EVALUATION OF EFFORTS OF PRIVATE AND INTERNATIONAL ORGANIZATIONS AT RESOLVING LEGAL CHALLENGES OF ELECTRONIC BILLS OF LADING WORLDWIDE*

Abstract
This paper is an evaluation of efforts of private and international organizations at resolving the legal issues which have inhibited the implementation of electronic bills of lading (e-Bs/L) in international trade. Since the introduction of paper bills of lading (Bs/L) in the 13th century, it has served as a crucial document in international trade. However, this very important document subsequently developed some flaws, ranging from late arrival of the document at the destination port to fraud and excessive costs owing to the volume of paper work involved. Stakeholders' efforts at seeking solution to these problems led to the introduction of e-Bs/L in international trade 40 years ago. Notwithstanding, its implementation has been very slow. The objectives of this paper are to: evaluate the efforts made thus far by private and international organizations towards resolving the legal issues which have inhibited the implementation of e-Bs/L in international trade; and suggest the way forward. This paper adopted the doctrinal research methodology, employed the functional equivalence approach and found that private and international organizations have made tremendous efforts at resolving the legal issues inhibiting the implementation of e-Bs/L in international trade. Accordingly, the paper concluded that these challenges can be resolved by the adoption of the relevant and specific solutions respectively proffered by the Comite Maritime International Rules (CMI Rules) and the United Nations Commission on International Trade Laws' (UNCITRAL) Model Laws and strongly recommended the incorporation of same into national legal frameworks for the recognition of e-Bs/L worldwide.

Keywords: Evaluation of Efforts; Private and International Organizations, Electronic Bills of Lading, Legal Challenges

1. Introduction

International trade involves many parties, including carriers, distributors, cargo interests, banks, insurers, government agencies, terminals, immigration and customs authorities.[1] Traditionally, many paper bills of lading (Bs/L) needed to be generated, copied and sent all over the world. These traditional paper transport documents have served the shipping industry for centuries. However, the paper Bs/L eventually developed some serious short-comings,[2] ranging from late arrival of the transport document[3] at the destination port to fraud[4] and excessive costs owing to the volumes of paper work involved.[5] This prompted stakeholders to start seeking alternative means of documentation with a view to saving cost, time and eliminating fraud. These efforts led to the introduction of electronic bills of lading (e-Bs/L) in international trade about 40 years ago.[6] Notwithstanding, its implementation has been very slow. In the light of all the above, this study seeks to critically examine efforts made thus far by private and international organizations at resolving these major legal issues inhibiting the replacement of paper Bs/L with e-Bs/L worldwide. The paper adopted the doctrinal research methodology and employed the 'functional equivalence' approach in order to ensure that e-Bs/L are able to perform all the functions of paper Bs/L and meet the same requirements towards the satisfaction of all the interests of stakeholders in international trade.

2. Conceptual Framework

Paper Bill of Lading (B/L): The phrase 'bill of lading' (B/L) was derived from a Latin verb '*lade*', which means to load the cargo onto a ship or other form of transport for transportation from a loading point to be delivered to the named consignee or his agent at the destination point.[7] The B/L is a document which acknowledges the receipt of cargo for shipment, evidences a contract of carriage by sea and serves as a document of title, which guarantees that the importing

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[1] Doan MA Thi, 'Switching Paper to Electronic Bills of Lading: Legal Perspectives and Reform Options for Vietnam' *World Maritime University Dissertations* (2018) 664 <https://commons.wmu.se/alldissertations/664> accessed 7 December 2025
[2] Matovu Ebbychris, 'Recognition of Electronic Bills of Lading in Commercial Transactions: A Critical Study of the Legal Framework in Tanzania' (2013) 24 <https://pdfs.semantic scholar.org> accessed 7 December 2025
[3] Kozolchyk Boris, 'Evolution and the Present State of the Ocean Bill of Lading from a Banking Law Perspective' *Journal of Maritime Law and Commerce* (1992) 23 (2) 212 <https://heinonline.org> accessed 7 December 2025
[4] UNCTAD, *The Use of Transport Documents in International Trade*. (UNCTAD/SDTE/TLB/2003/3) 82-86 <https://www.unctad.org> accessed 7 December 2025
[5] See K Boris, (n 3) 212.
[6] Brunner Raphael, 'Electronic Transport Documents and Shipping Practice Not Yet a Married Couple' (2007) 4 <https://www.academia.edu> accessed 7 December 2025
[7] See M Ebbychris, (n 2) 22.

