

**INTEGRATION IN PORTS AND MARITIME INDUSTRY IN
MODERN ECONOMY**

RASHA FOUAD ABDEL RAHMAN ¹

*College of International Transport and Logistics
Arab Academy for Science, Technology and Maritime Transport
El Moshir Ahmed Ismail st., Cairo, Egypt,
rashafouad@aast.edu*

ABSTRACT: The nature of competition in maritime and port industry in the modern economic environment of globalization has changed from competition between individual port and shipping companies to competition between maritime logistics chains connecting origin to destination. Ports aim changed from being just a corridor to addition of new services that add value to goods. The paper reviews types of integration in maritime industry focusing on its reasons and economic benefits. The study covered the Egyptian maritime readiness for integration which found that Egypt needs some tactical decisions for fast joining global maritime integration.

Keywords: ports, maritime, economic, horizontal, vertical, integration, Egypt.

INTRODUCTION

Ports integration within supply chains has become a major issue for both public and private players worldwide, as in the modern economic environment competitive strength of a port or any other maritime players does not depend exclusively on their own infrastructure or organization but affected by other market forces. The traditional role of ports has changed, as they become networking sites and gathering chain members. Higher degree of coordination and cooperation is needed through supply chain stressing on ports integration in order to meet customers' needs. This evolution lead to greater market power for large shipping companies and other service providers such as ports authorities and goods handlers. Integration strategies pursued by each of the maritime actors, cooperation strategies both horizontal and vertical are being developed to gain control over the entire supply chain. The study cover forms of cooperation between maritime players within the global competitive environment, integration reasons, some global examples and integration economic benefits. The paper use literature analysis, qualitative descriptive analysis using secondary data from published reports in addition to primary data from experts' interviews. The paper will study Egypt case to analyze its readiness for transport integration.

¹ Vice Dean of College of International Transport and Logistics Cairo-AAST.
PhD of Economics from Faculty of Economics and Political Science- Cairo University

FIRST: PORTS AND LIFE CYCLE MODEL

The product life cycle economic theory by Raymond Vernon suggests that all innovations follow a pattern of introduction phase, a growth phase, a maturity phase at which the product become standardized, and ends with the decline phase, lead to the disappearance of the initial innovation from the market. The duration of each stage varies according to the type of innovation, the management as well as level of market penetration (Sanchez & Wilmsmeier, 2010). Nakicenovic (1987) demonstrated that the lifecycle theory can be applied to transport modes and vehicle systems. Maritime transport now towards the maturity phase which need improvement to avoid reaching the decline phase. The maturity phase characterized by a wide diffusion of the technology around the world. Ships are getting larger and more efficient, shipping lines are deploying larger container vessels on the main trading routes targeting cost savings through achievement of economies of scale (Notteboom & Rodrigue, 2009). Container terminals have witnessed a series of innovations; modern terminal equipment is becoming standardized with the emergence of global terminal operators as DP World. It became difficult for terminal operators to achieve a competitive advantage through terminal equipment. Productivity gains have become a matter of terminal management skills, software, know - how and hinterland size instead of hardware. To avoid a phase of decline, innovations are needed in the logistics management. Smarter management of shipping system and networks is a must for sustainable development of shipping and global supply chains in the long term (Notteboom & Rodrigue, 2008). There are at least three dimensions of the global shift in economic activity, relevant to the economic environment of shipping and ports: Growing international economic interdependence; growing role of manufactured goods in exports; and shifts in port activities. With increasing international economic interdependence ports can develop through either horizontal systems or by integration into a vertical system. The port is part of a global supply chain; it needs to achieve a high degree of coordination and cooperation to be successful. The port needs local and national alliances along the international logistics system (Sletmo, 1999) which facilitate more efficient and effective flows of physical goods or services. Integrated chain maximizes the performance of the entire chain because the whole is considered to be greater than the sum of its parts (Christopher, 2010). For achieving supply chain integration, actors of the chain should cooperate with each other for reaching a mutually accepted outcome, through coordination, and collaboration (Yildirim & Deveci, 2016).

SECOND: TRIGGERS OF INTEGRATION

In economic theory vertical integration involves an entity, such as a manufacturer, trying to acquire or take control of the activities that are upstream or downstream of the stage it is involved in. while Horizontal integration involves the acquisition of entities that perform a similar function either as a process of consolidation or for the penetration of new markets. Those forms of integration take place in the port sector for better integrated transport chain (Rodrigue, 2017).

2.1 Evolution of Shipping Companies

With the increasing number of shipping companies they focused on terminal operations and inland transport services, as operations are increasingly approached from the complex logistics chains. Each link must contribute to the optimization of the chain as a whole, which has altered the competitive balance in the market, as shipping companies have gained in power through their overall control of logistics chains (Van de Voorde, Vanelslander, Meersman, 2010). To reach higher market share shipping companies need to deploy more and larger vessels which require integration due to high costs of purchasing and maintaining ships. If shipping companies integrated in a strategic operational alliance, their costs of vessel maintenance, along other related costs, could be reduced by dividing them with the respective partners of the alliance (Dragmoir, 2011).

2.2 Structural Evolutions within Ports

Traditional stevedoring firms evolved towards more complex terminal operating companies (TOCs), due to mergers, acquisitions and financed expansion projects. Many shipping companies have established their own terminal operating branch, operate as dedicated terminals for the shipping company as Cosco Pacific, or as independent course as APM Terminals, or as a multi-user terminal in order to improve the utilization rate (Van de Voorde & Vanelslander, 2009).

