A Conceptual Analysis of the Electronic Bill of Lading[1]

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Abstract

For centuries, bills of lading have been in paper form. However, the last few decades have seen continuous progress made in the development of electronic alternatives to the paper bill of lading, these generally being referred to as electronic bills of lading. This paper aims to conduct a conceptual analysis of electronic bills of lading. It explores the composition of an electronic bill of lading, analyses the legal requirements for it to replicate the functions of the paper bill of lading, and discusses its legal status under a number of available national laws and international rules. The paper concludes that it is vitally necessary to adopt legal rules at both national and international levels, so as to clarify its legal status and facilitate the use of an electronic bill of lading.

I. Introduction

Shipping relies on shipping documents to facilitate its operation. Among all shipping documents, the bill of lading (B/L) is the most important one. However, use of the paper B/L has long been criticized due to its drawbacks, these including its lower efficiency, higher cost and ease of forgery, as well as the problems of delay.

With the continuous advancement in electronic communication technologies, efforts have been made to apply electronic technologies to overcome the drawbacks inherent in the paper B/L. Yet, so far, the paper B/L still remains the most important shipping

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document in practice. There is plenty of literature discussing dematerialization of B/Ls and of replacing them with electronic alternatives. Nevertheless, there is a knowledge gap, because there lacks a dedicated conceptual analysis of the e-B/L. This paper aims to fill in this research gap by: 1) discussing the definition, form and essence of the e-B/L; 2) clarifying legal requirements essential for effecting the e-B/L; 3) examining the legal status of the e-B/L; and 4) exploring the relationships between the e-B/L and paper B/L. Accordingly, the outline of the paper is as follows: Part II briefly discusses the functions and drawbacks of the traditional paper B/L; part III is dedicated to demonstrating the different electronic alternatives to the paper B/L and discussing the practical and legal difficulties involved in using those electronic alternatives; part IV focuses on studying the form and functions of the e-B/L, and on the possibility of inter-converting between a paper B/L and an e-B/L; and Part V examines the legal status of the e-B/L. The paper concludes that the present lack of a specific and clear legal framework at both national and international levels may confuse the conceptual understanding of the e-B/L and be hindering its further development. At the same time, the paper's analysis refers to existing international conventions or rules, including the Rotterdam Rules and several United Nations Commission on International Trade Law (UNCITRAL) model laws on e-commerce, as well as a number of national laws.

II. The Paper Bill of Lading: Functions and Drawbacks

A. The Three Functions of the Bill of Lading

When transporting goods under a sea carriage contract, the carrier will customarily issue to the shipper shipping documents covering the goods being carried. The B/L is the most commonly used one for that purpose. The long history of the B/L shows that its roles have evolved through centuries of merchant practice and customs.[4] Around

[4] Much literature has been written on the bill of lading's history; for example, see Chester B. Mclaughlin, *The Evolution of the Ocean Bill of Lading*, Yale Law Journal, 1926, vol.35, Issue 5, pp. 548-570. Also see S.F. Du Toit, *The Evolution of the Bill of Lading*, Fundamina: A Journal of Legal History, 2005 (11)

the 14th century, the B/L started to be used merely as a non-negotiable receipt. It was issued by the master or shipowner to a merchant who did not intend to travel with his goods. The B/L at that time was issued to evidence that the goods had been shipped on board.[5] Subsequently, the terms of the contract of carriage were incorporated into the B/L in order to solve any disputes that may arise between the cargo owners and carriers. It later became a common practice to print these terms on the reverse side of a B/L. By the 18th century, the transferability of the B/L was recognized.[6] The transferability or negotiability of the B/L was developed in response to the demand of merchants, since the holder of a B/L in which the goods were to be delivered "to order or assigns" would be entitled to take delivery of the goods.[7]

Accordingly, a B/L nowadays normally has three functions:[8] (1) It functions as a receipt for the goods described in it; (2) it is the evidence of the contract of carriage;[9] and (3) it operates as a document of title. In particular, that the B/L can function as a document of title has gradually become its most important function; and its negotiability has also turned into its most distinctive characteristic.

B. The disadvantages of using a B/L

pp. 12-25. Raymond E. Negus, *Evolution of Bills of Lading*, Law Quarterly Review, vol. 37, no. 3, 1921, pp. 304-309.

[5] In early times, merchants travelled with their goods and did not need to receive documentation from the carrier or to give one to the buyer of the goods at a foreign port. Later, it was merchants beginning to trust carriers to deliver cargo that made some sort of receipt necessary to acknowledge the goods received. See Nicholas Gaskell, *Bills of Lading: Law and Contracts*, (LLP, 2000), pp.1, para.1.1.

[6] This mainly refers to the negotiability of the B/L, and its operation as representative of the goods was recognized formally in the 18th century by common law via the landmark case of *Lickbarrow v. Mason* [(1794) 5 TR 683], and in the subsequent case *Barber v. Meyerstein*, the bill of lading was held to represent the goods as a symbol of possession. In the case of a bill of lading, the meaning of "transferable" is equivalent to "negotiable".

[7] Stephen Girvin, *Carriage of Goods by Sea* (Oxford, 2007), p.34, para.3.05.

[8] See a report of the Law Commission (England and Wales), *Rights of Suit in Respect of Carriage of Goods by Sea*, HC 250,1991, para.2.50.

[9] The B/L is not itself the contract of carriage but is merely evidence of it, because the contract has been concluded before issuing the B/L: *Sewell v Burdick* (1884) 10 App Cas 74, p.105.

For centuries, the B/L has been in its paper form, but recently more and more drawbacks to it have been identified. To mention a few, it is time-consuming[10] and it is costly for its preparation, transfer and examination.[11] Furthermore, the use of large amounts of paper in the issuing and use of B/Ls is not environmentally friendly. In addition, paper documents are relatively easy to be forged or falsified as a means of fraud.[12] However, the most strongly criticized disadvantage in using a paper B/L is the delay.[13] The list of drawbacks of the paper B/L goes on and on, and collectively constitute a hindrance to shipping and trade transactions.

There was a time when the industry hoped to replace the bill of lading with non-negotiable sea waybills to overcome such drawbacks as the delay in using paper B/Ls, as mentioned above. It is true that the sea waybill can function as a receipt for the goods received and be the evidence of a sea-carriage contract. However, it cannot function as a document of title. Thus, a sea waybill cannot enable its holder to have a constructive

[10] If a bank is involved, as for a letter of credit, the process time will be further prolonged, as both the buyer and the seller's respective Banks need to review the B/L, and the situation will be even worse in case of discrepancies. See Susan Beecher, *Can the Electronic Bill of Lading go Paperless?* The International Lawyer, Vol. 40, No. 3, 2006, p. 633.

[11] According to a survey, each B/L is often sent at least three times through a courier process, which costs $100 on average. See more in Jake Herd, '*Blockchain of Lading' Distributed Ledger Technology and the Disruption of Sea Carriage Regulation*, QUT Law Review, Vol.18, No.2, 2018, p.306.

[12] A typical example is to alter the date of issuance or the record of the goods condition to meet the requirements of the issuing of the letter of credit so as to defraud the payment.

[13] Since the 1960s, container shipping and multimodal transport have greatly reduced the average time for transporting cargos, but the speed of processing and transmitting paper documents has remained almost unchanged, which has frequently caused the goods to reach the port of destination long before the B/L's arrival. Particularly where negotiable B/Ls are issued for transactions and then resale occurs, the original paper B/L has made its way through the chain of sellers, buyers and their respective banks via mail. This delay in the arrival of the B/L causes port congestion, demurrage costs and potential economic loss due to the price fluctuation, since no original B/L can be presented for delivery in time. In a worse case, if letters of indemnity are offered to resolve this trouble, then claims may be made against the carrier for tort or for breach of the contract in releasing goods without the original B/Ls. For more discussions please refer to Rouhshi Low, *Replacing the Paper Bill of Lading with an Electronic Bill of Lading: Problems and Possible Solutions*, International Trade and Business Law Annual, 2000, p.159.

possession of the goods. Since negotiability remains the predominant need,[14] the use of a sea waybill is very limited.