party receives the cargo.[8] It is also critical in foreign trade financing in order for the exporting party to receive payment for the goods.

Electronic Bill of Lading*:* Electronic bill of lading (e-B/L) has been defined as a creation of new species of traditional Bs/L in electronic form whereby data is inserted in a computer and transmitted electronically using electronic messages.[9] This document replicates all functional features of a paper B/L, namely: receipt of goods shipped; evidence of contract of carriage of goods by sea; and *prima facie* document of title.[10] Electronic bill of lading also contains necessary information of the cargo to be shipped by the carrier, like the name of the shipper, the description of the goods, the date and place of the receipt of the goods, a reference to the carrier's terms and conditions of carriage as well as private keys to be used in subsequent transmissions.[11] The Comite Maritime Rules (CMI Rules) for e-B/L are similar to the procedures for issuing paper B/L.[12]

The Functional Equivalence Approach

This study is hinged on the Functional Equivalence approach. This approach, which was adopted by the United Nations Commission on International Trade Laws (UNCITRAL)[13] in mid-1996, aims to create a more secure legal environment for what has come to be known as 'electronic commerce' by drafting Model Laws on Electronic Commerce (MLEC);[14] and Electronic Signature (MLES);[15] and Electronic Transferable Records (MLETR).[16] According to UNCITRAL, the 'functional equivalence' approach is based on an analysis of the essential purposes and functions of paper B/L requirements with a view to determining how those purposes and functions could be fulfilled through electronic commerce techniques.[17] However, the approach involves the determination of the criteria which the equivalent electronic communication must meet in order to be given the same legal recognition that the corresponding paper-based document enjoys, where both the paper-based document and the electronic communication are performing the same function.[18] Essentially, this approach intends to remove certain legal impediments which are inhibiting the recognition of electronic documents in many jurisdictions.[19] Under this approach, the UNCITRAL Model Laws extend the scope of the notions of the requirements of 'signature', 'originality' and 'writing' in order to create an environment under which electronic documents would be treated the same as the traditional paper-based documents,[20] for example, admissibility in evidence and recognition of electronic signature.[21]

Ngcobo[22] carried out a comparative study of the paper and e-B/L under the South African law. The purpose of the study was to compare the extent to which an e-B/L might be recognized as legally valid under South African law. The objectives of the study were to: consider the functions of the paper and e-B/L; discuss the private registries which have been approved by international group of P & I clubs governing e-B/L; and examine whether an e-B/L is sufficiently competent to replicate the major functions of a paper B/L, with specific reference to the document of title function. The study adopted the doctrinal research methodology and found that: clearly, there are barriers in the use of e-B/L, particularly in terms of replicating the document of title function of a paper B/L.

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[8] ibid.

[9] Yiannapoulos N Athanassios, *Ocean Bills of Lading: Traditional Forms, Substitutes and EDI Systems* (Netherland: Kluwer Law International 1995) 32.

[10] Ngcobo S Princess, 'A Comparative Study of the Paper and Electronic Bill of Lading Under South African Law' (*University of KwaZulu-Natal* 2017) 5 <https://researchspace.ukzn.ac.za> accessed 3 December 2025

[11] Comite Maritime International Rules for Electronic Bills of Lading, 1990 (CMI Rules) Rule 4 <https://comitemaritime.org> accessed 3 December 2025

[12] ibid, Rule 4(c).

