

The legal framework for the bill of lading in Algerian maritime legislation and international conventions

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Received: 12.02.2025 ; Accepted: 15.04.2025 ; Published: 01.06.2025

ABSTRACT

Electronic maritime documents provide significant benefits and efficiency in executing the contract of carriage of goods by sea, serving as the best alternative to paper bills of lading, which have proven ineffective due to inherent defects such as fraud and inaccurate data.

Technological advancements have necessitated the adoption of the electronic bill of lading as a document of title for goods, allowing for its transferability and use as evidence of the contract of carriage of goods by sea, as well as its execution. This is achieved through the recognition of the principle of functional equivalence between paper bills of lading and electronic bills of lading in terms of validity and evidentiary value.

Keywords: Contract of carriage of goods by sea, electronic bill of lading, shipper, consignee.

INTRODUCTION

E-commerce has become the core and backbone of international trade, relying on the global

internet network. It has introduced a new and innovative type of document in commercial exchanges between sellers and buyers worldwide, who have found in e-commerce an easy and cost-effective means of expansion and global shopping, in contrast to traditional paper-based documents.

The electronic bill of lading stands as the best alternative to these paper documents, benefiting from the remarkable advancements in information and communication technology. It serves as the most efficient mechanism for managing trade transactions. Therefore, international legislators have previously sought a means to mitigate the drawbacks of traditional bills of lading. This became possible thanks to the information technology revolution, which highlighted the necessity of using computers compatible with modern communication systems and their complexities¹, thus

¹Halima Hawalef, The Role of the Electronic Bill of Lading in the Execution of the Maritime Sales Contract,

Algerian Journal of Maritime Law and Transport, Issue 5, 2017, p. 53.

accelerating information exchange while ensuring security and data confidentiality. Additionally, the automatic translation of shipping data into multiple languages facilitates communication among parties.

However, the adoption of the electronic bill of lading was not a coincidence but rather the result of numerous studies at both the jurisprudential level and within regional and international organizations and committees. These efforts led to a consensus on the necessity of integrating information processing and the electronic exchange of bill of lading data as the optimal solution to overcome the shortcomings of traditional bills of lading.

The significance of this topic lies in the lack of clear legal provisions regulating electronic bills of lading in some countries, including Algeria, as well as the major challenges posed by their use as evidence and as an effective mechanism for resolving maritime disputes.

This raises a fundamental question: To what extent are the current legal provisions governing e-commerce and maritime legislation sufficient to regulate the specific characteristics of electronic maritime bills of lading, particularly

concerning their legality, evidentiary value, and endorsement?

The answer to this question will be explored through the following framework, adopting a descriptive and analytical approach.

FIRST TOPIC: THE CONCEPTUAL FRAMEWORK OF THE ELECTRONIC BILL OF LADING

The Algerian legislative texts lack any definition of the maritime bill of lading, and its presence would have assisted in defining the electronic maritime bill of lading. A reading of Articles 748 and 749 of the Maritime Code² makes it clear that they do not provide a legislative definition of the maritime bill of lading, as some might assume³. Instead, these articles merely address the carrier's obligation or that of their representative to provide the shipper with a shipping document that includes details regarding the identity of the parties, the goods to be transported, and the freight charges.

This necessitates an examination of the doctrinal definitions and international regulations that have been established concerning this emerging legal instrument.

²Ordinance No. 76-80, dated October 23, 1976, concerning the Algerian Maritime Law, as amended and supplemented, Official Gazette No. 29, 1977. Articles 748 and 749 appear in Chapter II titled "The Bill of Lading", under Part III, titled "Carriage of Goods", within Book III, titled "Commercial Exploitation of the Ship".

³Unlike the Saudi legislator, who defined the electronic bill of lading in Article 1 of the Maritime Commercial Law, issued by Royal Decree No. 11 on 16/03/2012, and the Egyptian legislator, who addressed it in Article 58 of Commercial Law No. 17/1999, issued on 17/05/1999.

First Requirement: Definition of the Electronic Bill of Lading in Jurisprudence

Some jurists have attempted to define the electronic bill of lading by applying the definition of the paper bill of lading to the electronic maritime bill of lading. Therefore, it is necessary to first present the doctrinal definition of the paper bill of lading before addressing the electronic bill of lading.

