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The Evolutionary Path of Seaports and the *Belt and Road Initiative*: the competitive position of the Venice Port System

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Introduction

The port and maritime shipping industry, similarly to most industries, has been characterized by radical developments in the last decades. The result is a new, upgraded identity of seaports, in comparison to few decades ago. In fact, mainly driven by the globalization phenomenon, the most competitive seaports are the ones that have integrated their original function of reception and transportation of goods with new and evolving set of value-adding activities. The variables at play in this transformation are numerous and varied, mainly pertaining to the globalization phenomenon, which is regarded as the single most important driver of change in the majority of industries in the last decades.

Overall, this thesis objective is to review the evolutionary path of ports and the environment in which they operate, and assess the Venetian Port System's position and competitiveness in relation to the past and current trends in the industry.

The first chapter of this work, after providing an overview of the current seaports and maritime shipping industry, reviews the main evolutionary steps characterizing seaports, under the dimensions of role and functions, governance, technological innovations, and sustainability of their operations.

In this context, a relatively new and massive force has entered, namely the *Belt and Road Initiative*, probably the most ambitious plan of infrastructural and commercial investments, initiated in 2013 by the Chinese government. According to most studies, this new variable is destined to radically reshape the environment in which seaports operate. The second chapter of this thesis is dedicated to this ambitious project, by overviewing its origins and objectives, and the investments already made in a multitude of seaports around the globe.

In conclusion, after the review of the main evolutionary steps of seaports and the *Belt and Road Initiative* as the current main driver of change in the industry, the third and final chapter of this work is dedicated to the Venice Port System case study, supervised by the North Adriatic Port System Authority. The chapter firstly provides an overview of the state of the art of the Italian port structure, as defined by the Italian legislation. The Venetian Port System, composed of the Ports of Venice and Chioggia, is examined mainly

by means of semi-structured interviews conducted in the North Adriatic Port System Authority, with regard to the dimensions considered in the first part of this work. The objectives of the case study are twofold: first, to assess whether the Venetian port system's case is conforming to the evolution and trends in the sector; second, to individuate the main competitive factors and attributes that make it successful now and that may constitute potential drivers of future success in the evolving industry.

CHAPTER 1 – EVOLUTIONARY PERSPECTIVE OF THE PORT AND MARITIME SHIPPING INDUSTRY

Introduction

This chapter's goal is to review the developments that have taken place in the port and shipping industry in the last decades, under the perspective of ports' roles, functions and services, logistics, scope for adding value, and variables bringing to life such changes.

Undeniably, the classic and foundational role of seaports is that of reception and transportation of goods, which has been mostly the case until few decades ago. This function is still at the core of all ports' business model. However, the most developed and competitive ports now are the ones that have constructed a whole sphere of additional value-adding activities around the basic function of reception and transportation of cargo. Besides the evolution in scope, the shipping industry and seaborne trade have been characterized also by an increase in scale of operations, driven by globalization and decentralization of production.

Paragraph 1.1 provides an overview of the port and shipping industry, with details about the evolution in trade and a snapshot of the most active ports in cargo traffic today. Given the variety in nature of the developments in port entities, the review of such evolutionary steps is organized into dimensions. *Paragraph 1.2* delineates the evolution of the role and functions of seaports, and the drivers of change.

The following *Paragraph 1.3* focuses on the governance dimension, reviewing the ways in which port entities are managed and financed. *Paragraph 1.4* reviews the main technological innovations in the shipping and port sectors, used as means for efficiency and sustainability. Such advancements are still of paramount importance for being competitive.

1.1 Overview of the port and maritime shipping industry

Seaports are fundamental actors in maritime transport activities, which can be defined as the shipment of goods and people by sea and other motorways.[1] Although developments in the transportation of people are undeniable, this thesis focuses on the evolution of the shipment of goods by sea and the functions and activities involved. Seaborne trade and the water transport industry have been characterized by major developments in the last five decades. This paragraph aims at summarizing some of such trends.

According to a report published by the UNCTAD, between 80 and 90% of international trade volumes are transported by ships.[2] In regard to the value of the cargo, the share falls between 60 and 70%, the cause being the fact that goods transported by ships have, on average, a lower price-weight ratio. *Figure 1.1* illustrates the timeline of the international sea trade development since the year 1970.

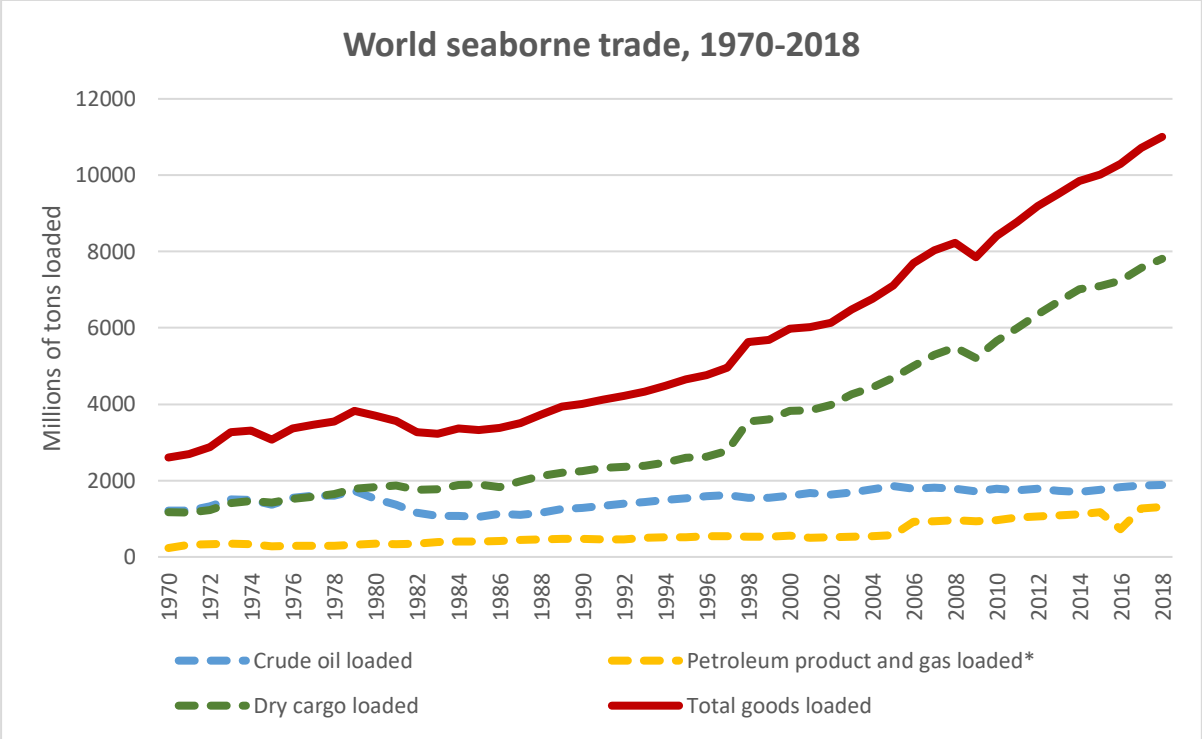
The first remark is that total world sea trade has seen a remarkable, although not always consistent, increase in the last five decades, going from about 2.6 billion in 1970 to 11 billion tons loaded in 2018. Moreover, as can be seen in the graph, besides the general volumes traded by ships, there have been changes also in the nature of the objects of trade. Most notably, dry cargo has seen a colossal growth, being in 2018 more than six times the tonnage of the year 1970.

An element worth of note is the increased participation from the early 2000s of many developing countries in international trade of primary, semi-finished and finished products. This is, according to the UNCTAD, an influencing factor causing the increase in global trade. Nevertheless, there are still ongoing imbalances, for example with Asian countries expanding exports of manufactured goods, whereas African and Latin American countries failed to keep pace due to some intrinsic factors of the regions, such as lack of adequate infrastructures and transport services.

[1] The Global Facilitation Partnership for Transportation and Trade (GFP) website. Retrieved from https://gfptt.org/

[2] Brooks, M. R., & Faust, P. (2018). 50 Years of Review of Maritime Transport, 1968-2018: Reflecting on the Past, Exploring the Future (No. UNCTAD/DTL/2018/1).

Figure 1.1 World seaborne trade, 1970-2018



Source: personal elaboration on UNCTAD data (https://unctadstat.unctad.org)

**Petroleum product and gas loaded: including liquefied natural gas (LNG), liquefied petroleum gas (LPG), naphtha, gasoline, jet fuel, kerosene, light oil, heavy fuel oil and others*

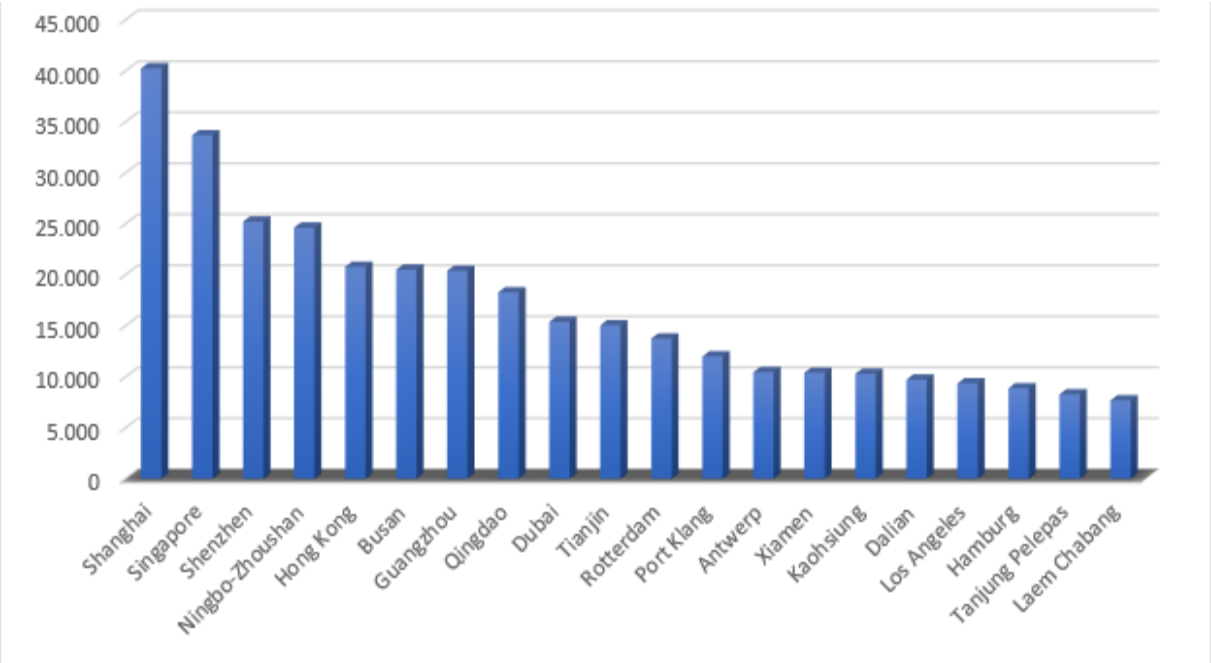
The causes of the developments are manifold and of diversified nature. Exogenous factors influencing the shipping industry include: rise of globalized and decentralized production processes and supply chains; increased international trade; rise of global companies and their divergent demands. Endogenous factors include: developments inside the maritime transport industry, such as better services in quality and price; technological advancements, such as the diffusion of containerized trade, information technology and industry 4.0 applications; decrease in the unitary cost of sea transport through economies of scale; dynamics among shipping companies, such as cooperation and alliances; vertical integration pursued by actors in the transport and supply chain, along with provision of additional services; changing role of ports through the implementation of value-adding activities. A more profound review of such variations is developed in the next paragraph.

Undoubtedly, seaports had and still have a fundamental role in international trade dynamics, in that they constitute essential nodes in the global transport system. Evidently,

the trends occurring in the water transportation of goods are hardly imaginable without some developments also in port entities.

The containerization trend is one of the most important phenomena in maritime shipping, discussed more in detail in the following paragraphs. *Figure 1.2* illustrates a ranking of the busiest container ports in the world in 2017 in terms of volume traded in TEUs[3]. Shanghai port attains the first position, with 40 million TEUs handled, followed by Singapore with its 33.7 million TEUs. In Europe, Rotterdam is the largest port in terms of volume traded, with 13.7 million TEUs, followed by Antwerp, with 10.5 million TEUs moved.

Figure 1.2 Ranking of container ports by volume traded (in thousand TEUs), 2017



Source: personal elaboration from Lloyd's List Intelligence, Top 100 Ports 2018[4]

[3] Twenty-foot equivalent units (TEUs): volume unit of measure of cargo capacity, referred to the standard container size of twenty feet.
[4] See: *https://lloydslist.maritimeintelligence.informa.com/one-hundred-container-ports-2018*

Seaports and relative port authorities[5] have also been characterized by changes in multiple dimensions, which are reviewed more in detail in the following paragraphs. For centuries, the role of ports has been that of reception and transportation of goods. In this regard, seaports up to few decades ago could almost be regarded as commodities, with limited or no strategical and functional differentiating factors beyond their intrinsic competitive advantages, such as the geographical position or the size of the port. The port was just a physical place used for departure and arrival of goods.

In the last few decades however, along with the world economy, the market in which ports operate has been characterized by substantial and continuous changes under a variety of dimensions. The drivers of change are multiple and variegated but could be all encompassed by the huge umbrella generally labelled as *globalization*. As widely confirmed, the massive force of globalization fueled and forced transformation in virtually every sector, among which is to be included the shipping industry. However, one could say that the opposite is equivalently true, i.e. that the shipping industry is one of the most important drivers of globalization. This latter view is intuitive: without the water transport of goods and people, globalization as is today is hardly conceivable. What follows is that the globalization wave and the shipping industry are interrelated on multiple levels, with one shaping and driving the other.

When studying the seaports' environment in particular, a shared view is that ports' evolution has been of a derived nature, considering that the shipping industry *per se* had a more active approach in driving, more than adapting to, the new market dynamics and demands; port entities, instead, had a more adaptive role, aimed at accommodating such shifts and taking measures to remain competitive in the new market. The identity of ports is now substantially different than it was up to the first half of the last century. The activities of reception and transportation are encompassed and supported by a whole set of new and variegated activities, an increasingly integrated and interconnected network of functions, services, actors and strategies. Inevitably, in this highly globalized world, modern seaports constitute now essential nodes in the global transport system. The next paragraphs provide a more in-depth analysis of the evolutionary steps occurred in the last decades, by categorizing them in four dimensions: functional; governance;

[5] Port Authorities are the entities supervising the activities in the port. More on "*Port Authorities*" in *Paragraph 1.3*.

technological; and environmental. These aspects are inevitably interrelated but isolating them can be favorable for visualizing the whole picture.

1.2 The role of ports then and now: route to a new identity

1.2.1 A derived change

The evolution of port entities in the last decades has been put under the lenses of numerous researchers, with the objective of studying the development of the role and functions of seaports. As mentioned, the main reason of the developments of port entities is the changing environment in which they operate. Therefore, to understand the drivers of the change in the ports' functions, a step-by-step cause and effect approach could be propitious.

Notteboom and Winkelmans identify a single most important catalyst of this evolution, namely the "structural shift in economy from Fordism to post-Fordism", which transformed the context in which seaports operate.[6] Since the 1980s, the Fordian era began to approach its limits and was challenged by a new economic system that was more oriented towards economies of scope, rather than economies of scale.

Figure 1.3 summarizes some important characteristics of the shift in the market.

[6] Notteboom, T. E., & Winkelmans, W. (2001). Structural changes in logistics: how will port authorities face the challenge?. Maritime Policy & Management, 28(1), 71-89.

Figure 1.3 Shift from Fordism to Post-Fordism

	Fordism		Post-Fordism
Source of competitiveness	Economies of scale based on basic production factors (capital, land, labour)	➡	Economies of scope based on advanced production factors (know-how, procedures)
Nature of products	Standard products Extended life-cycle Low lead-time	➡	Large product variety Short life-cycle Short time-to-market
Environment	Stable, limited insecurity and and risk Existing markets and products	➡	Dynamic, high insecurity and risk New markets and products
Organization	Integrated firm Standard procedures and processes In-house production ('make')	➡	Flexible multi-firm networks Incident management Outsourcing ('buy')

Source: Notteboom, T. E., & Winkelmans, W. (2001). Structural changes in logistics: how will port authorities face the challenge?. Maritime Policy & Management

Since the 1950-1960s, international trade has been growing at an increasing rate, due to globalization of production and consumption, leading to advancements in the transportation sector. An example of a direct effect on the transport industry is the shorter life-cycle of the marketed products, which requires a greater number of products to be shipped, with a higher frequency, whereas batch sizes were starting to decrease; transportation actors had to act accordingly. Under this aspect, the evolution of the transport sector, and of seaports, has been a "derived" one. With reference to the influences on the transport industry by the new economic system, two key drivers can be identified: the outsourcing tendency by the newborn global companies of some logistics functions, such as transportation, warehousing and distribution; and the demand by European manufacturers for global logistics packages as integration to simple shipping operations. The market saw a rise in demand from the biggest companies for entities that could provide value-adding activities for their goods, such as repackaging, labeling, assembly, and other logistics services.

Primarily, in order to keep pace with these new trends in the market, transport chain actors, such as shipping lines, terminal operators, rail operators and barge operators, pursued two main, non-mutually exclusive strategies:[7]

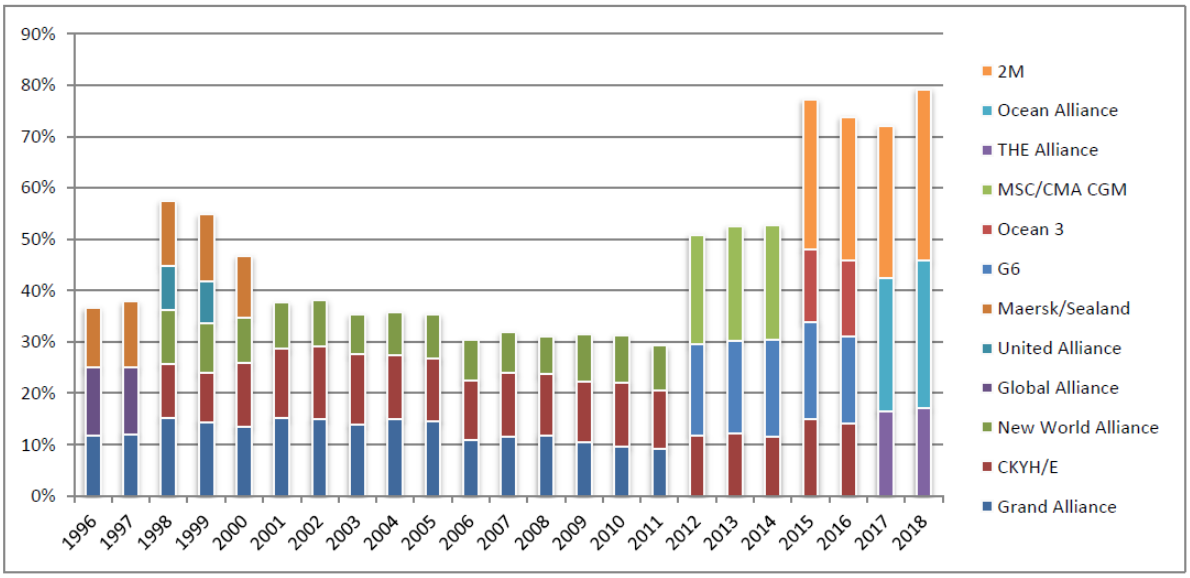
- *Horizontal integration* strategies through cooperation, mergers, and acquisitions, with the goal of increasing the scale of operations and cutting costs;
- *Vertical integration* strategies, in order to provide more efficient and extensive integrated logistics packages. For example, freight forwarders[8] responded by offering full logistics services, combining different transport modes for freight movements, via water and inland. Shipping lines also chose to diversify, with an increasingly broad range of services, introducing, beyond transportation, activities such as custom clearance and supply chain management.

A meaningful example of incremental horizontal integration strategies is found in the container-shipping sector. A report of the *International Transport Forum* classifies the developments in this sector in four *generations*.[9] The first generation of alliances started in the early 1990s, with large, although temporary, sharing practices of vessels among individual carriers. For example, *Maersk* and *SeaLand* formed an alliance in container shipping in 1991 to share resources and co-operate in some markets.[10] The second generation was characterized by more stable alliances among a dominant carrier and several smaller ones. Few years ago, there was the beginning of new trend of alliances between the largest carriers, labelled as the third generation. In 2005, it is estimated that 25 out of more than 400 carriers controlled more than 80% of container fleet capacity.[11] The last generation consists of alliances made up of at least two dominant carriers, resulting in control of more shipping lines by one group. As a consequence of such trends, today there are three global alliances, i.e. *2M*, *Ocean Alliance* and *THE Alliance*, composed by all major container carriers (e.g. *Maersk*, *MSC*, *CMA CGM*, *Cosco* and *Evergreen*).

[7] Notteboom and Winkelmans, 2001, op. cit.
[8] Freight forwarder: person or company who arranges for the carriage of goods and associated formalities on behalf of a shipper. The duties of a forwarder include booking space on a ship, providing all the necessary documentation and arranging customs clearance. (Source: World Bank. (2007). Port Reform: Toolkit, 2nd ed.)
[9] Merk, O., Kirstein, L., & Salamitov, F. (2018). The impact of alliances in container shipping. International Transport Forum: intergovernmental organization within the OECD, comprising 60 member countries and working on transportation policies
[10] Pinder, D., & Slack, B. (Eds.). (2004). Shipping and Ports in the Twenty-first Century. Routledge.
[11] World Bank. (2007). *Port Reform: Toolkit*, mod. 2

Figure 1.4 represents the market share of the alliances in container shipping in the last two decades.