[13] The United Nations Commission on International Trade Laws (UNCITRAL) <https://www.uncitral.un.org> accessed 4 December 2025

[14] MLEC, 1996 <https://www.uncitral.org> accessed 4 December 2025

[15] UNCITRAL launched the Model Law on Electronic Signature (MLES) MLES, 2001 <https://www.uncitral.org> accessed 8 December 2025

[16] UNCITRAL launched the Model Law on Electronic Transferable Records (MLETR), 2017 <https://www.uncitral.org> accessed 8 December 2025

[17] Pistorius Tana, 'Developing Countries and Copyright in the Information Age: The Functional Equivalent Implementation of the WCT Potchefstroom' *Electronic Law Journal* (2006) 11 <https://www.researchgate.net> accessed 8 December 2025

[18] ibid.

[19] See NS Princess, (n 10) 8.

[20] See MLEC, (n 14).

[21] Dubovec Marek, 'Problems and Possibilities for Using Electronic Bills of Lading as Collateral' *Arizona Journal of International Law & Comparative Law* (2006) 23 (2) 437-466 <https://papers.ssrn.com> accessed 8 December 2025

[22] See NS Princess, (n 10) 1-77.

Cui and Zhang[23] examined the use of e-B/L as a solution for delivering cargo without presentation of the original B/L. The objective of the study was to analyze the current legal regimes concerning the use of e-B/L and to hypothetically explore the possibility of delivering goods with a paperless B/L. The study employed the doctrinal research method and found that: legal issues affecting the e-B/L included the need for legislative authorization attributing to electronic communication the function of traditional writing and signature requirements, determining the probative effect of electronically generated prints and establishing the negotiability of e-Bs/L. The study concluded that the existence of clear international legal frameworks in many jurisdictions indicate that the stakeholders are moving towards legal solutions to e-B/L.

Abdul and Khin[24] investigated the legal implications of e-Bs/L as well as the imminence of the demise of paper documents. The objectives of the study were to examine: the 'functional equivalence approach' formulated in the UNCITRAL Model Law on Electronic Commerce, 1996; other attempts to facilitate the use of e-Bs/L, such as the CMI Rules and the BOLERO Project; and comment on whether the demise of the traditional paper Bs/L is imminent. The study adopted the doctrinal research methodology and found that: the UNCITRAL Working Group on Electronic Commerce has not yet finished its study on the issue of negotiability, which appears to be the most challenging aspect of implementing Electronic Data Interchange (EDI)[25] in international trade; the CMI Rules provide solution to the legal requirements of writing and signature so long as all the parties utilizing its procedures agree that any national or local law, custom or practice requiring the contract of carriage to be evidenced in writing and signed, are satisfied by the CMI Rules procedures.

3. Legal Challenges in Replacing Paper Bills of Lading with Electronic Bills of lading in International Trade

Generally, suggestions from various scholars regarding the legal challenges inhibiting the replacement of paper Bs/L with e-Bs/L in international trade can be summarized as follows:

(i) Whereas information and communication technologies are advancing astronomically, the longstanding contractual rules of engagement in business relations are not being modified fast enough to accommodate new technological realities;[26]

(ii) Many jurisdictions in the world are yet to legally recognize e-Bs/L as equivalent to paper Bs/L;

(iii) Since paper Bs/L operate from the realm of contract law and property law, the challenge is to replicate the physically written paper B/L which performs various functions, namely: receipt of goods on board; evidence of carriage of goods; and document of title,[27] in an electronic environment.[28] Unfortunately, such requirements like "writing" and "signatures" are yet to be adequately provided for electronically to the satisfaction of all the interests of stakeholders in international trade worldwide;

(vi) It has been observed that e-B/L can only be successful if it can fulfil the same functions as the traditional paper B/L to the satisfaction of all the interests involved in international trade,[29] by adopting the principle of functional equivalence in equalizing e-Bs/L with paper Bs/L; and

(v) Whereas e-Bs/L can easily replicate the first two functions of paper Bs/L, it has been difficult to replicate the document of title function electronically.[30]