2.3 Evolution of Port and Maritime Industry

Starting from 1990s port activities have changed deeply; based on UNCTAD study on the conceptual models of ports, focusing on three key criteria: policies, strategies, and operations of port activities. It has established a three-generation of ports. The first generation ports, prior to 1960s, operated in an isolated way, acting as interface between land and sea, and firms operated in the port independently, without joint activities. The second generation ports performed a range of functions and acted as centers of trade, commercial and transport services, “adding value” to cargoes. The third generation in 1980s due to modern economy of globalization ports became a part of the logistic chain adding new services that contribute to the value of goods (UNCTAD, 1992). Recently UNCTAD added the concept of fourth- generation ports that consider new aspects in logistics management; information handling is a differentiating element in their services, connectivity among transport modes, major added value services. These ports are characterized by diversification and internationalization of their activities, automation of activities, strong cooperation between the port community and complementary ports in view to increase its competitive advantages and transform into a networked port, perfectly integrated in the logistics chain and in global supply chains where the handling and distribution of information is a cornerstone (European Union, 2014). Change from the segmented to an integrated transport. Entities act with greater vertical and horizontal integration, increasing concentration with more complex functions (Cortil et al, 2016). Flynn et al. (2011) defined fifth generation ports as “customer centric and community focused ports, with service deliverables related to port user’s multi- faceted business

requirements while also taking care of community stakeholder requirements”. They focused on the changing shipping and port environment and inter port competition (Lee & Cullinane, 2016).

2.4 Controlling the Quality of Shipping Services

Some products are difficult to transport and are reliable to damage, their handling requires special expertise. If the shipping company integrated with production among supply chain the producer has a great control and monitoring over the handling process. Also integration helps in shipping delays as sailing times are synchronized with upstream and downstream schedules. Integration as well helps in facilitating high technical and safety oil tankers to avoid accidents as oil is highly inflammable product which needs a to avoid accidents. Oil also encouraging integration due to high fixed costs and rigid capacity as oil refinery must work in full capacity. Agriculture product as well encourage integration for controlling perishable products which requiring strict scheduling (Casson, 1986).

2.5 Macroeconomic Problems

Production and trade imbalances in the global economy reflected in physical flows and transport rates require reassessment of strategies of port calls and transportations. If a country or region imports more than it exports will face systematic accumulation of empty containers which will require repositioning of the empty containers which causes complex problem concerning freight distribution (Notteboom & Rodrigue, 2007), repositioning cost solved with shipping integration.

THIRD: FORMS OF INTEGRATION

Transport integration include ports intermediaries which establish efficient connectivity within transport chains as freight forwarders, transport firms, and intermodal operators, they all participate in horizontal and vertical integration (Ducruet & Van Der Horst, 2009).

3.1 Vertical Integration

Integration in ports operations in economic theory explained as an entity trying to acquire or take control of the activities that are upstream or downstream of the stage of its business (Rodrigue, 2017). It refers to the cooperation among stages of the supply chain such as terminal services, hinterland transportation services, warehousing, and distribution. The main objective of vertical integration is cost reduction along the supply chain (Dragomir, 2011). A port authority is a good example of a vertical integration that provides a wide array of services connecting the foreland and the hinterland. If inland facilities such as inland or dry ports and corridors are developed, a form of port integration is emerging (Rodrigue, 2017). Maersk is the most distinguished example of vertical integration (Dragomir, 2011). Vertical integration also exists between shipping

companies and forwarding agents, which target the efficiency of the management and handling of cargos. They form an integral unit in order to ensure efficiency, security and delivery time. In the practice, shipping companies engage in cooperation with forwarders which are connected in a global shipping business network. This facilitates the traffic of information and shipping documents between the business actors. Some shipping companies also have cooperation with freight forwarders for the extensive coverage of the shipping network and the high traffic of goods (OECD, 2011). The integration of services along the supply chain has led to the creation of Third Party Logistics (3PL) which add competitive advantage through creation of value added. 3PLs refer to integrated intra firm logistical services, reaching from transportation, to warehousing and distribution till delivered to consumers (Dragomir, 2011).

3.2 Horizontal Integration

It is the cooperation between companies competing in the same sector or market as a process of consolidation or for the penetration of new markets. Port holdings, as DP World, target horizontal integration by acquiring stakes at port terminals in different markets. A maritime shipping company that works in port management performs a process of vertical and horizontal integration since it is expanding geographically and also from maritime towards inland services as Maersk Terminals. The outcome is a more integrated and efficient transport chain that include maritime shipping, port terminal operations, inland access and freight distribution as a service to customers (Rodrigue, 2017). The maritime industry is dominated by horizontal integration, either through mergers and acquisitions or strategic alliances (Dragomir, 2011). The objectives of horizontal integration include the increase of the volumes carried, market share on a given maritime route or, to extend the geographical coverage in maritime networks (Frémont, 2008).

3.2.1 Merger & Acquisition: Merger implies two or more companies joining together to become one single enterprise. An acquisition, instead of creating a completely new company, one company buys another, controlling its assets. Both mergers and acquisitions can harm competition when not regulated (De Pamphilis, 2008).

3.2.2 Strategic alliance: it is a strategic business relationships imply a collaboration of partners acting on common grounds (De Pamphilis, 2008). There are three main types of strategic alliances. **First type:** the operational alliance, which concern the upkeep of functioning activities; and asset sharing as slot or vessel sharing (Dragomir, 2011). Slot sharing agreements require a fixed percentage of vessel capacity to be exchanged between the carriers over a given time period. It is beneficial when two partners have vessels deployed on the same route. Vessel sharing agreements is the collaboration between companies to fulfil demand on particular trade routes performing joint optimization on their vessel departure times and shipping order assignment to vessels. Carriers share profit, operating costs and collaborate on the basis of demand information sharing (Panayides & Wiedmer, 2011). **Second type:** pricing alliance it is collaboration between two or more carries on a specified trade route, in order to trail common objectives and

stabilize freight rates on certain trade routes. **Third type:** logistical alliances which constitute a competitive advantage due to consumers' expectations to acquire door to door transportation service (Dragomir, 2011). Koay distinguished a four classification of cooperation between maritime agents; marketing, risk sharing, fleet pooling and the sail scheduling. Equity sharing joint ventures include all four (Koay, 1988).