Figure 1.4 Market share of alliances in container shipping, 1996-2018



Source: Merk, O., Kirstein, L., & Salamitov, F. (2018). The impact of alliances in container shipping.

However, focus on cost efficiency was no longer a viable strategy for the transport chain partakers, that complemented it with some degree of vertical integration, aiming at taking a larger stake in the transport chain. An illustration of this is the integration between carriers and terminals. For example, *APM Terminals*, an international terminal operating company, was established in 2001 as an independent division within *A.P. Moller – Maersk*, that engages in both carrier and terminal services, among other activities.[12]

The result is that seaports found themselves in a market with new ingredients. The globalization of production and sourcing of raw materials and finished products by corporations inevitably increased exports/imports; producers were outsourcing parts of their non-core activities, such as distribution and assembly of components, to logistics providers; actors in the transport industry, such as line shippers and freight forwarders, proceeded towards strategies of vertical integration and differentiation to meet the

[12] APM Terminals website. Retrieved from: https://www.apmterminals.com/

demands of their big clients, consequently achieving a stronger bargaining power with respect to ports; inter-port competition was rapidly increasing.

Given that ports constitute the connection between water and land, between global producers and raw materials, between global companies and their final market, they were increasingly taking the form of (potential) *nodes* in their clients' logistics system. As such, ports could not rely on their natural competitive factors alone, but had to develop strategies in order to offer clients a more competitive logistics package in terms of costs and become value-adders in the global supply chain.

Therefore, according to Notteboom and Winkelmans, a cost leadership strategy was not sufficient for ports to be competitive in the new arena. Instead, a differentiation strategy was proving to be more valuable.[13] The value of a port's services, for instance, can be a determinant for a company's decision about where to locate a production plant. In fact, the most successful ports have been those that were able to attract *value-added services* while keeping down costs. It can be seen that the best-performing seaports, such as ports of Rotterdam and Singapore, comprise specialized logistics centers for such activities, either inside the port area or in its proximity. In Notteboom and Winkelmans' words, "seaports that will succeed in the 21st century will be those that are `customer led', who really understand customer needs and who can offer `best-in-class' performance".[14]

1.2.2 Generations of ports

After the review of the drivers of change, this section retraces the evolutionary steps taken by seaports. The UNCTAD framed the ports developments of the last decades into *generations of ports.*[15] Although some critics exist, this classification can be useful for grasping the nature and extent of the changes that the port industry has seen. Verhoeven has compiled a table summarizing the main elements of said generations (*Figure 1.5*).[16]

[13] Notteboom and Winkelmans, 2001, op. cit.
[14] Notteboom and Winkelmans, 2001, op. cit.
[15] Secretariat, U. N. C. T. A. D. (1992). Port marketing and the challenge of the third generation port. In United Nations Conference on Trade and Development, Geneva.
[16] Verhoeven, P. (2010). A review of port authority functions: towards a renaissance?. Maritime Policy & Management, 37(3), 247-270.

Figure 1.5 Generations of ports

A. First generation	Prior to 1950	Sea approach, transfer of goods, temporary storage, delivery
B. Second generation		Includes A plus industrial and commercial activities which give added value to the goods. The port is a handling and services centre
C. Third generation	Since 1980	Includes A plus B plus structuring of the port community, plus strengthening links between town and port and between port users, plus extension of the range of services offered beyond the port boundary, plus an integrated system of data collection and processing. The port has become a logistics platform for trade
D. Fourth generation	Since 2000	Network of physically separated ports (terminals) linked through common operators or through a common administration

Source: Verhoeven, P. (2010). A review of port authority functions: towards a renaissance?. Maritime Policy & Management, 37(3), 247-270.

As summarized in the table, according to the UNCTAD, up to the 1950 seaports were mainly limited to activities such as transfer, delivery and temporary storage of goods. This early category is referred to as *first-generation ports*. Port entities were regarded only as physical places where sea and land meet, simple logistic locations with no direct effect on the goods being transported. The function was usually limited to loading, discharging, and storing of the goods. *First-generation* ports were usually isolated from the transport and trade activities, disconnected from the city, and there was limited cooperation among the companies operating inside the port area. During the first half of the last century, there was little or no change in such characteristics.

However, as previously illustrated, market dynamics drove ports to broaden their functions. Starting in the 1950s-1960s, a new trend was starting to take place, i.e. that of port entities that added to their primary function also some kind of commercial and industrial activities, which directly contribute to the value of the goods being handled. These *second-generation* ports were considered also as commercial and service centers, in addition to their original transport function. Novel activities included cargo packing, marking and other industrial services, provided in industrial facilities included in the port area. When some limits occurred, some ports expanded towards the hinterland with industrial activities ranging from iron and steel, metallurgy and oil refineries, to agri-food activities. Although the industrialization wave of the seaports' activities became more

consistent in this time period, an early pioneer of such industrial ports worth mentioning is Marghera Port, an industrial project initiated in 1917, and that through the years was developed to include, for example, metallurgic, shipbuilding and petrochemical industries, in addition to the commercial activities. *Second-generation* ports established closer linkages with the surrounding community, given the needs of such industrial activities in terms of land, energy, water, transport and labor.

In the decade 1980-2000, according to the UNCTAD[17], a *third generation* of ports was seeing the light, i.e. entities that, beyond the *first* and the *second generations*' functions, further expanded their services, used more advanced systems of data collection and processing, and strengthened the link with the port users and the city. One of the main drivers was the increasing containerization trade. Due to the increased inter-port competition, ports in this period initiated more proactive strategies, with the intention of attracting cargo and thus participating in the global production and distribution system that was being created. Logistics, distribution and organization services are enhanced, aided by the adoption of information technology. Two kinds of industrial services are provided by these ports: ship and vehicle related technical services, e.g. repairing and engineering; and cargo related services, that add value to the goods being handled, such as manufacturing in the port area, custom clearance, modern equipment for handling containers at a higher speed and environment-friendly facilities. Banking, legal and insurance services are available in the port area. The ultimate goal is to increase the value added by the port for its users, also thanks to an integrated system of data collection and processes. Logistics and distribution centers were created in ports, providing services such as cargo consolidation and deconsolidation, up-to-date information on inventory and goods movements, palletizing, labelling, weighing, etc. The interdependence between the port and the surrounding city became stronger.

The 2000s saw the birth of the *fourth generation*, which the UNCTAD describes as a "network of physically separated ports linked through common operators or through a common administration".[18] Verhoeven criticizes this characterization, arguing that

[17] UNCTAD, 1992, op. cit.
[18] UNCTAD, 1999, Technical note – The Fourth Generation Port (Geneva: UNCTAD).

changes were present also in other aspects, therefore expanding the *fourth generation* concept.[19]

Regarding the functional aspect, ports of the *fourth generation* added to their core port services, constituted mainly by cargo-handling, nautical and ancillary services, also some other value-added logistics and industrial activities, with some directions towards sustainable industries. Inter-port competition on container attraction reached a higher magnitude. There was a process of port regionalization, through the development of connections beyond the port perimeter, for example with inland ports, load centers, and other geographically close seaports. The new stage of ports involves the participation of a greater variety of stakeholders, which enhanced the coordination function of the port among such users.[20] Those ports became a part of a wider ecosystem, with a variety of environmental and social connections with the outside and the community.

In summary, the new nature of the market in the ending decades of the last century inevitably had an impact on the transportation sector, and, in turn, on seaports. Modern seaports have gone through a long path of transformation. As a result, commonly identified competitiveness factors are numerous: geographical strategic position; physical infrastructure and equipment; costs; service range and quality; inter-port connectivity and coordination; product differentiation; IT systems; congestion; and many others. The competitive factors of a specific port will depend on its stakeholders' interests and the port's strategic objectives.

1.2.3 Seaport clusters

An additional concept related to the functional dimension of seaports is that of *seaport clusters*. In fact, analyzing seaports from a broader perspective, they are not just nodes in a transport chain, but can be regarded also as regional clusters of economic activity, in that there are multiple examples of firms tending to concentrate around the port area in order to acquire the benefits of collective proximity.

[19] Verhoeven, 2010, op. cit.
[20] Verhoeven, 2010, op. cit.

The expression *port cluster* was firstly used by Haezendonck, that defined a port cluster as "the set of interdependent firms engaged in port activities, located within the same port region and possibly with similar strategies leading to competitive advantage and characterized by a joint competitive position vis-à-vis the environment external to the cluster".[21]

Michael Porter defines a cluster as "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities".[22] According to De Langen, the port cluster consists of all economic activities related to the arrival of goods and ships, including: cargo handling, transport, logistics (such as storage, assembling, repacking and consolidating), manufacturing and trading activities.[23] Such economic activities constitute the economic specialization of the seaport cluster.

There are multiple examples of such port clusters. The Port of Antwerp is home to the largest oil and chemical cluster in Europe, including ten of the biggest chemical producers in the world, together with logistics service providers offering services for all types of oil, chemical products and gases. *Luxembourg Maritime Cluster*[24] comprises 60 member companies specialized in maritime transportation, dredging, logistics, insurance, consulting, safety and others. *Federazione del Mare*[25] is an Italian maritime cluster including organizations active in maritime law, merchant marine training, insurance, shipbuilding, port administration, etc. *Maritime by Holland*[26] is a joint initiative for 17.200 companies active in the maritime sector in Holland with the objective of connecting different maritime sectors, such as ports, maritime suppliers, shipbuilding, inland shipping. Rotterdam and Antwerp are taking a step further, planning to develop by 2030 the most integrated and sustainable petrochemical and energy cluster in Europe, by

[21] Haezendonck, E., Pison, G., Rousseeuw, P., Struyf, A., & Verbeke, A. (2001). The core competences of the Antwerp seaport: an analysis of" port specific" advantages. *International Journal of Transport Economics/Rivista internazionale di economia dei trasporti*, 325-349.
[22] Porter, M. E. (2000). Location, competition, and economic development: Local clusters in a global economy. *Economic development quarterly*, *14*(1), 15-34
[23] De Langen, P. W. (2004). Analysing the performance of seaport clusters PW DE LANGEN: Defining clusters. In Shipping and Ports in the Twenty-first Century (pp. 104-120). Routledge.
[24] Luxembourg Maritime Cluster website. Retrieved from https://www.cluster-maritime.lu
[25] Federazione del Mare website. Retrieved from http://www.federazionedelmare.it
[26] Maritime by Holland website. Retrieved from https://www.maritimebyholland.com

combining the know-how of the petrochemical cluster with the experience of the bio-based industry cluster.

1.3 Port governance

The last decades witnessed changes also in the way ports are managed and governed. States began, to different degrees, to delegate and decentralize regulatory powers over port areas to separate entities, leading to consequences in the port management system. In the 1980s there was also a wave of privatization initiatives of ports, which gave rise to an even higher degree of variety with respect to managerial and financial aspects.

These trends and their consequences are discussed in the following two sections of this paragraph.

1.3.1 How ports are managed

This section discusses the governance dimension of ports. Port governance refers to control, administrative and regulatory aspects of a seaport. During the 20th century, most governments delegated the management responsibility of their seaports to separate entities. Indeed, ports are usually governed by a body commonly named *Port Authority*, *Port Management* or *Port Administration*. In this thesis, the expression *Port Authority* is used to refer to such governing entities, since it is the most frequently used nomenclature. In the origin, such bodies had limited authority and responsibility.

The European Commission defined a Port Authority as a "State, Municipal, public or private body, which is largely responsible for the tasks of construction, administration and sometimes the operation of port facilities and, in certain circumstances, for security".[27] Another definition of a port authority provided by the European Union states that it is a "body which, whether or not in conjunction with other activities, has as its objective under national law or regulation the administration and management of the port

[27] World Bank. (2007). *Port Reform: Toolkit, mod. 3*.

infrastructures, and the co-ordination and control of the activities of the different operators present in the port or port system concerned".[28]

In general, it is the main body in charge of managing and controlling the operations in a port. Broadly, some functions that a Port Authority oversees, depending on the regulatory power it has, include: [29]

- management of the port area;
- regulation of the activities and operations in the port carried by the various users;
- strategic planning;
- port marketing and promotion of the port services;
- development and maintenance of the basic port infrastructure (e.g. port entrance, sea locks, berths, tunnels, canals, etc.)
- agreements with the city and the surrounding community.

The port governance concept is largely defined by the participation extent of the private and public sector. According to the World Bank, in the 1980s, as a result of some inefficiencies in ports' activities and the changing market environment, a privatization process of ports began, with some private investments being directed towards ports.[30]Also, it could be said that in general, due to the globalization phenomenon, the role of port authorities has been limited by the increasing power of private players. The United Kingdom saw the first port privatization event, when the government sold a 49% stake in Associated British Ports, followed by the sale of the remaining part.[31] Other ports, mainly in developing countries, followed the same path. The privatization process was followed by the issue of where the boundary between private and public should be drawn in relation to ownership, regulation, financing, services and activities provision, and any other issue related to port activities. Around such boundaries, the World Bank identifies four main port management models:[32]

[28] Commission of the European Communities (2007), Communication on a European ports policy – COM(2007)616, European Commission, Brussels
[29] The World Bank, 2007, op. cit.
[30] The World Bank, 2007, op. cit.
[31] Haeun Sanŏp Yŏn'guwŏn (Korea). (2005). Free Trade Zone and Port Hinterland Development. United Nations Publications.
[32] The World Bank, 2007, op. cit.

1. *Service Ports*: have a predominantly public character, by which the Port Authority owns all the assets and port areas, offers all the services, and employs directly all the personnel. Port Authorities within this system oversee all port operations, they often act as terminal operators, and are responsible for the maintenance of the maritime access. This type is mostly present in UK and in a number of ports in developing countries, such as India and Sri Lanka.

2. *Tool Ports*: have a strong public character, with the Port Authority owning and being responsible for the development and maintenance of the port infrastructure, superstructure (e.g., buildings, offices, terminal lighting, parking areas, repair shops, etc.) and equipment, whereas cargo-handling activities are realized by private firms. The World Bank refers to the "*Ports Autonomes*" in France as an example of a container terminal managed and operated as a tool port.

3. *Landlord Ports*: have a mixed public-private character, with the consequent complexity of achieving a balance between the public and private interests. The Port Authority has the status of a regulatory body and a landlord, whereas port services (such as storage and warehousing) are mainly carried out by private companies. The operating companies obtain infrastructure and land from the Port Authority under a lease contract, including quays, locks, docks and yards, while owning and maintaining their own superstructure and equipment, in accordance with their business goals. The *Landlord Port* model is the dominant system today and is applied by most European ports, including, for instance, Rotterdam, Antwerp, Italian Ports, but also Singapore and New York.
   In general, investments in the terminals are carried out by the terminal concessionaire or the lessee, whereas the port takes care of the land provision.

4. *Fully Privatized Port* or *Private Service Port*: focus on private interests, with the State having no meaningful involvement. Under this model, also regulation could be fully privatized. Land, infrastructure and superstructure pertaining to the port is privately owned, along with the operational aspect. Applications of this model are very limited in number, with few examples in New Zealand. According to

Verhoeven, the UK is the only European country that had its leading ports fully privatized.[33]

Notwithstanding the increasing private involvement, direct public intervention in seaports is justified by some elements, that include:[34]

- The economic benefits of ports' activities to the public, such as influences in second-order production and trade-related services;
- Large investment and fixed costs requirements for infrastructure, services, and expansion projects of ports, that constitute a deterrent for private involvement;
- The objective of some governments to eliminate anti-competitive behaviors (this is achieved in landlord ports, for example, by administering the concession agreements provided to the private firms);
- Strong connection between ports and cities, with reciprocal effects across multiple dimensions (environmental, cultural, economic, social).

The boundaries between the public and private roles in seaports are diverse among the models adopted in the world and are the result of the specific definition of private and public interests.

1.3.2 Financing the ports

According to the World Bank, up to the 1980s, *Service* and *tool ports* received mainly public financing.[35] *Landlord ports* had a financing of a mixed character, with the government and *Port Authority* investing in general infrastructure, whereas terminal superstructure and equipment were sustained by private operators. *Fully privatized ports*, in the case where the government did not possess sufficient funds, were financed by international institutions such as the World Bank.

[33] Verhoeven, 2010, op. cit.
[34] The World Bank, 2007, op. cit.
[35] The World Bank, 2007, op. cit.

However, the increasing involvement of private businesses in the port industry also influenced the financial aspect. There have been many examples of the private sector funding constructions of terminals, dredging operations, superstructure and equipment. Nevertheless, some investments for costly and durable infrastructure, such as entrance channels and locks, are out of the reach of private investors, which therefore still require public intervention.

The most diffused practice is that of governments mainly funding basic infrastructure projects. As far as operational infrastructure is concerned, however, Port Authorities of *service* and *tool ports* receive resources from the government; for landlord ports, instead, investments are usually arranged by the terminal concessionaire or the lessee (with the Port Authority providing the land). Besides this general rule, there are differences in practice, for example with the potential involvement of international financing institutions, private-public partnerships, etc.

1.4 Innovating in the pursuit of efficiency and sustainability: best practices

Ports and shipping industry have seen major technological developments. Innovations through the last decades have changed the way transport is carried out. Plausibly, the single most propagated and influencing innovation was the *container*, that transformed the way in which dry cargo is transported.

Marc Levinson tracked the history of the container concept, alongside the advantages and effects of its diffusion.[36] The first container shipping is to be placed in 1956, with the transportation of 58 containers from New York to Houston carried out by the company *SeaLand*. That pioneering event was the beginning of a logistic innovation that profoundly altered inter-continental trade. After some container services initiated with the use of converted ships to this new purpose, the first ship specifically designed for containers was launched in 1969. This was the beginning of the race around the speed and capacity of containerships: first and second generation containerships had a capacity up to 1,600

[36] Levinson, M. (2016). The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger-with a new chapter by the author. Princeton University Press.

TEUs; ships of the late 1980s reached 2,000 TEUs, whereas now the biggest ones can carry over 21,000 TEUs, used mainly for Europe-Far East trade.[37] In 2018, according to the UNCTAD, a total of 793 million TEUs of containers were handled by ports in the world, an increase by 4.7% from the precedent year.[38] In the same year, containerized trade represented 24% of the total volume traded. Containerized cargo expanded at an annual average rate of 8% in the period 1980-2018. Furthermore, it is estimated that international maritime trade will expand at an average annual growth rate of 3.5% driven mainly by containerized trade, dry bulk and gas cargoes.

The diffusion of the container is a sufficient evidence of the advantages it offers. In Levinson's words, "the container is at the core of a highly automated system for moving goods from anywhere, to anywhere, with a minimum of cost and complication on the way".[39] Indeed, the major advantages offered by this new system of organizing freight for transport are the non-negligible reductions in costs and time of transport. This made it more attractive for businesses to both sell products and acquire raw materials, components and semi-finished goods internationally, and even inter-continentally. According to Levinson, in 1961, before the diffusion of containers, ocean freight costs accounted for about 11% of the value of US exports and imports. A large part of such freight costs was due to the handling and shifting operations of the cargo, operated inevitably in a piece-by-piece manner, from land transport to ship, and vice versa.

Containers eliminated these laborious operations, making them less labor-intensive, cheaper, and quicker. Hence, the containerization process decreased personnel requirements for handling that type of cargo, and consequently increased the capital factor in such operations. For instance, according to the World Bank, before the advent of containers, generally about 200 men were required for loading and unloading operations of a large general cargo ship, and they could necessitate 10 days. With containers, only 50-60 men were sufficient to carry out the operation.[40] This obviously depends on some technical variables, such as infrastructure and equipment of the berth; nonetheless, there was undoubtedly an increase in efficiency. The advancement of the container is one of the fundamental elements that made economic globalization possible.

[37] Pinder, D., & Slack, B. (Eds.). (2004). Shipping and Ports in the Twenty-first Century. Routledge.
[38] UNCTAD. Review of Maritime Transport, 2019 (UNCTAD/RMT/2019).
[39] Levinson, 2016, op. cit.
[40] World Bank. (2007). *Port Reform: Toolkit*, mod. 3

However, the implications of this new mode of transport are far more extensive. Alongside the progress of ships deployed for transporting containers, with the aim of increasing capacity and reducing unit costs, also seaports were almost forced to adapt to these trends. Indeed, the places where containers are loaded and unloaded have to be appropriately equipped and infrastructured in order to be suited and efficient. Today, ports intensively compete on the numbers of containers attracted. In the quest for efficiency and cost minimization, ports are investing in technologies, logistics, and infrastructures in their areas and beyond. Moreover, the process of containerization goes hand in hand with the concept of *intermodality*, i.e. the transportation of cargo using multiple modes of transport. Standardization is the key: the uniformity of containers eases the operations, making the integration of shipping and inland transport more efficient, with inevitable effects on infrastructures in the hinterland.

Besides the containerization concept and its effects, ports are investing in other kinds of innovations in the pursuit of efficiency. Along with the globalization phenomenon, also the complexity of logistics has inevitably increased. Logistics management was influenced by aspects such as increased volumes and variety of products, shorter product life cycles, production of global products in centralized factories. Information technology has proved to be an invaluable tool for coping with such complexity in the shipping and port industry, as was the case in almost every other sector. Technology allows exchange of real-time information among all the actors involved, with enormous benefits. Technological systems link ports, terminal operators, ship agents, customs, freight forwarders, and other actors that may be involved in the operations, with benefits in efficiency. For example, a delay in a passage of the logistic chain influences every successive step, up to the final customer, with significant losses in terms of time and money; real-time information exchange through technology allows to at least reduce, if not prevent, such losses. The increase in containerized trade has enhanced the need for information technology, up to the point that it can be a determinant in the port choice by liner shippers.[41]

However, some ports are taking a step further in the technological progress, investing also in the domain of *Industry 4.0* technologies. For example, the port of Rotterdam pursues

[41] *Liner shipping* is the service of transporting goods by means of high-capacity, ocean-going ships that transit regular routes on fixed schedules (source: World Shipping Council)

the goal of becoming the *smartest port*.[42] This is attempted through numerous innovations, such as the introduction of an *IoT* platform, developed in collaboration with *IBM*, *Cisco*, and other partners. Such system offers real-time accurate and advanced information to its multiple users, including infrastructure, water and weather condition data, thanks to an extensive network of sensors and share via a cloud-based platform. This system offers advantages in terms of efficiency and safety, for example through optimization of berthing, loading/unloading and departing times of ships, contingent on water and weather conditions. In addition, Port of Rotterdam has set up *Pronto*, an online tool offering real-time information about exact ship arrival times through big data and machine learning algorithms.