III. Dematerialization of the Paper B/L

A. The Dematerialization of B/Ls

Thanks to the developments in telecommunications, particularly Electronic Data Interchange (EDI) technology, the past few decades have witnessed many efforts being made to dematerialize the paper B/L and transfer it into its electronic alternatives.

The earliest recognized one was the SeaDocs project,[15] which was started in 1986 in association with oil shipments.[16] The SeaDocs project used a bank as a central registry for the whole process, acting as a depository and custodian on behalf of all parties involved. Under the system, upon issuance the paper B/L is sent to the SeaDocs registry for custody, and a test key or code[17] will then be given to the shipper as authentication for any subsequent circulations.[18] Each transfer will be recorded both in the registry electronically and on the original paper B/L physically; then an identifying code will be sent to the last recorded endorsee for him to take delivery at the destination. This system can dramatically reduce the time it would take for paper B/Ls to be transferred

[14] This can be supported in a relevant survey implemented by UNCTAD in 2003, which indicated that the great majority of its respondents mainly or exclusively used negotiable bills of lading. See the UNCTAD Secretariat's Report *"The Use of Transport Documents in International Trade"*, November 26, 2003, p.30, para.90, the full text is available at UNCTAD's website.

[15] This is the "Seaborne Trade Documentation System" – a joint project of the Chase Manhattan Bank and International Association of Independent Tanker Owners (INTERTANKO).

[16] Boris Kozolchyk, *Evolution and Present State of the Ocean Bill of Lading from a Banking Law Perspective*, (1992) JMLC161, 227.

[17] The code or test key is equivalent to the personal identification numbers (PIN) provided by banks for use with automated teller machines. See Rouhshi Low, *Replacing the Paper Bill of Lading with an Electronic Bill of Lading: Problems and Possible Solutions*, International Trade and Business Law Annual, 5, 2000, p.171.

[18] The shipper notified SeaDocs electronically when he wanted to transfer the bill of lading and provided the transferee with a portion of the test key. SeaDocs verified the transferor and transferee through the test key before recording this transfer.

among different parties, as well as reduce the risk of being lost or forged. Although the system was well-designed at that time, the project was almost stillborn and of very short duration.

To promote the use of electronic alternatives to the paper B/L, The Comité Maritime International (CMI) introduced the "Rules for Electronic Bills of Lading" (CMI Rules) in 1990, which provided a voluntary regulatory framework open for parties who had the technological ability to communicate via the Internet and had agreed to use electronic alternatives to replace paper B/Ls.[19] The CMI Rules adopts a carrier-centric mechanism with private keys,[20] in which the carrier issues to the shipper an electronic notice – a "receipt message", together with a "private key", to replace the traditional paper B/L, with the shipper becoming the holder upon confirmation.[21] For subsequent B/L transfers, the carrier will send a new private key to the transferee as instructed by the holder in the same way.[22] However, the CMI Rules did not play its expected role.

Since the late 1990s, several electronic service platforms providing electronic solutions to replace paper B/Ls have emerged. These platforms are normally closed-club systems that are open to their members only. The members are required to sign a multilateral agreement subjecting to a specified legal system before having access to the software necessary for processing electronic alternatives. In order to ensure that the rights related to the goods and the associated contract can be transferred as in the case of paper B/Ls, all members shall agree to recognize that the data message has the same legal effect as paper B/Ls, and the effect and legitimacy of transferring rights among members by way

[19] Philip YANG, Bills of Lading and Other Shipping Documents, (2016, Dalian Maritime University Press), Cap.7, Sec.2.1.

[20] See Rule 2 of the CMI Rules: "Private Key" means any technically appropriate form, such as a combination of numbers and/or letters, which the parties may agree for securing the authenticity and integrity of a transmission.

[21] See Rule 4 (a)(b) of the CMI Rules.

[22] Sending a new private key means that the old one will become invalid. See Rule 7(b) of CMI rules.

of data messages would not be challenged. The International Group of P&I clubs has approved three such EDI B/Ls platforms, i.e. Bolero, essDocs and E-title; and cover liabilities arising under e-B/Ls.[23]

Bolero stands for "the Bill of Lading Electronic Registry Organization". It launched its club system using a central registry mechanism in 1999. Bolero names the electronic alternative to the paper B/L as "Bolero Bills of Lading (BBL)", which consists of the BBL text and records in the registry that function as a traditional paper B/L.[24] The BBL text is a message that contains all the necessary information of a paper B/L, and is communicated and authenticated in the "Bolero Core Messaging Platform" (BCMP). The registry records of the relevant BBL rights holders and any changes caused by each transfer are recorded by the central registration centre - "Bolero Title Registry" (BTR). Accordingly, the BBL process operates as follows: A carrier transmits its prepared BBL text to BCMP; BCMP checks the message for authenticity, endorses the message by adding its own digital signature and then forwards it to the specific shipper. The shipper becomes the holder of the BBL upon acknowledgement of receipt. The holder communicates its transfer instruction to BCMP; BCMP then checks the message, verifies it against its BTR records, adds BCMP's own digital signature and forwards the message to the transferee, who then becomes the new holder.[25]

The platform essDocs rolled out its "CargoDocs" service in 2009, for the creation, exchange and transfer of electronic original documents required for global trade, including the B/L.[26] Unlike Bolero, CargoDocs provides both a communication

[23] See P&I Club Circular 5.517, October 2015, Frequently Asked Questions ("FAQs") on Paperless Trading (Electronic Bills of Lading), Questions 1-2. Full text available via https://www.londonpandi.com/media/1560/5517.pdf.

[24] Philip YANG, Bills of Lading and Other Shipping Documents, (2016, Dalian Maritime University Press), Cap.7, Sec.2.3.1.

[25] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, p.286.

[26] See *CargoDocs Solutions*, http://www.essdocs.cn/zh/solutions/docprep/.

channel and a complete solution, so a B/L in place of the original paper B/L can be created, stored, transmitted, transferred and presented online as instructed.

The e-title™ solution was developed by a Singapore company E-Title Authority Pte Ltd in 2004, aiming at facilitating electronic transfer of a negotiable document and its title, including the bill of lading. It uses "Hardware Security Modules" (HSM) as the registry for the state of electronic title of e-B/Ls, and also provides an "Application Service Provider" (ASP) to communicate with the parties. The e-B/L under the e-title™ is typically operated as follows: Firstly, the carrier sends his prepared B/L information and authorization to e-title™ through its back office system, and e-title™ creates, digitally signs and registers a corresponding electronic title in the HSM; secondly, the carrier sends the e-B/L, together with the returned electronic title, through e-title™ to the shipper; the shipper then directs them to e-title™ for processing through an ASP; e-title™ now registers the shipper in the HSM as having the right to transfer, as e-title™ has validated the digital signature to confirm that it is authentic and that the B/L has not been altered. To transfer the e-B/L, the shipper accesses e-title™ to authorize the transfer, e-title™ validates that the shipper is the registered holder of the electronic title, creates and digitally signs an endorsement record, updates the electronic title registry on the HSM, and then sends the electronic title, the endorsement record and the e-B/L to the transferee.[27]

The development of blockchain offers a new opportunity for dematerializing the paper B/L.[28] Blockchain technology adopts a "distributed ledgers" system. Each transfer of

[27] See "*How Does E-Title™ Work?*" available at http://www.e-title.net/sol_work_create.php.

