Journal of legal and social studies

Issn: 2507-7333

Eissn: 2676-1742

Evolution of container shipping as an activating mechanism of the role of seaports

HARIZ Asma *

Lecturer class "A". University Oran 2 Mohamed ben Ahmed (Algeria),

asmahariz@yahoo.fr

Date of send: 09 / 06 / 2021	date of acceptance: 01 / 08/2021	Date of Publication: 01/09/2021

* **Corresponding author**

Abstract:

The development of container transport has not only revolutionized the world of shipping, but has also changed the features of trade and industry, given what resulted from the use of the container system and the subsequent development in the techniques of building new generations of container ships. This, in turn, requires the development of work methods and services during the receipt of container ships, the preparation of quays and suitable equipment for handling containers inside the ports so to remain in tune and harmony with the important and vital role assigned to them.

Keywords: Container ships; Sea ports; Container terminals; Planning; Efficiency.

INTRODUCTION:

Maritime transport is one of the most important forms of transport for international trade. Indeed, and thanks to the important and vital role that ports play in the maritime transport chain, as well as their status as a point of attachment between land and maritime transport, maritime transport contributes with the largest share in the world trade that would not be possible without the existence of seaports.[1]

Starting the 90s of the twentieth century, we observe a change in the role of sea ports whose activity is no longer limited to their own borders or adjacent areas, it also affected all the regions surrounding them, the port having only become a starting point in the transport chain[2]. We are therefore witnessing a progressive evolution of many traditional ports from being only, simple transport centers in the 1950s and 1960s, to trading and industrial service centers, a process in clear acceleration over the past ten years in some competitive ports.

In addition, the container revolution and the consequent advancements in the art of architecture and the construction of new generations of cellular container careers, have led world ship owners to plan the construction of container ships that can carry up to " to 12,000 containers, which pushed for constructing gigantic ports and hubs with advanced logistics thinking to ensure good service delivery at a fair price, and at time, in a manner allowing the meeting of customers' needs[3].

Thus, any port enjoying competitive characteristics in terms of geographical location, quality of services, efficiency and speed of performance, will have more attractiveness to ships from all countries, and will thus contribute to the development of international trade[4].

And considering the advantages of the container ship transport system in international trade, as well as the success that this type of transport has achieved in practice, shipping companies competed to adopt it until it became a tangible reality in many aspects of transport[5], and ships owners have started to demand container ships and the necessary equipment, as these ships ensure a continuous flow of goods to international ports.

In light of this, we raise the following problem: to what extent has container ship transport contributed to the development of seaports?

To address this problem, we decided to approach it within an analytical approach commensurate with the nature of the subject, by addressing the conceptual framework of container ships (the first chapter), with an explanation of assets of ports prepared to receive container-ships (the second chapter).

Chapter I: The conceptual framework of container ships

The mid-1960s observes the emergence of container ships specially designed for container transport, and competition was intense between Europe, America and Asian countries such as Japan and South Korea, in this area[6].

Through the study of this topic, we will try to set a definition for container ships (the first requirement), with an indication of the different generations of container ships (the second requirement).

The first topic: Definition of container ships

Before giving a definition of a container ship, it is necessary to define the term container. According to the International Customs convention on Containers[7], a container is an article of transport equipment (lift-van, movable tank or other similar structure) fully or partially enclosed to constitute a compartment intended for containing goods, of a permanent character and accordingly strong enough to be suitable for repeated use, specially designed to facilitate the carriage of goods, by one or more modes of transport, without intermediate reloading.

As for the Algerian maritime law, the legislator inserted the term container in the amendment published in 1998[8] when determining the maximum amount of compensation to be paid by the carrier if its liability is proven (paragraph 2 of article 805 of Algerian maritime law): "When a container, or any other similar device, is used to group the goods, is taken into account for the calculation of the highest limit to determine the liability, the number of packages indicated on the bill of mooring or any other document proving the contract of carriage by sea".

As for container ships, they are defined as ships specially designed for the purpose of transporting containers, whether inside cargo holds or on the ship's deck. Cargo holds in such vessels, are divided into cells to which containers are lowered directly through hatches (the openings from the main deck). Cells, are strong vertical structures constructed of metal, installed into a ship's cargo holds, in such a way that a container can be lowered or raised in the same theory of the

elevator, but cannot be moved horizontally[9]. Then is stacked the second container onto the first one until the hold is full, which explains the large number of hatch openings stretching the full breadth of the cargo holds. Containers in cells are not fixed or tied, as long as the rods support them during navigation. On shipping and stowage plans, each cell is identified by a fixed digit coordinate number.