FOURTH: ECONOMICS OF INTEGRATION

4.1 Vertical Integration Economic Benefits

Vertical integration appears to be a necessity, it consolidate shipping lines position as logistics operators to gain comparative advantages over competitors, to generate sustainably competitive margins through:

- 4.1.1 Economies of Scope:** lower average costs by offering multiple complementary services. Companies are able to cope with lower freight rates, and the problems of excess capacity. If shipping companies are not able to use ships, entry in different markets along the supply chain is the solution as the company will replace the low demand in business area with other services and activities (Dragomir, 2011).
- 4.1.2 Reducing maritime costs:** Vertical integration is expected to minimize transactions costs, reduce operational time for goods or cargo handling, ensure security and service quality standards which are beneficial for shippers (OECD, 2011).
- 4.1.3 One stop shop:** Vertical integration offers customers the option of buying more services from a single provider, thus cargo handling activities as well as hinterland delivery can be obtained from the same service provider (Dragomir, 2011).
- 4.1.4 Market control:** Larger market is served, and the consumer network is expanded, as new and attractive products can be offered (Harrigan, 1985) through providing door-to-door services (Frémont, 2008).
- 4.1.5 Limitation of market power abuse:** when the port operator is also the cargo owner and the end-product is sold in a competitive market. The vertically integrated entity has no ability to manipulate market outcomes in the end-market and its upstream services will have no ability to abuse market power to its downstream component. Therefore, many shippers of liquid bulk as petroleum companies own port terminals (OECD, 2011).

4.2 Horizontal Integration Economic Benefits

- 4.2.1 Economies of scale²** : The source of economies of scale are diversity and the spreading of fixed costs; increased productivity of variable inputs, especially in consequence of specialisation; joint purchases, marketing, and R&D (Van de Voorde & Vanelander, 2009). Economic theory justifies integration for sake of efficiency, since it creates more benefits than disadvantages for both providers and recipients of services, as it is reducing cost and time and benefits all agents (Corti et al, 2016).
- 4.2.2 Reduction of transaction cost³**: Minimise transaction costs using the comparative advantages of the alliance partner in information acquisition, and lower capital investment (Panayides & Wiedmer, 2011).
- 4.2.3 Risk sharing**: Share of financial risks, resources and all types of risks, on one hand, on the other hand there is profit sharing, technological and informational exchange (Dragomir, 2011). Lead to profit maximization, and increase in shareholder wealth (Panayides & Wiedmer, 2011).
- 4.2.4 Operational objectives**: increase in frequency of services, vessel planning and coordination on a global scale (Panayides & Wiedmer, 2011). Reduction of congestion in ports, since vessels are coupled and shared together. Reduction of the risk of empty containers, as the load is divided between the members of the alliance (Notteboom, 2004).
- 4.2.5 Marketing objectives**: satisfy customer requirements through higher frequency, flexibility, reliability, network expansion and offer greater variety of routes and destinations. **Higher Market power⁴**: the ability of firms to secure stronger positions in their market to achieve competitive advantage (Panayides & Wiedmer, 2011). **Higher market share** can be gained more easily by taking part in a colossal multi-company giant alliance rather than functioning alone (Cariou, 2000), which, enhances competitive position (Van de Voorde & Vane slander, 2009), wider geographical scope, increase in purchasing power (Panayides & Wiedmer, 2011).

² Economies of scale which is the decrease in average costs with an extra unit of output, thus increasing production of one good (Krugman, 1980).

³ Transaction costs arise as a result of process of information, negotiate and design contracts, and monitor and enforce the exchange relationship (Panayides & Wiedmer, 2011).

⁴ Shepherd (1970) defined market power as: “the ability of a market participant or group of participants to influence price, quality, and the nature of the product in the market place”. The sources of market power can be classified into product differentiation; barriers to entry and market share (Panayides & Wiedmer, 2011).

FIFTH: EXAMPLES OF INTEGRATION

Developed countries facilitate ports and shipping integration to help countries development as their economies are highly integrated with the global economy (Sanchez & Wilmsmeier, 2010).

5.1 Strategic Alliances

5.1.1 *Liver Pool Ports and Panama Canal Strategic Alliance:* The Panama Canal Authority (ACP) and UK ports operator Peel Ports⁵, have entered into a Memorandum of Understanding (MOU) early November 2016. The agreement creates a strategic alliance facilitating international trade and generating new business by promoting trade routes between Liverpool and the west coast of South America via the Panama Canal. They have both responded to the growth of the global container ship fleet with major investment to accommodate newer generations of container ships (World Maritime News, Oct 2016).

5.1.2 *CKYHE Alliance:* CKYH are Asian-based carriers COSCO, K Line, Yang Ming, Hanjin. In 2014 Evergreen Line and the four members of the CKYH Alliance have agreed in principle to form a new alliance that share ships on trades between Asia and North Europe and the Mediterranean (Hacegaba, 2014). After the South Korean shipping giant Hanjin Shipping, decided to file for court receivership, the remaining four members of the alliance have decided to cut all ties with the company (World Maritime News Sep. 2016).

5.1.3 *2M Alliance:* Maersk signed Vessel Sharing Agreement with Mediterranean Shipping Company (MSC) on the Asia-Europe, Transatlantic and Transpacific trades. The alliance started by controlling 35% market share in Asia-to-Europe trade, cutting a combined USD 1 billion in operational costs. Include 185 vessels with an estimated capacity of 2.1 million TEU. A strategic cooperation agreement between Hyundai Merchant Marine (HMM) and the 2M vessel sharing alliance is scheduled to begin in April 2017. HMM will purchase slots on the 2M routes connecting Asia - North Europe, the Mediterranean and US East Coast (World Maritime News, Dec 2016).

5.1.4 *O3 Container Shipping Alliance:* three box ship giants, CMA CGM Group, China Shipping Container Lines (CSCL) and United Arab Shipping Company (UASC). They signed vessel sharing agreement (VSA) involving vessel-sharing, slot exchange and slot charter, covering the Asia-Europe, Asia-Mediterranean, trans-Pacific and Asia-US East Coast (Maritime Insight, 2014). UASC with its

⁵ In 2016 Peel ports was the second largest ports group in the UK and is the owner and operator of the privatized ports of Dublin, Clydeport, Heysham, Liverpool, Manchester, Sheerness, and Great Yarmouth (Fiedler, 2016).

GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

partners have loaded a record breaking cargo of 18,601 TEUs (World Maritime News, December 2015).

5.1.5 G6 Alliance: Formed of APL, Hapag-Lloyd, Hyundai Merchant Marine, MOL, NYK Line and Orient Overseas Container Line. A vessel-sharing agreement creating one of the largest vessel networks in the Asia-to-Europe trade that allows container lines to achieve economies of scale and better cope with periods of slack demand. They are upgrading continuously in 2013, they expanded their cooperation to the Asia-to-North America East Coast trade deploying more than 50 ships in the Trans-Pacific trade. In 2016, in response to the upgrade of the Panama Canal and seasonal changes in market demand, the members are making product and service updates for the Asia – North America trade (World Maritime News, March 2016).

5.2 Mergers and Acquisitions

5.2.1 MSC, HMM Purchase Hanjin’s TTI: Swiss-based Mediterranean shipping company (MSC) and south Korean Hyundai merchant marine (HMM) have finalized the acquisition of Hanjin shipping’s interests in total terminals international (TTI), which operates two facilities in Long Beach and Seattle. The acquisition includes Hanjin’s equity and shareholder loans in both TTI and the associated terminal equipment leasing company. Under the new ownership structure, TIL has 80 percent, while HMM controls the remaining 20 percent. With the purchase of Hanjin’s 54 percent stake in TTI, MSC became the sole owner of the terminal operator (World Maritime News, Feb. 2017).

5.2.2 Merge of K Line, MOL, NYK: In October 2016, Japan’s big three container shipping companies Kawasaki Kisen Kaisha (K Line), Mitsui O.S.K. Lines (MOL), and Nippon Yusen Kabushiki Kaisha (NYK Line) have agreed to establish a new joint-venture company to integrate their container shipping businesses as well as worldwide terminal operating businesses excluding Japan. The new joint-venture company will operate a fleet totaling 1.4 million TEUs, placing the new company as sixth in the market with approximately 7% of global share. K Line and MOL, will each hold 31 percent, and NYK Line, will hold the remaining 38 percent. It is expected to start as of April 1, 2018. The parties opted for the move to ensure future stable, efficient and competitive business operations in the container shipping industry, which has struggled in recent years due to a decline in the container growth rate and the rapid influx of newly built vessels. The two factors which contributed to imbalance of supply and demand (World Maritime News, Oct. 2016).

5.3 Vertical Integration

5.3.1 Maersk: it supplies many activities along the logistics chain which let it gain a competitive advantage in the market. Because of vertical integration, Maersk is able to extend its global maritime network (Dragomir, 2011). It extended a great

deal through acquisitions (Sealand, P&O/Nedlloyd). In 1999 announced its biggest acquisitions: Sealand Inc., former company owned by Malcolm McLean. Maersk strategy is characterized by two key elements: economies of scale and direct services (Frémont, 2007). In 2005 acquired the Dutch company P&O/Nedlloyd. P&O is a British company, used to operate mostly in Northern Europe. Nedlloyd originates in the Netherlands; in 1997 it merged with P&O. Since 2002, Maersk's global coverage extended, ports are served around the world as well as in niche markets (Frémont, 2007).

5.3.2 *Evergreen Marine Corp.* built in 1968, used to function independently, but due to the negative impact of the financial crisis it considered strategic alliances, concerning vessel sharing agreements. Evergreen is situated between a vertical and a horizontal integration. Vertically, it holds its dedicated terminals; horizontally it has arrangements with other carrier as strategic relationships in 2006 with COSCON and OOCL (Dragomir, 2011).

SIXTH: KEY PERFORMANCE INDICATORS FOR INTEGRATION

6.1 Factors of Integration

Derived from Panayides (2007) study and Carbone and Gouvernal (2007) main factors of port competitiveness and transport integration that facilitate port integration global supply chain are:

- 1- Efficient port infrastructure.
- 2- Proximity to major sourcing and final markets.
- 3- Efficient rail and road network.
- 4- Transit Time.
- 5- Number of direct connections to overseas destination.
- 6- Good labor climate.
- 7- Efficient inland water ways connections.
- 8- Stable relationships with other actors in supply chain.
- 9- Intermodal services.
- 10- Feeder services extension.
- 11- Information availability.
- 12- Communication through Electronic Data Interchange EDI

The most important factor is stable relationships with other actors in supply chain. followed by efficient port infrastructure and efficient hinterland connections.

6.2 Tactical Decisions for Integration

In order to achieve a higher degree of transport integration, tactical decisions should be taken:

- 1- Select the key logistics service providers
- 2- Establish long term relationships with customers (by passing intermediaries)

GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

- 3- Standardize procedures and methods
- 4- Integrate supply chain via IT
- 5- Broaden the range of supplied services (Value added logistics services)

The most important is setting up privileged relationships with selected logistics service providers and the IT integration with actors of supply chain to consolidate shipping lines with the chain. Possible conflicts may happen between the shipping lines and traditional logistics service providers when shipping lines broaden their range of logistics services. The coexistence of different types of transport and logistics service providers within the supply chain requires a better understanding of the contribution to the value creation of each actor. The actors who will deliver higher value are able to offer door to door service mostly they are the logistics division in shipping lines or larger freight forwarders (Carbone & Gouvernal, 2007).

SEVENTH: OVERVIEW OF MARITIME INTEGRATION IN EGYPT

7.1 Screening of Egypt Suitability for Integration

This section will analyze Egypt readiness to integrate with global supply chain through sea ports. The results derived from literature analysis and interviews with experts in maritime and logistics services. According to the study Egypt has the following strengths, weaknesses, opportunities, and threats towards integration.

Table 1 SWOT Analysis of Maritime Integration in Egypt

Strengths	Weaknesses
<ul style="list-style-type: none">● Strategic location of Egyptian ports.● Government awareness of importance of maritime sector in Egypt.● Maritime transport and related logistics services play an important role in Egypt's economy.● foreign seaborne trade represents about 90% of the Egyptian foreign trade volume.● Adoption of Landlord model to increase the competitiveness of Egyptian ports.● Development of the Suez Canal.	<ul style="list-style-type: none">● Inefficient port infrastructure .● Expensive transport fees.● Shortage of qualified personnel.● Bureaucratic and regulative inefficiency.● Insufficient equipment.● Inefficient maintenance and repair.● Inefficient connection between marine and railway infrastructure.● Inadequate technology.● Custom Clearance regulations and systems.● Dispersion of responsibilities among several government departments.

