

Legal perspectives on the potential impact of blockchain technology on international trade law

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ABSTRACT

Legal perspectives on the potential impact of blockchain technology on international trade are discussed in this dissertation. At first, there will be a discussion as to why the development of blockchain technology is relevant. Together with its main features such as being decentralised, completely digital and eliminating the middleman, it leads to reduced international trade transaction time and costs. It is highly transparent and secure and creates a record of every transactional step taken, thus reducing certain risks, such as fraud. This is followed by a discussion of the possibility that blockchain technology might lead to another international trade revolution, triggering the development of a new subset of law, namely the *lex cryptographia*. This is discussed together with various other benefits and opportunities of blockchain technology and its use in conjunction with digital contracts and signatures. The impact of blockchain technology on the use of international trade documentation such as the bill of lading and letter of credit is also mentioned. There are various disadvantages of blockchain technology. This include, amongst others, the energy that will be consumed in creating a transactional record, and the possible unwillingness of companies to introduce blockchain technology into their system, mainly because of a lack of knowledge. Subsequently, the legal and other challenges accompanying the adoption of blockchain technology are reviewed, such as the regulation of digital documentation and jurisdictional questions that might arise. After having identified the problems, some solutions will be proposed. Some existing model laws will briefly be discussed. A conclusion will be drawn as to whether blockchain technology is ready to be implemented from a legal perspective, taking account of the risks of premature implementation such as unregulated governmental control over citizens and constraining the full development of blockchain technology.

Key words: blockchain technology | international trade | trade digitisation | international trade processes and financing | paperless trade |

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LIST OF ABBREVIATIONS

ABLU	Annual Banking Law Update
ADE	Automated Document Examination
DAO	Decentralized Autonomous Organization
DLT	Distributed Ledger Technology
DCW	Documentary Credit World
ICC	International Chamber of Commerce
ITFA	International Trade and Forfaiting Association
TDP	Trade Digital Platform
URDTT	Uniform Rules for Digital Trade Transactions
UNCITRAL	United Nations Commission on International Trade Law
SSRN	Social Science Research Network
WTO	World Trade Organization

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1 Introduction

Legal perspectives on the potential impact of blockchain technology on international trade are discussed in this dissertation. First, the problems that international trade are currently experiencing are highlighted. A possible solution to these problems, namely blockchain technology, is then suggested and discussed in detail. The origin and function of blockchain technology are presented, followed by a discussion on its key benefits and challenges. This discussion also focuses on trade digitalisation, smart contracts, various digital documents and digital signatures. Finally, a conclusion is drawn as to whether blockchain technology is ready to be utilised in the trade context and whether this could possibly lead to another international trade revolution.

1.1 Transformation as the topic of the times

The development of electronic communication and transactions is increasing by the day. Various significant discoveries have changed the way business is conducted, and there will certainly be many more. The internet is one of the most important innovations that changed the world.¹ This opened a whole new world of possibilities. Its impact was probably larger than the advent of container transport, preceding the internet, which also revolutionised international trade.² The question now is whether blockchain technology might lead to another revolution in international trade. Currently, the world is focusing on transformation and change. This might be the perfect time to join in and transform international trade as we know it.

1.2 Current problems experienced in international trade

International trade has for many centuries relied heavily on paper documentation and has become somewhat set in its ways in this regard.³ It might be because it predates the internet. Moreover, the rules and laws that were developed to regulate international trade and its disputes suggest the use of paper documentation and

¹ Ganne *Can Blockchain Revolutionize International Trade* 6.

² Ganne *Can Blockchain Revolutionize International Trade* 6.

³ Padinhere June 2020 *Documentary Credit World* (hereinafter *DCW*) 38.

transactions.⁴ This could hinder the development and functioning of international trade in modern society.⁵

There are various other restraints on the efficient functioning of international trade. First, the current transaction system is inefficient, expensive and vulnerable.⁶ This adds to the time it takes for a transaction to be concluded. The expansion of trade has also resulted in the emergence of trade-based money laundering, which creates a significant problem in international trade.⁷ Other problems relating to commercial crime include the use of additional, unauthorised sets of bills of lading in conjunction with the original shipping documents.⁸ This results in multiple bills of lading being circulated for the same shipment. The bills seem real and are presented to banks, which leads to money being paid out, or goods being delivered to the wrong people. Further increasing fraud is a lack of transparency. Clearly, fraud is a massive problem that needs urgent attention. Another cumbersome aspect is that the expansion of trade comes with a concurrent growth in the volume of paper that must be processed. This inevitably increases the time it takes for a transaction to be completed, especially given the lack of efficient ways to process transactions and documents.⁹ Preventative measures must be taken to avoid these risks. These preventative measures further increase the cost and complexity of the transactions. As an additional security measure, trusted third parties are necessary to validate transactions, consequently acting as intermediaries.¹⁰

There is no doubt that the use of original paper documents for bills of lading, certificates of origin, letters of credit, *et cetera*, delay transaction processes. Delays in processing paper documents often result in cargo being stuck at ports for longer than it should be. This leads to congestion at ports and creates numerous problems, such as late shipments, products going off, and companies losing money.

⁴ Nizardeen May 2020 *DCW* 20.

⁵ Nizardeen May 2020 *DCW* 20.

⁶ Padinhere June 2020 *Documentary Credit World* (hereinafter *DCW*) 38.

⁷ Padinhere June 2020 *Documentary Credit World* (hereinafter *DCW*) 38.

⁸ Padinhere June 2020 *Documentary Credit World* (hereinafter *DCW*) 39.

⁹ Gupta *Blockchain for Dummies* 5.

¹⁰ Gupta *Blockchain for Dummies* 4.

1.3 COVID-19 and international trade

The COVID-19 pandemic adds to already existing problems. This pandemic has led to an international trade dilemma, especially because courier services have not been working, thus no paper documents can be delivered nor processed.¹¹ The delay in processing documents also meant the documents could not be authenticated. This resulted in delayed payments. COVID-19 consequently has had and continues to have a major impact on international trade financing. It has often led to late, or even failed shipments,¹² especially because of the delay in payments.¹³

A clear need exists for an efficient, paperless and cost-effective system in processing and recording financial transactions. Such a system should be reliable and secure.¹⁴ Paperless business practices are becoming more popular by the day. However, it seems as if international trade business practices are slow to implement digitised platforms. The COVID-19 pandemic might just be the push the world needs to move to paperless trade. Although this seems like a daunting task, the solution might already exist, namely within blockchain technology.

1.4 Blockchain technology as the potential solution to international trade problems

Blockchain technology has the potential to decentralise¹⁵ financial transactions and the way data is being stored.¹⁶ It can furthermore improve the efficiency of international trade processes by enhancing transaction speed, transparency and the authentication of documents. It is able, in addition, to provide platform for self-executing digital contracts,¹⁷ which reduces the need for intermediaries, and

¹¹ Padinhere June 2020 *DCW* 38.

¹² Hussain March 2020 *DCW* 40.

¹³ Hussain March 2020 *DCW* 40.

¹⁴ Gupta *Blockchain for Dummies* 3.

¹⁵ Decentralised means there is no central authority that regulates the financial transaction, giving all the participants equal authority. This concept will be discussed in more detail below. Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 1.

¹⁶ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 1.

¹⁷ Letorneau and Whelan 2017 *Journal of Equipment Lease Financing* 1.

simplifies the complete process by involving fewer role players. It might even lead to a whole new development of the law, namely the *lex cryptographia*.¹⁸

Blockchain technology was described as follows by a consultant at the Blockchain Academy,¹⁹ Carel de Jager.²⁰

Blockchain technology is a ledger that is distributed into various blocks. Each of the blocks contains transactions and a new block is updated every few minutes. Every block is mathematically connected to the block on either side of it. When a participant tries to alter a transaction, it will lead to the changing of the complete structure of the blockchain. Thus, if one blockchain is being tampered with, it will immediately differ from the correct structure of the other blockchain. Therefore, it is easy to identify a block that has been tampered with. Furthermore, through cryptography a person will need to prove ownership of a blockchain with a private key to the blockchain. This key can be the use of his fingerprint or any other manner to prove his DNA. Furthermore, blockchain can consist of anything that can be formed in a digital manner such as a title deed or a medical record. Lastly, there are various types of blockchains, and it would be much better to use private blockchains for business purposes. This is because anyone with internet access will also be able to access the information on a public blockchain.

This description gives a good introduction to blockchain technology.

1.5 Conclusion

The world might be changing sooner than expected, which might leave the international trade world with no other choice but to adapt or die. The introduction of blockchain technology will consequently lead to a new way of doing business. The biggest problem is that international trade relies mainly on paper documents. No transaction can be processed without documents such as bills of lading, letters of credit *et cetera*. Each document also requires different stamps and formalities, which means that various role players are involved. The more participants, the more time it takes for a transaction to be finalised. Evidently, various problems already exist in relation to current international trade transactions such as that they are costly, inefficient, slow and susceptible to fraud, to name but a few. In addition, the

¹⁸ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 1.

¹⁹ The Blockchain Academy provides for training in blockchain and cryptocurrencies. It offers a wide range of courses and was established in 2015 in South-Africa. For more information see <http://blockchainacademy.co.za/about-us/>.

²⁰ Ramotsho August 2018 *De Rebus* 11.

limitation of paper movement because of the worldwide lockdown has increased these problems. Therefore, rapid business plans should be implemented to shift from traditional processes to digital platforms in conjunction with blockchain technology. This is known as a trade digital platform (TDP) and would enable financial institutions and personnel to operate from anywhere as long as they have access to the internet and a computer.²¹ Such transformation will not be easy, especially since international trade has used paper documents for decades. The system might therefore be set in its ways. Furthermore, because of the various stakeholders in every transaction, any change in the system would result in each stakeholder having to create a new infrastructure and be committed to revolutionise to digital trade.²²

However, transformation is the current topic in most environments worldwide. It might be time for another international trade revolution by means of blockchain technology. Consideration should be given to firstly, whether international traders should accept the challenge; secondly, whether they are ready for such a change. However, the main question that should be raised is what the potential legal impact of blockchain technology might be on international trade.

²¹ Hussain March 2020 *DCW* 40.