[28] Actually, the International Group of P&I Clubs has recently added three Blockchain e-B/Ls solution suppliers in a row to the list of approved systems. These are the edoxOnline platform in June 2019 (See P&I Club Circular 5.569, https://www.londonpandi.com/media/2466/g-circs-class-5-pdf-5569.pdf), the WAVE network in December 2019 (See P&I Club Circular 5.576, https://www.londonpandi.com/Media/2515/5576.pdf) and the CargoX in February 2020 (See P&I Club Circular 5.579, https://www.londonpandi.com/Media/2583/5579.pdf). In addition, several shipping groups have announced pilot projects on the application of blockchain technology into e-B/Ls, for

information is automatically recorded and appended in the form of a block, thus forming the blockchain. The blockchain contains the history of every token in circulation and provides proof of "who owns what" at any given juncture through a chain of notarized appendages.[29] Under the mechanism of blockchain technology, the blockchain B/L itself can prove rights, rather than requiring the carrier or a third-party registry to certify; therefore, this is more like the way a paper B/L operates.[30] It thus seems that this electronic alternative is autonomous, without the need for any direct involvement of a specific third party, and thus greater security can be provided.[31]

B. Analysis on the Dematerialization of the B/L

The above-discussed electronic alternatives have undergone great changes. In its early attempt, electronic alternatives were just auxiliaries to traditional paper B/Ls, their purpose being to speed up circulation of the paper B/Ls by electronic means, so that information related to the B/L could be communicated and transmitted faster. Accordingly, the electronic alternatives at that time were not independent, since the paper B/Ls were still required as the source of rights and obligations among the involved parties. Although the use of those electronic alternatives was more convenient and rapid when compared to the traditional paper B/L, their drawbacks were also very obvious. For example, under the SeaDocs approach, when the paper B/L was deposited at the registry in London, it would be difficult for the relevant parties in other countries (such as foreign banks for settlement of exchange or confirmation) to scrutinize that

example, Pacific International Lines (Pte) Ltd ("PIL") has been cooperating with IBM to conduct blockchain trails to create e-B/Ls and has gained some success. See *PIL and IBM collaborate to trial Lunar New Year delivery using IBM Blockchain Platform*, available at https://www.pilship.com/en-pil-and-ibm-collaborate-to-trial-lunar-new-year-delivery-using-ibm-blockchain-platform/132.html?n=276.

[29] Jake Herd, *'Blocks of Lading' Distributed Ledger Technology and the Disruption of Sea Carriage Regulation*, QUT Law Review, 2018, Vol.18, p.309.

[30] Guo Yu, *The practice of electronic bill of lading and the construction of regulations should be promoted*, International Business Daily, page A07, August 8, 2016.

[31] As the information on blockchain cannot be deleted or amended, only appended, it is therefore safer.

paper document.[32] Therefore, the parties would have less confidence in using such an electronic alternative.

It was hoped that the electronic alternative could completely replace the paper B/L. Electronic alternatives under CMI Rules and subsequent electronic platforms, despite the differences in their specific designations, composition and operation mechanisms, are the electronic alternatives intended to achieve such an aim. They have an "either-or" relationship with the paper B/Ls under the same contract of carriage.[33] It is the electronic alternatives of this kind that are believed to be real alternatives for or equivalents to traditional paper B/Ls. In this case, they should play an identical role to that of a traditional paper B/L, and perform all the functions of a paper B/L but in an electronic environment.

C. Difficulties in Using the e-B/Ls

Applying a well-designed electronic alternative that replaces a paper B/L can offer great benefits, including increased efficiency, cost savings, reduced documentary errors and losses. At the same time, problems associated with delays will also be largely solved. However, the e-B/L still has not obtained wide use in maritime and international trade practice.

There is a combination of legal, practical and conceptual challenges. In brief, firstly, the replacement of the paper B/Ls with e-B/Ls does not mean that the medium of the B/L is simply changed from a paper one to an electronic one. The main issue to be addressed for adopting e-B/Ls is how to replicate the functions of the paper B/L in an electronic environment. Secondly, laws governing B/Ls in most jurisdictions still

[32] Philip YANG, Bills of Lading and Other Shipping Documents, (2016, Dalian Maritime University Press), Cap.7, Sec.2.2.

[33] More about the relationships between the paper B/Ls and their electronic alternatives will be discussed elsewhere in the paper. See also: Xiang Zaisheng, *A Study on the Legal Issues on Electronic Bills of Lading*, the Doctoral Dissertation of Wuhan University, 2005, p.18.

remain focused upon paper-based B/Ls, whose fundamental legal source comes from mercantile customs and practice in the use of the traditional paper B/L.[34]

As discussed above, the traditional paper B/L has three functions. It is generally believed that there is no difficulty for the e-B/L to perform the first two functions in an electronic environment, i.e. as a receipt of cargo being received and the evidence of the contract of carriage.[35] These two functions are mainly based on information contained in the paper B/L. The practice of dematerializing B/Ls also shows that it is technically possible to change such information to electronic messages/data; and that the signature can also be carried out electronically by the carrier and then communicated electronically, just as if the information were handwritten or printed on a paper B/L.

The UNCITRAL Model Law on Electronic Commerce (MLEC) in the mid-1990s provides basic legal validity for the use of electronic communications (or "data messages" in MLEC terms),[36] so that transactions concluded or conducted electronically by e-B/Ls are not invalid simply because they are not in paper form.[37] By adopting the approach of "functional equivalent",[38] the MLEC establishes general rules on how to meet common legal requirements set for paper-based documents when data messages are used to substitute for papers. These rules are now incorporated into many domestic legislations on e-commerce to overcome legal obstacles in the use of electronic communications. Furthermore, signing electronically to replace the manual signature required in documents is no longer an insurmountable difficulty at law. For

[34] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, p.271.

[35] Vasileios Ziakas, *Challenges Regarding the Electronic Bill of Lading (EBOL)*, International Journal of Commerce and Finance, Vol. 4, Issue 2, 2018, p.43.

[36] See Article 5 of MIEC, which says that "Information shall not be denied legal effect, validity or enforceability solely on the grounds that it is in the form of a data message." In addition, MIEC gives data messages admissibility and evidentiary force by Article 9.

[37] Jenny Clift, *Electronic Commerce: the UNCITRAL Model Law and Electronic Equivalents to Traditional Bills of Lading*, International Business Lawyer, vol. 27, no. 7, 1999, p.312.

[38] The "functional equivalent approach" will be discussed later.

example, the 1978 Convention on the Carriage of Goods by Sea (the Hamburg Rules) has already allowed the signature on B/Ls to be made by electronic means.[39] Also, the UNCITRAL Model Law on Electronic Signatures [40] (MLES) has promoted "functionally-equivalent" electronic signatures for producing legal effects as handwritten signatures, on the basis of Article 7 of the MLES with respect to the fulfilment of the signature function in an electronic environment.[41] More about the writing information and electronic signature will be discussed elsewhere in the paper.

Rather, it is the third function of the B/L, it being the document of title, as well as its negotiability, that has posed enormous challenges to the use of the e-B/L. In the case of the negotiable paper B/L, all rights and obligations are embodied in a paper document.[42] Accordingly, the transfer of the B/L purporting to convey rights related to goods cannot be divorced from the physical possession of the original paper document. However, the e-B/Ls do not have physical presence and can be copied easily, making it difficult to ascertain the identity of the rightful holder. As discussed above, systems facilitating the use of e-B/Ls in the past have mainly adopted a registration mechanism to support a transfer of the e-B/L. Whenever an e-B/L is issued or transferred electronically, each and every time a record is made in a registry of the name of the person to whom it is issued or transferred, and the entry in the registry will indicate which person is now

[39] See Art.14(3) of the Hamburg Rules, which says "The signature on the bill of lading may be in handwriting, printed in facsimile, perforated, stamped, in symbols, or made by any other mechanical or electronic means, if not inconsistent with the law of the country where the bill of lading is issued."

[40] The Model Law on Electronic Signatures (MLES) was adopted on July 5, 2001, and was aimed at proving criteria for the equivalence between electronic and hand-written signatures, thus assisting States in establishing a legislative framework to address the legal treatment of electronic signatures and give certainty to their status.

[41] See Resolution adopted by the General Assembly, para.7, UNCITRAL Model Law on Electronic Signatures with Guide to Enactment 2001, United Nations Publication Sales No. E.02.V.8, pp. viii.

[42] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, p.271.

recognized as the rightful holder of the bill.[43] Except for the e-B/L prescribed under the CMI rules,[44] every EDI e-B/L system uses a central registry operated by a private group to record every holder and transfer. The blockchain e-B/L does not have to rely on the records in the registry to prove who the holder is, since the blockchains themselves contain the history of every transfer and holder. In the absence of a relevant law or international convention,[45] whether the rights and obligations can be transferred together with an e-B/L is rather dependent upon the contractual agreement of the parties.