Jurisprudence defines the paper bill of lading as: **"A document issued by the carrier to the shipper, whereby the former acknowledges receipt of the latter's goods for transportation to a specified port"**⁴. Another definition describes it as **"The receipt signed by the carrier or their representative (the ship's captain) upon receiving the goods on board the ship. It serves as evidence of both the shipment and the maritime transport contract itself"**⁵.

Regarding the electronic bill of lading, it has been defined as **"One or more data messages created or issued by the carrier through electronic means to the shipper, proving the transport contract, the**

carrier's receipt of the goods, and their shipment"⁶.

Another definition states that it is **"A complex system based on electronic registration, through which the sequential orders of concerned parties and the visible information are recorded"**⁷.

A different doctrinal perspective defines the electronic bill of lading as **"A system through which bill of lading data is exchanged via computers connected through remote communication networks, using a mutually agreed-upon model for data transmission or transfer. As a result, this document lacks any physical embodiment compared to the traditional bill of lading"**⁸.

Second Requirement: Definition of the Electronic Bill of Lading in International Conventions

The **UNCITRAL Model Law on Electronic Commerce**, adopted in its **29th session on December 16, 1996**, recognized

⁴Hashim Al-Jazairi, *The Implications of Using the Electronic Bill of Lading in Maritime Transport*, Conference on Law and Computing, Yarmouk University, Jordan, 2004, p. 11.

⁵Mustafa Kamal Taha, *The Concise Maritime Law*, Mansha'at Al-Ma'arif, Alexandria, 1st Edition, 1996, p. 207.

⁶Abbas Iskandar Abdul Al-Tamimi, *The Electronic Bill of Lading*, *Journal of Legal and Economic Research*, Mansoura University, Egypt, Issue 72, 2020, p. 08.

⁷See: Olivier Cachard, *Private International Law*, 7th Edition, BRUYLANT, 2018, p. 128.

⁸Hamoud Abdul Aziz Al-Mursi, *The Legal Validity of Electronic Documents in Evidence*, No Publisher, 2005, p. 10.

the legal validity of electronic data messages. It provided a general definition of electronic documents under the term "**data message**". Article 2, paragraph 1, states that a "**data message**" refers to "**information created, sent, received, or stored by electronic, optical, or similar means, including but not limited to electronic data interchange, email, telegram, telex**"⁹. Additionally, Article 8 of the Model Law considers an electronic data message to be equivalent to an original document, provided its integrity is ensured and it has not been tampered with ¹⁰.

Furthermore, Article 1, paragraph 7, of the **Hamburg Rules of 1978**¹¹ defines a bill of lading as: "**A document that evidences the contract of carriage by sea and the carrier's receipt or loading of the goods. The carrier undertakes to deliver the**

goods upon the surrender of the document. Any clause in the document specifying the delivery of goods to a named person, to order, or to bearer is arranged accordingly by the obligor."

In contrast to the **Hamburg Rules**, the **United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea**, known as the **Rotterdam Rules of 2008**¹², explicitly regulates the **bill of lading** and recognizes it as direct and explicit evidence of the contract of carriage of goods by sea.

Article 1, paragraph 18, of the Rotterdam Rules defines the **electronic bill of lading**¹³ as:

"Information in one or more messages logically issued by the carrier through electronic communication means under a contract of carriage, including

⁹United Nations General Assembly Documents, General Assembly Resolution 51/162, December 16, 1996, Part I, United Nations Publications. Available at: https://uncitral.un.org/ar/texts/ecommerce/modellaw/electronic_commerce

¹⁰Rachid Al-Ghazrawi, The Role of the Electronic Bill of Lading in the Execution of the Maritime Sales Contract, Commercial Judiciary Journal, Issue 02, 2013, p. 105.

¹¹Known as the "United Nations Convention on the Carriage of Goods by Sea, 1978", and in recognition of Germany's role in hosting the conference and covering its costs, the convention was named "Hamburg Rules". For full text, see: https://uncitral.un.org/ar/texts/transportgoods/conventions/hamburg_rules

¹²This convention, adopted by the United Nations General Assembly on December 11, 2008 (Resolution 63/122), establishes a globally uniform, balanced, and modern legal system regulating the rights and obligations of shippers, carriers, and consignees under international maritime transport contracts, considering technological and commercial developments in maritime transport, including the increase in container shipping.