²² Hussain March 2020 *DCW* 41.

2 Blockchain technology

Before discussing the potential legal impact of blockchain technology on international trade, a background to blockchain technology is first provided. Next, various definitions, explanations and classifications of blockchain technology are provided. Thereafter, the features of blockchain technology are provided, and relevant concepts and the function of blockchain technology are discussed. The relevant types of blockchain technology are also considered as well as countries and industries already making use of blockchain technology.

2.1 Blockchain technology: Background

Blockchain was implemented in 2009 as the foundation of Bitcoin and was developed by a pseudonym, Satoshi Nakamoto.²³ It is important to note that blockchain and Bitcoin differ and that the benefits and use of blockchain technology go beyond Bitcoin.²⁴ Blockchain is the technology that enables Bitcoin, being the virtual protocol that provides the foundation of Bitcoin.²⁵ Blockchain is an operating system providing facilities to record Bitcoin transactions.²⁶

The term “blockchain” originated from the way data is stored. Transactions are stored in blocks that are linked chronologically to form a chain. The blockchain grows and strengthens as the number of transactions increases. The more blocks in the chain, the better the verification of the previous blocks and the blockchain as a whole is strengthened.²⁷ There are two requirements before data is added to a block: first, the data should be validated, and second, the time and sequence should be confirmed whereafter the blocks will receive a time stamp.²⁸ The time stamp makes it nearly impossible to modify the data.²⁹ When data is entered into the blockchain, each block contains a specific hash which gives that block its unique

²³ Gupta *Blockchain for Dummies* 6.

²⁴ Gupta *Blockchain for Dummies* 6.

²⁵ Ganne *Can Blockchain Revolutionize International Trade* 3.

²⁶ Ganne *Can Blockchain Revolutionize International Trade* 3.

²⁷ Ganne *Can Blockchain Revolutionize International Trade* 6.

²⁸ Gupta *Blockchain for Dummies* 13.

²⁹ Ganne *Can Blockchain Revolutionize International Trade* 6.

identity. A hash is like a digital fingerprint that is completely unique and provides for a specific identification.³⁰ The blockchain thus contains a timestamped batch of recent valid transactions and the hash of the previous block.³¹ The chain will begin with one block, which is the original agreement. The blocks will then increase as the participants engage in the transaction. The increase in blocks will lead to an increase in the security of the blockchain.³² Each block has a header containing a hash, a timestamp and the hash of the previous block. None of the blocks can be altered or added to without the consent of all the participants. Lastly, each block is encrypted to ensure data integrity and to prevent forgery.³³ Furthermore, it is necessary that the identity of the participants be confirmed. This is done by means of the key access restrictions that are necessary for each participant to log in to the transaction.³⁴ Each participant receives an encryption key that they need to access the blockchain. As this key authorises only members to log into a transaction, it reduces the risk of fraud and also creates proof of ownership by using digital signatures.³⁵ The risk of fraud is furthermore reduced in that any activity is recorded and cleared. No traditional auditing is thus necessary to verify the activity.³⁶ This inevitably also reduces auditing fees. Money can be traced back to its source which could facilitate the apprehension of fraudsters. It is very complex to hack into – and interfere with the blockchain system.³⁷

Although blockchain essentially serves as a database, it has various other benefits. These are discussed in the next section.³⁸ Because blockchain technology is still a new development, many efforts have been made to define it. To provide a better

³⁰ Gupta *Blockchain for Dummies* 13.

³¹ Ganne *Can Blockchain Revolutionize International Trade* 4.

³² Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 48.

³³ Ganne *Can Blockchain Revolutionize International Trade* 6.

³⁴ Letorneau and Whelan 2017 *Journal of Equipment Lease Financing* 1.

³⁵ Hellwig and Huchzermeier *An Industry Study of Blockchain Technology's Impact on Trade Finance* 4.

³⁶ Hellwig and Huchzermeier *An Industry Study of Blockchain Technology's Impact on Trade Finance* 4.

³⁷ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 55.

³⁸ Gupta *Blockchain for Dummies* 14.

understanding of blockchain technology, various definitions and explanations are provided below.

2.2 Definitions and underlying operation of blockchain technology

Blockchain is defined by its creator as “a public ledger containing information on every transaction made within a Peer-to-Peer system”. Belu³⁹ (quoting the Tapscott`s) provides a more elaborate definition:

Blockchain is a global registry that works on computers and is made available by volunteers around the world. At the bottom of the blockchain concept there is a network of computational nodes, each client logged on the network receives a copy of the updated and validated data.

The definitions above are quite complex, hence simpler explanations of blockchain are provided below.

The basis of blockchain is known as distributed ledger technology (DLT).⁴⁰ Blockchain technology holds a ledger of all transactions and groups them into blocks – it is thus a digital and distributed transaction record. Blockchain is only one type of DLT – the one that compiles transactions in chained blocks. It is also the most well-known and tested DLT.⁴¹ However, the term ‘distributed ledger technology’ is commonly used to refer to all of them in general.⁴² Almost anything can be stored and processed on a DLT. A legal transaction can be developed and stored from the beginning of a negotiation up until the final contract.⁴³ This eliminates the risk where parties disagree on what had already been agreed on, leading to unnecessary litigation.⁴⁴

³⁹ Belu 2019 *The Roman Economic Journal* 3.

⁴⁰ Ganne *Can Blockchain Revolutionize International Trade* 7.

⁴¹ Ganne *Can Blockchain Revolutionize International Trade* 7.

⁴² Haynes and Yeoh “Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution” 58.

⁴³ Haynes and Yeoh “Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution” 50.

⁴⁴ Haynes and Yeoh “Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution” 50.

2.3 Features and elements of blockchain technology

Certain features of blockchain technology have been determined.⁴⁵ These features are, among others, decentralisation, distribution and disintermediation. This is firstly because transactions are controlled and validated by the participants on their various computer systems in a decentralised manner. All the information that is added to the blockchain is immediately visible to all key access participants simultaneously.⁴⁶ Each participant has a complete copy of the data at all relevant times and has the same degree of access.⁴⁷ This highlights the principles of trust and transparency.⁴⁸ Blockchain technology further enhances transparency in that it allows participants to record and track transactions and assets without the need for one central trusted authority.⁴⁹ It is a decentralised software platform that saves identical copies on various computer systems. The computer systems are also known as nodes. Nodes are linked through a key access system that is used to enable direct contracting between the buyer and the seller. The key access system acts as both the client and the server.⁵⁰ The parties can now communicate directly, thus eliminating the need for intermediaries and establishing the characteristic of disintermediation. Intermediaries would normally have been necessary to authenticate transactions, but they are now replaced by cryptographic evidence and technologies.⁵¹ The consecutive encrypted records are kept on blocks that are managed by the participants through the various nodes.⁵² Anyone with the appropriate permission can update and verify the data provided that the majority has reached consensus.⁵³ Consensus is the other principle blockchain technology relies on. The blockchain contains an accurate and verifiable version of every

⁴⁵ Belu 2019 *The Roman Economic Journal* 3; Ganne *Can Blockchain Revolutionize International Trade* xv.

⁴⁶ Ganne *Can Blockchain Revolutionize International Trade* 4.

⁴⁷ Ganne *Can Blockchain Revolutionize International Trade* 6.

⁴⁸ Ganne *Can Blockchain Revolutionize International Trade* xv.

⁴⁹ ECB *Virtual Currency Scheme – a Further Analysis* 33.

⁵⁰ Ganne *Can Blockchain Revolutionize International Trade* 5.

⁵¹ Ganne *Can Blockchain Revolutionize International Trade* 4.

⁵² Civelek and Ozalp 2018 *Eurasian Business and Economic Journal* 2.

⁵³ Ganne *Can Blockchain Revolutionize International Trade* 5.

transaction made.⁵⁴ In addition, blockchain technology is further immutable, highly secured and traceable because it is impossible to delete or modify information already on a system. Once an entry is made it is very difficult to simply erase it.⁵⁵ Lastly, the principle of automation applies.⁵⁶ Automation is made possible through self-executing smart contracts that do not need any human intervention and digital currencies that need not be regulated by governing bodies.⁵⁷ It therefore creates the possibility of automating processes and payments, thus enhancing efficiency.⁵⁸ On the other hand, there are certain disadvantages of blockchain technology. To start with, the transaction speed to create one block is quite low. This means that high frequency transactions will remain unavailable. The other big problem is that the users rely on their security keys for access. However, these keys can possibly be stolen, immediately giving access to unwanted outside parties.⁵⁹

In summary, the great advantage of blockchain technology is that intermediaries are eliminated and an immutable transaction record is created.⁶⁰ Blockchain is the consequence of a combination of several underlying techniques that have been developed over the last four decades.⁶¹ It has the potential to develop in another internet revolution.⁶²

2.4 Different types of blockchain technology

There are different types of blockchain technology. These are only briefly discussed.

The first blockchain that was created was public and permission-less. This is where anyone can download the software and confirm or create information.⁶³ Moreover, a public blockchain is an internet protocol that manages the distribution of exclusive

⁵⁴ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 92.

⁵⁵ Ganne *Can Blockchain Revolutionize International Trade* xv.

⁵⁶ Ganne *Can Blockchain Revolutionize International Trade* xv.

⁵⁷ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 2.

⁵⁸ Belu 2019 *The Roman Economic Journal* 3.

⁵⁹ Chang, Chen and Wu 2019 *Journal for Industrial Management and Data Systems* 4.

⁶⁰ Letorneau and Whelan 2017 *Journal of Equipment Lease Financing* 1.

⁶¹ Ganne *Can Blockchain Revolutionize International Trade* 4.

⁶² Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 2.

