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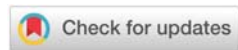
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Literature Review

The evolution of containerization and its impact on the Maghreb ports

Abstract

This paper studied the evolution of container traffic in the global world and its impacts on the seaports Maghreb region (Tunisia, Algeria and Morocco). The containerization transformed the ports sector from one generation to another and developed the international trade between regions. The descriptive analysis realized in this study shows the interested impact of containerization in the global world specially the Asian ports which have attracted more benefits from the containerization. While, the status of Maghreb seaports is covered by several challenges. Thus, the weakness of the maritime infrastructure is the main lack for the three countries.

Introduction

Maritime transport is a critical for international trade, to transit goods by sea, it becomes the major transport modes. In addition, the maritime transport has an important role in the globalization context. In this field, the technical innovations are considered the most imperative disposition that affects the maritime transportation. Therefore, the standardization of the container in the field of freight transport is an important factor. Consequently, containerization allows the transport of different goods in containers with standardized dimensions. Containerized transport is an industrial logic to ensure efficient maritime services and consistent with the equipment in shipbuilding yards, loading/unloading gantry or storage.

Since the introduction of the containers in the transport sector, several studies noted the massive evolution of the traffic containers over time and their affect on economics and international trade in different seaports regions in the world. In the literature review, numerous studies explicate the same subjects with different methods, for example [1,2], provided that the seaport became an assorted sector with various models over time, others studies the distribution of containerization as [3-7]. Whereas, some studies concluded that there is a lack in the analysis of the port range in the global context [8-10]. Furthermore, Frémont [9], explained the world as a box "the container" and treated the importance roles that the container accorded to the maritime transport and the facilitation of port activity.

In addition, some studies treated the impact of the containerization in the evolution of trade, the economic growth, the port infrastructure, the supply chain management and port

logistics, etc. For example [11], showed the great impact of the containerization on the growth of the world trade over 1966 which, proved that the international trade is caused by the containerization. Therefore [12], mentioned that the increase of the ocean shipping between 1974 and 1984 caused by the emerged of the containerization.

Furthermore [13,14], described that the most period of ships development, international trade model and progression of an urban city was introduced with the emergence of the container revolution in 1950-1990. Recently, the study of [15], analyzed the efficiency of the container ports founded that the major number of the throughput is handled by the Asian countries in 2015, in particular the china handled the most part of the container. In the same context [16], studied the development of the modern ships after the introduction of container.

Rodrigue et al. [7], demonstrated that the high demand of container is caused by the continued growth in the Asian Pacific region. Furthermore [17], report that the growth of global container traffic (the number of containers transported) is continuous over time. They noted that this sharp increase in container traffic is linked to the growth of international trade and the adoption of the container for sea and land freight transport.

According to the literature review the containerization has reached immense dimensions. It accounts for 80% of the general cargo traffic by sea and it obtains an essential role in the international trade in the global world. Against this background, The Maghreb countries are required to keep up these modern changes in the transport sector. Today, the popular cargo ships transit the Maghreb has foreign flags. The

national flag does not contribute to the Maghreb trade because the lack of national vessels used for international navigation. As a result, this lack of the national fleet of local, regional and international exchanges is a problem and supports a shortfall in the Maghreb economy. In addition, the investment in high-capacity cargo ships would allow the Maghreb to become self-sufficient in the goods transportation and containers transport. However, the numerous researchers done on this subject in various regions, the question of container progression while, the Maghreb ports has not been developed in any studies. Consequently, this paper requires about the containerization and its impact on the Maghreb region.

This paper is organized as follows. The first section treats with the introduction and the background studies in the literature review. The second section presents the containerized transport in its global context and describes the container ports, the third section illustrates the impact of the containerization on the Maghreb region seaports. The fourth section synthesizes the challenges of the Maghreb seaports. The last section represents the conclusion.

Containerized transport in the global context

The container is an intermediate tool. It is adaptable to a ship, a road trailer and railway. As well as, it makes possible the passage of a segmented transport between the different modes to an articulation and a combination between them as described by [18]. Containerization began in the 1960s and became globalized in the 1980s. In 2016, the total container trade through the global market recorded a significant slowdown in terms of containerized trade volume.

According to the World Bank data presented in figure 1 showed that the evolution of container traffic during the period 2008–2016 is increasing. Thus, the world trade is increasing from one year to another. Moreover, the maritime transportation plays a key role in the international trade. Hence, the study of the United Nations Conference on Trade and Development (UNCTAD) [19], showed that the container ports throughput increased by 1.9 percent in 2016, with volumes accumulated to 699.7 million twenty-foot equivalent unit (TEUs).