¹³The Rotterdam Rules (2008) do not explicitly mention the term "electronic bill of lading", but instead use the equivalent term "electronic transport record". For more details, see: Iman Al-Jamil, The Bill of Lading and Its Role in Maritime Transport, Al-Maktab Al-Jami'i Al-Hadith, Egypt, 2013, p. 93.

information linked to an electronic transport record through attachments or otherwise connected to the electronic transport record at or after its issuance by the carrier, thereby becoming part of the electronic transport record, which proves:

- (a) The receipt of the goods by the carrier or the performing party under the contract of carriage.
- (b) The existence of the contract of carriage or contains its terms."

This convention establishes **functional equivalence** between **electronic transport records (electronic bills of lading) and paper transport documents**, aiming to promote the use of electronic means in maritime transport and to address the challenges hindering the adoption of electronic bills of lading, particularly regarding their functions.

Furthermore, the **United Nations Convention on the Use of Electronic Communications in International Contracts (New York, 2005)**¹⁴ adopts the definition of "**data message**" as stated in the **UNCITRAL Model Law on Electronic**

Commerce. However, this convention excludes **negotiable instruments, documents of title, and similar securities, including the electronic maritime bill of lading, from its scope.**

Article 2, paragraph 2, of the **United Nations Convention on the Use of Electronic Communications in International Contracts** states: "This Convention does not apply to negotiable instruments (bills of exchange), promissory notes, bills of lading, or similar documents...."

Third Requirement: The Electronic Maritime Bill of Lading in Algerian Legislation

This section examines the extent of the legality of electronic maritime shipping in the absence of an explicit legislative provision in maritime law by exploring its features and legitimacy.

First Subsection: Features of the Electronic Maritime Bill of Lading in Algerian Maritime Legislation

Jurists agree that, despite the Algerian legislator's attempts to keep pace with digital technology advancements through amendments

¹⁴For the full text of the United Nations Convention on the Use of Electronic Communications in International Contracts, visit:

https://uncitral.un.org/ar/texts/ecommerce/conventions/electronic_communications

to the Civil Code under the 2005 Law, introducing Article 323 bis 1, which states: "Evidence in electronic form is considered equivalent to written evidence on paper", and reinforcing it in Article 327, paragraph 2, which stipulates: "Electronic signatures are valid provided they meet the conditions mentioned in Article 323 bis 1 above." Additionally, amendments were made to the Algerian Commercial Code, allowing under Article 502 the possibility of presenting checks for payment¹⁵ through electronic exchange means. This recognition of electronic commercial documents in general represents a significant step forward for electronic bills of lading¹⁶

However, this approach is not reflected in maritime law, as the legislator has not addressed specific provisions related to electronic maritime contracts, including the electronic contract of carriage of goods by sea and the electronic maritime bill of lading. Subsequent legislative

developments in the digital environment have included the issuance of both the Electronic Signature and Certification Law¹⁷ and the E-Commerce Law¹⁸.

This raises the question: Does the Algerian legislator's recognition of electronic writing and signatures in these legal texts implicitly allow the use of electronic maritime bills of lading?

Some jurists argue that, despite the absence of an explicit provision defining the electronic maritime bill of lading in maritime legislation¹⁹, the legal texts mentioned above suggest that the Algerian legislator has permitted its use and acknowledged its legitimacy through functional equivalence, as stated in Article 323 bis of the Civil Code, which equates electronic writing with paper-based writing for evidentiary purposes. The same applies to electronic signatures, leading to an analogous recognition

¹⁵The electronic bill of lading differs from electronic commercial papers in that the latter are transferred via endorsement without needing the phrase "negotiable", while order or bearer bills of lading require this phrase to be explicitly stated. Additionally, electronic bills of lading represent goods, whereas electronic commercial papers involve monetary payments. See: Hussein Bouzabouja, *The Evidentiary Value of the Electronic Bill of Lading in Proving the Maritime Transport Contract of Goods*, *Journal of Transport Law and Port Activities*, Vol. 05, Issue 01, 2018, p. 34.

¹⁶Some scholars disagree, arguing that the electronic bill of lading should not be classified as an electronic commercial document due to fundamental differences between them. See: Mousa Ibrahim Mousa Nassar & Dirar Hussein Ahmed Al-Daboubi, *The Regulation of the*

Electronic Maritime Bill of Lading in Jordanian Law: A Comparative Study, *Dirasat Journal*, Jordan, Vol. 50, No. 2, 2023, p. 128.