⁶³ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 48.

data. It contains authentication and verification technology and is less open to corruption. However, the participants still remain anonymous.⁶⁴ The second type is a private blockchain that runs on a private network.⁶⁵ In this case the identities of the participants are known. A private blockchain is based on consensus between identifiable and reliable participants.⁶⁶ With a private blockchain an entity must first give permission to enter and validate information.⁶⁷ Permission must also be given before someone can join in the blockchain. The private blockchain will be used when participants want to use a database already created to carry out a certain function.⁶⁸ Hyperledger are examples of the latter.⁶⁹ Lastly, the consortium blockchain is a form of private blockchain but only partially decentralised and managed by a group.⁷⁰ It is, however, built on the architecture of public blockchains.⁷¹ It provides technology for permissioned networks – for example, where 10 institutions jointly operate a blockchain and each controls a node. For a block to be valid in this instance, it requires that at least eight financial institutions sign the block.⁷² In the case of a consortium blockchain, the right to read transaction data can be determined on a case-by-case basis and can be either private or public.⁷³ Data from a closed network can also be moved to an open network, allowing public scrutiny.⁷⁴

In addition, two platforms are used for blockchain technology: permissioned and permission-less platforms. These platforms are classified by the extent to which access is restricted.⁷⁵ Permissioned platforms are used more in private blockchains, whereas permission-less platforms are used in public blockchains.⁷⁶ When the

⁶⁴ Ramotsho August 2018 *De Rebus* 11.

⁶⁵ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 50.

⁶⁶ Ramotsho August 2018 *De Rebus* 11.

⁶⁷ Belu 2019 *The Roman Economic Journal* 4.

⁶⁸ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 50.

⁶⁹ Ramotsho August 2018 *De Rebus* 11.

⁷⁰ Belu 2019 *The Roman Economic Journal* 4.

⁷¹ Ramotsho August 2018 *De Rebus* 11.

⁷² Ramotsho August 2018 *De Rebus* 11.

⁷³ Ramotsho August 2018 *De Rebus* 11.

⁷⁴ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 50.

⁷⁵ Ganne *Can Blockchain Revolutionize International Trade* 8.

⁷⁶ Ganne *Can Blockchain Revolutionize International Trade* 8.

blockchain is used for business purposes, it should rather be on a private and permissioned network, this is in order for the identities of the participants to be known.⁷⁷ Next, the industries and countries that have already adopted blockchain technology are discussed.

2.5 Blockchain technology in other industries and countries

Blockchain technology is a fast-developing field and has already been implemented in various countries and industries. In 2017, more than 2 500 applications for blockchain patents were filed.⁷⁸ Companies that are already developing applications to implement blockchain technology include Toyota, Samsung, Microsoft, IBM, Bosch, and Visa.⁷⁹

Blockchain technology is also used in various sectors.⁸⁰ These sectors include financial services, supply chain management of the food industry, and healthcare systems. In the last mentioned it is used to manage electronic medical records.⁸¹ It is also used in the banking industry as well as to settle insurance claims.⁸² Blockchain technology has been implemented in these various sectors using IBM Blockchain.⁸³ IBM Blockchain potentially already brings together all the relevant participants to guarantee success.⁸⁴ Blockchain is furthermore used in the food sector to trace tainted products quickly. It improves the traceability of animal and food products, thus guaranteeing consumers as much transparency as possible.⁸⁵ This had been implemented by Walmart together with IBM and the Tsinghua University in Beijing to track the movement of pork successfully.⁸⁶ The whole trail of the meat was tracked on the blockchain – from the farmer to the processors, dispensers, shops, and, ultimately, the consumers who bought the product.⁸⁷ Unilever, Nestlé and

⁷⁷ Public and permissioned networks and blockchains are discussed below.

⁷⁸ Letourneau and Whelan 2017 *Journal of Equipment Lease Financing* 3.

⁷⁹ Letourneau and Whelan 2017 *Journal of Equipment Lease Financing* 3.

⁸⁰ Gupta *Blockchain for Dummies* 25.

⁸¹ Gupta *Blockchain for Dummies* 27.

⁸² Gupta *Blockchain for Dummies* 25 – 32; Belu 2019 *The Roman Economic Journal* 4.

⁸³ Gupta *Blockchain for Dummies* 31.

⁸⁴ Gupta *Blockchain for Dummies* 25.

⁸⁵ Ganne *Can Blockchain Revolutionize International Trade* 79.

⁸⁶ Ganne *Can Blockchain Revolutionize International Trade* 80.

⁸⁷ Ganne *Can Blockchain Revolutionize International Trade* 79.

Kroger are also exploring blockchain technology to apply to their supply chains.⁸⁸ Furthermore, various governments are drafting and implementing legislation to recognise and promote the use of blockchain technology, especially various US states⁸⁹ – such as Florida – that have already introduced draft regulations to legalise and regulate blockchain signatures and smart contracts. France is also taking the initiatives to recognise financial instruments issued in blockchains. Moreover, the Supreme Court in China made a ruling in 2018 that evidence authenticated by blockchain technology would be legally binding. The China Merchants Bank, has already issued letters of credit through blockchain technology. Another big influential blockchain project in China is the cross-border financing platform that provides receivables financing, established by China's State Administration of Foreign Exchange (SAFE).⁹⁰ Other Chinese banks have also launched blockchain-based trade finance platforms. Clearly, China is expanding its use of blockchain technology. As China is the world's largest cross-border trading nation,⁹¹ it can serve as an example for many other countries and might assist the rest of the world in adopting more blockchain technology platforms. The US is also leading the way on distributed ledger technology followed by the UK.⁹²

2.6 Conclusion

Blockchain technology was like a hidden gem under the shadow of Bitcoin. It is a fascinating development that clearly has many benefits for various areas, especially international trade. The main characteristics of blockchain technology are that it is decentralised, distributed among networks, and needs no intermediaries. The distributed system is much stronger than a centralised system in that the risk of losing data is greatly reduced because the information is distributed.⁹³ Moreover, consensus is needed by the various parties to accept transactions, and all the

⁸⁸ Ganne *Can Blockchain Revolutionize International Trade* 79.

⁸⁹ Ganne *Can Blockchain Revolutionize International Trade* 99.

⁹⁰ Zuqing May 2020 *DCW* 35.

⁹¹ Zuqing May 2020 *DCW* 35.

⁹² Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 57.

⁹³ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 56.

participants take part in decision-making and not only one central authority. Blockchain technology is also immutable, highly secured, and traceable. It is nearly impossible to tamper with these transactions, as every step is recorded. Private blockchains on a permissioned network thus hold a lot of potential. As blockchain technology has already been implemented in countries such as China and companies such as IBM, the technology is not far-reaching and might change the world sooner than anticipated. China and the USA might just lead the way for other countries to implement this technology. In addition to the abovementioned there are many other benefits and opportunities for blockchain technology, which will be discussed below.

3 The benefits and opportunities of blockchain technology in international trade

Blockchain technology can be used in various areas of international trade, such as commercial and standby letters of credit, bank guarantees, factoring and forfaiting.⁹⁴ It can also be a possible solution to various problems, and lead to further developments in international trade. The efficiency of international trade could be improved, making it less time-consuming. Costs could be reduced, intermediaries could be eliminated, and so forth. These issues are discussed below. First, the opportunity to conduct paperless trade through trade digitalisation is considered.

3.1 Conducting paperless trade through trade digitalisation

A major challenge for international trade is managing original shipping documents from different locations because of the reliance on paper documentation.⁹⁵ These documents should be perfectly compliant with the underlying letter of credit (hereinafter "LC") before monies are paid out. The delivery of paper documentation is also crucial for the release of goods by ports.

A solution to this problem can be the digitalisation of trade. Blockchain technology might be key in this regard in that it has the potential to transform trade.⁹⁶ This may not be an easy task, and several aspects should change before blockchain technology is implemented. These changes would start with eliminating the requirement that original paper transport documents must be used to negotiate the documents under an LC and for the release of goods by port authorities. The challenge would thus be to create a successful connection between digital transport documents and banks. A successful connection should also be made to customs authorities so as to guarantee a more practical trade digitalisation.⁹⁷ The digitalisation of trade can also be used to gain participants' confidence in trade

⁹⁴ Zuqing May 2020 *DCW* 38.

⁹⁵ Hussain March 2020 *DCW* 41.

⁹⁶ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 84.

⁹⁷ Hussain March 2020 *DCW* 41.

transactions. This might lead to banks allowing the digital exchange of scanned images of shipping documents. For so long these images contain an authenticated SWIFT message that is acceptable to relevant stakeholders to examine and thus allows for release of shipments, there should be no problem. Once a protocol is set stakeholders will be allowed to continue routine activities.⁹⁸ The ICC is working on legal frameworks for these aspects. This include the *Uniform Rules for Digital Trade Transactions (URDTT)*, which has been drafted twice, and the third draft has already been distributed to the ICC National Committees.⁹⁹ The first two drafts received feedback on various aspects that had to be altered first. The third draft might lead to the finalisation of the *URDTT*.¹⁰⁰ These rules would assist with the overall digitalisation of trade and especially trade financing. The objectives are to develop a high-level framework that outlines obligations, rules and standards for trade digitalisation. The precondition is that the whole digital trade process should be conducted by using electronic documents in their entirety and no paper documentation.¹⁰¹ This process relies on the assumption that a physical underlying transaction for the sale and purchase of goods already exists. In this physical contract the parties will choose that the transaction be documented electronically. This would include that an electronic payment method should be used.¹⁰² At this stage, there are no real costs involved in utilising blockchain based systems. The situation might change in the future and would mean that a new payment method should be found to pay for the verification of transactions. Alternatively, other verification methods can be agreed upon.¹⁰³

3.1.1 COVID-19 and the digitalisation of trade

The use of electronic bills of lading in open account trade has increased fourfold between February and March 2020.¹⁰⁴ COVID-19 therefore forced the trade industry

⁹⁸ Hussain March 2020 *DCW* 41.

⁹⁹ Meynell June 2020 *DCW* 14.

¹⁰⁰ Meynell June 2020 *DCW* 14.

¹⁰¹ Meynell June 2020 *DCW* 13.

¹⁰² Meynell June 2020 *DCW* 13.

¹⁰³ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 51.