These kind of best practices in digitalization and *industry 4.0* technologies are active in a number of the best-performing ports in the world. For instance, Port of Antwerp participates in a shared project with the City of Antwerp, Antwerp University and IMEC, named *Capital of Things*, that gravitates around *IoT* and *Industry 4.0* Technologies.[43] To this project belong platforms allowing multiple players in the logistic chain to exchange real-time data in order to increase efficiency and safety, alongside the installation of cameras, sensors, autonomous sounding boats, 3D printing technologies for maintenance, and other innovative instruments. Port of Shanghai opened a fully automated port terminal, the *Yangshan Deepwater Port*, for handling containers. This allowed a reduction in labor costs by 70%, a boost in efficiency by 50%, and a contraction in carbon emissions by up to 10%.[44] The Maritime Port Authority of Singapore integrates *Big Data* through a unified platform.

As we have seen, the seaport industry, as numerous other industries, was characterized by technological advancements in the latest decades, with the goal of increasing competitiveness through innovations such as *IT*, automation, digitization and *industry 4.0* technologies.

Seaports and the shipping industry in general are influenced by the hot topic of the environmental sustainability. It is generally affirmed that maritime shipping is the most

[42] Port of Rotterdam website. Retrieved from https://www.portofrotterdam.com/en
[43] Port of Antwerp website. Retrieved from https://www.portofantwerp.com/en
[44] White N. (2018, April 11). The world's biggest automated port terminal opens in Shanghai. Retrieved from https://www.dailymail.co.uk/news/article-5604199/The-worlds-biggest-automated-port-terminal-opens-Shanghai.html

carbon-efficient form of transporting cargo.[45] Nevertheless, given the numbers of ship travels (according to the Financial Times, more than 90,000 ships navigated the oceans in 2018), it is one of the most polluting industries, whereby vessels create 2-3% of the world's total greenhouse gas emissions.[46] Seaports are inevitably a part of this phenomenon. In addition, with the industrialization wave of ports, the environmental impact has become even more significant.

Fortunately, a number of entities are taking steps towards eco-friendliness. The *World Shipping Council* (*WSC*) members, that represent about 90% of the global liner vessel capacity, are investing in reducing carbon emissions. For example, one of the strategies being proposed and encouraged is the introduction of new, larger and more efficient vessels, or modification to existent ones. According to the *WSC*, the majority of ships built by its members in the last 5 years are 30-40% more carbon efficient. [47]Moreover, there are attempts to collaborate with governments, policymakers and other important actors in the industry to develop new international guidelines for reducing the environmental impact.

Alongside shipping companies, also seaports are attempting to take a part in the journey towards sustainability. For example, some of the issues of concern for seaports include air pollution, water pollution, oily water discharge, noise, treatment of dredged materials, and others. To become more sustainable, seaports can act in two ways. One is through regulations, when and where they have the authority, to control the operations of port users; the second way is to directly put in place investments aimed at the sustainability of their own operations.

For example, Port of Rotterdam, the busiest port in Europe in terms of volumes traded, has the objective of being in line with the *Paris Climate Agreement* objectives, to be achieved through innovation and technologies.[48] Some of the steps taken in this direction include: the use of alternative fuels for transport, large-scale solar and wind electrification, circular economy, and in general a transition towards a CO2 neutral economy by the year 2050. More specifically, for example, the port intends to switch to

[45] World Shipping Council website. Retrieved from http://www.worldshipping.org/
[46] Raval, A., Spero, J., Campbell, C. (2019, May 30). Pollution: the race to clean up the shipping industry. *Financial Times*. Retrieved from https://www.ft.com/content/642b6b62-70ab-11e9-bf5c-6eeb837566c5
[47] World Shipping Council website. Retrieved from http://www.worldshipping.org/
[48] Port of Rotterdam website. Retrieved from https://www.portofrotterdam.com/en

electric propulsion, hydrogen and synthetic fuels such as methanol. Importantly, Port of Rotterdam hosts the Europe's largest bio-based industrial cluster, with companies taking efforts for becoming environment-friendly. Port of Rotterdam set up the *Green Award Initiative*, by which offers discounts on port tariffs for ships meeting some requirements in terms of cleanliness and safety. Port of Antwerp [49]has the goal of a transition towards a *Multi-Fuel Port* by 2025, to be achieved by the introduction of alternative fuels in addition to conventional ones, for example hydrogen gas and sustainable methanol, and towards a carbonless and circular economy.

In general, as is the case of many other industries, one of the most important areas of investment in the port and maritime shipping industry is that of technological innovations, used as a mean for achieving increasing efficiency and environmental sustainability in its activities. Investments of this kind on the side of the best-performing ports are constituting best practices for other ports to follow.

As reviewed in this chapter, seaports have a completely renovated identity as a result of the discussed factors and drivers of change. However, the environment in which ports operate is still evolving. The next chapter is dedicated to the *Belt and Road Initiative*, one of the most ambitious infrastructural and commercial projects, with the potential to reshape the identity of ports and the maritime shipping industry.

[49] Port of Antwerp website. Retrieved from https://www.portofantwerp.com/en

CHAPTER 2 – THE *BELT AND ROAD INITIATIVE* PROCEEDS TOWARDS SEAPORTS

Introduction

After the review of the ports' evolutionary path in the last few decades, under the dimensions of role and functions, value-adding services, and governance, along with the current trends and best practices in the areas of technological innovations and environmental sustainability, this chapter is dedicated to the most important variable of the 21st century so far, undoubtedly destined to influence, and possibly even disrupt, the port and shipping industry: the Chinese *Belt and Road Initiative*.

The first paragraph of this chapter intends to review the origins, foundational principles and formal objectives of the *Belt and Road Initiative*. *Paragraph 2.2* aims at reviewing the ways through which China intends to put this ambitious plan in practice, with a consideration on the countries involved in this project and the financing sources. *Paragraph 2.3* reviews the main investment steps already realized in seaports and related infrastructure around the globe, under the *Belt and Road*-brand, with a focus on the projects involving European and Italian ports in the last section of the paragraph.

Finally, the last paragraph endeavors to bring out considerations on such investments, with the objective of contemplating the possible reasons for the projects involving seaports around the world and finding the common denominator of such strategies.

2.1 The *Belt and Road Initiative*: the Chinese plan for international trade and connectivity

This paragraph retraces the most important events pertaining to the birth of the *Belt and Road Initiative*, along with its main objectives and principles. Two public episodes are generally considered as the triggering events for this ambitious plan. The first event is to be placed during the President Xi Jinping's visit to Kazakhstan in September 2013, where he announced *The Silk Road Economic Belt*; the second one, during the President's attendance to the *Asia Pacific Economic Cooperation* (*APEC*) summit in Indonesia a month later, characterized by the announcement of the *Maritime Silk Road of the 21st century* and the establishment of the *Asian Infrastructure Investment Bank* (*AIIB*).[50]

The overland *Silk Road Economic Belt* and the *Maritime Silk Road of the 21st century* are the two distinct, but converging in their goals, parts that form the Chinese *One Belt and One Road* (*OBOR*), later referred to also as *Belt and Road Initiative* (*BRI*).

Ideologically, this project takes inspiration from the ancient *Silk Road*, the route used for commercial purposes that extended from China, to the Southeast Asia and to Europe. The *Belt and Road Initiative* thus intends in principle to revive the idea of the ancient *Silk Road* apropos connecting the Asian and European continents, albeit with some differences.

It is worth of note that the direction of the Chinese foreign policy depicted by the *Belt and Road Initiative* is not a radical change from the recent past of the country. In fact, also during the former presidency of Hu Jintao, China engaged in multilateral cooperation agreements.[51] The *BRI*, however, indicates in a clearer way the direction that China is heading to with respect to its economic and foreign policy strategies.

The vision of the *Belt and Road Initiative* is to revive the Silk Road concept by enhancing the connectivity, through multiple ways, between China and Europe, and promoting regional economic integration. However, the geographical scope of the project is far more ambitious than it seems. The maritime component, for example, is planned to stretch

[50] Fallon, T. (2015). The new silk road: Xi Jinping's grand strategy for Eurasia. American Foreign Policy Interests, 37(3), 140-147.
Summers, T. (2016). China's 'New Silk Roads': sub-national regions and networks of global political economy. *Third World Quarterly*, *37*(9), 1628-1643.
[51] Yu, H. (2017). Motivation behind China's 'One Belt, One Road' initiatives and establishment of the Asian infrastructure investment bank. *Journal of Contemporary China*, *26*(105), 353-368.

across Southeast Asia, the Indian Ocean, Persian Gulf and the Mediterranean.[52] It is therefore evident that such project does not have effects on China and European countries alone, but involves potentially every region that is located in between, and beyond.

The objective of increasing connectivity and trade mainly between Asia and Europe, but also including some regions in Africa, is to be achieved via investments in infrastructures and transport corridors, including air, rail, road, and ports. The foundational principles of the *Belt and Road Initiative* are reported in a document released In March 2015, named *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st Century Maritime Silk Road*, issued by the National Development and Reform Commission, the Ministry of Foreign Affairs, and the Ministry of Commerce of the People's Republic of China.[53] This document delineates the grounds of the *Belt and Road Initiative*, by articulating the principles, framework, objectives and mechanisms through which to implement it.

The overarching goal is to promote regional cooperation and mutual economic development. Indeed, the document states:

> *"the Belt and Road Initiative aims to promote the connectivity of Asian, European and African continents and their adjacent seas, establish and strengthen partnerships among the countries along the Belt and Road, set up all-dimensional, multi-tiered and composite connectivity networks, and realize diversified, independent, balanced and sustainable development in these countries"*.[54]

The *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st Century Maritime Silk Road* calls for cooperative actions by the countries that are or may be involved in this project, in order to reach joint prosperity. The principles laid in the *Vision and Actions* document are:

- *Openness for cooperation*;
- *Harmony* and *inclusiveness*;
- *Market-based* operations, by abiding to the market rules and international norms; and

[52] Fallon, 2015, op. cit.
[53] National Development and Reform Commission, Ministry of Foreign Affairs and Ministry of Commerce of the People's Republic of China. (2015). Vision and actions on jointly building Silk Road Economic Belt and 21st-Century Maritime Silk Road. *State Council of the People's Republic of China*.
[54] NDRC, 2015, op. cit.

- *Mutual benefit* to all parties involved.

Along this perspective, the document sets out five cooperation areas, named *cooperation priorities:*[55]

1) *Policy coordination*, by promoting regional and intergovernmental communication, cooperation and political trust, in order to cooperate in large-scale projects;
2) *Facilities connectivity*, described as a "priority area"; countries involved in the *BRI* project are recommended to enhance the connectivity of their infrastructures and technical standard systems, and to develop an efficient infrastructure network among Asian regions, Europe and Africa. Attention is given also to the promotion of low-carbon and green economy. Regarding water transport, the document calls for improving port infrastructure construction, building smooth land-water transportation channels, increasing port cooperation and sea routes, improving information technology cooperation in maritime logistics;
3) *Unimpeded trade*, to be achieved by improving investment and trade facilitation, removing trade and investment barriers, promoting free trade areas, balancing trade flows, reducing trade costs, and rendering customs procedures more efficient;
4) *Financial integration*, by deepening financial cooperation, enhancing currency circulation, cross-country issuance of Renminbi bonds, jointly establishing the *Asian Infrastructure Investment Bank*, the *BRICS New Development Bank* and the *Silk Road Fund*, carrying out multilateral financial cooperation in the form of syndicated loans and bank credits;
5) *People-to-people bond*, seen as a popular support for implementing the project, to be achieved, among other ways, by enhancing friendly cooperation, promoting extensive cultural, academic and personnel exchanges, increasing tourism flows, and cooperation in science and technology.

[55] NDRC, 2015, op. cit.

Such goals are to be implemented in a cooperative manner at different levels, through international forums and bilateral and multilateral agreements among regions and nations, such as via plans and *Memorandums of Understanding*, and by passing through existing entities, such as *ASEAN Plus China* (10+1), *China-Gulf Cooperation Council Strategic Dialogue*, *Shanghai Cooperation Organization* (*SCO*), *China-ASEAN* (*Association of Southeast Asian Nations*) *Expo*, *Asia-Pacific Economic Cooperation* (*APEC*), *Greater Mekong Sub-region Economic Cooperation* (*GMS*).[56]

The *openness* and *inclusiveness* traits of the *BRI* are substantial contributors to its great ambition and success: countries are not only allowed to participate; they are *de facto* incentivized to engage. China seeks support from other countries in promoting the projects. The desire is to utilize competitive advantages and gain mutual benefits through cooperation. The document further states:[57]

"Though proposed by China, the Belt and Road Initiative is a common aspiration of all countries along their routes. China is ready to conduct equal-footed consultation with all countries along the Belt and Road to seize the opportunity provided by the Initiative, promote opening-up, communication and integration among countries in a larger scope, with higher standards and at deeper levels, while giving consideration to the interests and aspirations of all parties. The development of the Belt and Road is open and inclusive, and we welcome the active participation of all countries and international and regional organizations in this Initiative."

This invitation to cooperate was expressed also by the President Xi Jinping's initial announcement.

As anticipated, the *Belt and Road Initiative* aims to cover numerous areas of cooperation, such as trade, culture, technology, people-to-people exchanges, policy coordination, energy, and education. However, although some degree of emphasis is given on all these areas, the economic and trade dimension is the focus of this work. In principle, this plan

[56] NDRC, 2015, op. cit.
Yu, 2017, op. cit.
[57] NDRC, 2015, op. cit.

would promote economic development, boost intercontinental trade and attract foreign investment in the involved areas.[58] China has the goal of expanding its own economic growth, by increasing exports and supporting its internal industries characterized by surplus capacity. Indeed, one of China's problems is industrial overcapacity in sectors such as iron and steel, aluminum, and shipbuilding, that plans to solve by finding new markets for its firms and thus increasing trade outflows.[59]

Moreover, one of the potential advantages for China brought by this strategy is a modernization process of Asian countries' infrastructure, that will help China enhance trade flows and economic integration with such countries. Given that China's industries are dependent on exports of its manufacturing goods and imports of semi-finished goods, this strategy also aims at increasing the scale of import and export flows, mainly through maritime shipping.[60] This motivates China to invest in ports and related infrastructure in the regions of interest, as will be assessed in length later on in this chapter. By achieving such objectives, China will have the opportunity to restructure its industries, upgrade its technology, and make its firms grow and become more international.

China intends also to strengthen its influence in the world economy, geopolitics and governance, for example in international organizations such as the *World Bank* and the *International Monetary Fund*, where it has a limited leverage in the decision-making process considering its commercial importance.[61]

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[58] Fallon, 2015, op. cit.
[59] Summers, 2016, op. cit.
Blanchard, J. M. F., & Flint, C. (2017). The geopolitics of China's maritime silk road initiative.
Wang, Y. (2016). Offensive for defensive: the belt and road initiative and China's new grand strategy. *The Pacific Review*, *29*(3), 455-463.
Yu, 2017, op. cit.
[60] Yu, 2017, op. cit.
[61] Huang, Y. (2016). Understanding China's Belt & Road initiative: motivation, framework and assessment. *China Economic Review*, *40*, 314-321.
Yu, 2017, op. cit.

2.2 The *Belt and Road Initiative* in practice: how it works

As previously mentioned, the *Belt and Road Initiative* takes inspiration from the ancient *Silk Road*. However, as expressed in the *Vision and Actions* document, it is not strictly limited to the countries that were involved in the ancient *Silk Road* routes. In fact, it indicates that this initiative is open to all countries and organizations, in order to provide benefits to wider areas.

The *BRI* is programmed to stretch through Asia, Europe and Africa. According to the *Vision and Actions* document:

> "*The Silk Road Economic Belt focuses on bringing together China, Central Asia, Russia and Europe (the Baltic); linking China with the Persian Gulf and the Mediterranean Sea through Central Asia and West Asia; and connecting China with Southeast Asia, South Asia and the Indian Ocean. The 21st-Century Maritime Silk Road is designed to go from China's coast to Europe through the South China Sea and the Indian Ocean in one route, and from China's coast through the South China Sea to the South Pacific in the other.*"[62]

More specifically, the project is to be actualized through the creation of a number of overland (*Silk Road Economic Belt*) and maritime (*Maritime Silk Road*) transport corridors. Six economic corridors are identified as pertaining to the *Belt and Road Initiative*. The land routes are to be realized mainly as railway, but also as road and energy connections, whereas at the sea level the objective is to create transport routes through efficient inter-port connections. The general idea is to develop an integrated system of land, major seaports, roads, railways and related infrastructure, to achieve unimpeded trade. The six economic corridors are identified as follows:[63]

1. *China – Mongolia – Russia Corridor*
   It is the most direct route connecting North-East China to its Russian and European markets. In fact, this corridor links China, Mongolia and Russia, reaching the Baltic Sea.

[62] NDRC, 2015, op. cit.
[63] NDRC. (2015). op. cit.
Derudder, B., Liu, X., & Kunaka, C. (2018). *Connectivity along overland corridors of the belt and road initiative*. World Bank.
The Belt and Road Initiative. Hong Kong Trade Development Council (HKTDC). Retrieved from http://china-trade-research.hktdc.com/business-news/article/The-Belt-and-Road-Initiative/The-Belt-and-Road-Initiative/obor/en/1/1X000000/1X0A36B7.htm

2. *New Eurasian Land Bridge (NELB)*

   The *NELB* aims at connecting Chinese firms to European markets, through a series of rail corridors extending from eastern China to west European markets. It extends from China's Jiangsu province to Rotterdam Holland, passing through a number of Asian countries, including Kazakhstan, Russia, Belarus and Poland, and reaching some coastal ports in Europe.

3. *China – Central Asia – West Asia Corridor*

   Begins in Xinjiang in China and joins the existing railway networks of Central Asia and Middle East, passing through Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan and Afghanistan, and reaching West Asia by culminating to the Persian Gulf and the Mediterranean.

4. *China – Pakistan Economic Corridor*

   Runs from the Chinese' Xinjiang region to Pakistan's Gwadar Port.

5. *Bangladesh-China-India-Myanmar Economic corridor*

   Planned to consist of road and high-speed rail links between the southern Yunnan's province of China and Kolkata in India, passing through Myanmar and Bangladesh.

6. *China – Indochina Peninsula corridor*

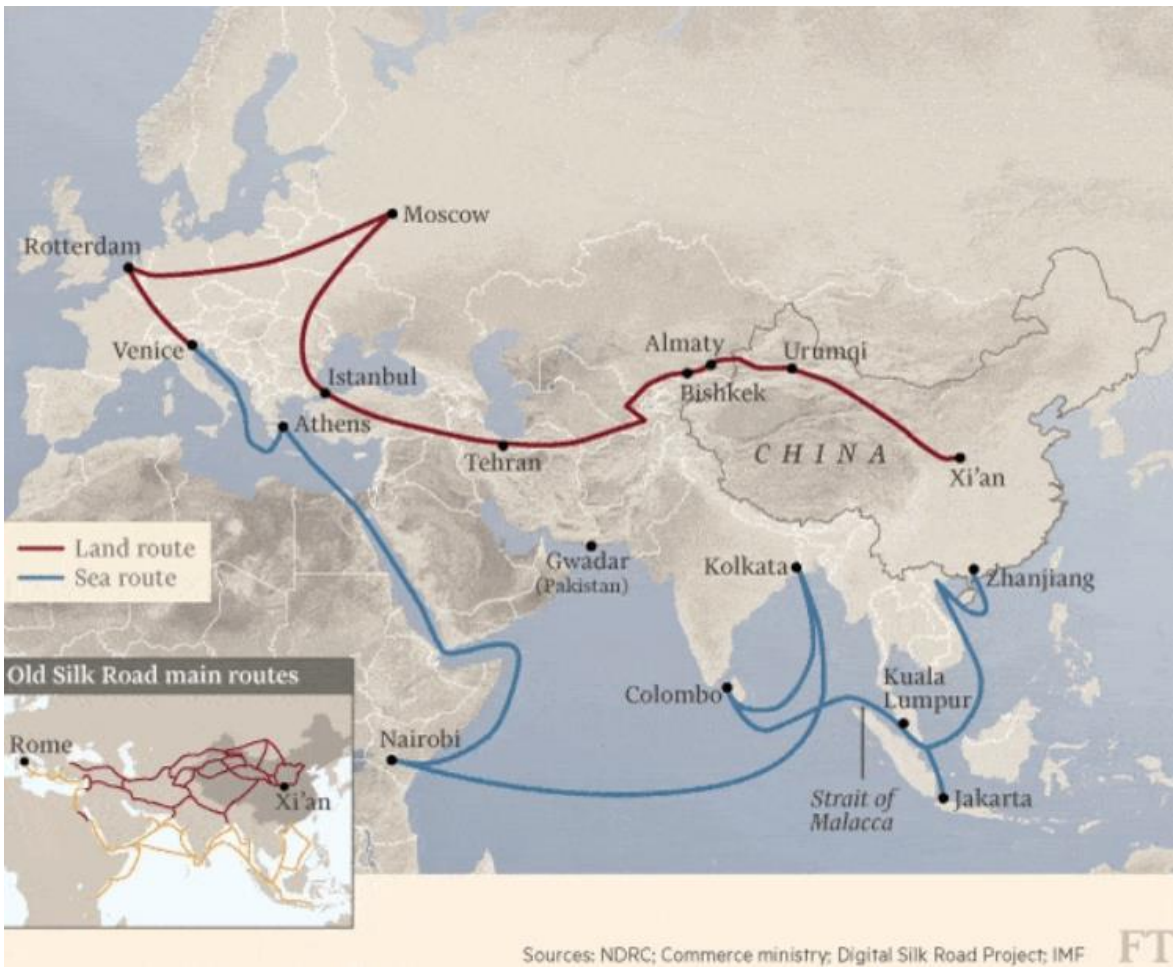
   Extends from China through Southeast Asia and South Asia, and reaches the Indian Ocean.