As shown in figure 2, the most volumes handled by container ports are in the Asia region around to 64 percent, the Europe, North America and developing America handled only 16, 8 and 6 percent, respectively. The region of Africa and Oceania handled less than 5 percent. Consequently, the Asian ports continue to dominate the world ranking in terms of port traffic and the qualities of the terminals.

According to [19], a number of global terminal operators, including companies closely associated with shipping companies, have marketed their operations to arrange and frame their operations. As shown by the statistical data, the Asian countries attract the benefit of the maritimization in the world economy. In 2016, Shanghai and Singapore handled more containers than other ports in the world. They are the largest ports in the world by throughput. The industrial relocation and the massive manufactured economic growth

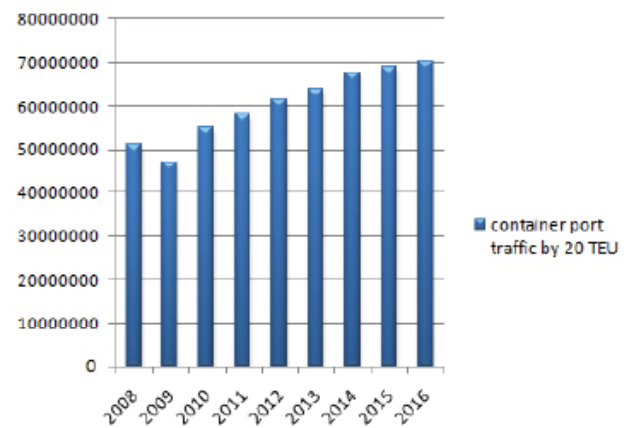


Figure 1: Evolution of container ports traffic, according to World Bank data.

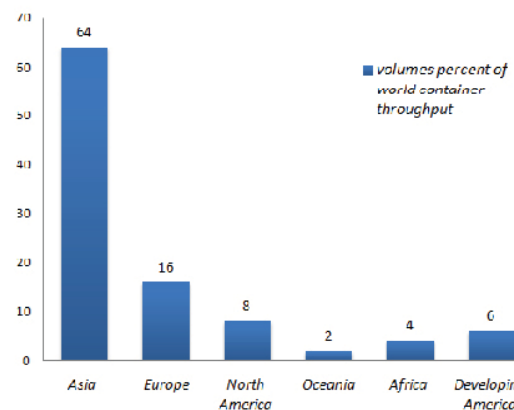


Figure 2: Volumes percent of world container throughput in 2016, according to the UNCTAD (2016) data.

in the emerged countries and the optimization of logistics chains, all these elements contribute to a fixed and determined increase in international shipping. This is accompanied by more standardized consumption practices with the search for a cost/quality ratio which arises in favor of an increased globalization of production systems. Accordingly, ships and ports gigantisms are a sign of this globalized logistic orchestration confirmed by all qualitative and quantitative statistical grids.

Moreover, the geographical location offers an important role in the development of the seaport sector in the Asian region. Consequently, The Strait of Malacca is used by the two main shipping routes that connect Europe and the Middle East to East Asia. The largest and oldest is the direct shipping route, coming from Suez via the Red Sea and taking the Straits of Malacca to access the sea from southern China. In addition, the growth of traffic in the Straits of Malacca is due to the strong growth of maritime traffic in East Asia, especially for container flows.

Containerization has become the main driver of globalization based on different production, mutation and differentiation systems. The analysis of the major 20 container ports, proved that there are 16 ports from Asia. Shanghai and Singapore remain the leaders with respectively 37.1 and 30.9 million boxes. In addition, only three European ports (Rotterdam,

Antwerp and Hamburg) are founded. For the Mediterranean and African region, there are no ports in the major 20 ports in 2016 (Table 1). China, Singapore and the United States affirm their global containerization hub status by opting a multiple container (hub system) to optimize rotations between the largest container ships and smaller vessels collectors (feeders).

The most major container ports are in Asia and the large number of these ports is located in China as figure 3 shows. Thus, the transport infrastructure and logistics corridors associated with the intermediate services (highways, railways, barges and short sea shipping) have developed for these ports to participate in the polarization of maritime traffic.

The specialization and concentration of seaports make it

Table 1: Ranking of major world ports in 2016.