¹⁰⁴ Byrnes June 2020 *DCW* 11.

to reconsider the necessity of paper documents in trade.¹⁰⁵ It is therefore inevitable to consider the effect of COVID-19 on the use of electronic documents. This is addressed throughout this discussion. COVID-19 could be the push the world needs to move to electronic document presentations. COVID-19 has resulted in a delay of the presentation of paper documents. Such delays have caused problems because of the interruption of courier services worldwide. Many stakeholders are consequently concerned about the efficiency of paper documents.¹⁰⁶ However, international trade had already started to shift towards electronic documents before COVID-19. This can be seen in that the *ICC* introduced an electronic *URC* version and revised an electronic *UCP* version. However, the digitalisation remained slow and the use of paper documents did not reduce much before the pandemic.¹⁰⁷ COVID-19 established the need for a paperless and more efficient document system. This can be seen especially in the partial or total shutdown of ports, shipping routes, *et cetera*, during the pandemic. Consequently, there was much pressure on participants, such as carriers and logistics providers, as well as on financial digital service providers, to digitalise paper documents. This is necessary for importers to gain access to their goods efficiently.¹⁰⁸ It is evident that international trade companies rely heavily on courier companies to deliver documents from the nominated bank to the issuing bank.¹⁰⁹ Without these services, trade would come to a standstill. This is evident in the delay of delivery of documents during the COVID-19 pandemic due to courier companies being under lockdown.¹¹⁰ Dependence on courier companies makes international trade too vulnerable. It is therefore even more necessary to move to paperless trade, thus eliminating the dependence on courier companies.

International stakeholders might already have changed the way they view digitalisation of trade. Especially after they have experienced the consequences of documents being on hold at either courier companies or the nominated banks

¹⁰⁵ Byrnes June 2020 *DCW* 12.

¹⁰⁶ Nizardeen May 2020 *DCW* 20.

¹⁰⁷ Nizardeen May 2020 *DCW* 20.

¹⁰⁸ Nizardeen May 2020 *DCW* 20.

¹⁰⁹ Hoque May 2020 *DCW* 23.

¹¹⁰ Hoque May 2020 *DCW* 23.

throughout the pandemic. This created another issue about who would be liable for the delay in the delivery of the documents. It cannot be the courier service because it plays no formal role. It will then either be the nominated or issuing bank.¹¹¹ This is an interesting question but is not addressed in this discussion.

3.2 Trade financing

In the foreign trade environment, many studies have been conducted on blockchain-based electronic bills of lading in conjunction with different payment methods that are being used. These methods include payment by LC.¹¹² The main reason might be because, in most countries, the ports and airports are governmentally owned or managed. Many institutions are still inefficient due to a lack of either knowledge or finances to improve infrastructure.¹¹³ Furthermore, there is a shortage of qualified human resources that understand and have the ability to implement electronic documents.¹¹⁴ Most ports and airports are thus compelled to deal with paper documentation. Hence, even if electronic documents are issued by logistic providers and carriers, they would, in most cases, at this stage, not be accepted at customs, which would create an even bigger problem and delay.¹¹⁵

Many stakeholders find the payment process much more complex than any other process in international trade transactions.¹¹⁶ The problem is that trade finance offered by banks is not yet integrated well into the trading cycle. This is mainly due to a lack of transparency.¹¹⁷ Trade financing is also time-consuming because of intensive information matching which in return increases costs. These are manual processes that increase the possibility of fraud and errors.¹¹⁸ The abovementioned

¹¹¹ Hoque May 2020 *DCW* 24.

¹¹² Civelek and Ozalp 2018 *The Eurasian Economic Journal* 2.

¹¹³ Nizardeen May 2020 *DCW* 21.

¹¹⁴ Nizardeen May 2020 *DCW* 21.

¹¹⁵ Nizardeen May 2020 *DCW* 21.

¹¹⁶ Nizardeen May 2020 *DCW* 21.

¹¹⁷ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 83.

¹¹⁸ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 83.

problems can all be addressed by introducing technology-enabled interactions.¹¹⁹ Blockchain will enable end-to-end supply chain data in a digital format, which will allow banks to extend their trade-finance offerings in even more phases of the supply chain.¹²⁰

3.3 Electronic documents in international trade

The success of the digitalisation of trade lies in the effectiveness of digital documents. The cost of trade documentation is currently estimated at one fifth of the transportation costs because different participants all rely on various systems to process transactions. This delays the whole process; therefore the digitalisation of documents is even more essential.¹²¹ If the costs of trade documentation are reduced, international trade could be increased by almost 15%.¹²² Each document in international trade has its advantages and disadvantages. These documents consist of, among others, the bill of lading, the LC, invoices, various certificates, and contracts. In addition, various chambers of commerce are already giving the option of the electronic issuing and delivery of the certificate of origin. The problem is whether the receiving country would accept the electronic version.¹²³ Another challenge would be the standardisation of electronic documents.¹²⁴

3.3.1 Bill of lading

The bill of lading is discussed first. The bill of lading has three main functions: it serves as a receipt for the goods; provides evidence of the terms of the contract of carriage; and it is a document of title for the goods.¹²⁵ It is also used to determine whether the presentation under an LC is complying.¹²⁶ The paper bill of lading has

¹¹⁹ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 83.

¹²⁰ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 92.

¹²¹ Gupta *Blockchain for Dummies* 29.

¹²² Gupta *Blockchain for Dummies* 29.

¹²³ Byrnes June 2020 *DCW* 12.

¹²⁴ Civelek and Ozalp 2018 *The Eurasian Economic Journal* 7.

¹²⁵ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 84.

¹²⁶ Sindberg May 2020 *DCW* 7.

been used to document international trade for centuries. Despite practically the whole world moving to paperless trade, the paper bill of lading remained in force.¹²⁷ The original bill of lading is essential in trade for the transfer of title. As COVID-19 caused courier services to stop, original bills of lading got stuck at ports of loading. This broke the credit chain.¹²⁸ COVID-19 might accelerate the shift toward paperless trade. It might also change the necessity of paper bills of lading. A further problem with the paper bill of lading is that the carriers are only allowed to release the goods on production of the original bill of lading. This causes various practical problems because the bill of lading is sometimes not delivered on time. Also, the bill of lading is exposed to the physical movement.¹²⁹ Exporters usually send the bill of lading to their bank for scrutiny together with the LC; from there, it goes to the importer bank for document checking and negotiation. This exposes the document to theft or loss, and the goods can then not be cleared from the carrier.¹³⁰ The documents can also possibly be forged, with the consequence that carriers may release the goods incorrectly against the forged bill of lading.¹³¹

An electronic bill of lading can be a solution to the above-stated problems. First, it can be sent to all the relevant stakeholders simultaneously. If any amendments are necessary, they can be made immediately in a much more efficient manner without the physical movement of paper. Second, electronic systems would be much more secure and would reduce the risk of fraud or forgery.¹³² An electronic bill of lading would guarantee less administrative costs and might also reduce transaction time. The problem is that the law treats an electronic bill of lading differently than the paper bill of lading. It is therefore not being properly adopted. In addition, a paper bill of lading is seen as a document of title. This is not the position with an electronic

¹²⁷ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 84.

¹²⁸ Padinhere June 2020 *DCW* 38.

¹²⁹ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 84.

¹³⁰ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 84.

¹³¹ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 85.

¹³² Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 85.

bill of lading. Various jurisdictions interpret this differently, thus adding to the problem.¹³³ A solution proposed is a multiparty system. This is a set of rules whereby users of an electronic trading system can subscribe to the vendor system in order for them to be able to use it. These rules will set out the format of electronic trading documentation as well as the consequences of using the specific document. It will then be the same as it would have been in law when using paper documents.¹³⁴

3.3.2 UCP 600

Currently, the *UCP 600* requires that original documents be examined by the relevant banks to inspect them for compliance before honouring the LC. The movement of these documents can be easily disrupted for several reasons, one being a worldwide pandemic and lockdown. This raises two main concerns for the seller: first, in this case, the seller would not be able to present documents to the bank for payment; second, the issuing bank would not be able to receive the original documents from the nominated bank.¹³⁵ If payments are delayed, the release of goods to the buyers is also delayed.¹³⁶

The solution to this problem may be an electronic version of the *UCP 600*, namely the *e-UCP*. This provides for a blended presentation of documents – part electronic and part paper. Alternatively, the whole document can be presented electronically.¹³⁷ The latest *e-UCP* version came into force in July 2019. These rules only accommodate electronic presentation and do not replace the *UCP 600* but rather complement it. The rules are technologically neutral; hence they allow for the use of any technological automated means and do not require the use of a

¹³³ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 85.

¹³⁴ Legwaila "Trade Finance and the Next-generation Trade Instruments or Technologies: What are the Implications for Banks" 86.

¹³⁵ Sindberg May 2020 *DCW* 7.

¹³⁶ Padinhere June 2020 *DCW* 39.

¹³⁷ Padinhere June 2020 *DCW* 40.

specific platform or system.¹³⁸ The *e-UCP* provides for a quicker movement of documents during emergencies like COVID-19.¹³⁹

3.3.3 Letter of credit

There are much room for improvements on LCs. This is because currently many letters of credit are being rejected by banks because of non-compliant documents. This delays the matter in that the issuing bank refuses to pay. On the other hand, when letters of credit are being constructed on the blockchain the money would be paid out at the time that the goods are being delivered. This process will record and inspect itself and be much more efficient.¹⁴⁰ Many countries, such as Estonia, are already implementing the benefits of electronic LCs. Estonia is leading the way on electronic LCs, since export LC documents that are issued by state authorities can already be ordered online without any physical paperwork.¹⁴¹ For LCs to adapt to the development of technology and electronically produced documents, some changes should be made to the way they function. Changes would especially have to be made regarding the issuing, presenting, examining and payment of LCs. However, certain mechanisms are already in place for the issuance and confirmation of electronic LCs. This can be seen in that the electronic scanning system of a bank can be used to examine documents. Electronic payments can also be made. The process of electronic issuing and presentation has thus improved. However, the digitalisation of LCs is not yet adequate.¹⁴²

Again, the solution might be blockchain technology by creating blockchain-based LCs.¹⁴³ Blockchain technology may reduce the risks and processing time of LCs. It can be used to issue, advise and negotiate LCs and to assist in the presentation of documents. The LC transaction can be completed on the open blockchain platform. The platform enables customers to connect with banks and trading partners directly

¹³⁸ Zuqing May 2020 *DCW* 36.

¹³⁹ Padinhere June 2020 *DCW* 40.

¹⁴⁰ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 52.