The plan is to develop the corridors as highly efficient transportation routes, by taking advantage of existing international transport routes, core cities along the corridors and using industrial parks and trade zones as cooperation platforms. According to the initial identification of the corridors, the *Initiative* involves at least 60 countries. Furthermore, the plan is to integrate the *BRI* projects to other connectivity projects, such as the *APEC Connectivity* program, *ASEAN Interconnection*, *Trans-Asian Railway Network*, *Pan-Asian energy grid*.[64] Therefore, the potential reach and scope of this project is enormous. The next section will discuss more in detail the major investment projects about seaports and related infrastructure.

[64] Wang, 2016, op. cit.
Blanchard & Flint, 2017, op. cit.

The *Vision and Actions* foundational document doesn't include a map of the economic corridors. In 2014, the Chinese news agency, Xinhua, publicized a graphic representation of the *Initiative* plans. Some examples of subsequent representations of the *BRI* and the economic corridors were reported by a *Financial Times* article[65] (*Figure 2.1*) and a discussion paper of the *World Bank*[66] (*Figure 2.2*).

Figure 2.1 Map of the Belt and Road Initiative

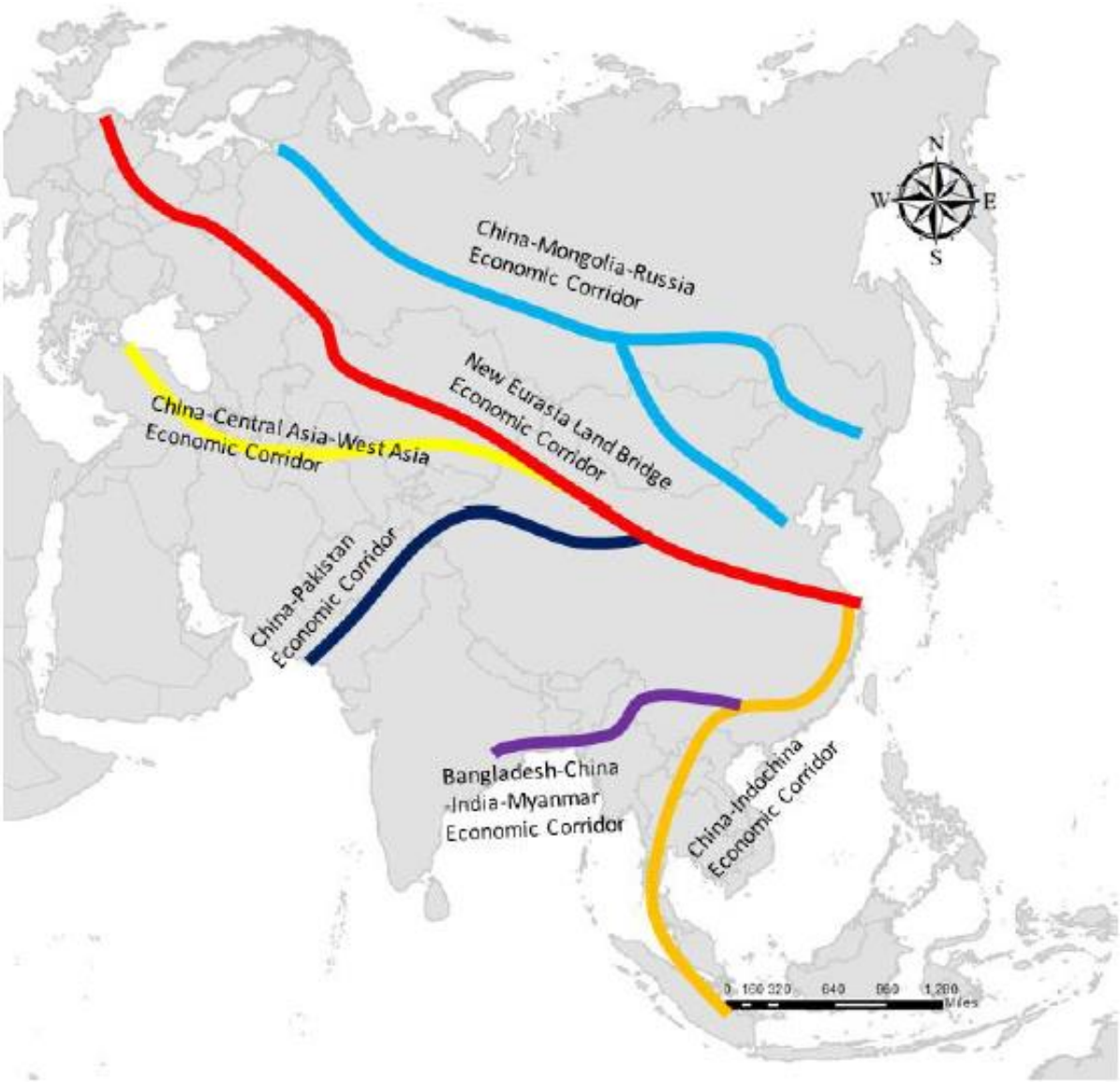


Source: Financial Times.

[65] *Clover, C., & Hornby, L. (2015, October 12). China's Great Game: Road to a new empire. Financial Times. Retrieved from: https://www.ft.com/content/6e098274-587a-11e5-a28b-50226830d644*

[66] *Derudder, B., Liu, X., & Kunaka, C. (2018). Connectivity along overland corridors of the belt and road initiative. World Bank.*

Figure 2.2 Map of the Belt and Road Initiative's Corridors



Source: World Bank.

Nonetheless, inside the *Belt and Road Initiative* project there is also some degree of consideration towards the Chinese sub-regions' development and connectivity, giving this plan also the trait of internal focus. In fact, *Section VI* of the document states "*In advancing the Belt and Road Initiative, China will fully leverage the comparative advantages of its various regions, adopt a proactive strategy of further opening-up, strengthen interaction*

and cooperation among the eastern, western and central regions, and comprehensively improve the openness of the Chinese economy".[67]

For example, one of the objectives is to support the development and connectivity of western Chinese provinces such as Gansu, Guangxi and Ningxia, through high-speed railroads, gas pipelines and electricity links.[68]

Since its initial announcement, the *Belt and Road Initiative* has manifested interest in many countries. A sign of such interest can be found in the elevate number of countries taking part in the foundation of the *AIIB*. The *BRI* is a substantial connectivity project for, among others, trade purposes; therefore, it inevitably requires large infrastructure investments, predominantly in the under-developed areas, but virtually in every involved region that is not adequately equipped to sustain the desired trade flows. In fact, it is generally considered that the underdeveloped infrastructure in some of the countries crossed by the corridors, caused by lack of financial resources or planning, building and coordinating capabilities, is a gap to be potentially filled by the investments under the *BRI* brand.[69] Specifically, it involves *hard infrastructure* projects, such as the construction of high-speed railways, highways, air and seaports, oil and natural gas pipelines and telecommunication networks; *soft infrastructure* projects are also included, in order to develop an efficient ecosystem for the infrastructure development, such as by removing barriers to trade, liberalizing foreign investments and forming agreements.[70]

Having envisaged the need for such large-scale investments, in October 2014 China lead the establishment of the *Asian Infrastructure Investment Bank* (*AIIB*), to which twenty-one Asian countries participated.[71] Since then, an increasing number of countries have been joining the *AIIB*, which is a sign of nations' interest in the *Initiative*. Fifty-seven countries joined as founding members by March 2015[72], and currently the bank counts 102 members, with the latest approvals of Croatia and Senegal in December 2019.[73]

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[67] NDRC, 2015, op. cit.
[68] Blanchard & Flint, 2017, op. cit.
Huang, 2016, op. cit.
[69] Huang, 2016, op. cit.
[70] Blanchard & Flint, 2017, op. cit.
[71] Fallon, 2015, op. cit.
Yu, 2017, op. cit.
[72] Fallon, 2015, op. cit.
[73] Asian Infrastructure Investment Bank website. Retrieved from https://www.aiib.org/en/news-events/news/2019/20191231_001.html. (Last accessed in January 2020).

Table 2.1 lists the countries become members of the institution, divided into regional and non-regional, with indication of each country's capital subscription and voting power.

Table 2.1 Members of the Asian Infrastructure Investment Bank.

MEMBERS	CAPITAL (MILLION USD)	% OF TOTAL	VOTING POWER	% OF TOTAL
REGIONAL MEMBERS				
AFGHANISTAN	86,6	0,0895%	2.465	0,2197%
AUSTRALIA	3.691,2	3,8164%	39.284	3,5013%
AZERBAIJAN	254,1	0,2627%	4.913	0,4379%
BAHRAIN	103,6	0,1071%	2.808	0,2503%
BANGLADESH	660,5	0,6829%	8.977	0,8001%
BRUNEI DARUSSALAM	52,4	0,0542%	2.896	0,2581%
CAMBODIA	62,3	0,0644%	2.995	0,2669%
CHINA	29.780,4	30,7908%	300.176	26,7540%
CYPRUS	20,0	0,0207%	1.972	0,1758%
FIJI	12,5	0,0129%	1.897	0,1691%
GEORGIA	53,9	0,0557%	2.911	0,2595%
HONG KONG, CHINA	765,1	0,7911%	9.423	0,8399%
INDIA	8.367,3	8,6512%	86.045	7,6690%
INDONESIA	3.360,7	3,4747%	35.979	3,2067%
IRAN	1.580,8	1,6344%	11.857	1,0568%
ISRAEL	749,9	0,7753%	9.121	0,8129%
JORDAN	119,2	0,1232%	3.564	0,3177%
KAZAKHSTAN	729,3	0,7540%	8.206	0,7314%
KOREA	3.738,7	3,8656%	39.759	3,5436%
KYRGYZ REPUBLIC	26,8	0,0277%	2.613	0,2329%
LAO PEOPLE'S DEMOCRATIC REPUBLIC	43,0	0,0445%	2.802	0,2497%
MALAYSIA	109,5	0,1132%	3.467	0,3090%
MALDIVES	7,2	0,0074%	2.444	0,2178%
MONGOLIA	41,1	0,0425%	2.783	0,2480%
MYANMAR	264,5	0,2735%	5.017	0,4472%
NEPAL	80,9	0,0836%	3.181	0,2835%
NEW ZEALAND	461,5	0,4772%	6.987	0,6227%
OMAN	259,2	0,2680%	4.964	0,4424%
PAKISTAN	1.034,1	1,0692%	10.645	0,9488%

PHILIPPINES	979,1	1,0123%	12.163	1,0841%
QATAR	604,4	0,6249%	8.416	0,7501%
RUSSIA	6.536,2	6,7580%	67.734	6,0370%
SAMOA	2,1	0,0022%	1.793	0,1598%
SAUDI ARABIA	2.544,6	2,6309%	27.818	2,4794%
SINGAPORE	250,0	0,2585%	4.872	0,4342%
SRI LANKA	269,0	0,2781%	5.062	0,4512%
TAJIKISTAN	30,9	0,0319%	2.650	0,2362%
THAILAND	1.427,5	1,4759%	16.647	1,4837%
TIMOR-LESTE	16,0	0,0165%	1.932	0,1722%
TURKEY	2.609,9	2,6985%	28.471	2,5376%
UNITED ARAB EMIRATES	1.185,7	1,2259%	14.229	1,2682%
UZBEKISTAN	219,8	0,2273%	4.570	0,4073%
VANUATU	0,5	0,0005%	1.777	0,1584%
VIETNAM	663,3	0,6858%	7.678	0,6843%
TOTAL REGIONAL MEMBERS	**73.855,3**	**76,3612%**	**825.963**	**73,6163%**
NON REGIONAL MEMBERS				
ALGERIA	5,0	0,0052%	1.822	0,1624%
AUSTRIA	500,8	0,5178%	7.380	0,6578%
BELARUS	64,1	0,0663%	2.413	0,2151%
BELGIUM	284,6	0,2943%	4.618	0,4116%
CANADA	995,4	1,0292%	11.726	1,0451%
DENMARK	369,5	0,3820%	6.067	0,5407%
ECUADOR	5,0	0,0052%	1.822	0,1624%
EGYPT	650,5	0,6726%	8.877	0,7912%
ETHIOPIA	45,8	0,0474%	2.230	0,1988%
FINLAND	310,3	0,3208%	5.475	0,4880%
FRANCE	3.375,6	3,4901%	36.128	3,2200%
GERMANY	4.484,2	4,6363%	47.214	4,2081%
GREECE	10,0	0,0103%	1.872	0,1668%
GUINEA	5,0	0,0052%	1.822	0,1624%
HUNGARY	100,0	0,1034%	2.772	0,2471%
ICELAND	17,6	0,0182%	2.548	0,2271%
IRELAND	131,3	0,1358%	3.085	0,2750%
ITALY	2.571,8	2,6591%	28.090	2,5036%
LUXEMBOURG	69,7	0,0721%	3.069	0,2735%
MADAGASCAR	5,0	0,0052%	1.822	0,1624%
MALTA	13,6	0,0141%	2.508	0,2235%

NETHERLANDS	1.031,3	1,0663%	12.685	1,1306%
NORWAY	550,6	0,5693%	7.878	0,7021%
POLAND	831,8	0,8600%	10.690	0,9528%
PORTUGAL	65,0	0,0672%	3.022	0,2693%
ROMANIA	153,0	0,1582%	3.302	0,2943%
SERBIA	5,0	0,0052%	1.822	0,1624%
SPAIN	1.761,5	1,8213%	19.987	1,7814%
SUDAN	59,0	0,0610%	2.248	0,2004%
SWEDEN	630,0	0,6514%	8.672	0,7729%
SWITZERLAND	706,4	0,7304%	9.436	0,8410%
UNITED KINGDOM	3.054,7	3,1583%	32.919	2,9340%
TOTAL NON REGIONAL MEMBERS	**22.863,1**	23,6388%	**296.021**	**26,3837%**
GRAND TOTAL	**96.718,4**	**100,0000%**	**1.121.984**	**100,0000%**

Source: personal elaboration on the AIIB website.[74]

Thanks to its contribution of $29.78 billion, China holds a total voting share of over 26%. The *AIIB* is a funding source for the infrastructure projects in the countries involved in the *BRI*. The main aim of the bank, with a capital base of 100 billion dollars, is to promote and sustain the construction of infrastructure in Asia and to provide financial support to China's *Belt & Road* projects, more specifically in the areas of energy, transportation, telecommunications, rural infrastructure and agricultural development, environmental protection and urban development. In fact, the functions of the AIIB as outlined by its Articles of Agreement, are:[75]

- To promote investment for development purposes, especially for infrastructure and other productive sectors;
- To deploy the financial resources to achieve harmonious economic growth of the region, with particular attention on the needs of less developed members;
- To encourage private investments in the projects for the economic development in the region;

[74] Asian Infrastructure Investment Bank website. Retrieved from https://www.aiib.org/en/about-aiib/governance/members-of-bank/index.html
[75] Asian Infrastructure Investment Bank. Articles of Agreement. Retrieved from https://www.aiib.org/en/about-aiib/basic-documents/articles-of-agreement/index.html

- To undertake other activities to further these functions.

The interest shown towards the *AIIB* by non-Asian countries has made it a truly global project.[76] Moreover, a significant 26% of the voting power pertains to countries defined as *non-regional*.

The *Asian Infrastructure Investment Bank* is not the only financial source for the *Belt and Road Initiative* projects. China has instituted the *Silk Road Fund* with a capital base of 40 billion dollars to be used for financing the infrastructure plans. Other funding sources include the *China Development Bank*, the *BRICS New Development Bank*, the *World Bank*, and the *Asian Development Bank*.[77]

To put the project in practice, China is signing formal agreements and Memorandum of Understandings with other countries that are willing to participate. Among such agreements is the "*Joint Construction of Silk Road Economic Belt*" stipulated with Kazakhstan in 2014. Another example is the "*Joint Statement on Cooperation between Construction of the Silk Road Economic Belt and Eurasian Economic Union*" with the Russian nation in 2015. In the same year, followed a bilateral agreement with Uzbekistan.[78]

The next paragraph outlines in detail the *BRI*-branded projects aimed at seaports throughout the world, with a focus on Europe, and Italy in particular, in the last section of the paragraph.

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[76] Godement, F., & Kratz, A. (2015). " *One Belt, One Road": China's Great Leap Outward*. European Council on Foreign Relations (ECFR).
EPSC. (2015). The Asian Infrastructure Investment Bank. A New Multilateral Financial Institution or a Vehicle for China's Geostrategic Goals. *European Political Strategy Centre*, (1), 24.
Yu, 2017, op. cit.
Summers, 2016, op. cit.
[77] Summers, 2016, op. cit.
EPSC, 2015, op. cit.
Huang, 2016, op. cit.
[78] Blanchard & Flint, 2017, op. cit.

2.3 Investments in seaports

One of the important areas of investment pertaining to the *Belt and Road Initiative* and the Chinese strategy is the maritime transportation of goods and related infrastructure. As a matter of fact, this is one of the primary goals of the project, and in principle it is coherent with all the desired objectives described earlier in this chapter. This paragraph retraces the main investments enacted by the Chinese nation, mainly through state-owned firms and/or through the institutions supporting the *Belt and Road Initiative*. This section attempts to consider the majority of seaport projects across the Asian, African, European and American continents, with the objective of forming a clearer picture about the Chinese intentions regarding the maritime part of the *Belt and Road Initiative* and the common denominator of the strategies.

Since the origin of the *BRI* plan, numerous steps have been taken with respect to seaports investments and development. *Table 2.2* lists the investments of major relevance. The table is divided into two sections: the "*Ports*" section contains investments and operations that involve a seaport entity as a whole; the "*Terminals*" section contains projects that involve one or more terminals of a port. The table summarizes such investments and contains the identification of the port involved in the project, the country in which it belongs, the company enacting the investment, and a brief description of the operation.

Table 2.2 BRI Investments in seaports

	COUNTRY	COMPANY	DESCRIPTION
PORTS			
Kuantan Port	Malaysia	Beibu Gulf Holding Co.	40%
Kyaukphiu deep-sea Port	Myanmar	China International Trust and Investment Corporation	Construction
Hambantota Port	Sri Lanka	China Merchants Port Holdings	85%; 99-year lease agreement
Gwadar Port	Pakistan	China Overseas Port Holding Company	Construction; 40-year concession agreement
Haifa Port	Israel	Shanghai International Port Group	Development and 25-year operation agreement

Djibouti Port	Djibouti	China Merchants Port Holdings	23,5%; development of the Doraleh Container Terminal and Multi-Purpose Port
Lamu Port	Kenya	China Communications Construction Company	Construction
Bagamoyo Port	Tanzania	China Merchants Holding International	Construction
Piraeus Port	Greece	COSCO Hong Kong Group Limited	51% (+16% from 2021)
Thessaloniki Port	Greece	China Merchants Holdings International	Minority shareholder
TERMINALS			
Busan Port Terminal	South Korea	COSCO and China Merchants Holdings International	Minority shareholders
Singapore terminal	Singapore	COSCO-PSA Terminal Pte Ltd	Property
Colombo Port terminal	Sri Lanka	China Merchants Port Holdings	85%; 35-year Build, Operate and Transfer agreement
Khalifa Port terminal	UAE	COSCO	90% operator
Ashdod Port terminal	Israel	Pan-Mediterranean Engineering Company	Construction
Port Said East - Suez Canal Terminal	Egypt	COSCO	20%
Lomé Container Terminal	Togo	China Merchants Port Holdings	50%
Abidjan Port Terminal	Ivory Coast	China Merchants Holdings International	Minority shareholder
Tin-Can Island Container Terminal	Nigeria	China Merchants Port Holdings	28,50%
Ambarli Port - Kumport Terminal	Turkey	Consortium: COSCO, China Merchants Holdings International;	65%

		China Investment Corporation Capital	
Marsaxlock Port Terminal	Malta	China Merchants Holdings International	Minority shareholder
Tangier and Casablanca Ports Terminals	Morocco	China Merchants Holdings International	Minority shareholder
Port of Antwerp Gateway	Belgium	COSCO	20%
Port of Antwerp Terminal	Belgium	China Merchants Holdings International	Minority shareholder
Port of Zeebrugge Terminals	Belgium	COSCO	85%
Port of Rotterdam - Euromax Terminal	Netherlands	COSCO	35%
Terminals in Montoir, Le Havre, Dunkirk and Fos	France	China Merchants Holdings International	Minority shareholder
Ports of Valencia and Bilbao Terminals	Spain	COSCO	Operator
Port of Constanta Terminal	Romania	Cofco International	Operator
Western Ligurian System Port Authority - Vado Gateway	Italy	COSCO and Qingdao Port International	49,90%
Port of Seattle Terminals	USA	COSCO	13,33%
Houston and Miami Ports Terminals	USA	China Merchants Holdings International	Minority shareholder
Chancay Port Terminal	Peru	COSCO	60%

Source: personal elaboration (See sources in the rest of the section)

In reviewing the seaport projects, this section follows the *Maritime Silk Road* geographic path, beginning in Far East, passing through Africa and Europe, and reaching also the American continent.

A number of Asian seaports have been of interest of the Chinese ambitious project. Starting from South-East Asia, *COSCO* holds 4.89% of the shares of the Busan Port Terminal, in South Korea.[79] As reported also later on in this paragraph, *COSCO Shipping Group*, a Chinese state-owned enterprise active in shipment and logistic operations, is one of the most active Chinese firms in the *Belt and Road Initiative project*.

