credit must be presented", the ledgers' tamper resistance nature will aid to satisfy this condition. To fulfil the condition in Article 17(a) of the UCP, one has to simply present a single electronic record as provided by the eUCP,¹⁰³ which seemingly adds nothing. Koji proposes that a better interpretation of the requirement in Art 17(a) would be that the condition is considered to be met where there is a trustworthy guarantee of the integrity of the data contained.¹⁰⁴

95 *Id.* at 942–43.

96 Uniform Commercial Code ("UCC"), §-108(b).

97 Uniform Customs and Practices for Documentary Credits ("UCP 600"), Art. 14(b).

98 See Larson, *supra* note 3, at 945.

99 *Id.* at 946.

100 See Takahashi, *supra* note 14, at 93.

101 *Id.*

102 *Id.* at 94.

103 The eUCP is a supplement and digital companion to the UCP 600 in purely digital form. See eUPC, Art. e8.

104 United Nations Convention on the Use of Electronic Communications in International Contracts, Art. 9(4)(a) (2005).

However, in as much as blockchain technology provides the advantage of a distributed ledger, it appears to be still lacking as false information can still be fed into the ledger.¹⁰⁵ It should be stressed that issuing falsified documents,¹⁰⁶ as opposed to manipulating documents after they have been issued, constitutes the most severe type of fraud in letters of credit.¹⁰⁷

3.6.3. STAGE 4 - PAYMENT

Traditional Practice

Whether a letter of credit allows for a sight draft,¹⁰⁸ a time draft,¹⁰⁹ or a deferred payment obligation,¹¹⁰ will impact when the beneficiary is paid.¹¹¹ The majority of letters of credit allow for sight drafts, probably due to the fact that the beneficiary prefers early payment.¹¹² Payment to the beneficiary is often delayed by time drafts and deferred payment obligations.¹¹³ Payment under a letter of credit is typically made via an electronic transfer if, as is generally the situation nowadays, the parties to a sales contract pick a fiat currency as the mode of payment for their contract.¹¹⁴

Advantages of Using Blockchain Technology

Adopting blockchain technology at the payment stage will be of no value if payment is done using a fiat currency as this is often affected by the use of an electric transfer. However, blockchain technology may be useful in this stage if parties to an international contract of sale select a cryptocurrency to be used as the method of payment.¹¹⁵ When parties choose to utilize a letter of credit in the sales transaction, a bank acts as an intermediary since the buyer cannot directly pay the seller. It raises the question of whether blockchain implementation could make letter of credit transactions trustless.

105 See Takahashi, *supra* note 14, at 94.

106 See Sztejn v. Schroder Banking Corp., 177 Misc. 719, 31 N.Y.S.2d 631 (Sup. Ct. 1941). In this scenario, the seller transported cow hair and other trash but submitted a bill of lading and invoices detailing the bristles as specified in the letter of credit.

107 See Takahashi, *supra* note 14, at 94.

108 A sight letter of credit is a document that attests to the payment for goods or services and is only valid when it is presented with the required documentation.

109 A time draft gives a specific deadline by which payment must be made after the purchaser has accepted it and goods have been received.

110 A deferred payment is when the financing institution undertakes to effect payment at maturity.

111 See Larson, *supra* note 3, at 945.

112 *Id.*; see also John F. Dolan, *Strict Compliance with Letters of Credit: Striking a Fair Balance*, 102 BANKING L. J. 18 (1985).

113 See Larson, *supra* note 3, 945.

114 See Takahashi, *supra* note 14, at 95.

115 *Id.*

While it's improbable that letter of credit transactions could become entirely trustless, automating the document examination stage could change this perception. Utilising a smart contract or computer code on a blockchain could automate this stage, triggering payment without manual authorisation by the bank. Thus, it's essential to explore the possibility of automating the document examination stage.¹¹⁶

3.6.4 STAGE 3 - DOCUMENT EXAMINATION

Traditional Practice

Examination of documents is done with the objective of determining whether they conform with the terms of the letter of credit. Examination of documents might require a value judgment. Thus, automation may pose a challenge. Unless and until there are significant developments in artificial intelligence, it would be close to impossible to automate inspection without foreseeing for every conceivable description of every conceivable good. Hence a conclusion can be drawn that this stage of document examination cannot practically be automated, yet.

The use of blockchain may aid in modernising payments in international sales contracts.¹¹⁷ Thus, blockchain can be essential in modernising letters of credit.¹¹⁸ Blockchain provides a simple way to store, organise, and verify documents because international transactions typically require the use of a lot of paper and maybe multiple stages of correspondence as seen with the stages of a letter of credit. Additionally, blockchain can be combined with smart contracts to enhance automation in international commercial transactions.¹¹⁹ However, blockchain technology does come with disadvantages, some of which include issues around safety and data protection, liability concerns, jurisdictional challenges and also the relative immaturity of the technology.