IV. A Conceptual Analysis of the e-B/L

A. What is the e-B/L?

1. The Definition

There lacks a specific definition of the e-B/L.[46] The e-B/L is used rather as a general term to refer to any electronic alternatives to paper B/Ls. Some scholars use the term to refer to any electronic process that is functionally equivalent to a paper B/L.[47] It is also believed that any data message containing the information usually contained in a paper B/L and is capable of transfer by indorsement or delivery to third parties may constitute an e-B/L, including those generated in a comprehensive e-B/L system.[48] The International Chamber of Commerce (ICC) summarizes that, despite the absence of a

[43] Miriam Goldby, *Electronic Bills of Lading and Central Registries: What is Holding Back Progress?* Information & Commercial Technology Law, Vol.17, No.2, June 2008, p.127.

[44] It adopted a private registry model operated by the carrier.

[45] Miriam Goldby, *Electronic Bills of Lading and Central Registries: What is Holding Back Progress?* Information & Communications Technology Law, Vol. 17, No. 2, 2008, p.125.

[46] A good example is the odd case of the CMI Rules: although the CMI Rules are rules on the e-B/L, the term "electronic bill of lading" neither appears nor is defined in specific rules.

[47] For instance, Miriam Goldby, *Electronic Documents in Maritime Trade*, Oxford, 2013, Chap.6.01, p.120.

[48] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, p.272.

single definition, an e-B/L in broad term refers to an electronic record which aims to have the functional equivalence of an original paper B/L.[49]

Therefore, the e-B/L is basically recognized through the description of its electronic form and "functional equivalent" to a paper B/L. This explains why some other terms are also often used when discussing the e-B/L, for example, the "electronic equivalent to paper B/Ls"[50] and "(negotiable) electronic transport record".[51]

2. The Electronic Form

Obviously, one of the biggest differences between the e-B/L and a traditional paper B/L lies in the former's "electronic form". Some may believe that the e-B/L is the electronic form of the traditional paper B/L.[52] This belief, though, is over-simplified. Instead of necessitating tangible paper and characters, it is true that the e-B/L is demonstrated before parties using electronic data as the medium. However, the e-B/L as an electronic record or message does not start its "life" as a paper document, but is created and transmitted electronically.[53] In this sense, the "electronic form" of an e-B/L is independent, rather than paper-affiliated. Therefore, a mere electronic hardcopy of a

[49] See a report on the survey about the legal status of e-B/Ls conducted by the ICC Bank Commission, *The Legal Status of Electronic Bills of Lading*, November 17, 2018, p.6. The full text is available at https://iccwbo.org/publication/legal-status-electronic-bills-lading/.

[50] See Jenny Clift, *Electronic Commerce: the UNCITRAL Model Law and Electronic Equivalents to Traditional Bills of Lading*, International Business Lawyer, Vol. 27, No.7, 1999, p.311-318. Also see Law Commission (England and Wales), Electronic Commerce – Formal Requirements in Commercial Transactions, 3 December 2001, p.24, https://www.lawcom.gov.uk/project/electronic-commerce-formal-requirements-in-commercial-transactions/.

[51] Unlike the Hague-Visby Rules and Hamburg Rules, the Rotterdam Rules abandoned the traditional use of the concept "bill of lading"; instead, the term "(negotiable) transport document" was introduced to cover various traditional shipping documents, including the B/L. Therefore, the e-B/L was covered by the term "(negotiable) electronic transport record" which is a corresponding concept to "(negotiable) transport document".

[52] Vasileios Ziakas, *Challenges Regarding the Electronic Bill of Lading (EBOL)*, International Journal of Commerce and Finance, Vol. 4, Issue 2, 2018, p.40.

[53] See a report on the survey about the legal status of e-B/Ls conducted by the ICC Bank Commission, *The Legal Status of Electronic Bills of Lading*, November 17, 2018, p.9.

paper B/L, such as an electronic image and a scanned PDF/Word file of the paper B/L, which is often mistakenly referred to as an "electronic bill of lading",[54] does not actually constitute a real e-B/L. These electronic copies are usually made upon issuance of the paper B/L by the forwarders at the port of shipment, and sent electronically to relevant parties, such as the shipper, consignee, and others, in order to inform them in a timely manner of the issuance of the B/L and the contents recorded in it. Therefore, rather than performing the same functions as a paper B/L, the roles of this kind of B/L are subsidiary in these cases, and only work to evidence the issuance of the paper B/L and the contents contained therein.

Moreover, special terms in lieu of the word "document" are frequently used when referring to electronic documents.[55] They include, for example, the term "data message" in the MLEC,[56] the term "electronic record" in the Rotterdam rules,[57] and the term "electronic records" in UNCITRAL Model Law on Electronic Transferable Records (MLETR).[58] In addition, an e-B/L can adopt the format of a frequently-used standard paper B/L (such as the Congenbill format), as well as have both front and back sides.[59]

[54] See a Chinese case: *Wantong Wuhan Co. v. Yiwu Mont Co.* (2008), Zhe Min Zhong No.8. In this case, the phrase the "electronic bill of lading" cited by the parties and the court is actually only an electronic scanned copy of the paper bill of lading, which is sent by the freight forwarder to the owner of the goods to inform of the shipment of the goods and other information after the paper bill of lading is issued. This electronic scanned copy can by no means constitute the electronic bill of lading this paper discussing.

[55] Vasileios Ziakas, *Challenges Regarding the Electronic Bill of Lading (EBOL)*, International Journal of Commerce and Finance, Vol. 4, Issue 2, 2018, p.40-45.

[56] Data message is defined as "information generated, sent, received or stored by electronic, optical or similar means including, but not limited to, electronic data interchange (EDI), electronic mail, telegram, telex or telecopy". See Article 1(a) of the MLEC.

[57] Electronic record in the Rotterdam rules is defined as "…information in one or more messages issued by electronic communication". See Article 1(18) of the Rotterdam rules.

[58] "Electronic record" in the MLETR means information generated, communicated, received or stored by electronic means, including, where appropriate, all information logically associated with or otherwise linked together so as to become part of the record, whether generated contemporaneously or not. See the Article 1, para.1 of the MLETR.

[59] Philip YANG, Bills of Lading and Other Shipping Documents, (2016, Dalian Maritime University Press), Cap.7, Sec.2.3.3.

3. “Functional Equivalent”

The “functional equivalent” approach was first developed by the UNCITRAL when drafting the MLEC, which aimed at establishing a basic legal framework to overcome legal barriers for the application of electronic communication technologies. This approach is based on an analysis of the purposes and functions of the traditional paper-based documents with a view to determining how those purposes or functions could be fulfilled through electronic techniques.[60]

The UNCITRAL states that a data message, in and of itself, cannot be regarded as being equivalent to a paper document, in that it is of a different nature and does not necessarily perform all conceivable functions of a paper document.[61] Therefore, on the one hand, not all data messages generated in the e-B/L solutions that can substitute for some general paper documents can necessarily be taken for granted as being real electronic equivalents to paper B/Ls, unless they can achieve all the functions, not just some of the functions, of a paper B/L. On the other hand, an e-B/L, one that is a real electronic equivalent to a paper B/L, and regardless of what particular technologies and mechanisms it adopts, does not have to precisely mirror all the operations of a paper B/L. In other words, as a real e-B/L, it should be capable of realizing the same functional effects as a paper B/L independently in the electronic environment. However, it should not dramatically destroy the basic requirements underlying the paper B/L in order to perform its functions.

It is necessary to reiterate that there is a significant difference in the roles played by different electronic alternatives. In the early attempts, for instance in the SeaDocs project, the electronic alternative does not have the functions of a paper B/L on its own, since the paper B/L remains the one that actually performs its functions. The paper B/L

[60] See *Guide to the Enactment of the UNCITRAL Model Law on Electronic Commerce* 1996 (hereinafter referred to as “the Guide to MLEC”), para.16.

[61] See the Guide to MLEC, para.17.

is essentially the source of the rights and obligations of the relevant parties. However, the newly-developed electronic alternatives, such as the e-B/Ls under CMI Rules and other subsequent electronic platforms, can arguably be regarded as being the "electronic equivalent" to the traditional paper B/L.