THE INTERNATIONAL MARITIME TRANSPORT & LOGISTICS CONFERENCE
(MARLOG 6)
GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

Opportunities	Threats
<ul style="list-style-type: none"> - Improvement of ICT in Egypt. - Efficient graduates in transport and logistics. - Adequate experts in the field. - Cooperation with global maritime actors. 	<ul style="list-style-type: none"> - Unstable political environment. - Inefficient transport infrastructure. - Bureaucratic and regulative inefficiency in public sector. - Traffic congestions. - Weak business environment. - Lack of innovation. - inefficient institutional framework.

Source: Created by researcher

7.1.1 Ports in the Egyptian Economy

The port system seen as potential strong contributor to growth, as the strategic location of Egyptian ports, provide many opportunities to international shipping (World Bank, 1998). Maritime transport and related logistics services play an important role in Egypt’s economy (Ghoneim & Helmy, 2007). The foreign seaborne trade volume of Egypt represents about 90% of the Egyptian foreign trade volume (www.aceaegypt.com). Egypt has 15 commercial ports of total berths' length of 32.4 Km, total area of main maritime commercial ports 481.54 km²; 27 specialized ports; 7 mining ports; 4 fishing ports; 11 petroleum ports; and 5 tourist ports (www.aceaegypt.com). Among the most important ports are Alexandria, the biggest port in Egypt, and the Port of Dekheila, which is a natural extension to the Port of Alexandria. Damietta Port has the largest container terminal of 62.5 hectares (Deandries, 2015). Damietta Port traffic saw a significant increase in 2016, cargo throughput went up by 12 % and increase of 53.1 % in its export cargo volumes, the number of ships calling at Damietta Port increased by 9 percent (World Maritime News, Jan. 2017).

In 2001, the Government adopted the Landlord model for managing and operating the ports as a means to restructure and increase the competitiveness of Egyptian ports. Under this approach a public port authority role to develop the port, invests in its infrastructure and serves as regulator for all maritime, security and environmental activities. The private sector operates facilities and services under a contractual agreement with the port authority, usually through a lease or “Build-Operate-Transfer” BOT contract for an agreed period. The model has been successful in development of Sokhna port and East Portsaid port (World Bank, 2006). Portsaid port divided into two parts, east portsaid port and west portsaid port, the first featuring 800 thousand TEUs capacity, and the second with 2.7 million TEUs. The infrastructure spread over an area of 90 hectares with a draft ranging from -14m to -16.5m and it comprises of 21 quay cranes (Deandries, 2015).

7.1.2 Transport Infrastructure

Ports in developing countries have been through evolution in the last twenty years to adapt to the global changes. Although ports have developed to face the challenges of growing trade flows, but ports infrastructure as corridors and institutional structures still in the early stages of development. Current infrastructural bottlenecks in port infrastructure reflect deficits and insufficiencies in the economic system and integration

with global supply chain through factors of port development as, transport services, port capacities and institutional frameworks (Sanchez & Wilmsmeier, 2010). In some ports, there is poor infrastructure and poor maintenance of equipment, which contribute to higher handling charges and more time. According to World Economic Forum Reports (2015, 2016, 2017) Egypt quality of, road, rail, port and air transport infrastructure ranked in 2015 as 107, 73, 58, 52 subsequently among 140 countries in 2014 ranked 110, 70, 55, 53 and in 2013 was 118, 78, 66, 60 subsequently which shows that transport infrastructure improved from 2013 to 2014 but in 2015 only roads and air transport improved slightly while rail and ports deteriorated. According to LPI report issued by World Bank Egypt infrastructure indicator deteriorated from 45th rank in 2012 to 60th in 2014 but improved to the 50th in 2016 out of 160 countries (World Bank Reports). Based on Notteboom and Rodrigue (2007) the main reasons of infrastructure problem:

- Infrastructure dominated by public authorities takes into account social, political aspects and financial limitations.
- Logistical providers dominated by market players don't have to depend on port authority.
- Dispersion of responsibilities among several government departments makes it difficult to develop an integrated intermodal transport policy.
- Port authority power is limited in developing infrastructure.
- Road network is very congested and leads to other serious problems as road safety, noise, and pollutions within cities.
- Rail-Road transport is already in operation, but the operational capacity is very limited due to the fact that the priority is given to passenger transport

7.1.3 Business Environment- Ease of Trading Across Borders

According to World Bank Egypt Rank 122nd among 190 countries in the ease of doing business in 2016 improved four ranks from 2015. Economies around the world have taken steps making it easier to start a business. Egypt started steps towards making business easier by merging procedures at the one-stop shop by introducing a follow-up unit in charge of taxes and labor authority as well as reduced the cost to start a business. According to ease of trading across borders globally, Egypt stands at 168 in the ranking of 190 economies. Egypt made trading easier by introducing an electronic system for submitting export and import documents, while it more difficult by making the process of obtaining and processing documents more complex and by imposing a cap on foreign exchange deposits and withdrawals for imports. The worst indicators:

- Time to import (border compliance)⁶: It needs 240 hours while it needs only 121 hours in MENA region and 9 hours in OECD high income countries.
- Time to import (documentary compliance)⁷: it needs 265 hours in Egypt and 101 hours in MENA region and 4 hours only in OECD high income countries.

⁶ The time and cost for border compliance include time and cost for obtaining, preparing and submitting documents during port or border handling, customs clearance and inspection procedures (World Bank, 2017).

THE INTERNATIONAL MARITIME TRANSPORT & LOGISTICS CONFERENCE
(MARLOG 6)
GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

- Cost to import: it costs US 1000 in Egypt while only US 305 in MENA region and US 26 in OECD high income countries (World Bank, 2017).