116 See Takahashi, *supra* note 14, at 95.

117 See Larson, *supra* note 3, at 958.

118 *Id.* at 959.

119 Reggie O' Shields, *Smart Contracts: Legal Agreements for the Blockchain*, 21 N.C. BANKING INST. 177, 181–82 (2017).

4. COMPLEMENTARY INFRASTRUCTURAL APPROACHES TO BLOCKCHAIN

4.1 DATA WITH DIRECT SPECIFICATION

To effectively implement blockchain technology in international commercial transactions, complementary infrastructural approaches are essential.¹²⁰ In this context, complementary infrastructural approaches to blockchain technology and smart contracts refers to using different supportive systems, technologies, or methodologies alongside blockchain and smart contracts to enhance their functionality, efficiency, or capabilities. There are several infrastructural approaches that can be used to enable the smooth flow of blockchain technology in global trade processes. One of these approaches is the implementation of Data With Direction Specification ("DWDS").

While blockchain technology offers a significant transparency advantage in international payment systems, a key challenge lies in ensuring consistent data interpretation across participants.¹²¹ Although all authorised participants have access to the transaction details recorded on the distributed ledger (data visibility), differences in data interpretation (data clarity) can lead to misunderstandings and delays. For instance, the same data points on an invoice, such as product descriptions or quantities, could be interpreted differently by sellers, buyers, and financial institutions, potentially causing friction in the payment process.

DWDS, also known as the "Internet of Rules," offers a compelling solution to bridge this data clarity gap. DWDS establishes a framework for attaching standardised rules and instructions directly to data.¹²² This enables everyone interacting with the data to interpret it consistently. In the context of blockchain-based international payments, DWDS can be leveraged to define standardised formats for trade documents commonly used in international commerce, such as letters of credit and bills of lading. By ensuring a common understanding of the structure and meaning of this data, DWDS significantly reduces the risk of misinterpretations.

¹²⁰ Mehdi Shiva et al., *Exploring Blockchain Technologies for Collaboration and Partnerships*, GOVERNMENT OUTCOMES LAB (June 2023), <https://golab.bsg.ox.ac.uk/documents/exploring-blockchain-technologies-for-collaboration-and-partnerships.pdf>.

¹²¹ Gousia Habib et al., *Blockchain Technology: Benefits, Challenges, Applications, and Integration of Blockchain Technology with Cloud Computing*, 14(11) FUTURE INTERNET 341, 349 (2022).

¹²² Joseph Potvin, *Data With Direction: Design Research Leading to a System Specification for 'An Internet of Rules'* (Jan. 1, 2023) (Ph.D. dissertation, Université du Québec, Canada) at 170.

Furthermore, DWDS goes beyond simply standardising data formats. It allows for embedding decision-making logic directly within the data itself. This embedded logic can guide smart contracts on how to interpret and process the data.¹²³ For example, consider an invoice submitted on the blockchain platform. DWDS could be used to embed a rule within the invoice data that instructs the associated smart contract to release payment only after the buyer confirms receipt of the goods. This eliminates ambiguity in the payment process and fosters greater trust and efficiency between trading partners.

The integration of DWDS with blockchain technology presents a powerful combination. The transparency and immutability of blockchain data are significantly enhanced by the clear and consistent interpretation facilitated by DWDS. This approach has the potential to streamline international commerce by minimising errors and delays caused by data misinterpretations. Consequently, a more robust and efficient ecosystem for secure international payments can be established.

CONCLUSION

The emergence of blockchain technology presents a transformative opportunity for secured payments in international commercial transactions. By leveraging its unique features of transparency, immutability, and decentralization, blockchain has the potential to address existing challenges associated with trust, security, and efficiency in global payment systems.

Throughout this research paper, general advantages of blockchain technology and its specific legal significance in the context of secured payments for international contracts of sale have been explored. The research highlights how blockchain technology can modernise and supplement traditional methods, such as documentary letters of credit, which often suffer from delays and complications. By integrating blockchain technology into international trade finance, the cumbersome processes can be streamlined, leading to faster, more secure, and cost-effective transactions.

123 *Id.* at 172, 191.

There are acknowledged limitations associated with the adoption of blockchain technology that have not been explored in this paper. For instance, the relative immaturity of the technology, jurisdictional and liability concerns amongst others. Despite these drawbacks, blockchain has the potential to modernize and streamline international trade finance processes, particularly when integrated with complementary infrastructural approaches like DWDS. Such an approach can ensure consistent data interpretation, thereby minimizing errors and delays potentially caused by misinterpretations.

Encountering challenges and uncertainties when transitioning from one technological advancement to another is not uncommon. Considering the relative novelty of blockchain technology in payment systems, experiencing a few issues is to be expected. Yet, by implementing appropriate measures and safeguards, it is possible to overcome these difficulties and capitalize on the numerous advantages offered by this class of technology.