The requirement of "functional equivalent" also implies an inherent requirement of "technology neutrality". This means that, in view of the speed of technological innovation, the law should neither require nor assume the adoption of a specific electronic technology when defining an e-B/L. Consequently, the law should accommodate the use of various technologies and models, such as registries, tokens and distributed ledgers.

B. The Legal Requirements of a Functionable B/L

The laws governing the bill of lading have evolved based on the idea that B/Ls are always in a paper form. In the case of the e-B/L, not only the form of a bill of lading becomes some intangible data message (or is encompassed by the term "electronic records"), but the mode of operation is also totally different. Therefore, directly applying the concepts and requirements developed from, and fashioned by, paper documents to e-B/Ls may create much confusion.

In general, there are three possible ways to eliminate any confusion: The first is to expand the scope of paper-based notions and requirements to encompass computer-based techniques and electronic equivalents; the second is to apply the approach of "functional equivalent", where criteria and requirements can be accordingly set to enable electronic data to achieve the same level of recognition as traditional paper documents; the third is to introduce new concepts tailor-made for the use of electronic documents. In view of the respective features and limitations of these three approaches, as analysed below, it can be found that all three are actually used in combination to

solve the conceptual confusion surrounding the e-B/L in current practice and under existing legal rules.

1. The Legal Requirements about the Form of a B/L

The rules governing the paper B/L require that the form of the B/L shall consider at least four aspects: 1) To be in writing; 2) to bear a signature; 3) to be the original; and 4) to contain the necessary information. As for the fourth aspect, it is not difficult to convert all the information essential for the operation of a carriage contract into a data message format, as analysed above. Therefore, the controversies will mostly arise from the other three aspects. Fortunately, a number of international and domestic regulations are in place to attempt to provide some guidelines on how the legal barriers in these other three aspects can be possibly eliminated.

(1) In writing

The bill of lading itself is not a contract of carriage of goods by sea, but merely the evidence of the contract. Meanwhile, to be "in writing" is a commonly acknowledged essential legal requirement for a B/L.[62] In order to ensure that e-B/Ls can satisfy the requirements of being "in writing", there are two basic approaches. Firstly, it is suggested that the meaning of "writing" should be expanded to include electronic forms. This approach is recognized in some international conventions and national legislations. For example, Art.1(8) of the Hamburg Rules defines "writing" to include telegram and telex; Art.1 of Sched.1A of the Australian Carriage of Goods by Sea Act 1991 defines "writing" as including "electronic mail, electronic data interchange, facsimile transmission, and entry in database maintained on a computer system".[63] The second

[62] It is believed that it was the Hague Visby Rules imposing on the carrier the duty to "issue" a B/L and specifying information necessary to be stated in the B/L that implies that the rules envisage the B/L to be in writing. See Rouhshi Low, *Replacing the Paper Bill of Lading with an Electronic Bill of Lading: Problems and Possible Solutions*, International Trade and Business Law Annual, 5,2000, p.193.

[63] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, p.271-279.

approach, represented by the MLEC, has gained a lot of acceptance. In a paper environment, a written requirement means that the information contained in the document shall be retained or presented "in writing", or that information be carried in some paper-based instrument. The specific purposes of it being in writing may vary in different documents and cases, but for the bill of lading the functions are mainly to ensure that the B/L is legible to all relevant parties, as well as by authorities and courts, so that these people can view and verify the information contained in the B/L. Although without any specific intention to address all functions of writing, the MLEC noticed the underlying basic notion that the information can be reproduced and read,[64] and therefore the MLEC provides an objective criterion for a data message to meet the "writing" requirement – the information contained in a data message is accessible so as to be usable for subsequent reference.[65] Actually, the requirement for all relevant information to be "in writing" is not difficult to be satisfied in the case of an e-B/L, since the electronic data can be converted by a computer into recognizable text and displayed on a screen.

(2) Bear a signature

As for paper B/Ls, the carrier must sign off on the prepared paper B/L to show his responsibility for the recorded condition of the goods and he will then be bound by the terms thereof. In addition, the current holder's (the endorser's) signature is required to put into effect the transfer of the B/L by endorsement, if any. Apparently, the laws customarily require such important documents to be signed to have certain legal effects. The main purpose of the signature in a paper-based environment is to authenticate the handwriting and identify the signatory. If there is any dispute, a signature can evidence the certainty of a person's involvement, the identity of the signatory, the knowledge of and consent to the document, and the intention of the signatory to be bound by the

[64] See para.50 of the Guide to MLEC.

[65] See Art.6(1) of the MLEC.

document. In addition to the traditional handwritten signature, the authentication purpose of the signature requirements can also be achieved by other derivative means, such as a recognized stamp or a typewritten signature; these are also referred to as a "signature" and are admitted by law.[66] From this point of view, if the main purpose of a signature is to demonstrate the signatory's authenticating intention, the term "signature" can perhaps be expanded beyond its handwritten form.

Various technologies of authentication are used in e-commerce practice to substitute for the paper-based signature in order to meet the "signature" requirement under a commercial contract. For example, pre-setting the sender's name and other information (such as job title, company name, etc.) in the e-mail system to cause them to be added automatically at the bottom of each email when sending out; scanning a handwritten signature into electronic data and inserting it into an email or other documents that need to be signed; clicking on a website button to confirm personal identity information and approving the contents.[67] An electronic signature may range from a typed name at the foot of an email message to a digital signature requiring a public-private key infrastructure (PKI).[68] For the e-B/L, the more complicated digital signatures have gained more popularity, as they can provide a higher level of certainty for determining the identity of the sender by PKI. Digital signatures can also be used to verify the integrity of a data message, and to make a data message accessible only to its intended recipient so as to help to guarantee its singularity.[69]

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[66] For example, a stamp was recognized as a signature in the case *British Estate Investment Soc Ltd v. Jackson (HM Inspector of Taxes)* (1956) TR 397, a "printing" was recognized as a signature in the case *Brydges (Town Clerk of Cheltenham) v. Dix* (1891) 7 TLR 215, a "typewriting" was recognized as a signature in the case *Newborne v. Sensolid (Great Britain) Ltd* (1954) 1 QB 45.

[67] Philip YANG, Bills of Lading and Other Shipping Documents, (2016, Dalian Maritime University Press), Cap.7, Sec.1.3.

[68] Miriam Goldby, *Electronic Documents in Maritime Trade*, Oxford,2013, p.28, para.2.28.

[69] For an introduction to digital signatures, see Miriam Goldby, *Electronic Documents in Maritime Trade*, Oxford, 2013, para.2.35-2.38. Also see the Guide to the MLES, para.35-62.

Arguably, then, two approaches can possibly be adopted to deal with the signature requirements for e-B/Ls. One way is to incorporate electronic means consistent with the notion of a signature. For example, Article 14(3) of the Hamburg Rules expressly provides that the signature on a bill of lading may be made by any electronic means. The Electronic Communications Act 2000 in England confirms that electronic signatures are admissible in legal proceedings to determine the authenticity or integrity of any electronic communication or electronic data in which they are incorporated, or with which they are logically associated.[70] Another way is to provide for "functional equivalent" criteria such as in the MLEC to satisfy the signature requirement in an electronic environment.[71] When drawing up the MLEC, the UNCITRAL working group considered that the notion of "signature" is intimately linked to the use of paper.[72] The criteria set down in the MLEC are thus the use of reliable methods capable of identifying a person and indicating that person's approval of the information contained in the data message,[73] which precisely reflects the basic functions of the signature in a paper-based environment. Electronic data incorporated in, affixed to or logically associated with a data message, which results from the use of such methods, is also commonly referred to as an "electronic signature".[74] The MLES provides that a

[70] Law Commission (England and Wales), *Electronic Commerce – Formal Requirements in Commercial Transactions*, December 2001, para.3.27. Also see Section 7(2) of the ECA: "For the purposes of this section an electronic signature is so much of anything in electronic form (a) is incorporated into or otherwise logically associated with any electronic communication or electronic data; and (b) purports to be so incorporated or associated for the purpose of being used in establishing the authenticity of the communication or data, the integrity of the communication or data, or both."