Rank	Port	Country	2016 (1000TEU)
1	Shanghai	China	37,133
2	Singapore	Singapore	30,904
3	Shenzhen	China	23,979
4	Ningbo	China	21,560
5	Busan	Korea	19,850
6	Hong Kong	China	19,813
7	Guangzhou	China	18,858
8	Qingdao	China	18,010
9	Dubai	UAE	14,772
10	Tianjin	China	14,490
11	Port Klang	Malaysia	13,170
12	Rotterdam	Netherlands	12,385
13	Kaohsiung	China	10,465
14	Antwerp	Belgium	10,037
15	Dalian	China	9,614
16	Xiamen	China	9,614
17	Hamburg	Germany	8,910
18	Los Angeles	USA	8,857
19	Tanjung Pelepas	Malaysia	8,281
20	Laem Chabang	Thailand	7,227

Source: Lloyds List Containers, 2016

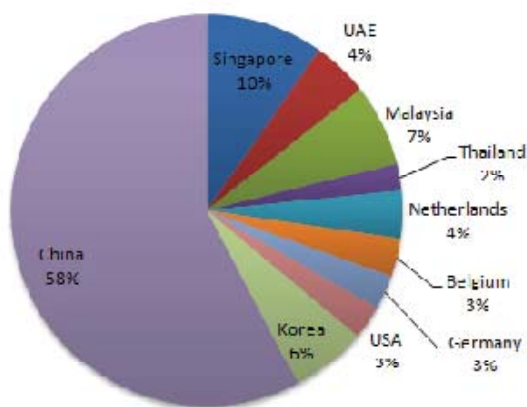


Figure 3: TEU Volume for countries in 2016, according to Lloyds List Containers.

necessary to highlight two fundamental trends that emerged from the evolution of different maritime activities. First, the specializations acquired in various countries for industrial sectors, transport goods and services. Second, the participation of many developed countries in different sectors is increased. The maritime transport developments are no longer dominated by rich countries, as many developed countries have benefited from market liberalization and have found niches where they can participate in the maritime transport service delivery chain. Concurrently, the containers are diffused in the Maghreb countries and it has an impact on the region.

The containerization in the Maghreb seaports

The Maghreb countries (Algeria, Morocco and Tunisia) have twenty-two ports, eight of which meet the standards of major international stopovers and seven mineral vessels, the Maghreb is considered as an equipped coastline in North Africa. The sea plays an important role in the transportation of goods (hydrocarbons, chemicals, mineral products, etc.) within and between Maghreb countries. As well as, the challenges of development the Maghreb ports are efficient in their activities, despite the specialization that characterized the majority of ports (Hlali, 2018).

Following the studies of [14], the Maghreb port traffic has an imbalance between imports and exports with about 30 million tons of Tunisian traffic, 60 million tons of Morocco traffic and more than 130 million tons of Algerian traffic in 2008. The statistical information proved that the Maghreb countries are considered as an import region.

Container ports ensure the integration of maritime transport into multimodal transport chains in the Maghreb region. Figure 4 shows the evolution of container traffic in these ports between 2008 and 2016.

The analysis of figure 4 proved that the container traffic in Maghreb ports does not exceed the 500,000 containers for Tunisia and 1,500 for Algeria and 4 million for Morocco. These statistics are quite low compared to global statistics which show that the twentieth port in 2016 (Laem Chabang) itself builds more than 7 million containers (Table 1).

The comparison of these data with the global data noted that Maghreb ports need to improve the status of the maritime sector, the efficiency and the performance of ports to maintain more productivity gains. Tanger Med is the only hub port with efficient activities in the Maghreb region. Tanger Med is an industrial-port platform connected to the major world ports and offered a capacity for 9 million containers, 7 million passengers, 700,000 trucks and 1 million vehicles. It is a logistics and industrial hub for more than 750 industrial companies. Thus, the Morocco ports handled more containers than the Tunisian and Algerian ports as figure 4 represents which demonstrates the role of the hub port.

It can recapitulate that one month of activities of the port of Shanghai represents a year of containerized handling of all the Maghreb ports which proved a bad situation in the Maghreb ports. According to this study, it is observed that these ports meet different challenges to be competitive with others seaport

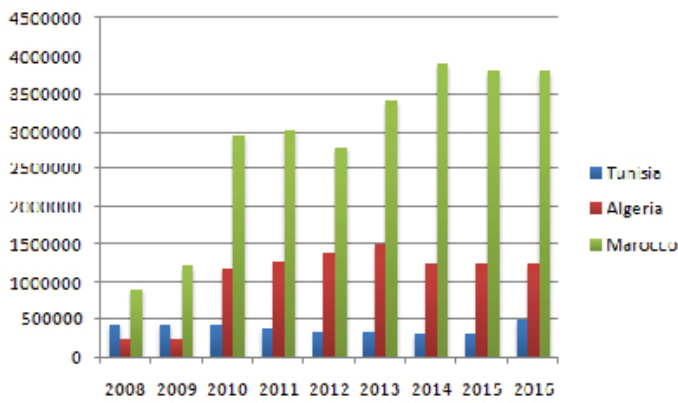


Figure 4: Evolution of container traffic in Maghreb ports.

in the world.