¹⁷Law No. 15/04, dated February 1, 2015, defining the general rules related to electronic signatures and certification, *Official Gazette* No. 06, issued on February 10, 2015.

¹⁸Law No. 18/05, dated May 10, 2018, concerning E-Commerce, *Official Gazette* No. 28, issued on May 16, 2018.

¹⁹Kamila Aarabe, *The Legal Framework of the Contract for the Carriage of Goods by Sea – A Comparative Study*, *Doctoral Dissertation in Law*, Faculty of Law, Mouloud Mammeri University, TiziOuzou, 2020, p. 213. See also Halima Hawalef, *op. cit.*, p. 53.

of the electronic bill of lading as a valid means of proof in maritime transport contracts.

Furthermore, supporting this argument is the fact that the data required in a paper maritime bill of lading, as outlined in Articles 748, 751, 753, 756, 759, and 760 of the Maritime Code, can also be included in an electronic maritime bill of lading, which can be issued, accepted, and modified electronically via computer systems ²⁰.

It is important to clarify that mutual consent regarding an electronic bill of lading does not refer to consent as a requirement for contract validity but rather to the agreement between the parties to issue and use an electronic bill of lading. Once this agreement is established, the electronic bill of lading holds the same legal value as a traditional bill of lading in terms of issuance and control ²¹.

The definitions provided indicate that, in essence, there is no fundamental difference between the electronic maritime bill of lading and the traditional maritime bill of lading, except in terms of the medium used for issuance—the electronic platform. The electronic maritime bill of lading is issued between parties who may be geographically distant, offering faster data transmission and enhanced security.

Notably, the definition provided by the Rotterdam Rules, which refers to the electronic bill of lading as an "electronic transport record," is the most precise and comprehensive. It closely aligns with the definition in Article 6 of Law No. 18-05 on Electronic Commerce and is highly compatible with it.

Second Subsection: The Legality of the Electronic Maritime Bill of Lading in Algeria

In the absence of an explicit provision in Algerian legislation defining the electronic maritime bill of lading ²², a question arises regarding the legality and permissibility of using this type of maritime document in Algerian ports. This question is further fueled by Algeria's non-ratification of the United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (Rotterdam Rules, 2008).

The answer to this question can be inferred by *contrario* from the legal texts mentioned above. There is no legal prohibition against the adoption and use of the electronic maritime bill of lading. The Algerian legislator does not explicitly require the ship's captain to carry the bill of lading in paper form, which suggests the possibility of using an electronic bill of lading in

²⁰Hussein Bouzabouja, *op. cit.*, p. 36.

²¹Marwa Mohamed Al-Issawi, *The Legal Regulation of Electronic Bills of Lading Under the 2008 Rotterdam Convention for International Carriage of Goods by Sea*,

Annals of Islamic and Arabic Studies for Women, Alexandria, Vol. 02, Issue 34, p. 770.

²²Kamila Aarabe, *op. cit.*, p. 213. See also Halima Hawalef, *op. cit.*, p. 53.

digital format, provided that the data it contains is correctly recorded, clearly structured, and ensures readability, stability, and continuity, similar to a paper-based document ²³.

This inference is supported by the provisions of Article 123 bis of the Civil Code and Law No. 18-05 on Electronic Commerce, both of which recognize the evidentiary value of electronic documents. Accordingly, there would be no legal impediment for the parties to a contract of carriage of goods by sea to issue the bill of lading in electronic form. Furthermore...

SECOND TOPIC: EVALUATION OF THE ELECTRONIC MARITIME BILL OF LADING

This section is dedicated to assessing the usefulness and effectiveness of this type of bill of lading in the maritime environment by examining both its advantages and its shortcomings.

First Requirement: Advantages of the Electronic Bill of Lading

The emergence and use of the electronic bill of lading have led to the following advantages:

- **Time Efficiency:** It eliminates the issue of goods arriving at the discharge port before their documents, which traditionally travel by mail or manual handling. This prevents cargo from being exposed to damage or deterioration due to prolonged exposure to environmental factors in warehouses or on the port dock ²⁴.
- **Easy Access and Remote Handling:** Parties can **access, view, and verify** the electronic bill of lading from anywhere in the world via the internet, using computers and smart devices. Additionally, it allows for **electronic modifications** or updates without needing to **rewrite the document from scratch**, unlike paper-based bills.
- **Reduction of Paperwork:** It eliminates the burdensome and excessive paperwork required for **traditional** bills of lading ²⁵.
- **Fast and Secure Information Exchange:** It enhances the **speed** of information exchange while ensuring **data security and confidentiality**.