[71] So far, national legislation based on or influenced by the Model Law has been adopted in 33 States. See UNCITRAL Model Law on Electronic Signatures (2001)–Status, https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_signatures. For example, in the Chinese Electronic Signature Law (2019 Amendment), Article 2 defines the "electronic signature" and Article 3 provides for its legal effect.

[72] See the Guide to MLEC, para.55.

[73] See Art.7(1)(a) of the MLEC.

[74] For instance, See Art.2(a) of the MLES: "Electronic signature" means data in electronic form in, affixed to or logically associated with, a data message, which may be used to identify the signatory in

signature requirement is met by a reliable electronic signature in case of the generation or communication of a data message.[75]

(3) Originality

In a paper-based environment, some important commercial documents are accepted only if they are an "original", since the recipient of the documents will be confident that the contents therein are authentic and unaltered. The concept of "original" or "originality", if explained in accordance with its normal meaning, is a medium on which information is fixed for the first time. Thus, it is impossible to speak of "original" data messages, since the addressee of a data message always receives a copy thereof.[76] Therefore, when considering the requirements of being "original" in the electronic environment, it is necessary to understand the purposes of this requirement, and to ponder over ways of adapting them to data messages.

The fundamental reason for presenting original documents is linked with its evidential value. Considering that various technical means are available to verify the contents of a data message, the MLEC sets down the minimum acceptable criteria of functional equivalence that enables a data message to satisfy the requirement of being "original". The requirements of being its original form can be met by a data message if: (1) There exists a reliable assurance as to the integrity of the information, and (2) the information is capable of being displayed to the person who requires the information to be presented.[77] When assessing the integrity of the information, it should be noted that necessary additions to that data message, such as an endorsement or change which arises in the normal course of communication, storage and display, would not affect its

relation to the data message and to indicate the signatory's approval of the information contained in the data message;

[75] See Art.6.1 of the MLES.

[76] See the Guide to MLEC, para.62.

[77] See Art.8(1) of the MLEC.

"originality" as long as the contents of a data message remain complete and unaltered.[78] Thus, for the e-B/L, some essential additions, such as an electronic certificate added for testing the "originality" of that data message or the data automatically added by computer systems for transmitting the data message, will be considered as if they were a supplemental piece of paper with an "original" piece of paper without affecting the "originality" of the e-B/L. Similarly, the MLETR and the Rotterdam Rules also contain such requirements for maintaining the integrity of data messages for their use.[79]

2. Some concepts relating to the transfer of the B/L

As for a B/L, it usually goes through a process of issuing, transferring and presentation, in which the holder of the B/L often changes. To allow an e-B/L to achieve such equivalent functions as the paper B/L, it is essential to impose the requirements for the B/Ls from a paper-based environment onto the electronic environment, yet some difficulties may still exist in understanding and interpreting a number of elements related to the operation of the e-B/L, including "possession".

(1) "Possession"

For a transferable document under the paper-based environment, its value lies in the rights embodied in the paper; the physical possession of the paper document is generally required in order to enforce the rights thereof. A transfer of rights demands the delivery of the original paper to the transferee for his/her possession. "Possession" constitutes an important notion for the circulation and use of a transferable document; only the

[78] See Art.8(3)(a) of the MLEC and the Guide to MLEC, para.67.

[79] See Art.10.1(b)(iii) of the MLETR: "Where the law requires a transferable document or instrument, that requirement is met by an electronic record if a reliable method is used to retain the integrity of that electronic record." Art.9.1(b) of the Rotterdam Rules states: "The use of a negotiable electronic transport record shall be subject to procedures that provide for an assurance that the negotiable electronic transport record retains its integrity."

rightful possessor[80] is entitled to enforce the document.[81] As far as the B/L is concerned, it not only evidences the contract of carriage, but is also itself regarded as a representative of the goods under it. Therefore, possession of the B/L means the acquirement of the rights under the contract of carriage and a constructive possession of the goods, as well as the acquirement of certain rights to dispose of the goods. The concept "possession" is closely related to the issue and transfer of a B/L – the carrier must deliver the signed and fully-informed B/L to the shipper's possession to fulfil his obligation of issuing, and the transfer of the B/L through delivery will mean the transferor's loss of possession of the B/L and the transferee's acquirement of the possession thereof.

In the rules available for electronic transferable records, the concept of "control" over an electronic record is regarded as the functional equivalent of "possession".[82] That is, the transfer of control over an electronic transferable record is the "functional equivalent" of transfer of possession of a paper document. The person in control of an electronic transferable record is in the same legal position as the possessor of an equivalent transferable document. Although the specific meaning of "control" is somewhat ambiguous, the concept of "control" may be interpreted as the qualification to bear exclusive claims on and the ability to transfer electronic transferable records and the rights embodied therein. Both the MLETR and the Rotterdam Rules introduce the concept of "control" as the functional equivalent of "possession". The MLETR provides that the requirement of possession of a transferable document can be met if a

[80] The person legally in possession of a transferable paper is typically referred to as the holder.

[81] UNCITRAL Working Documents for Working Group IV (Electronic Commerce) on the 45th session, *Legal Issues Relating to the Use of Electronic Transferable Records*, 8 September 2011, A/CN.9/WG.IV/WP.115, para.6.

[82] UNCITRAL Working Documents for Working Group IV (Electronic Commerce) on the 46th session, *Legal Issues Relating to the Use of Electronic Transferable Records*, 17 August 2012, A/CN.9/WG.IV/WP.118, para.52.

person can establish an exclusive control over the electronic transferable record.[83] The Rotterdam Rules provide that the notion of control is closely related to both issuance and transfer of the negotiable electronic transport record,[84] as well as provide a general rule to establish the functional equivalence between "possession of a paper-based document" and "control over an electronic record".[85] It is worth noting that both laws refer to "exclusive control" instead of "control", so that the notion of "control" can imply exclusivity in its exercise, which is similar to that of "possession".[86]

Where "control" is used to denote "possession" in the digital environment, there must be a method to identify the current party in control of a specific electronic transferable record. This is necessary for demonstrating control of that record, and thus determining the person who is entitled to bring claims on the rights embodied therein. For example, the MLETR identifies the person who establishes an exclusive control of that electronic transferable record as being the person in control.[87] The Rotterdam Rules calls for a manner in which the holder of the negotiable electronic transport record is able to demonstrate his identity as the holder.[88] In the case of an e-B/L, this identification is significant when applying the requirement that the B/L shall be presented to the carrier to claim delivery , since the notion of "presentation" in a paper environment relies on the demonstration of possession of the B/L as its core element. In an electronic

[83] See Article 11.1(a) of the MLETR.

[84] See Article 1.21 of the Rotterdam Rules: The "issuance" of a negotiable electronic transport record means the issuance of the record in accordance with procedures that ensure that the record is subject to exclusive control from its creation until it ceases to have any effect or validity. Also, Article 1.22: The "transfer" of a negotiable electronic transport record means the transfer of exclusive control over the record.

[85] See Article 8(a) of the Rotterdam Rules: The issuance, exclusive control, or transfer of an electronic transport record has the same effect as the issuance, possession, or transfer of a transport document.

[86] See *Explanatory Note to the UNCITRAL Model Law on Electronic Transferable Records*, 2018, United Nations Publication, Sales No. E.17.V.5, para.111.

[87] See Article 11.1(b) of the MLETR.

[88] See Article 9.1(c) of the Rotterdam Rules.

environment, that demonstration may only be possible by identifying the person in control of an e-B/L.

(2) Guarantee of Singularity

In a paper environment, a transferable document itself is the only embodiment of the rights it represents, and any transfer or assignment of such rights requires a physical transfer of the paper document. In order to prevent the circulation of multiple documents relating to the same performance and thus avoid multiple claims, each transferable document shall be unique.[89] For the B/L, the notion of "uniqueness" or "singularity" is not unknown to practitioners of shipping industries, since only the holder of the B/L has the right to claim delivery, to dispose of the goods, and to have contractual rights against the carrier. Although the practice of issuing three original bills of lading has long been established and always followed, the full set of three is almost invariably circulated as a whole, particularly when being transferred as a result of the terms of a sale contract or letter of credit;[90] and when one original copy is presented to take delivery at the destination, the remaining two will be automatically invalidated. The practice of issuing multiple original B/Ls for the same assignment of goods does not actually disrupt the notion of singularity of a transferable document.