In 2015, *Beibu Gulf Holding Co.*, a subsidiary of *Guanxi Beibu Gulf International Port Group*, that is a Chinese state-owned company operating, among others, in transportation, port management and logistics, acquired 40% of the shares of the Kuantan Port, in Malaysia, where a new Deep Water Terminal is under development, with the objective of catering 18.000 TEUs container ships.[80]

In the Singapore Port, the second world largest port by volume trade in 2017, the joint venture company *COSCO-PSA Terminal Pte Ltd*, in which *COSCO* holds 49% of the shares, owns five terminal berths with the annual handling capacity of 5 million TEUs.[81] The Singapore Port container terminal overall consists of 67 container berths with a capacity of 45.000 TEUs. Considering that this port is one of the protagonists in world cargo trade, the significance and reasons of China's presence are self-evident.

Another project pertaining to the *Belt and Road Initiative* is the development in Myanmar of the Kyaukphiu deep—sea port and an adjacent industrial park, for which the *China International Trust and Investment Corporation* won the tender. The new berths will be able to handle 4.9 million TEU containers.[82]

BRI-branded investments in ports reached also Sri Lanka. *China Merchants Port Holdings Company Limited*, a partially state-owned conglomerate with activities in port investment and development, has invested in the Hambantota Port. In 2015, *China Merchants* signed

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[79] COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/

[80] Kuantan Port Consortium Sdn Bhd official website. Retrieved from http://www.kuantanport.com.my/en_GB/

[81] COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/
PSA Singapore website. Retrieved from https://www.singaporepsa.com/

[82] Louppova, J. (2018, July 9). China finalises talks on Kyaukphyu port in Myanmar. *Port.today*. Retrieved from https://port.today/china-finalises-talks-kyaukphyu-port-myanmar/
Thompson, C., Htoo, T. (2018, November 09). Kyaukphyu port: What happens next?. *The Myanmar Times*. Retrieved from https://www.mmtimes.com/news/kyaukphyu-port-what-happens-next.html

an agreement with the Sri Lankan government to help the port develop, under a Private-Public Partnership, and achieved a 99-year lease agreement in 2017; the Chinese conglomerate has a majority ownership in the port (stake 70[83]-85%[84]). One year later, the port increased flows of Ro-Ro vessels, diversified its activities by adding container handling, general cargo, passenger, bunkering, gas and project cargo activities, and included other logistic activities in its portfolio.[85] A valuable competitive advantage of the port is its geographical position, providing close proximity to the East-West routes and to India.[86]

Remaining in Sri Lanka, a container terminal in the Colombo port, which is primarily a container port and the most important in the country, was built by *Colombo International Container Terminals Limited*, a joint venture company of *China Merchants Holding* and the *Sri Lanka Port Authorities.*[87] *China Merchants Port Holdings* holds 85% of the terminal and obtained a 35-year Build Operate and Transfer Agreement for the terminal, which is the only deep-water terminal in South Asia capable of handling the largest vessels.[88]

In Pakistan, the Chinese state-owned *China Overseas Port Holding Company* (*COPHC*) obtained a contract in 2013 for the construction and operation of the deep-sea Gwadar Port, a 64.000 sq m port, of which circa 48.000 is the surface of the container stacking area.[89] Pakistan still has the ownership of the port, but the Chinese conglomerate obtained a 40-year concession agreement for operating it, after financing its development.[90] The Chinese company also gained the control of the Gwadar Free Zone. Gwadar Port is a key part of the China-Pakistan Economic Corridor.

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[83] Sri Lanka signs deal on Hambantota port with China. (2017, July 29). *BBC News*. Retrieved from https://www.bbc.com/news/world-asia-40761732

[84] Abi-Habib, M. (2018, June 25). How China Got Sri Lanka to Cough Up a Port. *The New York Times*. Retrieved from https://www.nytimes.com/2018/06/25/world/asia/china-sri-lanka-port.html
China Merchants Port Holdings Company Limited website. Retrieved from http://www.cmport.com.hk/en/

[85] Sri Lanka's Hambantota International Port – Gateway to the sub-continent. (2019, May 09). *Lloyd's List Maritime Intelligence*. Retrieved from https://lloydslist.maritimeintelligence.informa.com/LL1127423/Sri-Lankas-Hambantota-International-Port--Gateway-to-the-subcontinent

[86] Sri Lanka Ports Authority website. Retrieved from https://www.slpa.lk

[87] Sri Lanka Ports Authority website. Retrieved from https://www.slpa.lk

[88] Colombo International Container Terminals Ltd website. Retrieved from http://www.cict.lk/
China Merchants Port Holdings Company Limited website. Retrieved from http://www.cmport.com.hk/en/

[89] Raza, S. I. (2013, February 18). China given contract to operate Gwadar port. *DAWN*. Retrieved from https://www.dawn.com/news/786992/china-given-contract-to-operate-gwadar-port
Gwadar Port Authority website. Retrieved from http://www.gwadarport.gov.pk/home.aspx

[90] China Overseas Ports Holding Company Pakistan Ltd website. Retrieved from http://cophcgwadar.com

In the United Arab Emirates, *COSCO* is a 90% shareholder of the *CSP Abu Dhabi Terminals*, the operator of the semi-automated container terminal in the Khalifa Port.[91]

In 2015, the Chinese company *Shanghai International Port Group* (*SIPG*) won the tender contract to expand the Haifa Port, i.e. Israeli largest port, and to operate it for the subsequent 25 years from the completion of the works, planned for the year 2021.[92] In the same year, another Chinese company, the *Pan-Mediterranean Engineering Company*, a subsidiary of *China Harbour Engineering Company*, started the construction of a new container terminal in the port of Ashdod, the other important Israeli seaport.[93] According to the plans, the two ports will be able to handle the largest containers currently moving through the Europe-Asia routes, also thanks to their advanced equipment.

In Egypt, *COSCO* is a 20% shareholder of the Suez Canal Container Terminal, in Port Said East. This terminal is located in the East Port Said Industrial Zone, an ambitious project for an innovative and vast industrial area and transshipment hub that is under development in Egypt.[94]

East-African countries have also been recipients of such investments. *China Merchants Port Holdings* is also operating and holds 23.5% of the shares in the port of Djibouti[95], where it is working on the development of, for example, the Doraleh container terminal and Doraleh Multi-Purpose Port. In 2018, China also began construction of a free trade zone in Djibouti, that will comprise house manufacturing, warehouse facilities, an export-

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[91] COSCO, Abu Dhabi Ports Open New Terminal at Khalifa Port. (2018, December 10). *World Maritime News*. Retrieved from https://worldmaritimenews.com/archives/266410/cosco-abu-dhabi-ports-open-terminal-at-khalifa-port/

[92] Harel, A. (2018, September 17). Israel Is Giving China the Keys to Its Largest Port – and the U.S. Navy May Abandon Israel. *Haaretz*. Retrieved from https://www.haaretz.com/israel-news/.premium-israel-is-giving-china-the-keys-to-its-largest-port-and-the-u-s-navy-may-abandon-israel-1.6470527

Yellinek, R. (2018, November 27). The Israel-China-U.S. Triangle and the Haifa Port Project. *Middle East Institute*. Retrieved from https://www.mei.edu/publications/israel-china-us-triangle-and-haifa-port-project

Shanghai Wins Haifa Terminal Concession. (2016, April 13). *Port Technology International*. Retrieved from https://www.porttechnology.org/news/shanghai_wins_haifa_terminal_concession/

[93] Port of the Month: Israel Ports Company (IPC). (2017, March 31). *ESPO*. Retrieved from https://www.espo.be/news/port-of-the-month-israel-ports-company-ipc

[94] COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/

East Port Said Development website. Retrieved from https://www.ep-egypt.com/

[95] Kuo, M. A. (2019, March 25). China in Djibouti: The Power of Ports. *The Diplomat*. Retrieved from https://thediplomat.com/2019/03/china-in-djibouti-the-power-of-ports/

China Merchants Port Holdings Company Limited website. Retrieved from http://www.cmport.com.hk/en/

processing area and a service center.[96] According to the director general of China Merchants Port Holdings, Jingtao Bai, Djibouti is located at a strategic position, being close to the Asia-Europe shipping routes, it's an important gateway for the hinterland countries of the region, and has valuable services and facilities; the plan for Djibouti is to develop it as a regional shipping center, thanks also to the free trade zone.[97]

A significant project in the African continent is the construction, initiated in 2016, of the Lamu port in Kenya by the *China Communications Construction Company* (*CCCC*), operating in design and construction of transportation infrastructure, including ports.[98] With an estimated investment of 5 billion dollars, Lamu port is expected to become the largest deep-sea port in the East African shores, serving the Kenyan, Ethiopian and South Sudan markets.[99] Lamu Port, that will supplement the ports of Mombasa and the other ports in cargo handling, is part of the *Lamu Port-South Sudan-Ethiopia-Transport* (*LAPSSET*) *Corridor* project, that by 2030 will consist of a network of roads, railway lines, port, international airports, oil pipelines.[100]

The Tanzanian government is negotiating with *China Merchants Holding International* the development of the Bagamoyo port and a special economic zone.[101] If completed, the Bagamoyo port is expected to become among the largest in East Africa.

The Lomé Container Terminal in Togo is developed and operated by a consortium of *China Merchants Port Holdings* and *Terminal Investment Limited*, each holding half of the shares.[102] It's worth noting that *China Merchants Port Holding* has also a 28.5% stake in the Nigerian Tin-can Island Container Terminal.[103] The acquisition of the shares was carried out in 2010, before the announcement of the Belt and Road Initiative; nonetheless,

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[96] Russon, M.A. (2019, April 5). Djibouti: Building Africa's shipping centre. *BBC News*. Retrieved from https://www.bbc.com/news/business-47803765

[97] Wagner, J., Caslin, O. (2019, March 20). "Investment is not limited to ports": Jingtao Bai, director general of China Merchants Port Holdings. *The Africa Report*. Retrieved from https://www.theafricareport.com/10475/investment-is-not-limited-to-ports-jingtao-bai-director-general-of-china-merchants-port-holdings/

[98] China Communication Construction Company Limited website. Retrieved from http://en.cccltd.cn/

[99] Lamu Port, Kenya. *Ship Technology Global*. Retrieved from https://www.ship-technology.com/projects/lamu-port-kenya/

[100] Kenya Ports Authority website. Retrieved from https://kpa.co.ke/Pages/Default.aspx

[101] Karuri, K. (2019, October 19). Tanzania Open to Talks Over $10 Billion Port Project, Daily Says. *Bloomberg News*. Retrieved from https://www.bloomberg.com/news/articles/2019-10-19/tanzania-open-to-talks-over-10-billion-port-project-daily-says

[102] China Merchants Port Holdings Company Limited website. Retrieved from http://www.cmport.com.hk/en/

[103] China Merchants Port Holdings Company Limited website. Retrieved from http://www.cmport.com.hk/en/

it certainly falls under the strategy the project and can be relevant, given also that the designed capacity of the terminal surpasses 400,000 TEUs.

Although the number of projects in Africa is limited with respect to the Asian and European continents, the African seaports under the influence of China are nonetheless significant, because of their location and throughput capacity.

The Chinese conglomerate *COSCO* has made investments also in the American continent. In 2015, it acquired a 60% stake in the Peruvian Chancay Port Terminal, to be further developed into multi-purpose and container terminals, and as an important gateway to Peru, and in turn, to South America.[104] In US instead, *COSCO* has a 13.33% stake in the SSA Terminals in the Port of Seattle.[105]

2.2.3 The Belt and Road in Europe and Italy

The *Belt and Road Initiative* has carried out projects also in the European continent, which can also be considered as the end-point of the plan.

In Turkey, the majority of the shares of the Kumport Terminal, characterized by a capacity of 2,1 million TEUs, of the Ambarli Port is held by a consortium made of *COSCO* (26%), *China Merchants Holdings International* (26%) and *China Investment Corporation* (*CIC*) *Capital* (13%).[106]

Probably, the most significant project under the *Belt and Road Initiative* plan regards the Piraeus Port in Greece. In 2016, *COSCO Hong Kong Group Limited*[107], a Chinese state-owned conglomerate operating in shipment and logistics, acquired 51% of the shares of the Piraeus Port Authority, and the parties agreed upon the transfer of further 16% of

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[104] COSCO Shipping Ports Buys Stake in Peruvian Chancay Terminal. (2019, January 25). *World Maritime News*. Retrieved from https://worldmaritimenews.com/archives/269604/cosco-shipping-ports-buys-stake-in-peruvian-chancay-terminal/
COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/

[105] COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/

[106] Tan, W. Z. (2015, November 19). Cosco and China Merchants complete Turkish terminal acquisition. *Lloyd's List Maritime Intelligence*. Retrieved from https://www.lloydsloadinglist.com/freight-directory/news/Cosco-and-China-Merchants-complete-Turkish-terminal-acquisition/64818.htm
COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/

[107] COSCO SHIPPING (Hong Kong) Co. Limited is held 100% by China Ocean Shipping (Group) Company, which in turn is held 100% by China COSCO SHIPPING Corporation Limited. As a result, China COSCO SHIPPING Corporation Limited indirectly holds 51% of the Piraeus Port Authority's voting rights.

shares after five years.[108] Following that transaction, the Piraeus Port Authority became a privately owned company. *COSCO* also owns a container terminal in Piraeus.

The significance of such investment derives from the intrinsic value of the port. In fact, Piraeus port is the largest in Greece and one of the largest ports in the Mediterranean. Furthermore, Piraeus port's value is to be found also in its strategic location. It represents the connection node between Asia and Europe, it is frequently considered as a gateway to Europe, and it's the only European port in the East Mediterranean that is able to constitute a valuable transshipment hub thanks to its infrastructure. These factors make the Piraeus Port an essential node in the international trade routes, that is now controlled by a Chinese state-owned company. Reportedly, China plans to further invest significantly in the Piraeus Port, with the objective of turning it into the biggest seaport in Europe and a fundamental transit hub for trade between the European and Asian continents.[109]

In 2018, ended the privatization process of the Greek Thessaloniki Port Authority. The new major shareholder of the port (67%), investing about 230 million euros, is the *South Europe Gateway Thessaloniki*, a consortium formed by *Deutsche Invest Equity Partners GmbH*, holding 47% of the alliance, *Belterra Investments Ltd* (20%), and the remaining 33% of the shares held by *Terminal Link*.[110]

Terminal Link is an international container terminal operator, that is owned by *CMA CGM* (51%) and *China Merchants Holdings International* (49%); it operates thirteen container terminals around the world, that handled a volume of over 2.8 million TEUs in 2018.[111] Other European terminals managed by *Terminal Link*, according to *CMA CGM Group*, are located in:[112]

- France: Montoir, Le Havre, Dunkirk and Fos;
- Belgium: in the port of Antwerp;

[108] Piraeus Port Authority. (2016). Financial Report 2016. *Piraeus Port Authority*. Retrieved from: http://www.olp.gr/en/
[109] Amaro, S. (2019, November 15). China bought most of Greece's main port and now it wants to make it the biggest in Europe. *CNBC*. Retrieved from https://www.cnbc.com/2019/11/15/china-wants-to-turn-greece-piraeus-port-into-europe-biggest.html
[110] Vaggelas, G., Pallis, T. (2018, April 17). Details of a port privatization: Thessaloniki port. *PortEconomics*. Retrieved from http://www.porteconomics.eu/2018/04/17/details-of-a-port-privatisation-thessaloniki-port/
[111] CMA CGM Group website. Retrieved from https://www.cmacgm-group.com/en/
[112] CMA CGM Group website. Retrieved from https://www.cmacgm-group.com/en/

- Malta: Marsaxlokk.

Moreover, it manages terminals in the Moroccan ports of Tangier and Casablanca, in the Port Abidjan in Ivory Coast, the Busan terminal in South Korea, and in Houston and Miami Ports in the US.

European ports have been considered for a number of investments also by the *COSCO Group:*[113]

- The Port of Antwerp Gateway, consisting of four container berths, with a capacity of 2.8 million TEUs, is operated by a joint venture to which *COSCO* has a 20% participation;[114]
- It has a 35% participation in the Euromax Terminal of Rotterdam, a highly automatized container terminal in Rotterdam's Maasvlakte, and with a capacity of 2.55 million TEUs;[115]
- In Belgium, there was a takeover of the *CSP Zeebrugge Terminals* NV by *COSCO*, that holds 85% of its shares. This operation granted *COSCO* an additional annual capacity of one million TEUs;
- In Spain, *COSCO* has acquired in 2017 control over the container terminal operator *Noatum Port Holdings*, that operates terminals in the ports of Valencia and Bilbao.[116]

[113] COSCO SHIPPING Ports Limited website. Retrieved from https://ports.coscoshipping.com/en/
[114] DP World Antwerp website. Retrieved from http://www.dpworldantwerp.com/our-businesses/antwerp-gateway
[115] Cosco Ports entra nell'Euromax Terminal di Rotterdam. (2016, May 12). *Informazioni Marittime*. Retrieved from https://www.informazionimarittime.com/post/cosco-ports-entra-nelleuromax-terminal-di-rotterdam
[116] COSCO Shipping to Buy 51 Pct Stake in Spain's Noatum Port. (2017, June 13). *World Maritime News*. Retrieved from https://worldmaritimenews.com/archives/222627/cosco-shipping-to-buy-51-pct-stake-in-spains-noatum-port/
Cosco entra in terminal in Cina e Spagna. (2017, June 13). *Trasporto Europa*. Retrieved from http://www.trasportoeuropa.it/index.php/home/archvio/14-marittimo/16612-cosco-entra-in-terminal-in-cina-e-spagna

In the Port of Constanta, Romania, the cereal terminal has been acquired by *Nidera*, a company that is fully owned by *Cofco International*, China's largest food and agriculture company.[117]

The Italian ports have also been of interest of the *Belt and Road Initiative*. In fact, Italy is often considered as the endpoint, in geographical terms, of this project.

In the Western Ligurian System Port Authority, composed by the ports of Genoa, Savona and Vado Ligure, the new deep-sea container terminal Vado Gateway is managed by *APM Terminals* (50.1%) and the Chinese *COSCO Shipping Ports* (40%) and *Qingdao Port International* (9.9%). The semi-automatized terminal with an expected annual capacity of 900 thousand TEUs, is planned to be operative starting in February 2020.[118] It is one of the project under the *Belt and Road Initiative*, aiming at connecting the Italian, Swiss, German and French markets with the rest of the world.

The Chinese conglomerate *COSCO*, which initially showed interest in the Port of Naples, approved in 2016 the decision to sell its share in the container terminals *Conateco* and *Soteco* to the other shareholder, *MSC.*[119] The decision was mainly due to the decreasing container traffic flows in the Naples Port that *COSCO* managed.

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[117] Nidera acquires terminal in Port of Constanta. (2014, December 18). *World Grain | Sosland Publishing Company*. Retrieved from https://www.world-grain.com/articles/3889-nidera-acquires-terminal-in-port-of-constanta

COFCO International website. Retrieved from https://www.cofcointernational.com/

[118] De Forcade, R. (2019, December 12). Inaugurato Vado gateway, il maxi terminal di Savona con soldi dalla Cina. *Il Sole 24 Ore*. Retrieved from https://www.ilsole24ore.com/art/inaugurato-nuovo-terminal-savona-ACtHpx4

Autorità di Sistema Portuale del Mar Ligure Occidentale website. Retrieved from https://www.portsofgenoa.com/it/porti/porti-vl/porti-apm-vl.html

Capuzzo, N. (2019, Dicember 17). Inaugurato a Vado Ligure il nuovo terminal container di Apm Terminals – Maersk e Cosco. *Il Giornale della Logistica*. Retrieved from https://www.ilgiornaledellalogistica.it/news/aziende/inaugurato-a-vado-ligure-il-nuovo-terminal-container-di-apm-terminals-maersk-e-cosco/

[119] Pane, A. (2016, July 8). Cosco lascia il porto di Napoli ad Aponte tutto il Conateco. *Il Mattino*. Retrieved from https://www.ilmattino.it/napoli/cronaca/cosco_lascia_napoli_aponte_tutto_conateco-1843855.html

Napoli e Salerno, due porti che si completano crescendo. (2018, September 19). *The Medi Telegraph*. Retrieved from https://www.themeditelegraph.com/it/transport/ports/2018/09/19/news/napoli-e-salerno-due-porti-che-si-completano-crescendo-1.38081842

2.3 Common factors in the BRI investments: what is China aiming at?

This section aim is to reflect on the picture that emerges from the review of the *BRI* projects. As shown, Chinese state-owned companies are taking steps in increasing their worldwide presence in ports as planned by the *Belt and Road Initiative*.

The possible reasons for the investments in seaports pertaining to the BRI are manifold. In 2018, China was the world's largest importer and second-largest exporter of goods.[120] This implies that the Chinese economy is highly connected and dependent on trade with other countries, neighboring and not. By increasing its presence in the important maritime routes' nodes, it is securing itself some advantages, such as the possibility to influence the trends in international trade, and gather valuable logistics data and information about the economy in which the ports are located. Furthermore, cooperation between China and the other countries helps to strengthen their relations.

By being directly present and involved in the most important nodes of the international transport routes, and therefore closer to the market demand and offer sides, the Chinese companies are also gaining the opportunity to develop valuable maritime services to offer to the actors involved in the shipment operations.

China aims at becoming a maritime world power, by having a greater control over the infrastructure involved in international cargo shipping. An expansive economic policy of this kind is permitted by the fact that China is the second economic power in the world.

Another factor to consider is that frequently the development operations in the ports are carried out by workers of Chinese nationality, Chinese machinery and Chinese materials, which obviously help its economy grow. This is a solution to the overcapacity problem mentioned earlier in this chapter.