²³See Articles 08, 10, and 11 of Law No. 18-05.

²⁴Farouk Melesh, The United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (2009) – Advantages and Benefits, Maritime Transport News Journal, Alexandria, Egypt, Issue 8, p. 6.

²⁵A United Nations Economic and Social Council Report indicated that each container ship carries up to 50 kilograms of paper documents per cargo. See: Rachid Al-Ghazrawi, op. cit., p. 102.

- **Facilitates Communication Between Parties:** It provides **automatic translation** of bill of lading data, making communication between parties easier.
- **Enhanced Credit Value in Trade:** Due to its **accuracy** and the ability to update information quickly, the electronic bill of lading strengthens its **commercial credit value**²⁶.

Second Requirement: Disadvantages of the Electronic Bill of Lading

Although electronic bills of lading have become a pressing necessity due to their numerous advantages, there are still some drawbacks that limit their effectiveness. These challenges mainly arise from errors in bill of lading data and fraud or manipulation in their use.

First Subsection: Errors in Electronic Bill of Lading Data

Errors affecting electronic bill of lading data may result from either human technical mistakes or external natural factors.

1) Human Errors:

These occur when data or information is manually entered into the computer system, making them among the most common mistakes in practical applications. When the carrier inputs

the data provided by the shipper into the system for processing through a specialized program, errors may arise if the carrier (acting as the programmer) enters the data incorrectly or follows an incorrect sequence, leading to faulty data processing²⁷.

Additionally, errors can result from failure to account for the system's processing capacity or delays in using the system when it should have been utilized²⁸. However, such mistakes are generally minor and can be quickly corrected once detected.

2) Technical Errors:

A technical failure in the computer system may prevent the proper entry or processing of electronic bill of lading data. This type of error occurs due to malfunctions in the computer hardware or software, commonly referred to as technical defects, which are beyond the control of the electronic data system operator. However, thanks to technological advancements, errors resulting from hardware or system defects have become less frequent.

3) External Errors:

These errors stem from environmental and external factors affecting hardware and software performance, potentially disrupting or hindering the use of electronic devices in programming

²⁶Hashim Al-Jazairi, op. cit., p. 11.

²⁷See: Rachid Al-Ghazrawi, op. cit., p. 108.

²⁸Farouk Melesh, op. cit., p. 08.

electronic bills of lading. Such factors typically include extreme temperatures (high or low), humidity, dust, electromagnetic interference, or external vibrations.

Second Subsection: Fraud and Cyber Manipulation

The **rapid advancement of information technology** and digital systems has been accompanied by a **simultaneous rise in cyber fraud techniques**. Certain **computer science specialists** have developed the ability to **breach any information system**, gaining unauthorized access to the **electronic bill of lading data** and compromising its **confidentiality and integrity**. They can manipulate the data by **deleting, modifying, or adding** information²⁹.

In most cases, the **injured party** is the **consignee (buyer)**, who, upon receiving the goods, **discovers that they do not conform** to the **terms of the sales contract** or that there is a **hidden defect** that was **not reflected** in the **electronic bill of lading or related data messages**.

THIRD TOPIC: LEGAL CHALLENGES RELATED TO THE ELECTRONIC MARITIME BILL OF LADING

²⁹Cyber piracy is criminalized under Article 394 bis 1 of the Algerian Penal Code.

³⁰The Hamburg Rules (1978) define a bill of lading as a document proving the contract of carriage and the carrier's

The Rotterdam Rules did not seek to abolish traditional maritime customs and practices, particularly those established by the Hamburg Rules of 1978, which recognized the maritime bill of lading as an evidentiary document. Instead, the Rotterdam Rules maintained the classification of the contract of carriage of goods by sea as a consensual contract that can be proven by all means of evidence³⁰.

However, this type of electronic bill of lading faces several legal challenges, the most significant of which are security breaches (piracy) and the issue of negotiability (endorsement).