¹⁴¹ Leet May 2020 *DCW* 32.

¹⁴² Zuqing May 2020 *DCW* 34.

¹⁴³ Zuqing May 2020 *DCW* 33.

for the issuing of LCs and the presentation of documents. LCs can be created, issued, amended and approved and be sent to the beneficiary immediately. The beneficiary can add the relevant data and documents to the blockchain platform. The drawing can then be paid directly after it has been accepted by the bank and applicant. Furthermore, trade documents can be sent digitally by means of the blockchain platform where they can be verified and processed.¹⁴⁴

In addition to the abovementioned benefits, blockchain technology reduces LC risks in that the data is irrevocably matched and reconciled to the specific LC on the blockchain platform. It also creates transparency as parties receive updates on the progress of their LC transaction. This would enable banks to know whether other banks are already financing documents that are presented in a certain transaction. This is because the blockchain database would contain accurate and verifiable records of LC transactions.¹⁴⁵ Clearly this would reduce the risk of fraud as well as the ability to produce trade documents from external systems. Also, the record of the LC process can be authenticated, which enhances security. Once the procedure and risk guidelines for adopting blockchain-based LCs have been set, it would lead to wider adoption of blockchain technology. Another aspect that deserves attention is how electronic LCs would be authenticated, how they would be examined and the time such examination would take. The last aspect to consider is the originality of electronic records kept on the blockchain.¹⁴⁶ First, the authentication of blockchain-based LCs will be considered. The authentication of any document is important for its efficient use. Authentication is especially important in LC transactions and is usually done by way of a signature. The *UCP 600* allows a document to be signed electronically. The purpose of a signature on a document is to identify the person who signed it and to authenticate the content of the document. Thus, an electronic signature would indicate the authentication of an electronic document. This is provided for in the *e-UCP (article 3(b)(iv))*. If a document cannot be authenticated, it can also not be presented as authentication is one of the requirements for

¹⁴⁴ Zuqing May 2020 *DCW* 34.

¹⁴⁵ Zuqing May 2020 *DCW* 34.

¹⁴⁶ Zuqing May 2020 *DCW* 36-37.

presentation. LC transactions can be authenticated by digital encryption methods. Blockchain technology could thus enhance the security of the LC process and provide the necessary technology for authentication. All that is still needed is basic standards and requirements of blockchain technology to enable the authentication of electronic records.¹⁴⁷

Another fundamental principle of LCs is the originality of the document. The *e-UCP* provides an explanation for what would be acceptable as an original document: “any requirement for presentation of one or more originals or copies of an electronic record is satisfied by the presentation of one electronic record”.¹⁴⁸ Thus, any document created by blockchain technology that is successfully authenticated would be deemed an original and should not have to be marked as such.¹⁴⁹ Furthermore, a blockchain platform can send, verify and process any trade documents that have been produced by external systems. Banks have certain time limits within which documents should be examined. The *e-UCP* allows banks to examine electronic records that have been accessible through an electronic system.¹⁵⁰ The examination should still be in accordance with the doctrine of independence, and it would be because it is done on the face of the external source.¹⁵¹ A blockchain-based LC was tested by the US treasury department. The aim of the innovative programme was to tokenise electronic LCs that were sent to grant recipients. This can help to track payments, thus making transactions more secure. This means that there would be no cash exchange but rather the exchange of tokens. The token represents the payment that can be tracked more efficiently. The token also carries data – the identity of the recipient, the amount, and important dates. The blockchain-based LC provides a peer-to-peer transfer. For grant recipients to have access to the tokenised LC, they would need an electronic wallet that is linked to a bank account.¹⁵² The *ICC* is also under pressure to give guidance on the adoption of

¹⁴⁷ Zuqing May 2020 *DCW* 36.

¹⁴⁸ Zuqing May 2020 *DCW* 37.

¹⁴⁹ Zuqing May 2020 *DCW* 37.

¹⁵⁰ Zuqing May 2020 *DCW* 37.

¹⁵¹ Zuqing May 2020 *DCW* 37.

¹⁵² Zuqing May 2020 *DCW* 37.

blockchain-based LCs.¹⁵³ However, the *e-UCP* may also apply to blockchain-based LCs.¹⁵⁴ The use of blockchain technology for LCs is promoted by the *e-UCP* in that the new version 2.0 includes provisions to accommodate the LC process by using blockchain technology.¹⁵⁵

In essence, using blockchain technology would not only reduce the process time of LCs but also the risk of fraud. Blockchain-based LCs might "shake up the trade finance market".¹⁵⁶ When an external system presents the documents electronically, the presenter to the blockchain platform should have access to the external system and the bank should examine the records from the external source. When trade documents are produced from an external system, they may be sent directly to the issuing bank. However, the nominated bank or beneficiary might not have control over the authentication of the documents.¹⁵⁷ Several blockchain transactions and LCs have been issued across the world. For example, the first Chinese LC using blockchain technology was issued by Standard Chartered. This was the first international Chinese renminbi-denominated LC transaction.¹⁵⁸ Another first was Abu Dhabi Commercial Bank which conducted their first end-to-end blockchain trade finance transaction that had full document automation. They also had a steady flow of blockchain-enabled LCs.¹⁵⁹ Furthermore, in January 2020, the US treasury department was near completion of a concept programme for a blockchain-based LC to facilitate the flow of payments between grant recipients. It involved a tokenisation of electronic LCs that would be sent to grant recipients – this would help tracking payments and making transactions more secure. A token thus represents the payment that can be tracked more efficiently than cash. It would also include information such as the recipient identification, as well as certain dates, including when the amount was awarded, *et cetera*.¹⁶⁰ Thus far, a blockchain-based

¹⁵³ Zuqing May 2020 *DCW* 36.

¹⁵⁴ Zuqing May 2020 *DCW* 35.

¹⁵⁵ Zuqing May 2020 *DCW* 33.

¹⁵⁶ Zuqing May 2020 *DCW* 35.

¹⁵⁷ Zuqing May 2020 *DCW* 37.

¹⁵⁸ Byrnes May 2020 *DCW* 9.

¹⁵⁹ Byrnes Jan 2020 *DCW* 4.

¹⁶⁰ Byrnes Jan 2020 *DCW* 4.

LC transaction have mainly been piloted and still have some limitations.¹⁶¹ It would be highly beneficial to introduce electronic LCs, as blockchain-based LCs have great potential.¹⁶² They would reduce the process time as well as the risks involved. Blockchain might therefore be the breakthrough for electronic LC transactions.¹⁶³

3.3.4 Automated document checks

Automated document examination (ADE) is an alternative to manual examination of documents by humans. It would be a complete replacement of the examination that would also enhance the trade process. Usually, at least two people are needed to examine the documents.¹⁶⁴ The other problem is that only a limited number of skilled people are employed to do this work. This leads to the documents piling up and extending the transaction time. For documents to be examined, staff should have the necessary skills. This means that they should undergo training. In addition, they should also be paid a monthly salary. This expense would add to the total cost of the international trade transaction. Eliminating additional expenses would also automatically reduce the transaction costs. Often, banks centralise their document examiners in a shared service centre. This has been an impossible task during the worldwide lockdown. Also, paper documents should still change hands. During the COVID-19 pandemic, it would be ideal to have an electronic system to examine the documents. ADE can clearly be a solution to the above-stated problems. ADE entails data being checked by algorithms for certain objectives. These objectives include, among others, the compliance with regulatory requirements. Such compliance would also include sanctions on specific countries as well as compliance with specific terms and conditions of the LC.¹⁶⁵

Examining the documents electronically may have several advantages: it would result in banks not being constrained by the limited amount of document examiners available. Also, the process would remain unaffected in situations where people are

¹⁶¹ Zuqing May 2020 *DCW* 35.

¹⁶² Byrnes May 2020 *DCW* 38.

¹⁶³ Zuqing May 2020 *DCW* 33.

¹⁶⁴ Yap May 2020 *DCW* 27.

¹⁶⁵ Yap May 2020 *DCW* 26.

in quarantine or unable to go to work. The speed of the examination can also be enhanced because machines can examine the documents 24 hours a day and are not limited to weekdays during working hours. This would accelerate the process of document examination. The document examination would consequently be much more accurate and would reduce the costs involved.¹⁶⁶

3.4 Digital signatures

Recently, the day-to-day use of electronic documents has become more popular. This creates the need for a secure way of signing documents. *Signed* is defined as “using any symbol executed or adopted with present intention to adopt or accept a writing”.¹⁶⁷ A digital signature on an electronic document is equivalent to a signature in writing on paper.¹⁶⁸ A digital signature is thus an alternative way to sign documents.¹⁶⁹ It can also be regarded as an expression of consent that links a person to a document, allowing that person to be identified.¹⁷⁰ Digital signatures are necessary to eliminate the need for paper documents.¹⁷¹ However, such signatures still need to be accepted in many countries and industries before they can be used worldwide.¹⁷² A digital signature may be used when the sender and buyer enter into an agreement. For a signature to pass verification by the recipient, the document cannot be altered after it has been signed. A digital signature can be applied to either the original text or encrypted text provided that no alterations were made after the text had been signed.¹⁷³

The leading country on digital signatures seems to be Estonia. This is because this country is already issuing and signing domestic guarantees electronically. A concern is how to be sure that the document was signed by someone with the necessary authority to do so. The solution is that companies create an e-stamp for themselves

¹⁶⁶ Yap May 2020 *DCW* 27.

¹⁶⁷ Klein March 2020 *DCW* 35.

¹⁶⁸ Leet May 2020 *DCW* 31.

¹⁶⁹ Leet May 2020 *DCW* 31.

¹⁷⁰ Byrnes April 2020 *DCW* 34.

¹⁷¹ Leet May 2020 *DCW* 32.

¹⁷² Leet May 2020 *DCW* 32.