Where e-B/Ls are used and the rights are embodied in and conveyed by data messages instead of paper documents, it is even more necessary to ensure that the rights embodied in the e-B/L are exclusive to the holder of the e-B/L, and that it would not be possible for more than one person at any time to claim to be the holder and enjoy such rights.[91]

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[89] UNCITRAL Working Documents for Working Group IV (Electronic Commerce) on the 45th Session, *Legal Issues Relating to the Use of Electronic Transferable Records*, 8 September 2011, A/CN.9/WG.IV/WP.115, paras.12 and 17.

[90] Nicholas Gaskell, *Bills of Lading in an Electronic Age*, Lloyd's Maritime and Commercial Law Quarterly, 2010, p.236.

[91] The reference to "one person" does not include the situation where several persons collectively form the holder.

Like the uniqueness in paper B/Ls, the data message in the e-B/L should be unique, thus satisfying the "guarantee of singularity" requirement. This requirement is specified in the MLEC, where it requires that a right or an obligation is to be granted or imposed on one person rather than anyone else. This requirement is met when using data messages provided that a reliable method is used to render such data messages unique.[92]

It should be noted that the meaning of uniqueness of a data message may not be the same as that of a paper document. Uniqueness in the electronic environment is a relative one, since providing an absolute guarantee of non-replicability may not be technically feasible at present, and an electronic record can generally be copied in a way that creates a duplicate record identical to and indistinguishable from the original. Therefore, the wording "render data messages unique" is clarified in the Guide to MLEC as being the assurance that data messages purporting to convey any right or obligation of a person might not be used by, or on behalf of, that person inconsistently with any other data messages by which the right or obligation was conveyed by or on behalf of that person.[93] Whereas the MLETR does not directly require electronic records to be unique, but focuses on establishing the rules of being "functional equivalent" so as to address the requirement of uniqueness of the electronic records. Realizing that the purpose of the uniqueness of electronic transferable records is to prevent the possibility of the existence of multiple claims to perform the same obligation, the MLETR establishes the rules to attain this purpose by applying two specific requirements: (1) It requires a reliable identification of the electronic transferable record that entitles its holder to request performance of the obligation indicated therein, and (2) the holder of that electronic transferable record can be determined.[94]

[92] See Article 17(3) of the MLEC.

[93] See para.117 of the Guide to MLEC.

[94] See para. 83-84 of the Explanatory Note to the MLETR. The first requirement is specified by Article 10.1(b)(i) of the MLETR, which provides that "A reliable method is used to identify that electronic record

(3) Other Elements related to the Use of the e-B/L

a. Endorsement

It is well known that paper B/Ls are transferred by delivery or by delivery and endorsement; the indorsement is done by the transferor's signature either written on the back of the B/L or by an attached sticky note on the transferable document to show his intent to transfer the document to either a designated or temporarily unknown person. Applying the endorsement requirement to e-B/Ls, all information required, including the transferor's signature for the endorsement, shall be included in the e-B/L, and the requirements of "written" form and "signature" should thus be complied with.

b. Converting between a Paper B/L to an e-B/L

When an e-B/L is used, the issues regarding inter-converting between a paper B/L and an e-B/L may have to be considered. This is about the change of medium, not about the co-existence of two media for the same carriage.

Based on the function or purpose of the guarantee of singularity as analysed above, it is essential to ensure that not only each e-B/L or paper B/L shall be unique, but also that the two media cannot be used simultaneously for the same purpose. Therefore, this converting must avoid simultaneous embodiments of the same rights by both a data message (i.e. an e-B/L) and a paper document; in other words, the converting results in that the previously-used (replaced) B/L, either the paper one or the e-B/L, becomes invalid and will not be further circulated, thus preventing two claims from different media over the same right. Moreover, the concept of "converting" or "replacement" refers to switching between two media rather than re-issuing a new B/L. Therefore, the converting must be conducted in a manner that all information required for the B/L would not be lost and that the rights and obligations of any party would not be affected.

as the electronic transferable record." The second requirement is related to the notion of "control", as discussed above.

The MLEC, CMI Rules, MLETR and Rotterdam Rules include provisions dealing with the converting of either a paper B/L or an e-B/L. The first two handle the one-way converting from an electronic B/L to a paper one, and the latter two address bi-directional converting. According to the MLEC, in order to replace an e-B/L by a paper one, the intended paper B/L shall contain a statement of the termination of the use of the e-B/L, and the replacement shall not affect the rights or obligations of the parties involved.[95] The CMI Rules provide that the paper B/L shall include all information contained in the previously issued e-B/L (except for the Private Key), and a statement that the paper B/L has been issued upon termination of the procedures for the e-B/L. The method of termination of the e-B/L herein refers to the cancellation of the private key, which is the access to control the e-B/L according to the CMI Rules.[96] The MLETR provides four requirements for bi-directional conversion: (1) A reliable method for the change of medium; (2) a statement indicating the change of medium; (3) the cessation of any effect or validity of the replaced e-B/L or paper B/L upon issuance of the B/L in another medium; and (4) that the rights and obligations of the parties will not be affected.[97] Under the Rotterdam Rules, in addition to the requirements of a statement about both the replacement and of the invalidity of the replaced e-B/L or paper B/L, mutual agreement over the replacement by both the carrier and the holder is also required as a precondition. In addition, in the situation where a paper B/L is replaced with an e-B/L, all the issued paper B/Ls shall be surrendered to the carrier to ensure that they cannot be further circulated.[98]

It can be concluded that the procedures for such an exchange shall include a statement about the change of medium to ensure that the previously used paper B/L or e-B/L will

[95] See Article 17(5) of the MLEC.

[96] See Article 10 of the CMI Rules.

[97] See Articles 17 and 18 of the MLETR.

[98] See Article 10 of the Rotterdam Rules.

become invalid. Accordingly, either the paper B/L will be recalled or control of the e-B/L will no longer be obtained by anyone.

V. The Legal Status of the e-B/L

The idea of the e-B/L comes from the dematerialization of paper B/Ls. It is said that, currently, the e-B/L can be technically independent, and plays the role of a paper B/L. Nevertheless, up to this point in time the e-B/L has neither been widely used nor fully supported by law. It therefore still comes with questions as to what the legal status of an e-B/L is, and how it relates to a paper B/L.

(1) On a national level

The e-B/L is not recognized in sea carriage law in most jurisdictions. Since the most important attribute of negotiability of the B/L is conferred by statute law, an e-B/L may therefore fail to be recognized as the bill of lading, unless the sea carriage legislations covering negotiable B/Ls extend their scope of application to electronic documents or to the communication of a shipping document by electronic data; or the domestic e-commerce legislations applicable to cargo transportation and shipping documents provide for electronic records with the legal effect of negotiability.[99]

Under English law, although parties can agree through a contract to the use of an e-B/L to substitute for a paper B/L, and subject its use to the Carriage of Goods by Sea Act 1992 (COSGA), this kind of e-B/L is not recognized in common law, so they would only be considered as "electronic contracts for carriage" or "equivalents of paper B/Ls", as the case may be. The Law Commission of England and Wales once believed that, at least as far as those e-B/Ls operated under CMI Rules and several platforms like Bolero were concerned, they were not true equivalents to paper B/Ls, even though the three

[99] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, p.271-279.

functions of a paper B/L may be achieved electronically.[100] Those kinds of e-B/Ls or platforms involve the carrier or the registrar during transfers. They should be taken merely as the "electronic contracts for carriage", even though they may achieve the same results as paper B/Ls by means of a direct attornment by carrier or registrar, combined with a contract incorporating terms of the original contract for carriage.[101] According to the Commission, although the recent blockchain technologies can enable an e-B/L to satisfy the requirements of "a true electronic equivalent of a paper bill of lading",[102] such an e-B/L is still neither a "bill of lading" nor any other similar document of title according to the principles in existing maritime law.[103] The current mercantile custom and usage has only recognized a paper B/L as satisfying the narrow common law definition of a "document of title".[104] Additionally, although the COGSA provides the possibility of extending the application of this Act to electronic communication networks,[105] no such regulations have, however, been made to date.