First Requirement: Threats to the Electronic Maritime Bill of Lading

One of the major obstacles to the adoption of the electronic bill of lading, as part of the electronic data interchange (EDI) system in maritime transport, is the lack of sufficient safeguards to protect its users from threats that hinder its intended purpose. Among the most common threats are security breaches and cyber piracy, which have led some stakeholders to avoid using this type of bill of lading due to a lack of trust in electronic data security, ultimately resulting in

receipt or loading of goods, obligating the carrier to deliver the goods upon surrender of the document.

the loss of information security for the document³¹.

Referring to Article 38 of Law No. 18-07, concerning the protection of individuals in the processing of personal data³², the Algerian legislator requires data processors to implement appropriate technical and organizational measures to protect personal data from accidental or unlawful destruction, loss, or unauthorized access. These measures must ensure an adequate level of security, taking into account the risks associated with data processing and the nature of the data requiring protection.

One of the most effective mechanisms for protecting electronic bill of lading data from cyber fraud and ensuring the security of electronic transactions and e-commerce is encryption technology. Therefore, it is essential to examine the nature of this technology and its various forms.

First Subsection: Definition of Encryption

The Algerian legislator did not provide a definition of encryption in the E-Commerce Law but merely defined private encryption keys and public encryption keys in Law No. 15-04, which

³¹Information security is a critical issue in the digital age. See: Khaled Hassan Ahmed Lotfi, *Information Security*, Dar Al-Fikr Al-Jami'i, Egypt, 2021, p. 13.

³²Law No. 18/07, dated June 10, 2018, concerning the Protection of Natural Persons in the Processing of Personal Data, Official Gazette No. 34, issued on June 10, 2018.

establishes the general rules related to electronic signatures and certification.

Therefore, it is necessary to refer to jurisprudence to establish a precise definition of encryption. Some scholars define it as:

"The process of converting text into unreadable symbols and signals that appear meaningless to prevent unauthorized access, allowing only authorized individuals to view and understand the encrypted text. Encryption involves transforming plain text into encrypted text, with the possibility of restoring the encrypted text to its original form using a decryption key specifically created for encryption and decryption."³³

Second Subsection: Forms of Encryption in Algerian Law

There are two types of encryption, namely:

First: Private Encryption Key

This key is exclusively held by both the sender of the message and the recipient (consignee). The same secret code is used for both encrypting and decrypting messages, which is why this technique is called symmetric encryption³⁴.

³³Mohammad Fawaz Al-Mutalqah, *The Concise Guide to E-Commerce Contracts*, Dar Al-Thaqafa for Publishing and Distribution, Amman, 1st Edition, 2nd Issue, 2008, p. 159.

³⁴Article 8/2 of Law No. 15/04 states: "The private encryption key is a series of numbers exclusively held by

In this method, the two parties initially agree on a password to be used for encryption and decryption³⁵. When the password is entered, it is converted into a binary number that can be understood by computers. When the message is sent to the recipient, they must decrypt it to restore the message to its original form using the same password used for encryption.

However, this technique has a significant drawback: the same private key is shared between two different parties (the seller (sender) and the consignee). This makes it impossible to guarantee that the key has not been leaked or illegally transferred to an unknown third party. This undermines the evidentiary value of electronic documents and digital records, reducing their legal reliability.

Additionally, this technique places a burden on the consignee, who is required to maintain multiple private keys, corresponding to the number of encrypted bills of lading received from various senders and sources³⁶.

Second: Public Key (Asymmetric Encryption)

the signer and used to create an electronic signature. This key is linked to the public encryption key."

³⁵Sultan Abdullah Mahmoud Al-Jawari, *E-Commerce Contracts and the Applicable Law – A Comparative Study*, Al-Halabi Legal Publications, Beirut, 1st Edition, 2010, p. 203.

³⁶For more details, see: Mohamed Akouni & Youssef Majri, *Legal Mechanisms for Protecting Information*

Unlike the private key encryption method, the public key encryption method relies on asymmetric encryption, meaning that the same key is not used for both encryption and decryption³⁷. Instead, this method employs two mathematically related secret keys to generate an electronic signature for encrypting and decrypting data and information.

- The first key is known only to the sender, who keeps it confidential and uses it to encrypt or decrypt messages.
- The second key is public and is distributed to other parties who wish to send encrypted messages to the recipient.

As a result, even if a third party gains access to the public key, they cannot derive the private key or use it to decrypt the message contents.