There are no cranes on the deck of the container ships. They are loaded and unloaded by cranes (gantry cranes) on quays gantries capable of lifting (40-50 tons). There are also special vehicles for transporting containers called trucks. The use of container ships provides number of benefits including:

- Economy and speed up of containers handling.
- A good guarantee against the risks of theft or damage, especially for high-value goods (precision devices and equipment - very special cargo).
- Reduce the costs of packaging goods inside containers[10].
- Door-to-door service, called multimodal transport.

The second topic: types of container ships

Container ships can be divided into three types, depending on "The Vessel Requirements" adopted to describe container ships. The first criterion is the generation to which the ship belongs, the second criterion is the purpose assigned to this container ship, as for the third criterion, it is the route of the ship[11]. And here are details of the three criteria:

Category I: container ships, with respect to the generation

The generation to which a container ship belongs is determined by calculating the length and breadth, the draft, and the number of equivalent containers that can be moored in the holds and deck.

The first-generation containerships appeared in 1968, and the wesser express is a typical ship for this generation of container ships, with a capacity of 700 equivalent containers, a speed of 20, 6 knots, and with dimensions (total length: 171 meters, width: 24.5 meters, draft: 7.85 meters). The first-generation container ship is characterized by the number of vertical cells inside the hull, up to 3 cells and a height of 3 stacks[12].

Less than a year later, the first second-generation ship with a capacity of 1,500 equivalent containers was introduced. Three years later, the first third generation ship was launched, known internationally as Panamax container

ships, the typical representative of which is the Liverpool Bay with a capacity of 3000 TEU, a speed of 26 knots, and a dimension of 268 meters in length, 32.3 meters in width, and draft is 11.9 meters in depth, ships characterized by the number of vertical cells inside the hull of up to 7 cells, and a height of 5 stacks.

In 1984 appeared the New Panamax container-ship, the typical representative of the fourth-generation container ships capable of loading 4000-5000 equivalent containers appeared, vessels known internationally as the Panamax container ships, and the main dimensions of a typical ship of this type are, 289.5 meters in length, 39.3 meters in width, and 11.6 meters in depth[13]. This type of ships is characterized by the number of vertical cells inside the hull which is up to 8 cells and a height of 5 stacks of containers.

In 1987, the first models of container ships of the fifth generation known internationally as Post-Panamax, made their appearance. They have a capacity of 5,000 to 6,000 TEUs, and are characterized by the number of cells: 10 vertical cells inside the hull and 6 stacks of containers on the deck. As for the sixth generation of container ships, it entered service in 2001, with a capacity of 11,000 containers, a length of 360 meters, a width of 55 meters, and a draft of 16.5 meters[14].

Category II: container ships, with respect to trade routes

Shipping companies are now moving towards the idea of concentrating a maximum of volumes in fewer voyages possible. The thing that appears clearly, in the follow-up of a regular route announced in advance, by the company.

Category III: container ships, with respect to the design

One of the most important advancements that particularly affected the shipping industry is the emergence of container ships, a system created by Malcolm McLean (the first shipping company to use container ships), then came the turn of the international maritime trade across the Atlantic Ocean to make use of containers in the port of Rotterdam in the Netherlands[15], and since then, this system does not stop progressing. Container-ships based on the design, are the followings:

First**:** The fully containerized vessel

It is the vessel using guide cells[16] to allow containers to easily come to the right place in the cell lodging containers in stacks on top of each other up to 3/4 containers on the deck, and six containers under the deck; which allows the ship

to have more volumetric capacity added to that of the holds[17]. But this creates problems related to balance and safety, this is why lashing systems have been put in place so that containers stacked on the deck, can withstand weather fluctuations.

Second: partially containerized vessel

It is a ship which is equipped in such a way as to be able to diversify its loading in containers and others, and whose hull is fitted out to accommodate both containers in one hold, and normal cargo in a second hold; or stack the containers on the deck, and reserve the holds for normal cargo.

Note that this type of container ships is characterized by flexibility to meet the demands of transporting goods of all kinds.

Chapter II: The major assets of ports intended to receive container ships

Because of their importance, ports constitute an effective tool in economic and social development of countries, and have therefore, become an economic institution in the broad sense, and not only a service company[18].

With reference to Article 888 of the Algerian Maritime code[19], "the port is a point on the sea shore, fitted out and equipped to receive, harbor ships and ensure all maritime trade, fishing and recreational operations".