¹⁷³ Smith March 2020 *DCW* 33.

which is similar to a SWIFT signature.¹⁷⁴ The use of e-signatures is limited at this moment and still depends on whether countries have accepted e-signatures and introduced such systems. This process results in guarantees being authenticated and issued swiftly with minimal costs.¹⁷⁵ It also lessens the risk of losing the only original document. In Estonia, each citizen receives an ID card with a chip on it. This chip allows the ID holder to sign a document electronically. It also allows ID holders to identify themselves. The e-signature also has a time stamp to determine the exact time the document was signed.¹⁷⁶ This is an excellent example of sufficiency of digital signatures. To complement the use of electronic signatures, the ICC published opinions in 2009 on the *UCP 600*, stating that “a stamp as signature can fulfil requirement for ‘signed commercial invoice’; any form of signature with indication on whose behalf it is made can act as form of endorsement when credit requires bill of lading to be blank endorsed”.¹⁷⁷ In the past, guarantees were issued on a paper document together with a book of signatures that the issuer kept. This book was used to authenticate signatures, which was time-consuming. Moreover, papers to be verified and documents had to be mailed back and forth continuously. Now, more documents are signed electronically.¹⁷⁸

E-signatures would assist banks when issuing and paying out guarantees. They would make the process more efficient enabling authenticated guarantees to be moved from the issuer to the beneficiary significantly quicker. Furthermore, the risk of losing the only original is no longer a factor, because as many copies as necessary can be e-signed and all remain both identical and original.¹⁷⁹ The use of e-signatures is idyllic but cannot yet be used worldwide due to different legal systems and IT challenges. The fact that Estonia uses e-signatures has also helped much in that country during the COVID-19 pandemic in that bank employees, who had to work from home, could still issue documents efficiently.¹⁸⁰ E-signatures are thus secure,

¹⁷⁴ Smith March 2020 *DCW* 33.

¹⁷⁵ Leet May 2020 *DCW* 32.

¹⁷⁶ Leet May 2020 *DCW* 31.

¹⁷⁷ Byrnes March 2020 *DCW* 34.

¹⁷⁸ Leet May 2020 *DCW* 31.

¹⁷⁹ Leet May 2020 *DCW* 32.

¹⁸⁰ Leet May 2020 *DCW* 32.

convenient and much faster. Estonia might just be the country to follow in this regard, as it has already implemented the use and acceptance of digital signatures.¹⁸¹ The COVID-19 pandemic has forced institutes to think outside the box and make way for electronic documents and signatures. Although the world has come to a standstill, international trade has not halted.

One solution is that paper LCs should still be issued, but in conjunction with a machine or stamp signature, and maybe even in addition to a certification of authenticity. Machine signatures are already used on bank cashier checks. This should be efficient to bind the bank to the undertaking if authorised by the issuing bank.¹⁸²

3.5 Conclusion

The ICC banking commission plays a significant role in trade digitalisation and has set up a road map for it.¹⁸³ Blockchain technology might be fundamental to trade digitalisation because e-commerce is expanding and blockchain technology standards are implemented in various areas.¹⁸⁴ The more blockchain technology is used, the more it would assist trade digitalisation.¹⁸⁵

On the one hand, relevant stakeholders might be ready to move to paperless trade; on the other hand, there might still be fear of the unknown and fear of change. This is evident as international trade has stuck to paper documents over the years despite delays in payment or the receiving of the goods.¹⁸⁶ The pace of a successful move towards paperless trade might be the determining factor for recovery of global trade after the worldwide pandemic.¹⁸⁷ With trade digitalisation, it might not be necessary to issue separate documents for each transaction anymore and the functions of all documents can be envisaged in one document.¹⁸⁸ An open mind

¹⁸¹ Leet May 2020 *DCW* 32.

¹⁸² Klein May 2020 *DCW* 35.

¹⁸³ Zuqing May 2020 *DCW* 38.

¹⁸⁴ Zuqing May 2020 *DCW* 38.

¹⁸⁵ Zuqing May 2020 *DCW* 38.

¹⁸⁶ Nizardeen May 2020 *DCW* 21.

¹⁸⁷ Byrnes April 2020 *DCW* 8.

¹⁸⁸ Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 7.

should be kept about trade digitalisation. It is not yet perfect but it definitely works.¹⁸⁹To summarise, a comparison made by Chang *et al*/ will be used to explain the differences between the traditional trade process and the digital process.¹⁹⁰

Table 3-1: Comparison between traditional trade process and a digital trade process

ISSUES	TRADITIONAL TRADE PROCESS	PROPOSED TRADE PROCESS
TRADING CONTRACT	Malicious alterations and tampers on contract terms can cause trade disputes even after contract endorsement.	Contract terms are recorded on blocks and any alteration is kept on chain. This design mitigates the tampering issue.
BILL OF LADING	<ol style="list-style-type: none"> 1. Shippers need to present the bill of lading in exchange of payment claims after cargo dispatched by exporters. 2. Advising bank needs to forward B/L to negotiating bank for reimbursement. Cost rises in this scenario and depends on the distance between the countries. 3. Importers still wait for documents at times even after cargo arrived and costs rises. 	<ol style="list-style-type: none"> 4. No need for shippers to print out or exporters to present B/L for cargo claims. 5. Without B/L delivery, records regarding withdrawals from exporters and cash advances by notifying banks are timely recorded on blockchain within minutes. 6. Importers with consortium identification can claim cargo without presenting the B/L.
INFORMATION TRANSMISSION	Information updates rely on manual workforce, such as email, messages etc. It takes a lot of expenses to conduct information transmission and confirmation.	Event driven mechanism is adopted to make trade activities automatically executed. An example is that logistic traceability could be tracked with contract notifications. Costs for conducting information transmission and confirmation can be reduced.

¹⁸⁹ Byrnes June 2020 *DCW* 12.

¹⁹⁰ Chang, Chen and Wu 2019 *Journal for Industrial Management and Data Systems* 16.

CREDIT	Credit evaluation amongst traders is usually committed to local trustful and trustworthy companies.	A member database can be searched for an examination of credit ratings which results in a better user experience.
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Beside all the benefits that blockchain technology offers, there are also various challenges to overcome before blockchain technology can be successfully implemented. These challenges will be discussed below.

4 Challenges of and limitations to adopting blockchain technology

Several challenges must first be addressed before blockchain technology can be used in international trade worldwide. These challenges include legal and technological challenges, as well as interoperability and governance issues.¹⁹¹ The technical challenges are amongst others the size of the blocks, security concerns and the transaction speed.¹⁹² General challenges may also entail infrastructural challenges, hardware and software malfunctions, *et cetera*.¹⁹³ There is also the problem of the amount of energy that is being consumed when conducting a blockchain transaction.¹⁹⁴ The Otto Beisheim School of Management in Germany conducted an industry study on the impact of blockchain technology on trade finance. Three major concerns were raised in the study: the main concerns entailed regulatory and legal uncertainty; the lack of knowledge and experience in this field; and the absence of industry standards.¹⁹⁵ The participants also raised concerns about the risk of hacking and other security issues.¹⁹⁶ The latter include cases in which the security key is lost or stolen.¹⁹⁷ If a third party has access to this key, they will be able to access the transaction.¹⁹⁸ This following discussion focuses on legal challenges.

4.1 Legal challenges

For any system to function sufficiently and to be recognised, it must have a legal framework. The framework should regulate operational and compliance aspects. A framework is necessary for several reasons, among others, to clarify the legal status of blockchain transactions, to regulate rights and responsibilities for various

¹⁹¹ Ganne *Can Blockchain Revolutionize International Trade* 90 – 105.

¹⁹² Chang Chen and Wu 2019 *Journal for Industrial Management and Data Systems* 20.

¹⁹³ Ramotsho August 2018 *De Rebus* 11.

¹⁹⁴ Haynes and Yeoh "Legal Issues Arising From the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 56.

¹⁹⁵ Hellwig and Huchzermeier *An Industry Study of Blockchain Technology's Impact on Trade Finance* 4.

¹⁹⁶ Hellwig and Huchzermeier *An Industry Study of Blockchain Technology's Impact on Trade Finance* 4.

¹⁹⁷ Chang Chen and Wu 2019 *Journal for Industrial Management and Data Systems* 4.

¹⁹⁸ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 58.

scenarios, and to regulate how data should be accessed and used.¹⁹⁹ Other challenges might also include proving the scalability of blockchain technology. This is because of the security within the system. In order to prevent later users to alter earlier records in the system a hash puzzle will be added to each new block.²⁰⁰ In addition, the ability of blockchain to work with other existing systems should be determined.²⁰¹ This should be done because blockchain will have to work with other systems until its functionality is fully established.²⁰² Legal issues furthermore include uncertainty as to which legal system would govern a dispute, as well as determining which court would have jurisdiction, as mentioned earlier.²⁰³ At this moment there is no clear legal system governing blockchain technology. The development of blockchain technology can consequently give rise to a new subset of law, namely *lex cryptographia*.²⁰⁴ Next, the regulatory framework and legal validity of blockchain transactions are discussed.

4.1.1 Regulatory framework and the legal validity of blockchain transactions

The regulatory framework for the use of blockchain technology is still uncertain,²⁰⁵ as there is currently no definite international legal framework.²⁰⁶ A further problem for the regulator is that the majority of information sits with the two trading parties whereas the regulators will have little information.²⁰⁷ Another major impediment for blockchain technology might be that it initially appeared in the world of currencies which were already regulated. Blockchain technology has already attracted numerous regulators' attention even if it is still in its infancy. At this stage, its full

¹⁹⁹ Ganne *Can Blockchain Revolutionize International Trade* 97.

²⁰⁰ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 59.

²⁰¹ Letourneau and Whelan 2017 *Journal of Equipment Release and Financing* 2.

²⁰² Letourneau and Whelan 2017 *Journal of Equipment Release and Financing* 2.

²⁰³ Ganne *Can Blockchain Revolutionize International Trade* 98.

²⁰⁴ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 44.

²⁰⁵ Civelek and Ozalp 2018 *Eurasian Economic Journal* 6.

²⁰⁶ De Caria "A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities" 109.