Note:

Despite the many practical and legal advantages of encryption technology—such as allowing the sender of an electronic bill of lading to use a single secret key for encrypting and decrypting

Privacy in the Virtual Environment, *Journal of Legal and Political Science Research*, Algeria, Issue 5, 2021, p. 50.

³⁷Article 8/02, paragraph 9, of Law No. 15/04 defines the public encryption key as: "A series of numbers made available to the public to enable verification of the electronic signature, which is included in the electronic certification certificate."

documents, thereby ensuring data confidentiality against cyber threats (e.g., hacking, malware, or viruses)³⁸; its effectiveness is not absolute.

One major concern is its lack of absolute reliability, particularly from the perspective of the buyer (consignee). The shipper (sender) can manipulate or alter the electronic bill of lading data after it has been received by the carrier, creating a false impression of contract fulfillment. This situation forces the consignee to accept the electronic bill of lading under uncertain conditions³⁹.

This has led to the emergence of electronic bill of lading authentication, aimed at verifying its validity. This process involves a neutral third party, monitored by the state, that electronically certifies the shipping document before delivering it to the contracting parties.

This third party, known as the electronic certification authority, may be appointed by the state or private entities. Its main role is to secure electronic transactions, rely on electronic signatures, issue certificates verifying document authenticity, and store them securely⁴⁰.

Second Requirement: The Negotiability and Transferability of the Electronic Maritime Bill of Lading

Although the Algerian legislator successfully established the principle of functional equivalence between electronic and paper-based documents in terms of evidentiary value, it did not address the issue of endorsement (negotiability), particularly regarding electronic maritime bills of lading and electronic documents in general. The legislator also failed to consider specific legal provisions governing the negotiability and modification of electronic bills of lading, as outlined in international conventions, especially the Rotterdam Rules (2008) and the United Nations Convention on the Use of Electronic Transferable Records (2017).

Given this legislative gap in Algerian law, it becomes necessary to refer to recent legal developments, particularly the 2017 United Nations Convention on Electronic Transferable Records, which enhanced the legal framework established by the Rotterdam Rules (2008).

First Subsection: Innovations in the 2017 United Nations Convention on Electronic Transferable Records

Although the Rotterdam Rules (2008) introduced significant advancements regarding electronic bills of lading, the UNCITRAL Model Law on Electronic Transferable Records

³⁸Mohamed Akouni & Youssef Majri, *op. cit.*, p. 51.

³⁹See: Marwa Mohamed Al-Issawi, *op. cit.*, p. 282.

⁴⁰This matter was addressed by the Algerian legislator in Article 15 and subsequent provisions of Law No. 15/04 on Electronic Signature and Certification.

(adopted on December 7, 2017)⁴¹ provided new provisions and solutions to facilitate the secure and widespread use of electronic records. It also addressed certain gaps in the Rotterdam Rules, particularly regarding:

- The endorsement (negotiability) of electronic transport records
- The modification of electronic transport records
- The possibility of replacing a paper bill of lading with an electronic transport record (electronic bill of lading)
- The specification of time and place within such electronic records

This convention introduced two key legal innovations that were previously unrecognized in maritime law and Algerian e-commerce legislation:

First Issue: The Possibility of Converting Electronic Transport Records into Paper Documents, and Vice Versa

This provision allows for the conversion of an electronic transport record into a paper document (or vice versa) without losing the legally required information. The aim is to

⁴¹The full text of the United Nations Convention on Electronic Transferable Records (in Arabic) is available at:

https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/ar/mletr_ebook_a.pdf

⁴²Abbas Iskandar Abdul Al-Tamimi, op. cit., p. 19.

ensure the continuous circulation of both electronic and paper-based bills of lading, while maintaining their transferability. This transformation must be carried out without affecting the rights and obligations of any party, thereby enhancing the efficiency of this method⁴².

Second Issue: The Endorsement and Negotiability of Electronic Bills of Lading

This provision enables the tracking and modification of electronic bills of lading, ensuring that all changes to the document's data remain accessible to all parties involved.

Article 16 of the 2017 UNCITRAL Model Law on Electronic Transferable Records explicitly states that all parties to the electronic bill of lading, including any current holder, must be able to view all modifications made to the document. This ensures that the amendments are not merely recorded but also remain easily traceable, aligning with the general obligation to maintain the integrity of the electronic transferable record⁴³.