7.1.4 Level of Automation

Container terminals in the ports of Alexandria, El-Dekhila, Port Said and EL Sokhna have been automated with state of the art software for container terminal operations. Currently there is no communication between ships and container terminal prior to arrival except in ports of Alexandria, El dekhila, Damietta and Sokhna port. There is no exchange of loading and unloading plans between the terminal and ships, which could save time and costs. The implementation of EDI is likely to face several obstacles due to cultural and organizational complexity of port authorities. Availability of latest technologies ranked 120 out of 144 countries (World Economic Forum report, 2016). According to interview with marketing specialist at DP world Sokhna, it is found that it's the first fully automated port in Egypt including; One stop shop solution for customers, Mobile Telephony (SMS) (The customer receives SMS with his customs inspection date to observe and release his container), Front Office Services (data entry of Customs declarations and Inspection Requests), and Customs EDI (receive electronic cargo manifests and send customs clearance messages).

7.1.5 Shipping Connectivity

UNCTAD liner shipping connectivity index (LSCI), indicates a country's integration level into global liner shipping networks. The index generated from five components: (a) the number of ships; (b) the total container-carrying capacity of those ships; (c) the maximum vessel size; (d) the number of services; and (e) the number of companies that deploy container ships on services from and to a country's ports. According to the index:

- Egypt score is (62.5) ranked 20th globally and second best-connected country in Africa after Morocco (64.72) according to LSCI 2016.
- Egypt one of the largest ship owning countries in Africa among Angola, and Nigeria but doesn't play role in foreign trade.
- In the container sector, Egypt, Morocco, and South Africa identified as the busiest parts in Africa for maritime trade.
- Among leading ports in Africa with significant levels of traffic are Durban, South Africa; Lagos, Nigeria; and Port Said, Alexandria and Suez, Egypt.
- Container port throughput 8 810 990 TEU (Twenty foot Equivalent Unit) in 2014 the latest data available only 1% of world throughput of 684 584 947 TEU (UNCTAD reports and World Bank data).

⁷ The time and cost for documentary compliance include the time and cost for obtaining documents, preparing documents, processing documents, presenting documents, and submitting documents (World Bank, 2017).

GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

7.1.6 Logistics Services

According to LPI issued by World Bank Egypt position deteriorated from 57th rank in 2012 to 62nd in 2014 but improved to 49th in 2016. Competence and quality of logistics services indicator deteriorated from 50th rank in 2012 to 58th in 2014 and improved to 43rd in 2016. Ability of tracking and tracing consignments improved from 66th in 2012 to 43rd rank in 2014 but deteriorated to 54 in 2016. Egypt categorized as partial logistics performer with a level of logistics constraints. In comparison to Middle East countries Egypt shows a logistics gap as United Arab Emirates, Qatar, Turkey, Bahrain occupy positions 13th, 30th, 34th, and 44th respectively as shown from the table.

Table 2 Comparative Logistics Performance Index (Rank 2016)

Country	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timelines
UAE	13	3.94	12	13	7	18	18	18
Qatar	30	3.6	21	28	26	29	35	35
Turkey	34	3.42	36	31	35	36	43	40
Bahrain	44	3.31	41	48	41	33	44	51
Egypt	49	3.18	65	50	45	43	54	48
Saudi Arabia	52	3.16	68	40	48	54	49	53
Algeria	75	2.77	108	80	77	59	72	91
Morocco	86	2.67	124	90	54	91	122	83
Tunisia	110	2.5	147	93	133	90	84	99

Source: *The Logistics Performance Index and Its Indicators 2016- World Bank*

7.1.7 International Cooperation

- Egypt's Port of Damietta Authority has signed a Memorandum of Understanding (MOU) with China Harbor for the development of Damietta Port's second container terminal. Under the agreement, signed on October 9, 2016, the project implementation period would be 24 months. The new terminal is planned to comprise berths totaling 2,225 meters with 17 meters depth and stacking space of 700,000 m². The Chinese Bank is scheduled to finance 85 percent of project cost, while the authority will have complete ownership of the terminal. This agreement will enhance national container terminal performance in accommodating latest containerships (World Maritime news, Oct. 2016).
- French container shipping CMA CGM has upgraded its coverage between the Adriatic Sea and Egypt by introducing new service, links Egypt, Malta, Croatia, Italy, and Slovenia. This service, designed for perishable goods transportation in reefer containers, offers the best transit times on the market between the Adriatic Sea and Egypt. The service links Alexandria old port in Egypt to Rijeka in Croatia in 6

GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

days, Trieste in Italy in 7 days, and Koper in Slovenia in 9 days. Calls Damietta in 7 days from Koper, 9 from Trieste, and 10 from Rijeka (World Maritime news, Dec. 2016).

- Singapore-based container shipping company APL has decided to expand its Asia-Middle East and Latin America networks by adding new services to these routes. To its Asia-Middle East coverage, the company has added the Red Sea Express 2 (RE2) Service, which will link China to the Red Sea ports of Jeddah, Sokhna and Aqaba (World Maritime news, Nov. 2016).

7.1.8 Custom Clearance

The Egyptian Department of Customs, which operates under the Ministry of Finance, is responsible for clearing merchandise into Egypt. Imported goods may not legally enter Egyptian commerce until the shipment has arrived within the port of entry and customs has authorized delivery of the merchandise. Import declarations and corresponding documentation are filed either by the customs broker or by the importer. Standard commercial practice is for a broker to file the entry as an agent of the importer. Declaration is processed in the event of goods being imported to the local market from other countries against the payment of customs duty & sales taxes or duty exempted whichever is applicable (Egytrans.com). Derived from interviews with transport experts the main problems they face with custom clearance in Egypt which require fast correction are:

- Absence of electronic custom clearance system.
- Non-consolidated custom clearance system.
- Problems in customs regulations enforcement.
- Custom clearance procedures are not uniform in all ports.