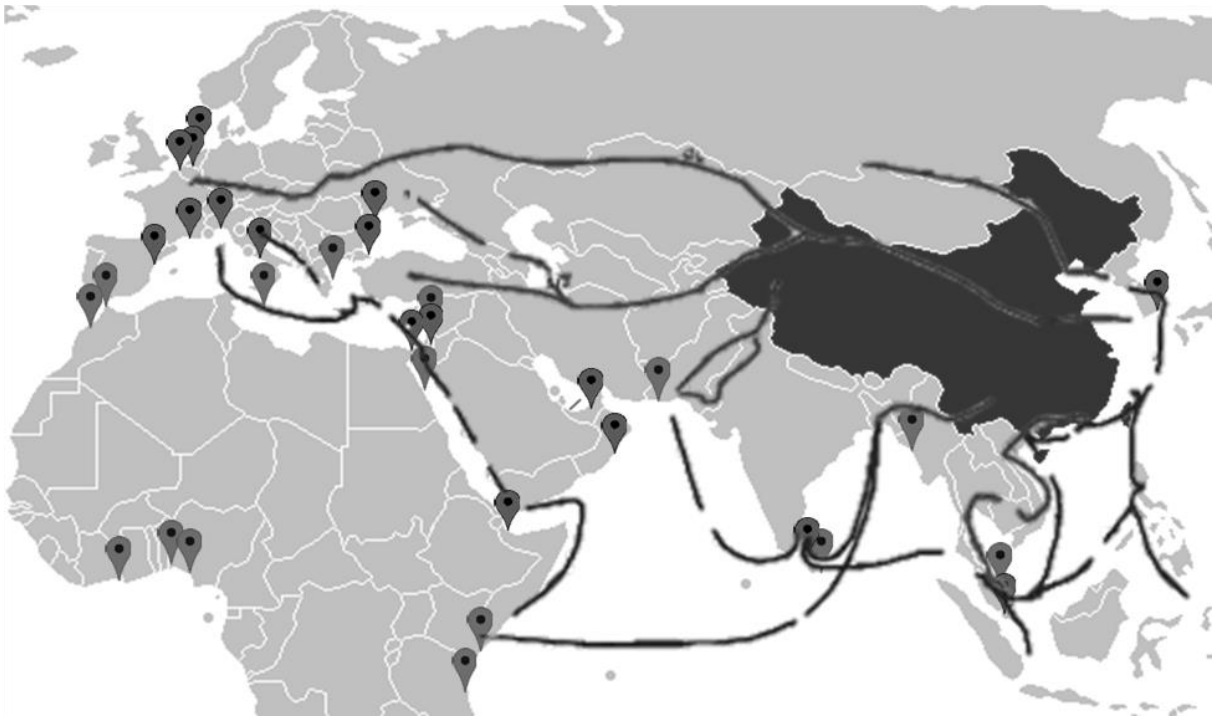
[120] World Bank Database.

Having reviewed the main investments in ports in the previous chapter, an attempt can be undertaken to identify other possible common factors of such investments:

- *Strategic location and decision-making.*

Most, if not all, of the investment operations involve seaports that are located on (or in the proximity of) the routes envisaged in the *Vision and Actions* document. This can be seen in *Figure 2.3*, where the lines are a representation of the routes identified by the *Belt and Road Initiative*, whereas the pins represent the investments in seaports considered in the previous section. The geographic position of such ports is in line with the desired objectives set in the document. From the strategic point of view, these investments provide China a tighter control of key sea passages and also energy supply routes. Furthermore, the ports are often seen as gateways to the inland markets, that constitute potential destinations for the Chinese goods.

Figure 2.3 Map of Belt and Road Investments in seaports



Source: Personal elaboration

**The investments in US and Peru are not represented in this map for graphical reasons.*

As shown in the previous section, China is investing heavily in developing countries' port infrastructure. Such attention to developing countries is linked to the fact that they are geographically close to the Chinese boundaries and are crossed by the economic corridors of the *BRI*. Furthermore, it's possible that the Chinese government has anticipated that global trade will be increasing at a great rate in such countries.

The selected ports often hold a strong position in the competitive arena, have a solid positive performance, and have scope for expansion. In fact, in the majority of cases, Chinese investments are directed towards the acquisition of stakes directly in the port authorities, such as the significant and emblematic case of the Piraeus Port, or in the companies that are operating the terminals. This allows the Chinese companies to have a direct say in the decisions and control of the assets of such entities, which inevitably provides a further opportunity for meeting the objectives.

- *Focus on containerized trade.*

Most of the ports, or terminals in the ports, in which the Chinese-based firms carried out investments have a specialization in containers handling. For example, *China Merchants Port Holdings* have an 85% stake in the container terminal in the Sri Lankan Colombo Port; *Terminal Link*, which operates thirteen terminals in the world and is co-owned by *China Merchants Holdings International*, is specialized in container terminal management.

Moreover, Chinese companies not only endeavor to have stakes in container ports and terminals. They invest afterwards in the development of the infrastructure in order to strengthen container flows of such ports. For example, according *to China Merchants Port Holdings*, the ports in which it operates through the *Terminal Link* company handled more than 12.5 million TEUs in 2017, i.e. 13% more relative to the precedent year.[121] Thanks to its investments, COSCO has experienced a growth of 12.3% in its activities in 2018 with respect to the previous year, reaching globally 98 million TEUs. This growth was achieved thanks, for example, to the increase in its traffic flows in Bilbao and Valencia, Singapore,

[121] China Merchants Port Holdings website. Retrieved from http://www.cmport.com.hk/EN/

Piraeus and Vado Ligure terminals, whereas the Turkish Ambarli Port increased its flows by 18.3% in 2018.[122]

Furthermore, it is worth of note that a number of the investments are directed towards the construction of deep-sea ports. This is in line with the trend of the last decades, by which ships' size is increasing in order to reduce unitary costs of shipment. Development of deep-sea ports allows the Chinese companies to attract the largest vessels, which transport large batches of goods.

- *Interest towards industrial areas and special economic zones.*

A part of the projects is directed towards ports that are located in the proximity of industrial areas and special economic zones. In some cases, a part of the project is the development of a special economic zone. For example, as a first step, *China Merchants Port Holdings* invested in the Djibouti Port, and later began the construction of a free trade zone. Other examples include the Bagamoyo port and the Gwadar Port with their annexed free trade zones. This factor provides enormous economic benefits for the Chinese companies, by creating a more favorable environment for investments.

This chapter has reviewed the objectives of the *Belt and Road Initiative* and the related projects that have been already realized in seaports around the world. The analysis showed that China has taken enormous steps in increasing its influence on international trade dynamics, with an estimated amount of 1,000 billion dollars already invested, and such efforts are still ongoing.

The next chapter focuses on the case study of the Venice Port System, managed by the *North Adriatic Port System Authority* (a.k.a. "*Venice Port Authority*"), with the objective of assessing its position in terms of the industry's evolution reviewed in the first chapter of this work, and its main attributes as potential drivers of competitiveness in the current industry scenario, influenced also by the *Belt and Road Initiative*.

[122] International activities boosted COSCO Ports annual growth. (2019, January 28). *The Medi Telegraph*. Retrieved from https://www.themeditelegraph.com/en/transport/ports/2019/01/28/news/international-activities-boosted-cosco-ports-annual-growth-1.38071938

CHAPTER 3 –THE VENICE PORT SYSTEM CASE STUDY: BEING COMPETITIVE IN THE 21ST CENTURY

Introduction

After the review of the main evolutionary steps in ports and maritime shipping, and the *Belt and Road Initiative*'s advancement, with a focus on the investments on seaports around the world, this chapter is dedicated to the current Italian seaport structure in general and the Venice Port System case study.

The first paragraph of this chapter discusses the framework under which the case study is analyzed. *Paragraph 3.2* aims at reviewing the overall functioning system and role of the Italian seaports under the administration of the Port System Authorities, as defined by the Italian legislation with a deeper focus on the developments resulting from the latest legislative reforms.

The Venetian Port System, comprising the Ports of Venice and Chioggia, and managed by the *North Adriatic Port System Authority*, is examined as a case study, in terms of its functions and activities, governance, competitive advantages, sustainability, and limitations. *Paragraph 3.3* is the dedicated to an overview of the Venetian Port System and an assessment of its main competitive advantages and limitations to the further expansion of its activities.

Paragraph 3.4 discusses the outcomes of the analysis of the Venetian Port System, and provides some considerations on how it can remain competitive in today's arena, based on its competitive factors and limitations, and the current trends in the port and maritime shipping sector.

3.1 Methodology

This paragraph's goal is to illustrate the framework under which the case study of this thesis is analyzed. The framework used for the case study research is based on Yin's Case Study Research: Design and Methods.[123]

3.1.1 The research questions and case study analysis

The analysis focuses on a single case study, namely the Venetian Port System, along with the Port System Authority that oversees and manages it, i.e. the North Adriatic Port System Authority.

After the review of the main evolutionary steps characterizing the port and maritime shipping sector in general in the last decades (*Chapter 1*), and of the current *Belt and Road Initiative*'s investments that influence the sector (*Chapter 2*), the case study analysis in this chapter has the following purposes:

- The Venetian Port System is studied to assess whether it conforms to the general evolution and trends of the port and maritime shipping sector, discussed in the first part of this work. It can also be regarded as an illustrative example of the progression of the Italian ports' role, functioning and governance, given the relative uniformity throughout the Italian ports;
- The Venetian Port System's competitive factors and peculiar characteristics are discussed as a ground for its competitiveness and (potential) future success in the port and maritime shipping industry.

Hence, the questions driving this work can be clustered into two groups:

a) Q1: What are the main evolutionary steps of the port and maritime shipping sector in the last decades?

[123] Yin, R. K. (2009). Case study research: Design and methods 4th edition. In *United States: Library of Congress Cataloguing-in-Publication Data*.

Q2: What are the developments of the *Belt and Road Initiative* and its influences on the port and maritime shipping sector?

b) Q3: What is the position of the Venetian Port System, and the Italian in general, in relation to the evolution and trends of the port and maritime shipping sector?

Q4: What are the Venetian Port System's factors that render it competitive today?

The answers to Q1 and Q2 have been mainly found from a literature review and on-desk research, whereas for Q3 and Q4 the main sources used are literature review and direct interviews. The sources for the case study analysis are outlined more in detail in the following section.

3.1.2 Sources of information

Multiple sources have been used for retrieving the information for the case study analysis:

- Direct observation: I occupied an internship position in the *North Adriatic Port System Authority*. The experience lasted from September to December 2019. The position was in the *Port Operations Coordination Department*, specifically in the *Work and Operations Coordination Area*. My job was mainly that of supporting the area in its wide spectrum of daily activities, which allowed me to deeply understand the functions carried out by the area. Furthermore, whereas prior to the internship experience I had knowledge about the functioning of the Italian ports merely from a theoretical perspective, during the whole experience, I got the opportunity to gain much more insights as to how the whole port and the Authority function in practice. Thus, the internship experience helped me in writing this thesis;
- Theoretical research: I relied and built upon existing theoretical knowledge on the port and maritime shipping sector, the *Belt and Road Initiative*, and the Italian port system. More specifically the sources consist of: books; scientific papers; documents; databases; websites and online information;

- Interviews: In January 2020, I conducted three qualitative, semi-structured interviews to employees of the *North Adriatic Port System Authority* occupying positions that were relevant for my work. More specifically, the interviews were addressed to:

  - Marta Citron and Erika Rizzo, respectively head and employee of the *Environment* area;
  - Giulio Stella, employee of the *Strategic Planning and Development* area; and
  - Jacopo Esposito, employee of the *Legal Affairs* area.

  The interviews were of semi-structured kind and were different one from another. For each interview, there was a number of open questions prepared in advance, to be used as a guide for the conversation in order to discuss the topics of interest of this work, with the possibility to be integrated with further questions and issues that may have arisen during the discussion on my or the interviewee's side. The transcription of the three interviews is reported in the Appendix of this thesis, following the procedure order of the interviews.

The theoretical sources and the interviews' information is not arranged in dedicated sections; it is instead reported throughout the entire *Chapter 3*.

3.2 The Port System in Italy: Seaports and Port System Authorities

This paragraph provides an overview of the state of the art of the port structure in Italy, by discussing the recent port reforms and the role of the Italian *Port System Authorities* today, in order to more clearly lay out the framework under which the Venetian Port functions.

Due to its morphological configuration and being located at the center of the Mediterranean Sea, the Italian nation is characterized by numerous seaports. Italian seaports' administration and functions are highly intertwined with and defined by the law. In fact, Italian law has tried to keep up to the evolutions and trends arising in the port and maritime shipping industry in the second half of the last century, reviewed in the first chapter of this thesis. Hence, many aspects of the ports' activities are regulated by the national law.

The central legislative output on which Italian ports are based is the law n. 84 of 1994 (L. 84/1994).[124] The main amendments to such law are constituted by two legislative decrees (*D.L. n. 169, 4th August 2016*[125], and *D.L. n. 232, 13th December 2017*[126]), which produced some important changes. The resulting law is the main source of regulation of the port sector in Italy.

Following the legislative decree of 2017, the Italian seaports are organized into bigger port systems, and governed by "*Port System Authorities*" (*PSA*) or "*Port Network Authorities*", that are entities resulting from an integration to the major ports of some minor ones located in their proximity. As a result of such amendment, the Italian 58 ports are now organized into 15 *Port System Authorities*, as listed in *Table 3.1*.

[124] Gazzetta Ufficiale della Repubblica Italiana. Legge 28 gennaio 1994, n. 84. "Riordino della legislazione in materia portuale".
[125] Gazzetta Ufficiale della Repubblica Italiana. Decreto Legislativo 4 agosto 2016, n.169. "Riorganizzazione, razionalizzazione e semplificazione della disciplina concernente le Autorita' portuali di cui alla legge 28 gennaio 1994, n. 84, in attuazione dell'articolo 8, comma 1, lettera f), della legge 7 agosto 2015, n. 124".
[126] Gazzetta Ufficiale della Repubblica Italiana. Decreto Legislativo 13 dicembre 2017, n. 232. "Disposizioni integrative e correttive al decreto legislativo 4 agosto 2016, n. 169, concernente le Autorita' portuali".

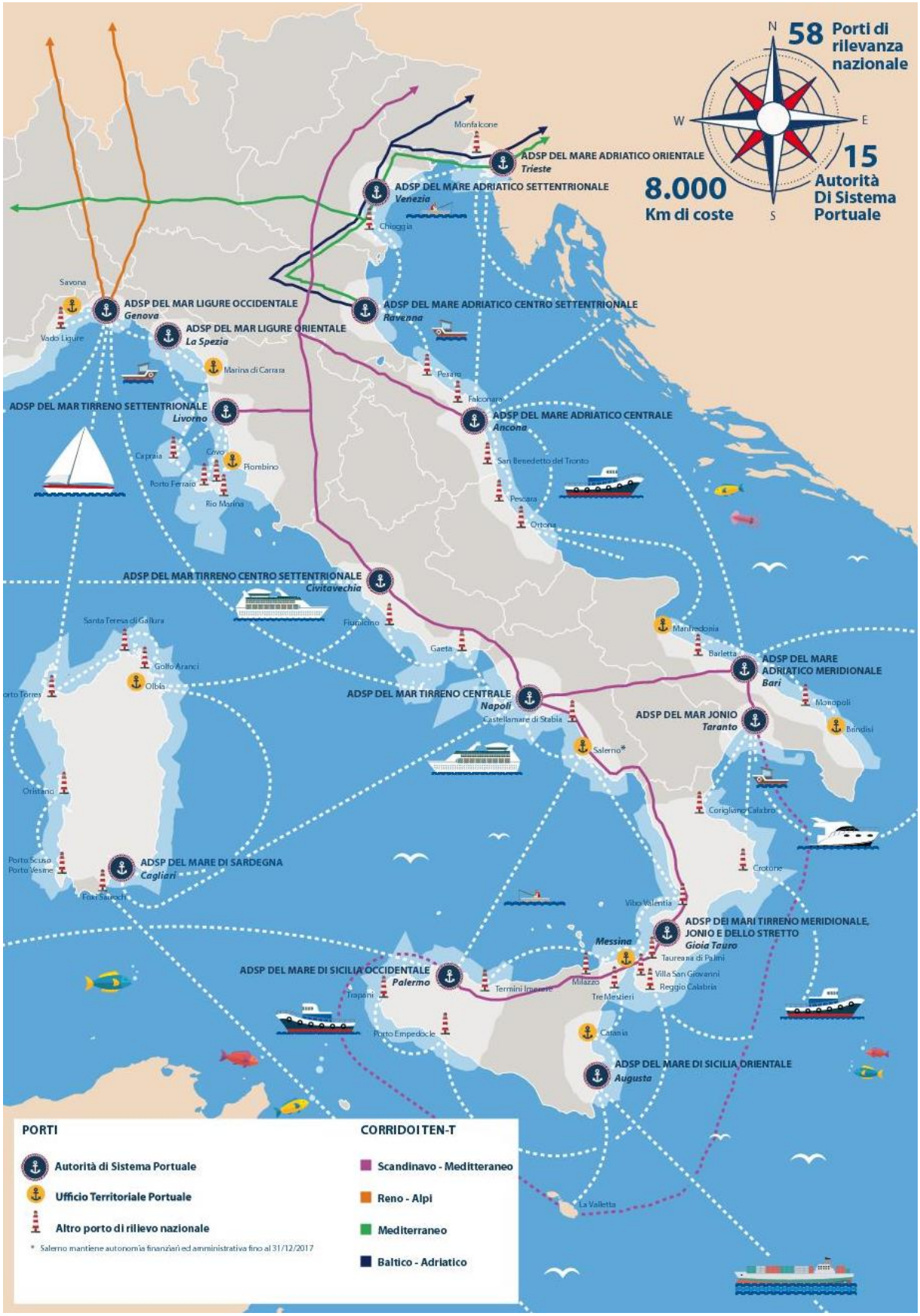
Table 3.1 List of Italian Port System Authorities

PORT SYSTEM AUTHORITIES	***PORT MEMBERS***
Western Ligurian PSA	Genoa, Savona, Vado Ligure
Eastern Ligurian PSA	La Spezia; Marina di Carrara
North Tyrrhenian PSA	Livorno; Capraia; Piombino; Portoferraio; Rio Marina; Cavo
Centre-North Tyrrhenian PSA	Civitavecchia; Fiumicino; Gaeta
Central Tyrrhenian PSA	Naples; Salerno; Castellamare di Stabia
Sardinian PSA	Cagliari; Olbia; Foxi-Sarroch; Porto Torres; Golfo Aranci; Oristano; Portoscuso-Portovesme; Santa Teresa di Gallura
Western Sicillian PSA	Palermo; Termini Imerse; Porto Empedocle; Trapani
Eastern Sicillian PSA	Augusta; Catania
Southern Tyrrhenian and Ionian PSA	Gioia Tauro; Crotone; Corigliano Calabro; Taureana di Palmi; Villa San Giovanni; Messina; Milazzo; Tremestieri; Vibo Valentia; Reggio Calabria
Southern Adriatic PSA	Bari; Brindisi; Manfredonia; Barletta; Monopoli
Ionian PSA	Taranto
Central Adriatic PSA	Ancona; Falconara; Pescara; Pesaro; San Benedetto del Tronto; Ortona
Centre-North Adriatic PSA	Ravenna
Northern Adriatic PSA	Venice; Chioggia
Eastern Adriatic PSA	Trieste; Monfalcone

Source: personal elaboration

Figure 3.1 illustrates a map of the Italian Port System Authorities.

Figure 3.1 Map of the Italian Port System Authorities (Source: Italian Infrastructures and Transportation Ministry)



The relationship between the law and the port activities has been clarified thanks to the interview in the *Legal Affairs* area of the *North Adriatic Port System Authority*.

As mentioned, the main law regulating ports in Italy is the law 84/1994. Before such law, and hence before the *Port Authorities*, there were other types of institutions managing the seaports, generally named "*Enti-porto*". In the case of Venice, the governing institution was the "*Provveditorato al Porto di Venezia*". Such entities, differently from today, were carrying out some functions that now belong to the terminal companies.

The definition of a *Port System Authority* is provided by the law 84/1994, which states that "*the Port System Authority is a public and not-for profit entity of national significance and of a special system, and is endowed with administrative, organizational, regulatory, and financial autonomy*".[127] Its functions are also defined by the law, that states that the *Port System Authority* <<[...] carries out the following functions:

a) Addressing, planning, coordination, regulation, promotion and control [...] of port operations and services, of the authorization and concession activities as of the articles 16, 17 and 18 and of the other commercial and industrial activities carried out in ports and territorial districts. The Port System Authority is also empowered with decree powers, also with regard to safety concerning risks of accidents related to the activities and hygiene conditions [...];
b) Ordinary and extraordinary maintenance operations of the common parts of the port area, including that of the seabed maintenance;
c) Assignment and control of the activities aimed at the provision to the port users of for-payment services of general interest, which do not coincide nor are strictly connected to the port operations as of art. 16, p. 1;
d) Coordination of the administrative activities carried out by public bodies and organizations within the ports and in the maritime state-owned areas included in the territorial district;
e) Exclusive administration of the state-owned maritime areas and goods included in the port's own circumscription [...] except possible Region's jurisdictions and the special law for the protection of Venice and its lagoon [...];

[127] Law 84/1994, art. 6, p. 5. Personal translation

f) Promotion and coordination of the junctions with the inner-port and inter-port logistic systems>>.[128]

According to such functions and responsibilities of the Port System Authorities and based on the literature review in the first chapter, the Italian ports belong to the category of the *Landlord* port management model. Hence, the Venice Port System can be defined as a landlord port, and the North Adriatic PSA is entitled with the functions listed.