The challenges of maghreb seaports

The challenges of ports are strongly related to the global economic growth, which is accompanied by the evolution of port production and the increased number of containers in the world. In addition, the evolution of the navigation nature which applied a new generation ships with a massive volume. Subsequently, ports are adapted to the maritime sector innovations, such as the increasing size and the fleet complexity.

For the Maghreb ports, the developing of vessel constituted a major obstacle, because the larger vessels require larger capacities when unloading goods or loading a large number of passengers. As results, the emergence of larger vessels for short sea shipping creates new needs for energy efficiency, fuel efficiency and environmental performance. In addition, new trends in logistics and distribution systems are attracting more value-added services to the port area.

The problem of larger vessels is caused by the weakness of the infrastructure as studied by [20,21], there is a lack of specialization and problem of accessibility include the port city connection. The structural problems linked to the transport infrastructure are opposed to the realization of commercial opportunities between the Maghreb partners. The almost complete absence of direct lines, whether land or sea transport, generated additional costs and limits the price competitiveness of the products traded.

Nevertheless, it should be emphasized that the introduction of a direct and regular shipping line between the ports of Casablanca (Morocco) and Rades (Tunisia) should boost bilateral trade. This line can avoid the transshipment of goods from one ship to another and contribute to reduce the cost of trade between the two countries.

Tunisian ports suffer from lack of investment in infrastructure. Developments are have been limited since their creation. In addition, no port location strategy is developed by the port authorities, which stabilized the status of ports to be considered like a first generation port as studied by [22]. This stems the role of port as a simple service, transit tool that responds only to the shippers needs and not as

a tool for economic development that stimulates demand and strengthens its market share in a competitive economic environment.

Algerian ports are characterized by the weakest drafts of the docks and the cramped spaces. Their effects on large vessels with significant economies of scale cannot access ports. The key drawback is to install high-performance equipment meeting the requirements of the recent generation ship technology. This causes low cargo loading and unloading efficiencies and ports congestion. The government in Algeria invested only in the oil ports. Multifunctional ports are covered behind obsolete infrastructures. Therefore, it's considered as Tunisian ports like a first generation ports. Moreover, the main specializations of Algerian ports are finished in the hydrocarbon transport.

Moroccan ports suffer from a weak infrastructure that has influenced their performance, though the construction of Tanger Med has an important impact on the Moroccan trade. This study shows that Moroccan ports handled more containers than Algerian and Tunisian ports. As cited by [23], the Tanger Med has changed the status of Morocco cities by including a dynamic global demand.

The difficulty of hinterland connectivity is also a lack for the Maghreb port development. Thus, the traffic of a port is determined by the richness of its hinterland and its location in relation to the main maritime routes [24]. The connectivity with the hinterland affect seaport to be more preferment. Rodrigue and Notteboom [25], treated the role of the terminal/port region generates a competitive connectivity between them and other seaport regions and influence the cost and the service. Wiegman et al. [26], selected that the hinterland accessibility is the most determinant to use a seaport.

In addition [27,28], explained that the hinterland connectivity with seaport needs a performance transport infrastructure in their region. The port must be accessible for the modern ships to participate in economic growth. However, the Maghreb port region is characterized by weak connectivity due to the weakness of the infrastructure and the lack of industrial-port area activities.

Conclusion

This paper studied the impact of containerization, as a factor of seaport development and economic growth, on the Maghreb seaports. The results showed that the Maghreb ports subsisted in a competitive environment. Indeed, the massive development of international ports deposits the Maghreb region in front of several obstacles that leads it to seek more solutions in order to be competitive. Thus, the absence of developed network hub ports between the three countries creates a complex context.

The maritime sector remains divided between the economic realities, the maritime and the politician wills. Hence, the assessment its seafont need to create a transshipment traffic in a national port that has multiple advantages as added value for the port, jobs, reduced freight rates, etc. These obstacles have revealed the limits and inconsistencies of the maritime policy in the Maghreb region.

The global context development has evolved considerably through the containerization progress. The regional seaport growth has potential access to global markets. But they are also competing in their markets with the increase number of containers. As a result, container traffic has grown over time, in particular by reducing the costs for both the world's leading shipowners and for the ports. Therefore, the global developments maintain the competitiveness between the regions. Consequently, the international progression can be a factor for Maghreb region development in order to update their status.

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