7.2 RECOMMENDATIONS FOR EGYPT CASE

7.2.1 Development of Port Operations

Based on the current study and previous academic studies, Egyptian ports performance need improvement to strengthen their economic role requires:

- Reduction of ports operating costs.
- Shortening the time needed for container movement.
- Raising port capacity.
- Real time monitoring and control operations.
- Better marketing campaigns.
- Coordination between transport modes .
- Advanced ICT solutions.
- Efficiency automation.
- Cooperation and integration within port.
- Advanced and reliable information.
- Fast exchange of data for decision making.

7.2.2 Intermodal Transport System Development

Intermodal transport is an important factor of integration as seen earlier. Based on Rui Wang Egypt intermodal transport system needs the following upgrades:

- 1) Seaport: need expansion to establish a container barge terminal, including the berth dimension, berth number, and total required quay length. The service design requires kind and number of container handling equipment to be upgraded.
- 2) The improvement of Alexandria—Cairo waterway to ensure a safe and efficient barge transport all the year, including the required water depth, water width, bottleneck lock, bottleneck bridge, and necessary navigation aids.
- 3) River port: creation of new river port in the north of Cairo it should include three parts: at the quay, between quay and storage yard, and within the storage yard.
- 4) Local truck transport: the last part of the inland door-to-door transport system, local truck is responsible for delivering and picking up the containers to or from the end customers or shippers within the country. Safe and efficient container transport between the seaports and final destination should be ensured through for example more checking points, installing GPS tracking systems in trucks; drivers should take safety and defensive driving training course as prerequisite for job, regular check of trucks GPS system, maintenance, drivers health.
- 5) Government of Egypt should provide attractive environment to attract more private actors to get involved in the River-Road transport market through better investment environment as taxes exemptions, issuing new attractive projects for private actors.

7.2.3 Upgrade Port Information System

Inter- organization information system between ports and different actors of supply chain should be created as basis for maritime integration to supply chain which requires the following procedures to avoid any bottleneck in system development and to ensure system efficiency:

- Well established information technology infrastructure before implementation of the system to avoid system failures.
- Updating business processes within the ports to be consistent with the system.
- Upgrading ports equipment to operate in harmony with the new system.
- Strengthening port infrastructure and support facilities in IT.
- Strengthening institutional support.
- Coordination between public and private community members to invest in the new system.
- Upgrade port personnel language and technical skills including ICT skills as well as understanding of new technologies to be able to use the new system efficiently.

7.2.4 Automation of Custom Clearance Procedures

As seen from Egypt analysis above that the worst trade indicator was time to import including the time and cost for border compliance and documents include time and cost for obtaining, preparing and submitting documents during port or border handling,

GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

customs clearance and inspection procedures which require tactical decision to solve this obstacle for integration. In Rotterdam port 95% of customs documents relating to export containers can now be dealt electronically. It is now no longer necessary to stop at the terminal to submit documents. Exporters and freight forwarders can simply send pre-notification of the documents electronically via the Portbase service Notification Export Documentation. The documents will then be released automatically when the container arrives at the terminal. Problems with Customs are avoided in advance (Rotterdam web site, visited in February 2017). Reduction of clearance time requires creating information system to facilitate electronic customs procedure includes:

- electronic submission of manifests and entries.
- payment of duties electronically by banks.
- sharing of files by custom officials through the system.
- transferring of electronic messages between Customs and Importers.

CONCLUSIONS

- Maritime transport towards the maturity phase which needs improvement to avoid reaching the decline phase which trigger integration to facilitate more innovations in logistics management and cost reduction, smarter management of shipping system and networks is a must for sustainable development of shipping and global supply chains in the long term.
- Horizontal and vertical integration take place in the port sector for better integrated transport chain.
- Developing countries have to adjust their port and transport development strategies in order to face current challenges induced by increased demand for maritime services to raise country's competitiveness in trade, to reach sustainability.
- Integration to supply chain represents the new strategy of port development, which used to focus only on the port itself.
- Integration results from logistics decisions and actions of shippers and third party logistics providers.
- Port authorities should enhance the integration process to face current port challenges, as congestion, increasing costs, limited handling capacity and additional traffic.
- Tactical decision of port authorities should go beyond traditional facilitator to play an important role in the creation of economies of scope increases and raise port competitiveness through active engagement, development of freight distribution, information systems, better access to hinterland, and intermodal transport.
- Main objectives of horizontal integration are economies of scale, increase of volumes carried, greater market share, extension of the geographical coverage in maritime networks.
- Main objectives of vertical integration are cost reduction along the supply chain and economies of scope.

GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

- The worst trade indicator in Egypt found from indicator and from interviews with experts to be custom clearance procedures as time to import including the time and cost for border compliance and documents include time and cost for obtaining, preparing and submitting documents during port or border handling, customs clearance and inspection procedures which require tactical decision to solve this obstacle for integration.