²⁰⁷ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 55.

potential is not completely understood, which might limit its full development.²⁰⁸ Because blockchain first appeared with cryptocurrencies, it may be indirectly regulated by virtual currency rules. This might limit the overall development of rules and regulations in respect of blockchain technology.²⁰⁹ Due to the lack of a sufficient regulatory framework, development of the technology in itself is limited. At this stage, the legal status of and definite regulatory framework for electronic documents are not recognised.²¹⁰ Another important motive for a standard legal framework is that blockchain technology does not require any intermediaries. This makes it difficult to regulate blockchain transactions and creates the potential for unlawful business conduct. Besides a legal framework, it should also have a standard technological framework that is approved by the participants.²¹¹ The anonymity of the administrator of the blockchain is another aspect that should be considered. One challenge may be determining the party liable in the case of a problem or malfunction.²¹² In addition, when blockchain is used as a payment instrument, the problem that arises is that the administrator would be both the banker and custodian of the fund. It would thus be an over-the-counter transaction. Transparency in this regard is crucial. The identity of the administrator should be well known to the user to ensure effective communication between the parties.²¹³

There is, at this stage, no fixed set of regulations to govern blockchain technology at national or international level.²¹⁴ The growing use of blockchain technology leads to an even greater necessity for such a regulatory framework. Currently, the lack of a regulatory framework is definitely a cause for concern. Concerns in this regard include, among others, whether a court would recognise blockchain technology as

²⁰⁸ De Caria "A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities" 110.

²⁰⁹ De Caria "A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities" 111.

²¹⁰ Zuqing May 2020 *DCW* 35.

²¹¹ Letourneau and Whelan 2017 *Journal for Equipment Lease Financing* 2.

²¹² Ramotsho August 2018 *De Rebus* 11.

²¹³ Ramotsho August 2018 *De Rebus* 11.

²¹⁴ De Caria "A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities" 110.

a tamper-proof source of truth and whether smart contracts would be regarded as legal contracts. Another question is how legitimate activities would be classified if they are not structured according to legal requirements of the world outside of blockchain.²¹⁵

4.1.2 Liability of parties

Another challenge would be to determine the liability of parties in various circumstances.²¹⁶ For a system to be functional, it is necessary that participants know who is liable in what instances. This would prevent participants escaping responsibility for their own actions.²¹⁷ This also includes the development of dispute resolution processes in case of conflict or technical problems. Another apprehension is to determine who would be liable in the case where distributed ledgers are not functioning, because usually, a single entity is responsible for the functioning of the system. Other aspects to regulate are liability when a smart contract fails to perform and who would be responsible to fix technological errors.²¹⁸ These are just some of the problem areas. Many of these problems can be solved with permissioned blockchains; however, permission-less blockchain still leaves numerous uncertain areas because the identities of the participants are unknown.²¹⁹

4.1.3 Decentralisation and jurisdiction

A prominent feature of blockchain technology is that it is a decentralised system. This means that the transaction is not being stored on a server at a particular location, as is the situation with a traditional online application, but it is stored directly on the blockchain.²²⁰ It consequently operates transnationally beyond jurisdiction and has no fixed geographic location. Decentralised organisations can, however, still be regulated and managed by online users, but the problem comes in with decentralised autonomous organisations. In the latter, no single person, entity

²¹⁵ Ganne *Can Blockchain Revolutionize International Trade* 98.

²¹⁶ Ganne *Can Blockchain Revolutionize International Trade* 98.

²¹⁷ Ganne *Can Blockchain Revolutionize International Trade* 99.

²¹⁸ Ganne *Can Blockchain Revolutionize International Trade* 100.

²¹⁹ Ganne *Can Blockchain Revolutionize International Trade* 100.

²²⁰ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 54.

or government owns or controls them. Certain questions become inevitable. The first is how the law will determine the person or entity in control and who is responsible for the activities. For this problem there are three possible solutions that was suggested by Wright and Filippi.²²¹ Firstly, the answer could be that the creator of the decentralised organisation should be held liable for any damages, on the assumption that the creators are always identifiable. Another possible solution will be to hold the users vicariously liable when they have some sort of control or financial benefit. On the other hand, this could cause issues if one user must pay for another`s mistake, especially if they were unaware of the possible harm, or of the activity itself. Alternatively, the decentralised organisation could be held liable. However, it might be impossible to recover damages from a decentralised organisation, except if these measures have been encoded into the contract.²²²

The further questions regarding which national law would govern disputes and which country would have jurisdiction, becomes inevitable. This is one of the biggest legal issues.²²³ The question as regards jurisdiction becomes even more complex when public blockchains are used. In this instance the participants are unknown and nodes might be anywhere in the world. However, with private blockchains, jurisdiction can be determined more easily. To regulate disputes, the governing law that regulates blockchain will have to be considered. This is complicated because jurisdiction varies in terms of offer and acceptance in various countries.²²⁴ However, there are possible solutions to the problem of jurisdiction that are discussed below.

4.1.4 Other challenges

Other challenges to overcome might be the viewpoint of various stakeholders and market acceptance, among others.²²⁵ In addition, the fear of electronic fraud also plays a vital role. People are not always familiar and comfortable with technology.

²²¹ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 55.

²²² Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 55.

²²³ Ramotsho August 2018 *De Rebus* 11; Ganne *Can Blockchain Revolutionize International Trade* 100.

²²⁴ Ramotsho August 2018 *De Rebus* 11.

²²⁵ Zuqing May 2020 *DCW* 35.

Such discomfort creates a vulnerable group for hackers and fraudsters to take advantage of. Also, people generally do not like change. Participants are used to how things are presently working and might fear change. They are already safe and secured in their ways.²²⁶ Consequently, banks are still waiting on the sideline, especially because a fixed standard does not yet exist. The other problem is the clear absence of corporate awareness and education. Lastly, the adoption of blockchain technology would require business models to change, and this in itself is a daunting task.²²⁷

4.1.5 Risks when implementing blockchain technology prematurely

There are certain risks should blockchain technology be implemented prematurely, especially when it is not yet ready to be regulated successfully. The early development of regulations could potentially limit the future development and use of blockchain technology.²²⁸ Once blockchain technology is fully developed and ready to be implemented, the next crucial aspect is the clarification of the legal status of the blockchain. In the event of blockchain technology being implemented while there is still uncertainty about jurisdiction, coordination and liability, however, the successful development of the technology may be harmed.²²⁹ Other potential threats of implementing blockchain technology prematurely include the risk that the blockchain might be used by governmental bodies as a tool for surveillance and control. This will mean governments will have an increasing control over the electronic interaction and communications of its citizens, thus regulating people`s behaviour and forcing legal or contractual compliance.²³⁰ It will furthermore mean that every transfer or vote of an individual will be stored and tracked, infringing the right to freedom. The blockchain consequently has the potential of being abused and used as a tool for control and surveillance.²³¹ The development of appropriate rules and regulations will take some time and should be done carefully and

²²⁶ Nizardeen May 2020 *DCW* 21.

²²⁷ Zuqing May 2020 *DCW* 35.

²²⁸ Ganne *Can Blockchain Revolutionize International Trade* 99.

²²⁹ Ganne *Can Blockchain Revolutionize International Trade* 100.

²³⁰ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 53.

²³¹ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 54.

thoroughly.²³² It is therefore better to wait for the successful and thorough creation of a legal framework and regulatory system before implementing blockchain technology prematurely.²³³

4.1.6 Solution

There is a need to educate companies on the use of blockchain technology and how it functions.²³⁴ As regards interoperability, the blockchain platform can connect with other providers and can inter-operate with other platforms. This platform includes shipping, insurance and the entire supply chain. Thus, additional industries are expected to participate in the blockchain platform once clear guidelines have been set, especially the platform for the electronic bill of lading.²³⁵ There are still some concerns about challenges relating to interoperability with other applications on the same blockchain. If blockchain technology assists in a move towards paperless trade, a regulatory framework will be required that recognises the validity of electronic documents, signatures and transactions. It should also set legal boundaries for electronic data exchange between various parties and governments.²³⁶ It is highly likely that the law will develop quickly in this respect.

4.1.6.1 Lex cryptographia

Throughout times, various events have led to the development of certain laws. The *lex mercatoria* provides a good example. The *lex mercatoria*²³⁷ arose out of the expansion of domestic trade that progressed internationally. Laws had to be developed to regulate international trade and transportation. The customs and usages of the merchants eventually became law. Another example is the

²³² Ganne *Can Blockchain Revolutionize International Trade* 99.

²³³ De Caria "A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities" 110.

²³⁴ Zuqing May 2020 *DCW* 36.

²³⁵ Zuqing May 2020 *DCW* 36.

²³⁶ Ganne *Can Blockchain Revolutionize International Trade* 99.

²³⁷ For more information see: Berman "The Law of International Commercial Transactions (Lex Mercatoria)" 1987 *Harvard International Law Journal* 221 – 277.

development of the *lex informatica*.²³⁸ In relation to the internet. This was necessitated by the widespread use of the internet and internet transactions. The growing use of blockchain technology is currently creating the same type of need for legal development. It seems likely, therefore, that blockchain technology will lead to the rise of a new subset of law, namely the *lex cryptographia*, which will be characterised by a set of rules and regulations administered through decentralised organisations and self-executing smart contracts.²³⁹

International laws should thus be adopted and national legislation should be developed to address these aspects. Law should specifically address issues such as jurisdiction and legal validity of transactions. Model international laws have already been developed. This is an attempt to regulate and legalise various blockchain aspects, as these documents have already been submitted to the WTO. These laws further comprise various proposals to deal with electronic authentication, recognising electronic documents and e-signatures, and establishing frameworks for electronic contracts, e-payments and the protection of personal information. This might be the start of the process of creating a workable regulatory framework. The framework must establish legal parameters for electronic exchange of data between relevant participants. This will be necessary to move to paperless trade.²⁴⁰

4.1.6.2 The problem of liability

A solution to the liability problem in the case of a permissioned blockchain, as suggested by Deloitte, can be to create an additional paper contract in every transaction. Such a paper contract would regulate the relationship between the parties. It should also cover what the use of the blockchain in the specific circumstances entails as well as other legal aspects such as jurisdiction and the liability of the parties. It would be best to store such a contract in the blockchain to ensure that the latest version is available to all participants. The only way to change

²³⁸ For more information see: Reidenberg "Lex Informatica: The Formulation of Information Policy Rules Through Technology" 1998 *Texas Law Review* 553 – 594.

²³⁹ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 48.