4. Efforts Of Some Private and International Organizations at Resolving Legal Challenges Inhibiting Implementation of Electronic Bills of Lading in International Trade

Electronic Data Interchange

The introduction of Electronic Data Interchange (EDI)[31] in international trade facilitated the e-B/L in shipping practices.[32] The main objective of the EDI is to create a platform of transmission which connects multiple users, including shippers, carriers, forwarders and banks, in a safe network as well as the accomplishment of a fully integrated electronic process

[23] Cui Zhipeng and Zhang Pengfei, 'Using Electronic Bill of Lading as a Solution for Delivering Cargo Without Presentation of the Original Bill of Lading' *International Journal of Research in Humanities and Social Studies* (2022) 9 (1) 36-41 <https://www.ijrhss.org> accessed 8 December 2025

[24] Ghafur H Abdul and Sein M Khin, 'The legal Implications of Electronic Bills of Lading: How Imminent is the Demise of Paper Documents?' *The Journal of the Malaysian Bar* (2004) (33) 3, 1-17 <https://www.malaysianbar.org.my> accessed 8 December 2025

[25] Electronic Data Interchange (EDI) is the electronic transfer from computer to computer of information using an agreed standard to structure the information. UNCITRAL Model law on Electronic Commerce Article 2(b) United Nations, New York, 2002 <www.uncitral org> accessed 3 December 2025

[26] Marshall P Kimball, 'Has Technology Introduced New Ethical Problems?' *Journal of Business Ethics* (1999) 19, 81-82 <https://link.springer.com> accessed 8 December 2025

[27] WHV Boom, 'Certain Legal Aspects of Electronic Bills of Lading' *European Transport Law* (1997) 32 (1) 9-13 <https//9jalegal.com> accessed 8 December 2025

[28] See M Ebbychris, (n 2) 32.

[29] See D Marek, (n 20) 448.

[30] ibid, 448-9.

[31] See Electronic Data Interchange (EDI), (n 25).

[32] See M Ebbychris, (n 2) 1.

that will promote paperless international trade.[33] The aim is to automatically perform the functions of business with minimum human interventions.[34] For EDI to perform, a combination of management resources and technology is necessary to build up a system by which data can be transmitted accurately and correctly between computers.[35] This will include using similar software to transmit data between the parties in a mutually acceptable format. It also requires that the computer systems of both parties use the same standard so that the transmitted message is received without corruption and in the same unaltered condition.[36] The difference between EDI and electronic commerce is that electronic commerce encompasses all aspects of electronic business exchange while EDI entails the exchange of business information in a standardized electronic form[37] which defines things like the layout of information on invoice or purchase order.[38] The EDI can be used effectively as a method by which data can be transferred but in order for it to operate effectively in international trade, it must be regulated by effective local and international legal frameworks.[39] This is because electronic transfers through the EDI has encountered legal challenges and uncertainties,[40] such as requirements for writing, signatures and authenticity.[41]

The SeaDocs System 1986

In early 1980s, SeaDocs Registry Limited (SeaDocs), a London-based Delaware Corporation, was formed on the initiative of Per Gram, the then Chairperson of the International Association of Tanker Owners (INTERTANKO).[42] This project was taken over by Chase Manhattan Bank but lasted for less than one year.[43] The SeaDocs preceded all e-B/Ls and was the first system to administer e-B/L using a central registry where original paper Bs/L were deposited.[44] Unlike other projects of e-B/L, the main future of SeaDocs system was the establishment of a central registry of shipping documents (SeaDocs Registry Limited) which used the Chase Manhattan Bank as a central registry.[45] The objective of the project was to protect the parties involved from fraudulent alterations of tanker Bs/L in the oil transport industry in the 1970s and 1980s.[46] The apparently well designed SeaDocs system was thought to be the solution to the problems of paper B/L. It was believed that e-B/L was the practical solution to the paper-based B/L and that SeaDocs was the answer.[47] While no operational challenges were reported during about one year of SeaDocs experiment and in spite of its moderate registration fee which ranged between US$300 and US$500, SeaDocs failed to attract sufficient number of traders and financial institutions to survive. Several other efforts were made by many private and international organizations like the International Commercial Terms (INCOTERMS);[48] the Bolero Bill of Lading (the Bolero Project);[49] the Electronic Title (the E-Title); and the Rotterdam Rules,[50] with various degrees of successes and failures. Though these cannot all be discussed here for want of space, just two which this paper considered as most successful shall be discussed below in some details.