We will try through the study of this chapter, to address the role of container terminals in seaports (topic I), as well as determining the importance of strategic planning in ports' activity (topic II).

Topic I: The role of container terminals in seaports[20]

Container terminals play a very important role in the chain of cargo flow, thus requiring the development of ports container terminals, and increasing their performance and productivity rates have direct and indirect economic impact on the economy of any country[21], in terms of services rendered to the foreign trade, or in terms of the competitiveness of seaports at domestic and global levels.

Let us note here that the Algerian legislator has not given a definition of container terminals, except in the statement of Article 7, paragraph 3 of executive decree n ° 02-01,[22] where he qualifies them as "specialized facilities necessary for the handling of goods".

The development in container ships industry has led to the emergence of new terminals equipped with the necessary equipment and facilities for handling containers from and to all types of container ships[23] by providing infrastructure necessary for the execution of operations, at the desired speed and quality, in particular for handling operations related to large vessels which require adapted installations in terms of length and depth of the quay, as well as large yards that can accommodate and process a large flow of containers in a short time[24].

An edifying example in this area is the Mediterranean terminal of Béjaia, born out of a partnership agreement between the port of Béjaia and a Singaporean company[25]

In 2009, the port of Algiers concluded a partnership contract with the International Port of Dubai with the aim of handling nine hundred thousand containers during the year 2015, which considerably increased the traffic of containers handled in the port. Then came the turn of the port of Jenjen to sign a partnership contract with the same company for the establishment of a container terminal[26] intended to be used in the management of the flow of containers, under two operational aspects: the first in the handling of containers imported or exported by Algeria, and the second relates to containers unloaded at the port awaiting reloading on another vessel.

One of the infrastructure requirements is the availability of cranes[27], whose height calculated from the quay must exceed that of the last container stacked on the deck, and can go up to about 60 meters. The lifting arm is longer to reach the last container among twenty-two rows on the deck that it can reach**.**

Topic II: The **importance of strategic planning of container terminals**

The purpose of strategic planning in the field of container terminals is to put in place strategies and determine objectives which, when integrated into programs and activities, give the container terminal a competitive advantage enabling it to achieve its objectives[28], including the optimization of its market share relative to competing container terminals, this increase is the starting point towards efficiency of the container terminal marketing process.

Consequently, the relationship between planning and competitive advantage of a container terminal is a close relationship, since a notable competitive position cannot be achieved in an instant. Rather, it is the result of a long-term global strategic plan set by the container terminal, taking into account the various success factors in its favor, and going through the analysis of its own

strengths and weaknesses, as well as those of its competitors in regard of a number of considerations namely:

- The strategic geographical location of the container terminal.
- The important role of the container terminal in facilitating external trade flows.
- The degree of cooperation, interrelationship and coordination between workers in the container terminal.
- Improve the quality of services provided to clients to meet all their requirements.
- The important role of the container terminal in achieving the economic and social well-being of the community.

CONCLUSION:

Through this study, we were able to determine the crucial role of container ships, as well as the importance of a modern national port managed according to the latest scientific and technical methods, capable of making it a commercial service center offering a whole connected transport service. A situation favored by a combination of several factors such as the nature of the global market, multimedia services and modern communication systems.

In light of the above, we present a set of recommendations, which are:

- Maintenance and development of ports to enable them to manage container ships as quickly as possible and in the best safety conditions.
- Ensure better use of modern technology in order to optimize the capacity of seaports.
- Improve ports services in terms of speed and quality.
- Pre-planning of securing and storing containers method and thereby speed up the process of handling and transferring containers thereof.
- Necessity for a network communication system at the container terminals by means of central wireless stations, connected to the operating equipment and container transport areas.
- Allocate skilled personal in operating and maintenance to container terminals.

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[21] Sharif Maher Haikal, previous reference, page 105.

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[25] This information is provided on the website www.Port debejaia.dz, consulted on June 10, 2018 at 10:00 a.m.

[26] The container terminal does not have a precise definition in international agreements or domestic laws, but it requires modern and sophisticated equipment, where container ships transport at least five thousand containers in a single voyage as they combine the size of container ships that require a berth that can accommodate the length of the ship that reaches about 340 meters.

[27] Some of the features of gantry cranes include:
- High productivity in operating circles.
- A capacity to coordinate up to a height of five containers.
- Can operate automatically.
- A high level of stability and security.

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