As emerged from the interview, a characteristic worth pointing out is the current stronger connection between the Port System Authorities and the Ministry, compared with the pre-2016 reform situation. Currently, the relationship can be defined as more centralized, because the overall strategies pass through the Infrastructure and Transport Ministry; hence, the Port System Authorities have autonomy in defining their strategies, although of a lower degree if compared to the initial 89/1994 law.[129]

The Italian Port System Authorities are not economic entities. Nevertheless, an implicit objective of economic aspect is that of maximizing traffic inflows and outflows. In fact, port development regards not only the infrastructural sphere, but aims also at enhancing traffic flows. Such flows are obviously more of interest of the port's users and stakeholders, namely the terminal companies, since they are directly involved with the ships. The Port System Authorities, instead, have the important objective of facilitating the various port users in their activities, in order to allow them to increase their operational capacity, in line with the current regulations, and, in turn, to develop the local and national economy.[130] Hence, Italian Port System Authorities pursue a public interest.

The Venetian Port System Authority has the goal of improving and enhancing the existing infrastructure of the port it manages, and developing new infrastructure projects, with the final objective of the port development regarding commercial and/or touristic activities. The evident rationale is that if the resulting port is well-equipped and appealing, there is a higher clients' interest. The area pertaining to the Port of Venice is fairly wide, therefore such functions have an important impact on the Venetian economy.

[128] Law 84/1994, art. 6, p. 4. Personal translation
[129] Esposito, J. Interview 2020
[130] Esposito, J. Interview 2020

Considering that port operations are managed by the Port System Authority, the planning function with which it is entitled is of particular importance. An important output of such function is the "*Port Regulatory Pla*n" ("*Piano Regolatore Portuale*", *PRP*), introduced by the law 84/1994, and later re-defined as the "*Port System Regulatory Plan*" ("*Piano Regolatore di Sistema Portuale*", *PRdSP*) by the amendments that gave birth to the Port System Authorities. The *PRdSP* is the planning instrument of the Port System Authorities and is composed of:[131]

- the *Strategic System Planning Document* ("*Documento di Pianificazione Strategica di Sistema*", *DPSS*). It defines the port's development objectives and the functional purpose of the port areas, along with the related infrastructure; and
- the *Port Regulatory Plans* of every port in the Port System. They define the setting and layout of the areas assigned for port operations, namely for commercial, cruise, manufacturing, shipbuilding, and other port-related activities.

The *DPSS* must be consistent and in line with the *National Transportation and Logistics Plan* ("*Piano generale dei trasporti e della logistica*", *PGTL*), the *National Strategic Port and Logistics Plan* ("*Piano strategico nazionale della portualità e della logistica*"), and the European directions in the port, logistics and infrastructure networks fields.

The *Port System Regulatory Plan* has enormous influence on the Port Authority policies enacted for the port development. From the interviews emerged that an important introduction of the 2016 reform is the power given to the Authority to intervene in the authorization of the construction projects in the port, whereas previously such authorization belonged to the municipality. The process is now different: for a work project in the port area, with the prerequisite of being pertinent to the port activities, the Port Authority is addressed, which then calls for a conference with the subjects involved, according to the law; at the outcome of such conference, the final authorization power about the project belongs to the Authority, in accordance with the regulations in force, such as environmental, cultural, etc. It is important for the Authority to be called to assess

[131] Law 84/1994, art. 5.

the utility of such work projects, that now can evaluate them also with regards to its own strategy.[132]

After this broad overview of the Italian seaports functioning and governance, the next paragraph is dedicated to the Venetian Port System case study.

3.3 The Venetian Port System case study

3.3.1 Presentation of the Venetian Port System

The commonly called "*Port of Venice*" or "*Venice Port Authority*" is now officially denominated as "*North Adriatic Sea Port Authority*" (in Italian "*Autorità di Sistema Portuale del Mare Adriatico Settentrionale*"), following the law reform.

The *North Adriatic Port System Authority* is one of the resulting Port System Authorities, and the port system that it manages is composed of the Port of Venice, one of the most important seaports in Italy, both historically and in terms of economic impact, and the Port of Chioggia, being annexed through the legislative reform.

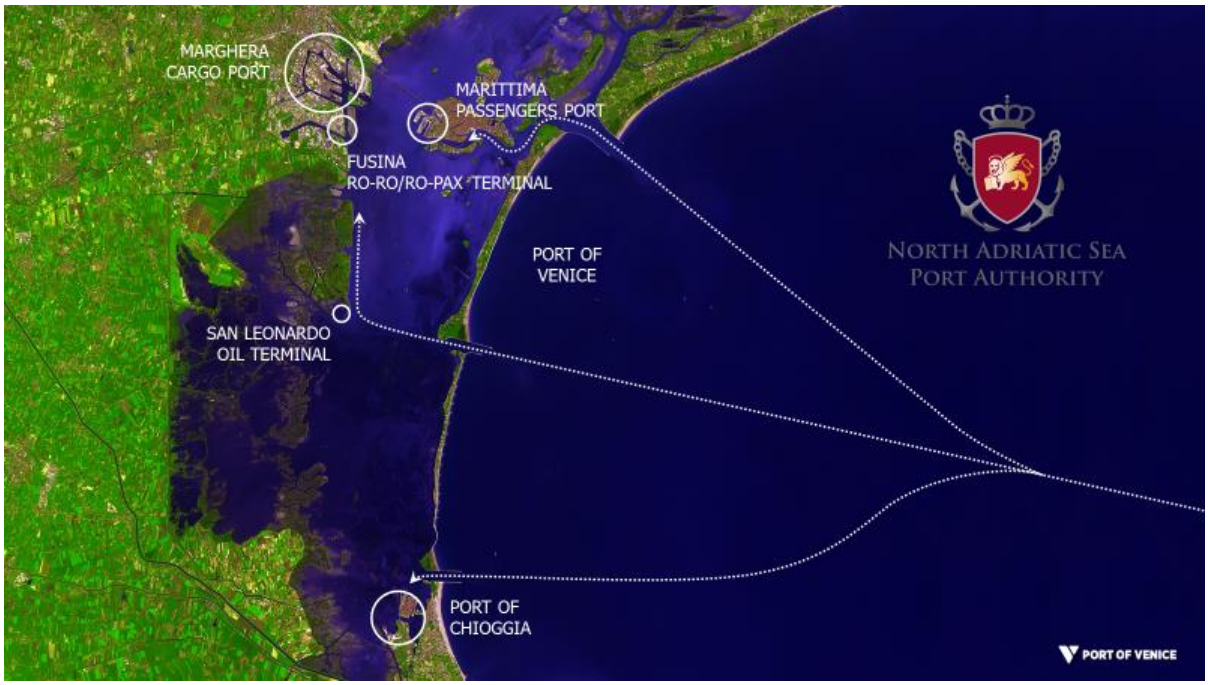
By further decomposing the North Adriatic port network, it is formed by:

- Marghera cargo Port, located in the geographically close city of Marghera;
- Marittima Passengers Port, located in Venice;
- San Leonardo Oil Terminal;
- Port of Chioggia;
- Fusina RO-RO/RO-PAX Terminal.

These constituting elements are represented in *Figure 3.2.* The expression "Venetian Port System" is used throughout this chapter to refer to this network of ports.

[132] Law 84/1994, art. 5.
Esposito, J. Interview 2020

Figure 3.2 The ports managed by the North Adriatic Port System Authority



Source: North Adriatic Port System Authority

These platforms are now unified and governed by a single public body, namely the *North Adriatic Port System Authority*, that has the functions of guiding, planning, coordinating, promoting and monitoring port operations, as well as providing maintenance of the common areas and the seabed, overseeing the supply of services of general interest, managing the state maritime property areas, and planning the development of the port, in accordance with the law discussed in the previous paragraph.[133]

The firms operating in the port area are also accounted for and defined by the law. In fact, art. 16 of the law identifies port operations as the following activities: loading, unloading, transshipment, storing and movement of cargo and any other material, carried out in the port's area.[134]

The ports managed by the North Adriatic PSA are composed of different categories of terminals: commercial; industrial; passenger; and oil terminals. The terminals handle all types of traffic, including containers, liquid bulk, solid bulk, Ro-Ro and Ro/Pax, project

[133] North Adriatic Port System Authority website. Retrieved from https://www.port.venice.it/en
Law 84/1994
[134] Law 84/1994, art. 16.

cargo, general cargo. More in detail, the terminals, that form the very core of the port's activities, are as follows:[135]

- Commercial Terminals:
    - Terminal Intermodale Adriatico (TIA)
    - Multi Service
    - Terminal Intermodale Venezia (TIV)
    - Terminal Rinfuse Venezia (TRV)
    - Transped
    - Vecon
    - Venice Ro-Port M.o.S.

- Industrial terminals:
    - Alcoa Trasformazioni
    - Cereal Docks Marghera
    - Colacem
    - Enel Produzione Fusina
    - Grandi Molini Italiani
    - Idromacchine
    - ArcelorMittal Italia
    - Acciaierie Beltrame
    - Consorzio Venezia Nuova
    - PIlkington
    - Simar

- Oil terminals:
    - Eni Marghera
    - ENI San Leonardo
    - Decal
    - Petroven
    - San Marco Petroli
    - I.E.S.

[135] North Adriatic Port System Authority.

- Versalis

- Passenger terminal: Venezia Terminal Passeggeri (VTP).

The port has a significant economic impact on the city of Venice, the Veneto region, and the whole Italian economy. It is also worth mentioning that the Port of Venice ranks as the first cruise homeport in the Mediterranean, reaching a total of 1.6 million passengers in 2019.[136]

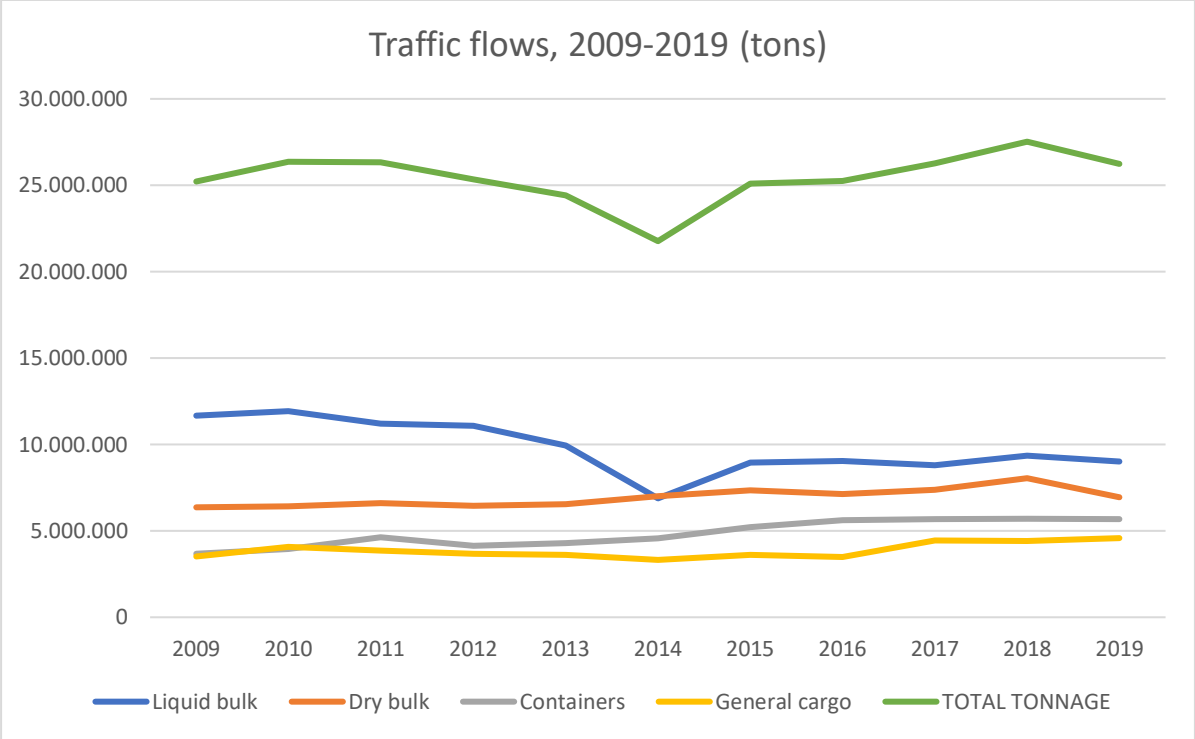
The analysis of the freight flows in the Venice Port and the evolution of its activities is integrated with the interview conducted in the *Strategic Planning and Development Area* of the Port System Authority. His function is predominantly that of conducting analyses of economic-statistical kind, monitoring the traffic inflows and outflows of the port, the logistic chains, the product sectors handled by the port, and forecasts of future flows.

Figure 3.3 represents the traffic flows in the time period 2009-2019. The graph represents the yearly total of freight inflows and outflows in the time period under consideration.

When considering the types of goods being handled in the port, there have not been substantial changes in the last decades. In fact, as can be noted in the graph, the port has handled all categories of cargo: liquid bulk, dry bulk, containers, general cargo, Ro-ro and others. In 2019, the whole port system handled about 26 million tons of cargo. More specifically, it handled 9 million tons of liquid bulk (34%), 7 million tons of dry bulk (27%), 5,7 million tons of containers (22%) and 4.5 million tons of general cargo (17%). The feature of handling all categories of goods defines the Venetian Port System as a *multi-purpose port*.

[136] North Adriatic Port System Authority.

Figure 3.3 Traffic flows of the Venetian port, 2009-2019



Source: Personal elaboration on North Adriatic Port System Authority data

Note: the data for the port of Chioggia are considered starting in the year 2017 (included), according to its incorporation to the Port System Authority in the same year.

However, from the interview emerged that there were some adjustments in time. Concerning the liquid bulk branch, the traffic flows are highly contingent on external dynamics, related to the industries. The port of Venice has managed to remain competitive in the market, although there has been a decrease in the liquid bulk traffic flows, going from the almost 12 million tons in 2012, to almost 7 million tons in 2014. In 2019, the total inflows and outflows of liquid bulk amounted to 9 million tons. Such variations are mainly determined by the industries oscillations. For example, in the past there was the petrochemical industry that in time was decreasing. The Venetian port used to have an oil refinery, but the market dynamics resulted in the import of the final product, to which the port has adapted, but there have been inevitable influences on the traffic. The past oil refinery serves now more as an oil depot. This partially explains the decrease of liquid

bulk traffic up to the year 2014. Similarly, the directions of the chemical, automotive, and other industries influence in turn the flows of the port of Venice.[137]

Beyond the industry dynamics, there can be other types of external factors having considerable influence on a port traffic flows, such as national and international decisions or trends. Clear examples of such exogenous factors can be found in the energy sector. One of them is the European Union strategy to phase out coal-powered electricity by 2030, to which Italy committed to abide to by the year 2025, in favor of more sustainable sources.[138] Macro-decisions of this kind inevitably influence the usage of some categories of cargo, and, in turn, their traffic in ports, and are external to the range of control and the competitive position of single ports. Finally, also the evolving situations of the specific terminal companies have a final effect on the port's inflows and outflows.

It is worth to note that, in the past, the industrial branch of the Venetian traffic was the predominant one, later surpassed by the commercial one, alongside the worldwide containerization phenomenon. However, as emerged from the interview, the containerization process in the Venetian port brought in general to a loss of goods. In fact, the port did not obtain a one-to-one replacement for the goods that used to be carried in conventional ships and were containerized. The reasons are to be found in the geographical context of ports. In fact, for trade with the North America, region for example, the North-European and the Tyrrhenian ports are more feasible and efficient than the Adriatic ports. The port of Venice obtained a competitive advantage for the Far-East traffic flows due to its geographical position. However, the North-European ports still managed to grow and be favored thanks to their competitive advantages obtained in time. Hence, the Tyrrhenian ports are located along the route terminating in the North-European ports, therefore attracting part of the traffic.[139]

Nonetheless, the container inflows and outflows in the Port of Venice are characterized by a consistent increasing trend, going from a total of 3,6 million tons in 2009 to almost 5,7 million tons in 2019. This is inevitably the result of the containerization trend

[137] Stella, G. Interview 2020
[138] Ministero dello Sviluppo Economico. Ministero dell'Ambiente e della Tutela del Territorio e del Mare. Ministero delle Infrastrutture e dei Trasporti. (2019) Piano Nazionale Integrato per l'Energia e il Clima.
[139] Stella, G. Interview 2020

characterizing the world in the last decades, but also of the competitive advantages and the efforts of the Venetian port, discussed later in this chapter.

The next section aims at reviewing the competitiveness of the Venetian Port System, by examining its competitive factors, as well as its main limitations that may restrain its further growth.

3.3.2 The uniqueness of the Venetian Port System: assessing the competitive factors and limitations

This section aims at reviewing the current competitiveness of the Venetian Port System, by discussing its competitive advantages that (potentially) allow it to remain in the port competitive arena of the 21st century, as well as the main limitations that it is currently facing.

The historical importance of the Venetian port system has provided it with a number of competitive advantages, that allow it to preserve its role as a significant player in the 21st century.

- ***Strategic position***

First and foremost, the Venetian Port System is characterized by an important and strategic geographical location, which is undeniably one of the most important factors for a seaport. It is worth mentioning that 40% of global shipping and trade is composed by the European shipping sector.[140] Located in the northern Adriatic Sea, the Venetian port is a natural gateway to Europe for goods transportation. In fact, it can reach the markets of the northern Italy regions, but also of the central and eastern areas of Europe. It is very close to the Mediterranean Sea, which has a large significance in the maritime commercial flows at the global level.

[140] European Commission. Simpson, B. (2018). Motorways of the Sea. Detailed Implementation Plan of the European Coordinator Brian Simpson.

Furthermore, three out of nine *TEN-T Core Network Corridors* pass through Venice, and its port has been defined as a *core port*. The *Trans-European Transport Network* (*TEN-T*) is a European project aimed at the development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals. Hence, it is a network comprising the infrastructural connections and nodes of most relevance at the European level.

The objective is to enhance connectivity and develop an integrated and efficient European transport system, in order to increase the social, economic and territorial cohesion and development in the European region, also through technology and infrastructure innovations.

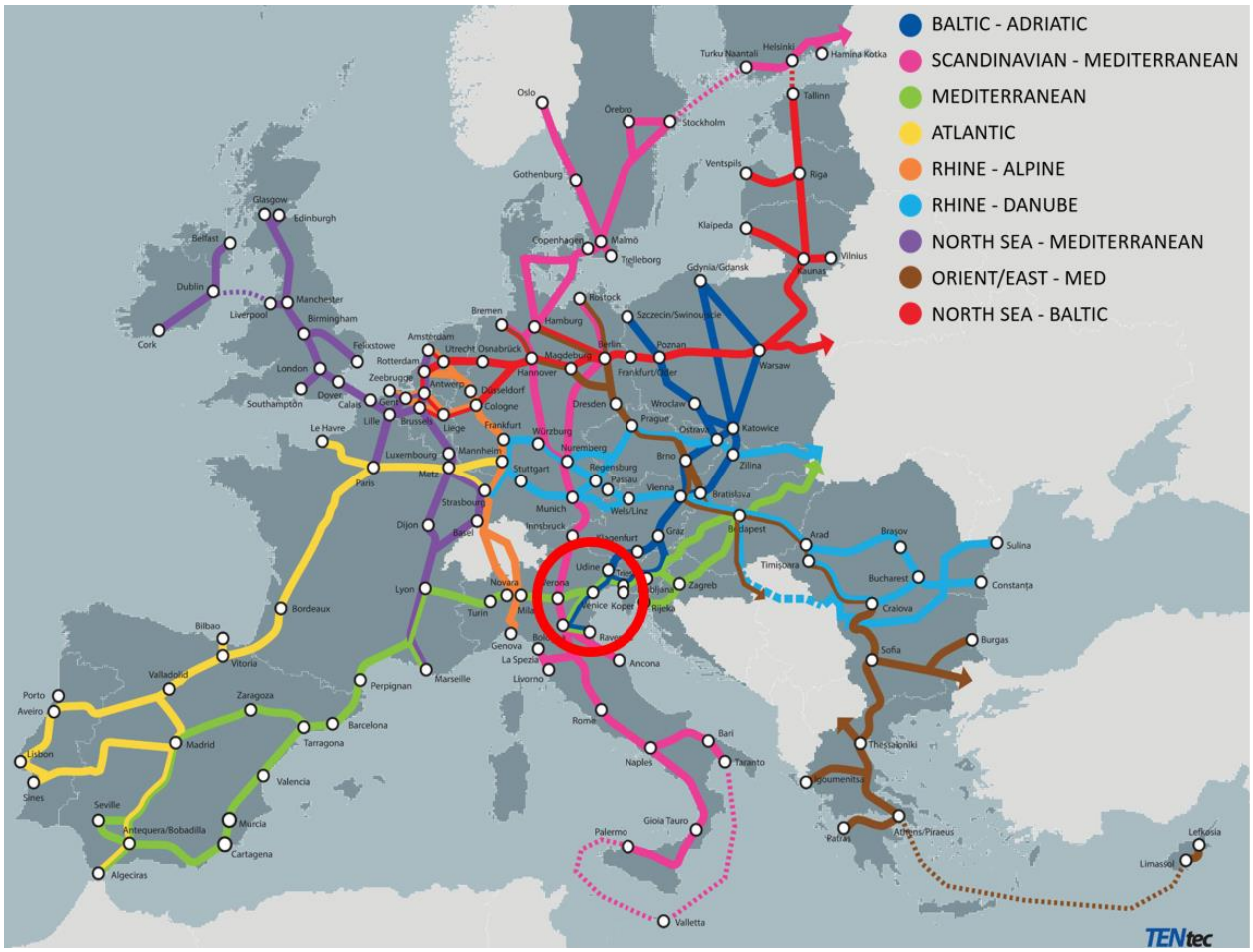
The TEN-T project is composed by two ambitious sub-levels and objectives:[141]

- The *Core Network*, to be completed by the year 2030. It is made of the most important connections among the most relevant nodes in Europe;
- The *Comprehensive Network*, to be completed by the year 2050. It is a multimodal network that encompasses all European regions, including more peripheral ones.