The Comite Maritime International Rules

The Rules for Electronic Bill of Lading adopted in Paris in 1990 by the Comite Maritime International (The CMI Rules)[51] is the most sophisticated attempt to date to regulate an 'Open Ended' computerized method of issuance and negotiability

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[33] See DMA Thi, (n 1) 664.
[34] Indira Carr, '*International Trade Law*' (2010) (4th edn, Routledge-Cavendish 2010) 115. <https://www.library.wbi.ac.id> accessed 9 December 2025
[35] See DMA Thi, (n 1) 664.
[36] ibid.
[37] See NS Princess, (n 10) 34-36.
[38] ibid.
[39] See DMA Thi, (n 1) 664.
[40] H Ankia, 'Electronic Bill of Lading' (Mini-Dissertation Submitted in Partial Fulfilment of the Requirements of the Degree of Magister Legum in Import and Export Law at the North-West University, Potchefstroom Campus, 2006) 2 <dspace.nwu.ac.za/bitstream/handle/10394/1388/holtzhausen_ankia.pdf; sequence=1> accessed 9 December 2025
[41] ibid.
[42] Hare John, '*Shipping Law and Admiralty Jurisdiction in South Africa (Online)*' (2nd edn, Juta & Co 2009) 540 <https://juta.co.za> accessed 9 December 2025
[43] United Nations Convention on Carriage of Goods by Sea, 1978 (Hamburg Rules) <https://www.uncitral.org> accessed 9 December 2025
[44] Peel Samantha, 'The Development of the Bill of Lading: Its Future in the Maritime Industry' (Unpublished Thesis for the Degree of Doctor of Philosophy (Ph.D) *University of Plymouth, Institute of Marine Studies, Faculty of Social Science* (2002) 430-431 <https://www.pearl.plymouth.ac.uk> accessed 7 December 2025
[45] Chase Manhattan Bank's Seaborne Trade Documentation System (SeaDocs) <https://www.ijrhs.org> accessed 7 December 2025
[46] See H John, (n 42) 540.
[47] ibid.
[48] International Commercial Terms (INCOTERMS) <https://resolutions.unep.org> accessed 23 December 2025
[49] The BOLERO Project <https://www.sciencedirect.com> accessed 4 December 2025
[50] The United Nations Convention on the Contracts for the International Carriage of Goods Wholly or Partly by Sea, 2008 (The Rotterdam Rules) <https://unctad.org> accessed 4 December 2025
[51] See CMI Rules, (n 11) Rule 4.

of Bs/L.[52] Though carriers, shippers or purchasers do not need to be members of a club and pay registration fees, they need the technology to transmit messages to each other.[53] The CMI Rules for e-B/L were put in place in an attempt to address the problems encountered by the SeaDocs system.[54] However, because of their contractual flavour, unless the participating parties specify the application of the CMI Rules in their 'master' or individual agreements, they will have no effect. The contractual approach is consistent with the most general method of doing business with EDI.