The e-B/L is recognized in some national legislations. Australia is one of the few countries that have enacted its legislation to enable e-B/Ls to have the same legal effect as paper B/Ls. The Sea-Carriage Documents Act 1996 (Queensl.) extends the scope of sea-carriage documents to include those in the form of data messages as well as those

[100] Law Commission (England and Wales), *Electronic Commerce – Formal Requirements in Commercial Transactions*, December 2001, p.24, para.4.7.

[101] Law Commission (England and Wales), *Electronic Commerce – Formal Requirements in Commercial Transactions*, December 2001, p.24, para.4.7.

[102] The Law Commission believed that a true equivalent would not require the involvement of either carrier or registry. The blockchain e-B/L just does not need a third-party registry to intervene in each transfer.

[103] It mainly refers to the Carriage of Goods by Sea Act 1971 (GOGSA1971), which applies the Hague-Visby Rules to the contract for carriage, and the Carriage of Goods by Sea Act 1992 (GOGSA1992), which gives the holder of the bill of lading rights of suit under the contract for carriage.

[104] Law Commission (England and Wales), *Electronic Commerce – Formal Requirements in Commercial Transactions*, December 2001, p.24, para.4.9, note 7.

[105] See ss.1(5) and (6) of GOSGA 1992.

communicated by means of a data message;[106] the sea-carriage document herein includes the B/L. The Act also defines concepts such as "endorsement" and "delivery" broadly to accommodate themselves to all electronic means. In addition, the amendment of Australia's Carriage of Goods by Sea Act 1991 has also adopted the term "sea-carriage document", in which both paper and electronic form were included. Yet they do not specify the definition and composition of an e-B/L, neither do they address the procedures and methods for their creation, transmission and transfer, since these matters are left to be agreed by the parties.[107] Korea has also introduced in its Commercial Act an article enabling the use of e-B/Ls,[108] under which the legal equivalence between paper B/Ls and e-B/Ls is established. The e-B/Ls shall contain the same information as required for paper-based B/Ls, and can be transferred by indorsement. Therefore, e-B/Ls in Korea are given similar legal status to paper B/Ls, but they shall be managed in an officially certified electronic title registry.[109]

Accordingly, an e-B/L may be used as an option in practice if there is no express prohibition in the relevant laws. However, the legal status of an e-B/L may be questioned if there are no express laws in this regard. Nevertheless, it is also argued that the chance is always there that an e-B/L can be admitted to fall within the concept of "bill of lading", especially when there is a clear intention of the parties to treat the e-B/L as having the same legal effect as a paper B/L.[110]

(2) The Rotterdam Rules

[106] See Section 4 (1) and (2) of the Sea-Carriage Act 1996 (Queensl.).

[107] Emmanuel T. Laryea, *Paperless Shipping Documents: An Australia Perspective*, Tulane Maritime Law Journal, Vol.25, 2000, Part V. Section C.1.

[108] Article 862 of the revised Korean Commercial Act, enacted on 3 August 2007 (Law n. 9746).

[109] See UNCITRAL Working Documents for 42nd Commission Session, A/CN.9/692, *Present and Possible Future Work on Electronic Commerce*, 15 April 2010, para.27.

[110] Philip YANG, Bills of Lading and Other Shipping Documents, (2016, Dalian Maritime University Press), Chap.7, Sec.3.3.3. Also see Miriam Goldby, *Electronic Documents in Maritime Trade*, Oxford, 2013, Chap.6, para.6.16, p.127.

The Rotterdam rules contain some provisions devoted to regulating electronic transfer records containing rights to goods in the field of sea-carriage contracts. Unlike Australian or Korean national legislations, the Rotterdam Rules introduce the concept of "electronic transport records" independently from the "transport document", so that the concept of "transport documents" will not stray from its original meaning, that is, it still only implies paper documents.

According to the Rotterdam Rules, e-B/Ls are recognized as legally equivalent to traditional paper B/Ls, and have the same legal effect as paper B/Ls .[111] The rules also stipulate an either/or relationship between a paper B/L and an e-B/L under a single contract of carriage,[112] together with the procedures for replacement between the two in use.[113] Also, references to the term "(negotiable) transport document" in other provisions concerning shipping documents in the Rotterdam Rules are always followed by the term "(negotiable) electronic transport record". It seems that, under the Rules, the legal status of paper B/Ls and e-B/Ls are the same. It may thus be more appropriate to consider the e-B/L as a separate type of document under the term "shipping documents", one that is functionally equivalent to, but independent from, any paper B/L.[114]

VI. Conclusions

Electronic communication technologies provide an opportunity for the development of e-B/Ls to overcome the drawbacks and disadvantages existing in the use of paper B/Ls.

[111] David A. Bury, *Electronic Bills of Lading: A Never-ending Story*? Tulane Maritime Law Journal, vol.41, 2016, pp.226. Also see Article 8(2) of the Rotterdam Rules.

[112] See Article 35 of the Rotterdam Rules, which provides that, unless according to the parties' agreement, or by custom, usage or practice of the trade that neither transport documents nor electronic transport records will be used, one of the two must be issued, either negotiable or non-negotiable.

[113] See Article 10 of the Rotterdam Rules.

[114] Xiang Zaisheng, *A Study on the Legal Issues on Electronic Bills of Lading*, the Doctoral Dissertation of Wuhan University, 2005, p.88. Also see A. N. Yiannopoulos, *Ocean Bills of Lading: Traditional Forms, Substitutes, and EDI Systems*, Hague, Boston: Kluwer Law International, 1995, p.19-20.

The ability of e-B/Ls to electronically replicate the functions of paper B/Ls has been gradually improved, with the understanding of electronic documents/records communicated by means of data messages being continuously strengthened. Additionally, it is hoped that the e-B/L will work as a real electronic alternative to a paper B/L. In terms of the form, the e-B/L should contain data messages rather than being simply an electronic form copied from a paper B/L. In terms of functions and role, an e-B/L should be capable of being used independently and realizing all the functions of a paper B/L, instead of just playing a complementary or affiliated role in assisting the use of a paper B/L.

In most jurisdictions, as well as at an international level, there lacks a specific law or convention dedicated to regulating the operation of e-B/Ls. Given the dual nature of e-B/Ls as electronic alternatives to paper B/Ls and electronic transferable records, the legal provisions in the maritime law or the sea carriage contract law (i.e. the laws governing the carriage of goods by sea and shipping documents) and e-commerce law (i.e. general rules on paperless transactions) may be relevant. With regard to maritime law, on the one hand, among international rules, neither the Hague Rules nor the Hague-Visby Rules go beyond their applicability to traditional paper B/Ls; the Hamburg Rules contain the possibility of using e-B/Ls; whereas the Rotterdam Rules, if in force, are expected to provide for the use of e-B/Ls with legal certainty and as having equivalent effects to paper B/Ls, as well as providing requirements for their use. On the other hand,, only South Korean and Australian legislations currently recognize the same legal effect of e-B/Ls as paper B/Ls. In terms of e-commerce law, on the one hand the rules based on “functional equivalent” established by the UNCITRAL model laws on e-commerce and electronic signatures (i.e. the MLEC and MLES) have been widely incorporated within some national legislations; on the other hand, with the MLETR offering specimen text for use in electronic transferable records, it is anticipated that negotiability of the e-B/L will be established.

Since the e-B/L is intangible and complicated, and also lacks extensive practice and clear legal recognition, there are ambiguities and confusion over its conceptual aspects. As a result, when there is no express prohibition, the issuance of either a paper B/L or an e-B/L may both be options for the parties to choose from in practice. However, the lack of dedicated and sufficient legal support from both national and international levels of law may confuse the conceptual understanding of electronic alternatives to the paper B/L, thus hindering further use and development of the e-B/L.