Perspective on the Second Issue

⁴³The convention states: "Where the law requires or permits the modification of a document or a transferable instrument, this requirement is met in the context of an electronic transferable record if a reliable method is used to modify the contained information, ensuring the modifications are identifiable."

Some may argue that the definition of an **electronic signature**, as referenced in **Article 15 of Law No. 15/04 on Electronic Signature and Certification**, allows for the **endorsement and transferability of electronic bills of lading**. However, this argument is **flawed**, as a signature only attributes the **content of the electronic document to its signer** and does not extend to **negotiability**.

Furthermore, applying a **general legal provision to a specific legal issue** is not a **sound legal approach**, as **exceptions cannot be used as a basis for analogy**. The validity of any document depends on a **proper signature**, proving the **signer's acceptance**, but this does not imply that the **rules of electronic signatures can regulate the endorsement and transferability of electronic bills of lading**.

Thus, **electronic signature provisions are not suitable** for addressing the **negotiability and conversion of electronic bills of lading**.

Second Subsection: The Bill of Lading Under the MSC System

After the global COVID-19 crisis, which highlighted the importance of information technology in remote transactions, the European container shipping and logistics company MSC⁴⁴ developed a model for an electronic bill of lading on a secure blockchain-based platform. This initiative aimed to ensure that all stakeholders in maritime cargo transport could issue, transfer, and manage bills of lading through a secure and decentralized network⁴⁵.

The company deemed it necessary to introduce this type of electronic bill of lading due to the disruptions in global ports and supply chains caused by the pandemic. During this period, cargo shipping and container collection were suspended in many ports due to delays in the physical delivery of bills of lading to consignees.

On April 28, 2021, MSC launched its electronic bill of lading (e-BL), allowing all its customers to receive and transfer electronic maritime bills of lading and other shipping documents digitally, without disrupting daily commercial operations⁴⁶.

This type of electronic bill of lading enabled maritime transport stakeholders to issue all

⁴⁴MSC (Mediterranean Shipping Company) is a global container shipping company based in Geneva, Switzerland. Its website: e.BL.www.MsC.COM

⁴⁵Anwar Matawa Mansour Mohamed, The Role of Electronic Documents in the Execution of the Maritime Transport Contract for Goods – The Electronic Bill of Lading as a Model, Legal Journal, Faculty of Law, Cairo University (Khartoum Branch), Sudan, 2023.

⁴⁶A predecessor to this type of electronic bill of lading was the Bolero Project, a specialized electronic bill of lading system aimed at addressing technological challenges. It was a pilot project partially funded by the European Union in 1994 and was formally launched on September 10, 1999, managed by Bolero International Limited.

original negotiable copies and exchange them via direct and encrypted transmission from one party to another. Additionally, it allowed for immediate and secure modifications to these electronic bills, making them fraud-resistant and protected against manipulation, tampering, or human errors.

As a result, the adoption of electronic bills of lading (e-BL) has significantly increased in recent years. The usage rate tripled from 1.2% in 2021 to 3.7% in 2024. This growth trend is expected to continue as industry bodies, solution providers, and governments work together to encourage the widespread adoption of electronic maritime bills of lading to overcome challenges⁴⁷.

CONCLUSION

A careful analysis of this topic leads to the following conclusions:

- The electronic maritime bill of lading proves to be highly effective in facilitating international trade transactions, enhancing flexibility, reducing costs and time, while ensuring security and reliability.
- It accelerates the transfer of ownership of goods and enables fast modifications to the electronic bill of lading data.

Based on these findings, the following recommendations emerge:

- Algeria should ratify the Rotterdam Rules, which have not yet entered into force. By doing so, Algeria would benefit from the latest legal framework for electronic data exchange in maritime transport. This convention provides detailed provisions regarding electronic transport records, including their content and transferability. Ratifying it would allow Algeria to incorporate its provisions into national legislation.
- Amendments to Algerian maritime law should be introduced, particularly regarding the negotiability of electronic bills of lading, to align with developments in maritime transport and international e-commerce regulations. This would help eliminate the complexities associated with paper-based documents.
- Security mechanisms should be implemented to ensure the integrity and safety of electronic transmissions, protecting them from cyber threats and fraud and guaranteeing their legal validity as evidence in court.

⁴⁷Latest DCSA (Digital Container Shipping Association) report on the obstacles to e-BL adoption.

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ENDNOTES