The CMI Rules do not make use of a central registry like the SeaDocs and Bolero, rather, this function is fulfilled by the carrier.[55] In other words, the procedures which are set out in the CMI Rules are very similar to the procedures of issuance of traditional paper-based B/L. This suggests that the CMI Rules maintains the traditional procedures of paper B/L.[56] As far as the objectives of the CMI Rules are concerned, attempts have been made by the CMI Rules, through the adoption of the functional equivalence approach, to ensure that the functional features of the traditional paper-based B/L have been electronically replicated.[57]

The United Nations Commission on Trade Model Laws

Relying on the 'functional equivalence' approach, the United Nations Commission on International Trade Laws (UNCITRAL)[58] was established to harmonize and promote international trade. The United Nations (UN) established the Model Law on Electronic Commerce (MLEC) in 1996 to enhance the use of paperless communication.[59] Further, in 2001 UNCITRAL launched the Model Law on Electronic Signature (MLES)[60] in order to increase the use of electronic authentication techniques as a substitute for manual signature and other traditional authentication procedures as required by the laws of many jurisdictions. The Model Laws would also provide a useful framework for adoption by countries seeking to draft their own legislations.[61] The Model Law is essential in improving the efficiency of international trade and it also facilitates the use of EDI and related means of communication as well as providing equal treatment to users of both paper-based documentation and users of computer-based information.[62]

The UNCITRAL Model Law on Electronic Commerce (MLEC) 1996: The MLEC addresses the legal issues related to electronic commerce in general.[63] The Model Law has a total number of 17 Articles, the first part of which deals with electronic commerce in general while the second part was dedicated specifically to the issues of carriage of goods by sea, particularly in respect of contract of carriage of goods and transport documents.[64] Article 1 of MLEC provides for the scope and application of the law and reads 'this law applies to any kind of information in the form of data message used in the context of commercial activities.' Since e-B/L is a data message, the Model law is applicable to it where the parties agree.[65] The Model law also makes provision for the recognition of data message as equivalent to paper document. It provides that data message should not be denied validity by the parties on the ground that it is a data message.[66] Accordingly, this provision removes the legal requirement that commercial documents should be paper-based documents.[67] Further, the Model law provides for the removal of the requirements for 'writing'. The Article reads 'where the law requires information to be in writing, that requirement is met by a data message if the information contained therein is accessible so as to be usable for subsequent reference …'[68] This provision is also relevant in the recognition of e-B/L as a data message.[69]

The UNCITRAL project also considered the fact that the laws of most jurisdictions do not admit electronic evidence and provides that 'in any legal proceedings, nothing in the application of the rules of evidence shall apply so as to deny the admissibility of a data message in evidence … on the sole ground that it is a data message'.[70] Thus, this provision has

[52] Bal A Basu, 'Electronic Transport Records: An Opportunity for the Maritime and the Logistics Industries' *Journal of Transportation Law, Logistics and Policy* (2014) 81 (1) 17 <https://www.trid.trb.org> accessed 9 December 2025
[53] ibid.
[54] ibid.
[55] See M Ebbychris, (n 2) 47.
[56] ibid.
[57] ibid.
[58] See UNCTRAL, (n 13) 82-86.
[59] See I Carr, (n 33) 115.
[60] See MLES, 2001, (n 15).
[61] See MLEC, (n 14); MLES, (n 15); and MLETR, (n 16).
[62] Livermore John and Euarjai Krailerk, 'Electronic Bills of Lading and Functional Equivalence' *The Journal of Information, Law and Technology (JILT)* (1998) 2, 1-10 <https://digitalcommons.schulichlaw.dal.ca> accessed 9 December 2025
[63] See M Ebbychris, (n 2) 58.
[64] See MLEC, (n 14) Arts 16 & 17.
[65] See M Ebbychris, (n 2) 58.
[66] See M Ebbychris, (n 2) 58.
[67] See MLEC, (n 14) Art 5.
[68] ibid, Art 6.
[69] See M Ebbychris, (n 2) 59.
[70] See MLEC, (n 14) Art 9.