REFERENCES

- 1 Carbone, V. and Gouvernal E. (2007), “Supply-chain Management and Supply Chain Management: Appropriate concepts for Maritime Studies”, Ashgate Publishing Ltd., England.
- 2 Cariou, P. (2001), ‘Vertical Integration Within The Logistic Chain: Does Regulation Play Rational? The Case For Dedicated Container Terminals”, *Transport Europei*
- 3 Casson M. (1986), “The Role of Vertical Integration in the Shipping Industry”, *Journal of Transport Economics and Policy*
- 4 Christopher, M. (2010) ,”*Logistics and Supply Chain Management*”, 4th ed. Edinburgh: Prentice Hall.
- 5 Corti el el, (2016), “New Maritime Alliances and Competition in a New Economic Environment”, *Traffic Policy Review, Traffic &Transportation Review*, Vol. 28, 2016, No. 3
- 6 De Pamphilis, D.,(2008), “Mergers, Acquisitions, and Other Restructuring Activities”, Elsevier, New York, USA
- 7 Deandries, M. (2015), “The New Suez Canal: Economic Impact on Mediterranean Maritime Trade”, *SRM Maritime Economy*.
- 8 Dragomir L. (2013), “Vertical and Horizontal Integration in the Maritime Industry – The impact of the Financial Crisis”, *Erasmus University of Rotterdam*.
- 9 Ducruet C., Van Der Horst M. (2009),” *Transport Integration at European Ports: Measuring the Role and Position of Intermediaries*”, *EJTIR* 9(2), June 2009
- 10 Fiedler D. (2016),” *Port Cooperation Between European Seaports - Fundamentals, Challenges And Good Practices*”, *Fraunhofer Center For Maritime Logistics And Services - Germany*
- 11 Frémont, A. (2006), ‘Shipping Lines And Logistics’, *Proceedings Of The IAME 2006 Conference-Journal Of Transport Geography*
- 12 Frémont, A. (2007), “Global Maritime Networks: The Case of Maersk”, *Journal of Transport Geography*, vol. 15, no 6.
- 13 Frémont, A. (2008), "Empirical Evidence For Integration And Disintegration Of Maritime Shipping, Port And Logistics Activities", *OECD/ITF Joint Transport Research Centre Discussion Paper*, No. 2009-1
- 14 Ghoneim, A. and Helmy, O. (2007), "Maritime Transport and Related Logistics Services in Egypt", *ICTSD Trade in Services and Sustainable Development Series*. International Centre for Trade and Sustainable Development, Switzerland.
- 15 Hacegaba, N. (2014), "Big Ships, Big Challenges: The Impact of Mega Container Vessels on U.S. Port Authorities", Long Beach, CA.
- 16 Harrigan, K. R., (1985), “Vertical Integration and Corporate Strategies”, *Academy of Management Journal*, Vol.28, No.2
- 17 Koay, P.Y., (1988), “Strategic Alliances in the Liner Shipping Industry”, *National*

THE INTERNATIONAL MARITIME TRANSPORT & LOGISTICS CONFERENCE
(MARLOG 6)
GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

- University of Singapore
- 18 Krugman, P., (1980), “Scale Economies, Product Differentiation, and the Pattern of Trade”, the American Economic Review, Vol. 70, No. 5.
- 19 Lee, P., Cullinane, K., (2016), “Dynamic Shipping And Port Development In The Globalized Economy”, Houndmills, Basingstoke, Hampshire ; New York: Palgrave Macmillan
- 20 Maritime Insight (2014), "Strategic Alliance in Container Liner Shipping After P3 Failure", Maritime insight Volume 2, Issue 3, Autumn 2014
- 21 Notteboom, T. And J-P Rodrigue (2005) “Port Regionalization: Towards A New Phase In Port Development”, Maritime Policy And Management, Vol. 32, No. 3
- 22 Notteboom, T. And J-P Rodrigue (2007), "Re-Assessing Port Hinterland Relationships In The Context of Global Commodity", Ashgate Publishing Ltd. England
- 23 Notteboom, T. And J-P Rodrigue (2008), “Containerisation, Box Logistics And Global Supply Chains: The Integration of Ports And Liner Shipping Networks”, Palgrave Macmillan- Maritime Economics & Logistics
- 24 Notteboom, T. And J-P Rodrigue (2009), " The Future Of Containerization: Perspective From Maritime And Inland Freight Distribution". Geojournal Vol. 74 No.(1)
- 25 Notteboom, T.E., (2004), “Container Shipping and ports: an overview”, Review of Network of Economics, Vol.3, No.2.
- 26 OECD (2011), "Policy Roundtables: Competition in Ports and Port Services", DAF/COMP(2011)14, OECD
- 27 Rodrigue J. and Notteboom T. (2013), “Port regionalization: improving port competitiveness by reaching beyond the port perimeter”, Port Technology International.
- 28 Rodrigue, J. (2017), "The Geography of Transport Systems", New York: Routledge
- 29 Rodrigue, J.P. (2010),"Maritime Transportation: Drivers for The Shipping and Port Industries", International Transport Forum. OECD
- 30 Rodrigue, J.P. (2013),"The Geography of Transport Systems", New York: Routledge
- 31 Sanchez R. , Wilmsmeier G. (2010)," Contextual Port Development: A Theoretical Approach", P. Coto-Milla'n et al. (eds.), Essays on Port Economics, Contributions to Economics, Springer-Verlag Berlin Heidelberg Approach",
- 32 Sletmo G. (1999) "Port Life Cycles: Policy and Strategy", World Bank
- 33 UNCTAD (1992),"Port Marketing and The Challenge of Third Generation Port", UNCTAD, Board of Shpping
- 34 Van de Voorde E.,Vaneslander T. (2009), “Market Power and Vertical and Horizontal Integration in the Maritime Shipping and Port Industry”, OECD/ITF. — Discussion Paper 2009-2
- 35 Van de Voorde E.,Vaneslander T., Meersman, H. (2010), “ Port Competition Revisited", Review of Business and Economics.
- 36 Yildirim C. & Deveci A. (2016)," Integration Of Maritime Transportation to Supply Chains: A Literature Review and Suggestions For Further Research", Derlem, Turkey
- Reports**
- 37 European Union (2013), "Port Integration. Port Authority Action Plan", Published March 2013
- 38 European Union (2014), " Action Plan towards the SMART PORT concept in the Mediterranean Area SMART-PORT", European Regional Development Fund
- 39 UNCTAD(2015)"Review of Maritime Transport", UNITED NATIONS PUBLICATION
- 40 UNCTAD(2016)"Review of Maritime Transport", UNITED NATIONS PUBLICATION
- 41 World Bank (2006), Project Appraisal Egypt Port Development. Report No.:

THE INTERNATIONAL MARITIME TRANSPORT & LOGISTICS CONFERENCE
(MARLOG 6)
GLOBAL INTEGRATION IN PORTS “FUTURE OPPORTUNITIES”
19 - 21 MARCH 2017

- AB1461. World Bank. Washington DC. US
- 42 World Bank "The Logistics Performance Index and Its Indicators 2012", Reports from 2012 to 2016
- 43 World Bank (2017)," Doing Business 2017", World Bank
- 44 World Economic Forum, "The Global Competitiveness Report ", Reports from 2013 to 2017.
- Web Sites**
- 45 Alexandria Crewing Agency <http://www.acaegypt.com>
- 46 World Maritime News [www.http://worldmaritimenews.com/](http://worldmaritimenews.com/)