²⁴⁰ Ganne *Can Blockchain Revolutionize International Trade* 99.

this contract should be by consensus of all stakeholders.²⁴¹ As regards the question of jurisdiction, private blockchains may be a solution to this problem. An agreement can be concluded stating, for example, that the jurisdiction would follow the participants in the transaction. This is possible because, in this case, the participants are known.²⁴² It can even be regulated more specifically by stating that the jurisdiction rules of the country of the defendant would apply.

4.1.7 Development of model laws

UNCITRAL developed various model laws that may assist in solving various problems. These model laws include the Model Law on Electronic Transferable Records.²⁴³ This introduces the legal use of blockchain technology in international trade transactions. It should, however, first be introduced to national legislation before it would be applicable.²⁴⁴ The model law is an attempt to clarify the legal status of transactions and processes. It also sets out certain conditions that an electronic document must meet in order to qualify as a transferable document.²⁴⁵ Other model laws that have been developed are the Model Law on Electronic Signatures in 2001 and the Model Law on Electronic Commerce (1996, revised in 1998).²⁴⁶ *UNCITRAL* model laws do not have any legal status; they simply serve as examples that can be used to assist countries when developing their own national legislation.²⁴⁷

Consequently, the biggest challenge for the law makers will be to balance the need for governance on the one hand against too much state intervention on the other hand. Too much state intervention could limit the development.²⁴⁸ The features and implications of various concepts should be fully analysed before being implemented

²⁴¹ Ganne *Can Blockchain Revolutionize International Trade* 100.

²⁴² Ganne *Can Blockchain Revolutionize International Trade* 100.

²⁴³ United Nations Information Services, 2017. See also Ganne *Can Blockchain Revolutionize International Trade* 98.

²⁴⁴ Ganne *Can Blockchain Revolutionize International Trade* 98.

²⁴⁵ Ganne *Can Blockchain Revolutionize International Trade* 98.

²⁴⁶ Ganne *Can Blockchain Revolutionize International Trade* 98.

²⁴⁷ Ganne *Can Blockchain Revolutionize International Trade* 98.

²⁴⁸ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 59.

to prevent over-regulation.²⁴⁹ This process will only become clear once there is certainty on how blockchain technology will evolve. In summary, the regulatory framework developed should be efficient, technologically neutral and implemented against fixed and clear principles.²⁵⁰

²⁴⁹ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 60.

²⁵⁰ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 60.

5 Conclusion

Blockchain technology could revolutionise international trade. It might simplify complex operational procedures and administration, and also eliminate the middleman.²⁵¹ This may lead to the reduction of costs and transaction time.²⁵² Because of less human participation it could further reduce error rates and improve convenience.²⁵³ In addition, document integrity is strong, which reduces the risk of fraud and forgery.²⁵⁴ Other benefits include improving transparency and enabling the tracking of products and the tracing of money transactions. The main attribute of blockchain technology is that all parties to the transaction can immediately view and validate a transaction as soon as it is on the block. There is thus no delay in the process caused by the movement of documents. Banks only need to rely on a single source to track the goods and transfer ownership, making the process much more efficient.²⁵⁵ Blockchain technology has the potential of eliminating paper transactions and paper-based trade. Its efficiency, moreover, can be further enhanced when it is used in combination with smart contracts. The use of electronic documents will increase significantly and might even be mandatory in the future. Electronic documents will be very useful in international trade.²⁵⁶

The biggest challenge might be to draft laws and regulations able to cover each aspect of digital trade. It is unlikely that stakeholders will adopt blockchain technology and DLT as the core of their business when the regulation thereof is still uncertain.²⁵⁷ Regulation should therefore be implemented in governments around the world.²⁵⁸ This will give rise to the emergence of a *lex cryptographia*, a new

²⁵¹ Hellwig and Huchzermeier *An Industry Study of Blockchain Technology's Impact on Trade Finance* 4.

²⁵² Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 7; Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 52.

²⁵³ Legwaila "Trade Finance and the Next Generation Trade Instruments or Technologies: What are the Implications for Banks" 93.

²⁵⁴ Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 7.

²⁵⁵ Legwaila "Trade Finance and the Next Generation Trade Instruments or Technologies: What are the Implications for Banks" 94.

²⁵⁶ Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 1.

²⁵⁷ Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 6.

²⁵⁸ Haynes and Yeoh "Legal Issues Arising from the Utilisation of Blockchain-based Products in the 4th Industrial Revolution" 60.

subset of law regulating the use of blockchain technology. It provides the possibility of a world with individual freedom.²⁵⁹

Standing against these benefits are the challenges to overcome before blockchain technology can be fully implemented. Blockchain can potentially be used for malicious purposes such as governments controlling and tracing individual activities.²⁶⁰ The success in balancing the power of blockchain technology and emerging decentralised systems to enhance international trade lies in the success of the development of a sound *lex cryptographia*.²⁶¹ Before blockchain technology can be successful, much development is necessary. There should be legal compliance, and infrastructural changes should be made.²⁶² Companies will need to be persuaded to make such changes. A solution to the unwillingness to digitalise trade might be to use relevant stakeholders who are already using digital platforms to put pressure on their competition – for example, a beneficiary communicating to customers that there are other banks able to issue an LC within 30 minutes. This will compel other participants and banks to move to paperless trade if they want to keep up with the competition.²⁶³

Fraud is another motivator to enhance paperless trade. The digitalisation of trade would ensure that banks can more easily authenticate the genuineness of transactions. Digitalisation is not the goal, but a solution to facilitate trade.²⁶⁴ This should also reduce the risk of a participant obtaining multiple financing with different banks.²⁶⁵ Blockchain technology allows for shippers and carriers to track the movement of goods. Briefly, blockchain technology increases security, enhances freight flow, limits fraud and reduces paperwork.²⁶⁶

²⁵⁹ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 56.

²⁶⁰ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 56.

²⁶¹ Wright and Filippi *Decentralized Blockchain Technology and the Rise of Lex Cryptographia* 58.

²⁶² Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 1.

²⁶³ Nizardeen May 2020 *DCW* 21.

²⁶⁴ Legwaila "Trade Finance and the Next Generation Trade Instruments or Technologies: What are the Implications for Banks" 95.

²⁶⁵ Padinhere June 2020 *DCW* 39.

²⁶⁶ Letourneau and Whelan 2017 *Journal of Equipment Lease Financing* 5.

Even though blockchain technology provides major opportunities for international trade, it might not yet be at its full maturity stage for widespread development.²⁶⁷ Trade finance technology has not fully developed. More applications of blockchain technology should be explored in the business and banking world. Various parties play a role in the success of blockchain technology and the development of a *lex cryptographia*.²⁶⁸ To reach the full potential of blockchain technology, industries and stakeholders will have to work together and be willing and able to be educated in this field to fully understand its potential and to implement it successfully. To make international trade more efficient will require common platforms where all the parties involved in a transaction come together. This creates the opportunity to remove paper documents completely and to conduct all transactions electronically, leading to a full digitalisation of international trade. The legal integration of countries will also be required in various areas such as electronic signatures. This integration can now become possible with blockchain technology because it can provide document integrity without needing a trusted third party,²⁶⁹ as it is not controlled by one single authority but rather all relevant participants.²⁷⁰ Some states have already adopted a legal framework in this regard, but it is still unclear when other countries might adopt these frameworks.

The complete digitalisation of trade remains problematic. The most important aspect in this regard is the development of a regulatory framework. The ICC plays a crucial role in this regard and has already developed a draft Uniform Rule for Digital Trade Transactions (UDRTT). This draft recognises electronic bills of lading and puts forward standards for digital service providers. In addition, *UNCITRAL* adopted the Model Law on Electronic Transferable Records (MLETR). This model law makes provision for the use of blockchain technology. It also facilitates paperless trade.²⁷¹ Once the content of these instruments become law, the problem of legal validity of contracts and blockchain transactions should be solved. As technology develops and

²⁶⁷ Byrnes May 2020 *DCW* 38.

²⁶⁸ Zuqing May 2020 *DCW* 38.

²⁶⁹ Civelek and Ozalp 2018 *Eurasian Business Economic Journal* 1.

²⁷⁰ Gupta *Blockchain for Dummies* 5.

²⁷¹ Zuqing May 2020 *DCW* 38.

the world moves towards digitalisation the possibility of blockchain technology being integrated into banking platforms increases by the day – which will lead to the digitalisation of LC presentations. The problems of jurisdiction and the liability of parties can be solved by first creating a paper contract stating exactly who is liable in what instance and dealing with the issue of jurisdiction in the case of a dispute. The contract can even go so far as consenting to digital signatures and digital transactions from thereon.

The COVID-19 pandemic might just turn out to be good for the future of international trade and the use of blockchain technology. The movement of paper-based documents has been extremely decelerated due to the standstill of courier services. The best solution would be a digitalisation process and a remote comprehensive electronic document presentation process. Businesses would, however, need an exceptionally good continuity plan to move to paperless trade, especially because they depend on numerous stakeholders that are not party to transactions, such as courier services.²⁷² This is not impossible, however. The COVID-19 pandemic clearly has the probable outcomes of the enhancement of trade digitalisation and a movement towards paperless document presentation.²⁷³

It might be safer to wait for the further development of blockchain technology and full regulations on its use. Premature radical movement in this regard may suffocate the innovation. Blockchain technology could completely revolutionise international trade and the business world, but only if it is implemented correctly and with the sufficient legal framework. Blockchain technology is beyond its experimentation phase. It offers good solutions and promises efficiency; however, it is still a few years away from worldwide use.²⁷⁴ The focus should be firstly to develop common platforms in order to facilitate this development, and, secondly, to develop a sufficient regulatory framework. Finally, it is very important to provide education on the blockchain in various sectors where it could be used beneficially.²⁷⁵ Numerous

²⁷² Nizardeen May 2020 *DCW* 21.

²⁷³ Nizardeen May 2020 *DCW* 21.

²⁷⁴ Byrnes February 2020 *DCW* 9.

²⁷⁵ Legwaila "Trade Finance and the Next Generation Trade Instruments or Technologies: What are the Implications for Banks" 95.

legal developments and regulations are still needed. Blockchain technology is, however, the start of something new and remarkable, and, it is suggested, something better than current system.

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