been structured to make e-documents admissible.[71] It is interesting to note that the UNCITRAL Model law deals elaborately with the carriage of goods by sea aspect of electronic commerce.[72] It dedicated two important Articles to it, namely, Articles 16 and 17. Article 16 deals with actions related to the carriage of goods and defined the scope of its application by providing a non-exclusive list of actions in connection with the contract of carriage of goods.[73] All tripartite functions of the traditional paper-based B/L can be found in the said list but even if the list is found to be insufficient to cover any contract of carriage of goods, it can still be relied upon considering the fact that the list is not exclusive.[74]

Furthermore, the last Article of the Model law effectively deals with transport documents.[75] In this Article,[76] the Model law anchors basic legal requirements for transferability of rights in the e-commerce environment that enable merchants to use data messages instead of paper documents, whether there is a legal requirement for paper documents or there are legal consequences set out for not having paper documents.[77] It is specified that in cases where there is a need to transfer a paper document in order to convey rights or obligations, the requirement is met if the right or obligation is conveyed by using data messages.[78] However, the Model law establishes uniqueness and reliability of the method used as requirements to transfer rights and obligations by means of data messages.[79]

The UNCITRAL Model Law on Electronic Signatures (MLES), 2001: The UNCITRAL Model Law on Electronic Signatures (MLES), 2001 applies when it is used within the context of commercial activities.[80] Article 6 of the MLES contains provisions similar to those under Article 7 of MLEC. Under it, the requirement of a person's signature for whatever purpose or law is met in relation to a data message, if an electronic signature is used that is as reliable as was appropriate for that purpose for which the data message was generated or communicated, in the light of all the circumstances, including any relevant agreement.[81] An electronic signature will be considered reliable if the data that created it are, within the context in which they are used, solely linked with the signatory; or the signature creating data were, at the time of signing, under the sole control of the signatory; and any alteration to the electronic signature made after the time of signing is detectable; and where a purpose of the legal requirement for a signature is to provide assurance as to the integrity of the information to which it relates, any alteration made to that information after the time of signing is detectable.[82] The reliability of the electronic signature is also permitted to be proved or challenged by other ways than those established under the MLES.[83] Articles 8 to 12 of the MLES cover rules on specific types of signature, particularly those that involve the use of a public key infrastructure (PKI) and certification of the link between the signatory and signature creation data.[84] Articles 8, 9 and 11 of MLES, respectively, govern the responsibilities and liabilities of the signatory; the certification service provider; and the reliant party in regard to the electronic signatures.[85] While Article 7 lists some of the relevant factors to be considered in assessing the trustworthiness of the systems, procedures and human resources employed in the certification services, Article 12 lays down rules of recognition of foreign certificates and electronic signatures.[86]

The UNCITRAL Model Law on Electronic Transferable Records 2017

Finally, UNCITRAL concluded work on its Model Laws with the Model Law on Electronic Transferable Records (MLETR) in 2017.[87] This was prompted by the need for further clarification of the term 'electronic transferable records' as used in the Rotterdam Rules.[88] Similar to the previous work by UNCITRAL, the MLETR also promotes the principles of technology neutrality and functional equivalence.[89] Thus, it sets out the conditions which electronic records must satisfy to fulfill the purposes and functions of the requirements relevant to transferable documents. The Model Law seeks

[71] See M Ebbychris, (n 2) 59.
[72] See MLEC, (n 14) Art 16.
[73] ibid.
[74] ibid.
[75] ibid, Art 17.
[76] ibid.
[77] See M Ebbychris, (n 2) 60.
[78] ibid.
[79] See MLEC, (n 14) Art 17 (3).
[80] Wilson F John, 'Carriage of Goods by Sea' (6th edn, Pearson Education Ltd. 2008).
[81] Ugwuokpe S Kenneth, 'The Bill of Lading in an Era of Electronic Commerce: Legal Developments and the Reform Options for Nigeria' *Dalhousie University, Halifax, Sotia* (2016) 73 <https://pdfs.semanticscholar.org> accessed 7 December 2025
[82] See MLES, (n 15) Art 6 (3).
[83] ibid, Art 6 (4).
[84] ibid, Art 3.
[85] See MLES, (n 15) Arts 8, 9 & 11, respectively.
[86] See US Kenneth, (n 81) 75.
[87] See MLETR, (n 16).
[88] The Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea, 2008 (The Rotterdam Rules) <https://unctad.org> accessed 9 December 2025
[89] See MLETR, (n 16).

to ensure uniqueness[90] by requiring that a 'reliable method' is used to identify an electronic transferable record and establish 'exclusive control' of an electronic transferable record as functionally equivalent to possession of a transport document.[91] The Model Law defines 'electronic record' in line with the definition of 'data message' in the MLES[92] but clarifies that electronic records do not need to include a set of composite information as the composite nature of an electronic transferable record is mainly relevant for the notion of 'integrity'.[93] The MLETR aligns with the signature requirement as set out in the MLES, which can be fulfilled if a reliable method is used to identify the signatory.[94] Like the CMI Rules,[95] the Model Laws are not legal systems by themselves but proposed sets of regulations providing for electronic documents like e-B/L.[96] Thus, the Model Laws do not specifically provide laws for the use of e-B/L but present sets of regulations, which can include e-Bs/L, for States to adopt. Though the Model Law fails to provide the transferring process of a data message, it remains the cornerstone of the legal framework for EDI.[97]

Findings

Enormous efforts have been made thus far by private and international organizations at resolving the major legal challenges inhibiting the replacement of paper Bs/L with e-Bs/L. These organizations include The SeaDocs;[98] The CMI Rules;[99] and UNCITRAL Model Laws,[100] which have elaborately provided for Electronic Commerce (MLEC)[101]; Electronic Signatures (MLES)[102]; and Electronic Transferable Records (MLETR).[103]

5. Conclusion and Recommendations

This paper concludes that tremendous efforts have been made thus far by private and international organizations, particularly those of the CMI Rules[104] and the UNCITRAL Model laws on Electronic Commerce (MLEC);[105] Electronic Signatures (MLES); and Electronic Transferable Records (MLETR)[106] at resolving the major legal challenges inhibiting the replacement of paper Bs/L with e-Bs/L in international trade. Though the CMI Rules[107] and the UNCITRAL Model Laws on MLEC,[108] MLES[109] and MLETR[110] are not laws by themselves, they have proposed sets of regulations providing for electronic documents like e-Bs/L,[111] for States to adopt. The envisaged legal framework for the replacement of paper-based Bs/L with e-Bs/L must, of necessity, latch onto the tremendous efforts made thus far by private and international organizations, especially those of the CMI Rules[112] and the UNCITRAL Model Laws on Electronic Commerce (MLEC),[113] Electronic Signatures (MLES)[114] and Electronic Transferable Records (MLETR)[115] towards resolving the various legal challenges which have inhibited the replacement of the traditional paper-based Bs/L with the trending e-Bs/L in international trade.

[90] ibid, Art 10 (1) (b) (i) and (ii); and Art 11 para 1 (a).
[91] ibid, Art 8 (b).
[92] See MLEC, (n 14) Art 8 para 3.
[93] See MLETR, (n 16) Art 8 para 2.
[94] ibid, Art 9.
[95] See CMI Rules, (n 11) Rule 1.
[96] See MLEC, (n 14) Part 2.
[97] See M Ebbychris, (n 2) 60.
[98] See SeaDocs, (n 44).
[99] See CMI Rules, (n 11).
[100] See UNCITRAL, (n 13).
[101] See MLEC, (n 14).
[102] See MLES, (n 15).
[103] See MLETR, (n 16).
[104] See CMI Rules, (n 11).
[105] See MLEC, (n 14).
[106] See MLES, (n 15).
[107] See MLETR, (n 16).
[108] See CMI Rules, (n 11).
[109] See MLEC, (n 14).
[110] See MLETR, (n 16).
[111] See MLEC, (n 14) Part 2.
[112] See MLEC, (n 14) Part 2.
[113] See MLEC, (n 14).
[114] See MLES, (n 15).
[115] ibid.