The *Core Network* envisages nine *Core Network Corridors*, as illustrated in *Figure 3.4*. These *Corridors* are the most significant infrastructural links covering Europe, four of which pass through the Italian territory, interconnecting multiple Italian cities, logistic nodes and seaport regions. Venice, as illustrated in the map, is located at the intersection between two of such *Corridors*, i.e. the *Mediterranean* and the *Baltic-Adriatic Corridors*, and is in the proximity of the *Scandinavian-Mediterranean Corridor*.

[141] European Commission website. Retrieved from https://ec.europa.eu/transport/themes/infrastructure/ten-t_en

Figure 3.4 The TEN-T Core Network Corridors



Source: personal elaboration on European Commission representation

The contiguity to these C*orridors* provides the Venetian Port System with robust links not only to the Northern-Italian but also to the European most important nodes, and hence with a more prominent position in the European and world maritime landscape.

Table 3.2 lists the most important maritime and terrestrial nodes connected by the three *Corridors* passing through or in the proximity of Venice.

Table 3.2 Main seaports and cities crossed by the TEN-T Corridors of interest of Venice

	TEN-T Corridors		
	Mediterranean Corridor	**Baltic-Adriatic Corridor**	**Scandinavian-Mediterranean Corridor**
Seaports	*Algeciras; Cartagena; Valencia; Tarragona; Barcelona; Marseille; Trieste; Ravenna; Koper; Rijeka; Csepel*	*Ravenna, Trieste, Koper, Gdańsk, Gdynia, Szczecin, Świnoujście*	*Helsinki, Stockholm, Rostock, Lübeck, Hamburg, Bremen, La Spezia, Livorno, Ancona, Napoli, Bari, Taranto, Gioia Tauro, Palermo, Augusta*
Terrestrial nodes	*Seville, Madrid, Zaragoza, Lyon, Verona, Bologna, Milano, Novara, Torino, Udine, Ljubljana, Zagreb, Budapest*	*Padova, Bologna, Udine, Ljubljana, Klagenfurt, Graz, Vienna, Bratislava, Katowice, Zilina, Ostrava, Wroclaw, Poznan, Warsaw,*	*Helsinki, Stockholm, Hanover, Nuremberg, Berlin, Munich, Verona, Bologna, Florence, Rome, Naples, Palermo*

Source: Personal elaboration on European Commission info.[142]

It can be seen that the Venetian port is directly connected to the other European *core ports*: the *Mediterranean Corridor* comprises, for example, the ports of Algeciras, Valencia, Barcelona, Marseille, Koper, Trieste and Ravenna; the *Baltic-Adriatic Corridor* interests the Ravenna, Trieste and Koper ports; whereas the *Scandinavian-Mediterranean Corridor*, which for the port of Venice is easy to reach through the *Mediterranean Corridor*, passes through the ports of Hamburg, La Spezia, Ancona, Gioia Tauro and others. Such direct links are important nowadays in consideration to the trans-shipment trend in the maritime shipping sector, and thus provide the Venetian port with a direct access to those markets.

[142] European Commission website. *Retrieved from https://ec.europa.eu/transport/themes/infrastructure/ten-t_en*

Moreover, it is worth mentioning that the Venice port is the only Italian port with inland waterways links.

Furthermore, another European Union concept, i.e. the "*Motorways of the Sea*" (MOS), has been added and developed as the maritime integrative part of the TEN-T project. It is a system putting together the European short-sea routes, seaports, and maritime infrastructure, facilities and equipment, with the objective of developing projects for new intermodal maritime-based logistics chains to improve the transport network in Europe in a more efficient, accessible and sustainable fashion.[143] Being located in the northern Adriatic Sea and constituting an important node in the Eastern Mediterranean and Aegean Sea routes, the port of Venice is in a strategic position also for this kind of projects.

- ***Sustainability***

The Port of Venice has and is continuing to put efforts in order to be increasingly sustainable. Such projects were discussed during the interview conducted in the *Environment Area* of the North Adriatic Port System Authority. The responsibilities of the area include a spectrum of environmental topics, such as air quality, energy consumption and efficiency, waste handling, water quality, sediments handling.

It is worth of note that the law regulating the port authorities directs a particular attention towards the environmental sustainability of the port activities. For instance, art. 4-bis of the law determines that the Port System Authorities promote the formulation of the *Document of Energetic and Environmental Planning of the Port System* (in Italian: "*Documento di Pianificazione Energetica ed Ambientale del Sistema Portuale*", *DEASP*), to achieve suitable sustainability objectives, with a particular attention on the reduction of CO2 emissions.[144] This plan is to be drafted in accordance with the national guidelines about such matters. The objective is to improve the energetic efficiency and to promote the usage of renewable energy in the port area.

[143] European Commission website. Retrieved from https://ec.europa.eu/transport/themes/infrastructure/motorways-sea_en ; https://ec.europa.eu/transport/modes/maritime/motorways_sea_en
[144] Law 84/1994, art. 4-bis.

The document identifies:[145]

- The actions to be adopted, within a timeframe, in order to meet the objectives;
- Coordination mechanisms among the environmental and the infrastructural actions in the port;
- Suitable measures for energy and environmental monitoring of the realized actions, for valuation purposes.

The North Adriatic Port System Authority has drafted such a plan, analyzing the state of the art of the port activities' impact. The document assesses in quantitative terms the environmental, with a focus on the carbon footprint, and energetic impact of the port as a whole, based on 2017 data, and proposes some projects in planning in order to achieve a more efficient and sustainable status. The analysis will allow to better understand which actions can be taken to improve the environmental sustainability of the activities, by also intervening on the infrastructure. The evaluation of the potential projects in the plan will allow to set some future courses of actions, with the final goal of identifying the best performing projects to reduce the carbon footprint of the port's operations and achieve a higher degree of sustainability. Hence, this document is significant for the future strategy of the port, given that some of the projects outlined constitute goals to be reached. By increasing the energy consumption efficiency, the CO2 emissions will decrease, and that is one important goal pursued by the North Adriatic Port System Authority.

As emerged from the interview, the Port System Authority sees the sustainability of its operations as a competitive advantage, and it moves towards that direction. Sustainability is composed of three dimensions: economic, social, and environmental sustainability. Improving the level of the environmental sustainability implies a reduction in energy and materials consumption, which in turn determines a reduction in costs, and fewer amounts of waste and of all the by-products of production that may produce diseconomies. Therefore, the environmental sustainability dimension is much related to the economic sustainability because it allows a greater process efficiency.[146]

[145] Law 84/1994, art. 4-bis.
[146] Citron, M., Rizzo, E. Interview 2020.

Regarding the short-term strategy, the Authority plans some intervention projects on the existing infrastructure in order to reach higher efficiency levels, by starting, for example, with interventions on the lighting infrastructure of the port. It was mentioned during the interview that the North Adriatic Sea is characterized by aged ports, and as such are putting efforts to gradually transform and enhance their outdated infrastructure.[147] Concerning the longer term, there are ongoing projects about cold ironing, i.e. the provision of electrical power to ships at berth directly from land (*onshore power supply*), also by reconsidering the schedules and typologies of ships coming to berth, in relation to the infrastructure costs. Such power should be produced from sustainable sources. The planning considers also the liquefied natural gas (LNG), a type of fuel with lower levels of sulfur content, that will result in a better air quality. However, according to the head of the environment department, it would be beneficial to have some further macro standards to be agreed upon by ports, in order to put in practice such important and long-term projects and to increase efficiency.[148]

A virtuous step taken by the Authority in the management of environmental issues is the fact that they are supervised through an environmental management system that the Authority has developed and adopted in the last years and is in line with international standards. In fact, the Authority attained in 2012 its first ISO 14001 Certificate, which has been confirmed in the following years.[149] ISO 14001 is a standard developed by the *International Organization for Standardization*, setting the requirements for an environmental management system used by any organization to enhance environmental performance.[150] The standardized management system deployed by the Port System Authority, resulting in a more qualified organization of the activities, entails actions according to the *Deming cycle* (or *PDCA*), a management method including the steps: *Plan*, *Do*, *Check*, *Act*.[151]

A considerable event in the port's recent history is the creation of the *Venice Gateway for Science and Technology* (*VEGA*) as a support center for the industrial system. It is one of the most important scientific and technological parks in Italy, and is a platform composed

[147] Citron, M., Rizzo, E. Interview 2020.
[148] Citron, M., Rizzo, E. Interview 2020.
[149] Citron, M., Rizzo, E. Interview 2020.
North Adriatic Port Sea Authority website. Retrieved from https://www.port.venice.it/en/green-port.html
[150] International Organization for Standardization website. Retrieved from https://www.iso.org
[151] Citron, M., Rizzo, E. Interview 2020.

by universities, research centers and firms in the Venice metropolitan city and the Veneto region at large.[152] As emerged during the interview, the birth and development of this pole can be seen as a support for firms to achieve a greater efficiency and environmental sustainability, also thanks to technological innovation, as a response to the increasing importance of the regulation in the environmental dimension.[153]

Another illustration of the efforts put in place in the Venetian Port concerns the air quality, i.e. the *Venice Blue Flag*. In fact, driven by the specific Venetian context, there was a development of a standard to improve the air quality, under a voluntary agreement among the Port Authority, the Municipality of Venice, the Venice Harbor Master (in Italian "*Capitaneria di Porto*") and the main cruise companies. The result of such agreement, that is now signed by all cruise and tug companies, is the increasing use of a lower sulfur fuel (less than 0.1 %) by ships in the port mouth–mooring trait.[154] This is a standard developed in the Port of Venice in 2007, and was renewed in the following years. It sets a more environmentally sustainable limit than the EU and Italian regulation, and hence goes beyond the guidelines set by the national regulation. Another recent trend in the port, referred to during the interview, is the introduction of new production types in the port industrial activities, characterized by the concept of circular economy, that put the waste materials back in the production cycle.[155]

The Authority continues to make efforts also through the use of technology, to improve its environmental performance and to keep up to the international standards, under the philosophy of a "*green port*". Such efforts aim at enhancing air quality, protecting the delicate Venetian lagoon, reducing waste production and pollution, requalifying port areas, and developing a sustainable supply chain. In fact, observance of the regulation on environmental aspects, both national and local (e.g. the "*Special Law for Venice*") is seen as a minimum requirement by the port, that all Italian seaports must abide to; however, as emerged from the interview, paying close attention to such aspects and proving a continuous effort that goes beyond the minimum standards, which the Venetian Port

[152] VEGA official website. Retrieved from https://www.vegapark.ve.it/
[153] Citron, M., Rizzo, E. Interview 2020.
[154] Citron, M., Rizzo, E. Interview 2020.
North Adriatic Sea Port Authority website. Retrieved from https://www.port.venice.it/en/air-quality.html
[155] Citron, M., Rizzo, E. Interview 2020.

System Authority has the possibility and the means to do, can provide a valuable competitive advantage to the whole port.[156]

- ***Infrastructure and industrial reality***

While having maintained an important role in commercial trade throughout history, the Venetian port gained relevance also in the national manufacturing industry, thanks to the development of the Marghera industrial Port. In fact, the Venetian Port system comprises a consolidated industrial reality. Conceived in 1917 with the intention to cope with the increasing naval traffic and become a pole for manufacturing activities, Marghera Port is now one of the biggest industrial zones in Europe, consisting of 1,447 ha of operative and industrial areas and 662 ha of canals, roads, railways and other hard infrastructure. Furthermore, it is characterized by 12 km of quayside and 45 km of internal railway network.[157]

In the Marghera Port, there are seven commercial, eleven industrial, and six oil terminals, as shown in the previous paragraph. The non-commercial firms operating in the port handle diverse types of cargoes, including coal, grains and oil seeds, agri-bulk, break bulk, heavy lift goods, oil and derived products, containers. In fact, one of the competitive factors of the whole port system is its attribute of being a *multi-purpose* port.

The firms directly operating in the whole port system can be quantified at about 2,840, of which 1,260 operate in Marghera Port, at the time of this work.[158] This number includes, beyond the terminal companies, the firms providing complementary services to the port operations and those providing services to the ships, the cargo and passengers. The beneficial characteristic of the manufacturing and oil companies in the Venetian Port is their proximity to the terminals, which allows great economic and logistic advantages in the handling operations of the arriving and departing cargo.

Furthermore, another competitive advantage of the port of Venice is given by its hinterland and the proximity to the manufacturing activities. In fact, besides the

[156] Citron, M., Rizzo, E. Interview 2020.
[157] North Adriatic Port Authority System.
[158] North Adriatic Port Authority System.

consolidated industry inside the port perimeter, the Venetian port is also located in the North-East Italian industrial reality, which is the backbone of the Italian manufacturing industry. The port of Venice serves the manufacturing industries in the Veneto region, but also reaches those in Brescia, Bergamo, and more in general the Eastern Lombardy region.[159]

An additional competitive advantage of the Venetian Port System is given by the infrastructure network which it is endowed with. One of the results is that the port of Venice is a leader in project cargo handling. As emerged from the interview in the *Strategic Planning and Development* area of the Authority, the accessibility in the hinterland is very important for this type of cargo. Given its hinterland, the port of Venice is often chosen as a home port for project cargoes. Furthermore, the terminals in the port have acquired in time precious expertise and equipment in handling this kind of goods, which are often of high value, of considerable dimensions and arduous to handle because of their physical nature. The difficulty in transporting such objects explains the importance of the land-infrastructure, that must be suitable for moving them to and from the port. Thanks to the competitive advantages of the Venetian port, that differentiate it from the competitors, the hinterland for the project cargo is more extended than for the other types of goods, encompassing the North Italy, but also reaching markets beyond the Italian borders.[160]

Being a core port of the *TEN-T* network, there have been significant investments to expand the railway park in the Marghera port, after some decontamination and reconversion works of the area.[161] The objective was to enhance the railway traffic and develop new and more efficient links between the Venetian port and the Padova and Verona inter-ports. Time optimization in the port sector is essential. To achieve it, the port must be equipped with cutting-edge infrastructure. For this reason, the Venetian Port System Authority always invests in infrastructure development and promotion.[162] Furthermore, the Venetian port is located in the proximity of a number of interports, such as that of

[159] Stella, G. Interview 2020
[160] Stella, G. Interview 2020
[161] Citron, M., Rizzo, E. Interview 2020.
[162] Esposito, J. Interview 2020

Padua, Rovigo, Portogruaro, Verona, which have a significant role in freight distribution in the entire North-Eastern Italian area.[163]

This whole system of manufacturing activities, hinterland, infrastructure, and proximity and connections to interports, make the Venetian port a significant competitor in the Adriatic maritime shipping, but at the European level also.

- ***Limitations***

The main limitation to the further thriving of the Venetian Port stems from a phenomenon concerning the canals of the port, described by the head of the environment area of the Authority. This issue can be examined under two aspects: the morphological and the legal aspect.

Being located inside the lagoon, because of morphological factors, there is a need for dredging activities aimed at removing the sediments that in time naturally form in the canals, in order to guarantee nautical accessibility. This phenomenon concerns mainly the commercial activities of the port of Venice, given that the Lido Canal, employed for the navigation of cruise ships, does not need such interventions because of natural hydraulic reasons. Such dredging and maintenance operations, being crucial for nautical accessibility, are understandably of utmost importance not only for a further increase of the traffic flows, but for the very survival of the port. The average seabed depth of the lagoon is about one meter, whereas the port canals go about twelve meters in depth, with some variations defined in the *Port Regulatory Plan*.[164]

However, as emerged during the interview, the biggest complication is of normative kind, because the sediments that are being removed must consequently be handled with caution. The handling of the sediments in the lagoon is regulated by the so called *"Protocollo Fanghi"*, a regulation that categorizes sediments and identifies their potential use and destination according to their chemical quality. The highest quality sediments (*class A*) are put to use for morphological reconstruction works, such as restoration of depressed areas, and can safely be in direct or indirect contact with the lagoon. Lower

[163] Unione Interporti Riuniti website. Retrieved from http://unioneinterportiriuniti.org/
[164] Citron, M., Rizzo, E. Interview 2020.

quality sediments (*class B*) can be used for restoration works of lagoon islands in a way that such sediments are not in contact with the lagoon. The sediments categorized in class C can be used for works such as extension of islands that are permanently above the sea level and areas with permanent confinement, that can't in any way permit the release of polluting substances in the water. Sediments with chemical values that exceed the limits of class C, that are nevertheless not toxic and noxious, can be used for restoration works of depressed areas outside the lagoon. Lastly, the toxic and noxious sediments are treated as waste and handled according to the related regulations.[165]

This local regulation is very strict, and a difficulty is given by the fact that the destination sites for the sediments are not abundant. A further complexity derives from the fact that most of the sediments pertain to the class B, which are difficult to handle because there is a lack of locations with sufficient volume capacity. Hence, dredging activities in canals of the port of Venice constitute a laborious procedure, that has to be deployed for a number of activities, such as, for example, the construction of berths, that involves motion of sediments. It is also characterized by enormous financial costs, especially for sediments beyond class C.

It follows that such limitations are both normative and technical, which renders the support of nautical accessibility in the port canals even more complex.[166] The "*Protocollo Fanghi*" in force dates to the year 1993. However, there are some ongoing efforts to review it and enact an updated regulation, which will expectedly be more oriented towards the protection of the lagoon and the habitat in the lagoon.

This issue was discussed also during the interview in the Strategic Planning and Development area, during which emerged that it limits the port to import and export cargo volumes mainly for the neighboring hinterland, and doesn't allow for an increase in traffic volumes necessary for a more extended market reach. The routine accessibility by ships in the canals of the port of Venice also results in higher costs given that it is a port located in the lagoon. In fact, there is the need for nautical services for the ships, deploying, for example, towing boats for the transfer of the ship to and from the berth. This is a difference with respect to ports where the ships can reach directly the berth. The

[165] Ministero dell'Ambiente. (1993). Criteri di sicurezza ambientale per gli interventi di escavazione trasporto e reimpiego dei fanghi estratti dai canali di Venezia (art. 4, comma 6, Legge 360/91), "Protocollo d'intesa sui fanghi".
[166] Citron, M., Rizzo, E. Interview 2020.

accessibility issue is even more relevant for the container part, because the traffic would be far more considerable if the port had a greater draught allowance.[167] Nevertheless, such costs are then at least partially recovered thanks to the fact that the port is geographically close to the origin or destination of the goods.

Related to the nautical accessibility topic is the *MOSE* project. In fact, one of the Venetian lagoon's peculiar characteristics is the flooding phenomenon, with the consequent problems for the entire city of Venice. The *MOSE* is the solution developed to oppose the negative effects of the high tide issue and protect the city and the lagoon. The project involves the development and construction of mobile barriers at the three lagoon inlets, made of flap gates that allow to separate the lagoon from the sea in case of high tide.[168]

However, this project, while succeeding in its intent, inevitably influences the Venetian port's activities. In fact, given that the three lagoon inlets are also the inlets for the Venetian port, in case of activation of the barriers, the access to the port is also blocked and the ships cannot reach the destination for the time the barriers are lifted. When fully operational, the barriers will have most repercussions on the liner shipping services, transporting mainly containers and Ro-Ro. In fact, given the rigidity of the ship schedules, this would result in delays and diseconomies, thus impacting the competitiveness of the port. Nevertheless, an efficient organization and forecasting of the functioning of the *MOSE* will result in a better management of the traffic, with reduced costs and loss of traffic.[169]

Furthermore, according to the head of the environment area, the port area is not organized in an optimal way, with negative effects on the operations both under the environmental and the operative aspects. A possible solution could be to make changes in the layout of the port area, in order to organize the activities in a more rationally efficient way. It could be positive to optimize the infrastructures according to the type of goods, in order to create a diversification and an optimization of the system. This would result in a reduction of the loading and unloading activities, to be done with sustainable

[167] Stella, G. Interview 2020
[168] MOSE official website. Retrieved from https://www.mosevenezia.eu/
[169] Stella, G. Interview 2020

infrastructures. The limits to a restructuring of the port area are given by the costs of such projects and the need to reorganize the concession agreements.[170]

In general, as emerged during the interviews, the enactment of ad-hoc regulations in consideration to the specificity of the port of Venice, the know-how and environmental knowledge about the lagoon could be advantageous both for the performance of the port and the preservation of the lagoon. The city of Venice and its port are highly interconnected in physical, historical, economic and geographical aspects, therefore a regulation about a sustainable and integrated development of Venice and the port should be the seen as the way forward.[171] These factors certainly represent a limitation to the port's further development; if overcome, the port system could better exploit the competitive factors that render it unique and increase its competitiveness.

The next paragraph contains some considerations resulting from the Venetian Port System analysis, concerning its position with respect to the general ports' evolution reviewed in the first chapter, along with possible directions that could increase its competitiveness.

3.4 The Venetian Port System in the 21st century: how to be competitive?

This chapter reviewed the most important developments brought by the Italian law to the port system. The analysis of the Venetian port system in specific exhibited that it has seen an important evolution in the last decades. It has now the identity of a network composed of multiple and diversified ports and terminals. According to the literature review in the first chapter of this work, the Venetian port system can be defined as a *fourth-generation* port. In fact, beyond carrying out the fundamental activity, i.e. that of reception and transportation of goods, it offers a wide spectrum of additional value-adding activities and services. Marghera Port is a pole of industrial and commercial activities. Moreover, the Marghera Port, given that it was conceptualized in 1917, is a pioneer in the emergence of industrial ports, and is now one of the biggest industrial zones in Europe by extension.

[170] Citron, M., Rizzo, E. Interview 2020.
[171] Citron, M., Rizzo, E. Interview 2020.

Furthermore, the port system offers logistics and distribution services thanks to the rich infrastructure, hinterland and port operators which it is endowed with. The Authority is investing in enhancing its connectivity, for example by further expanding the already rich internal railway infrastructure. Environmental sustainability is a common rule and objective for all the activities and investments, with the aim of preserving the lagoon and the world climate. Such efforts and the peculiar competitive factors confirm the Venetian port system's position as a strong competitor.

The port and maritime shipping industry has always been competitive in nature. However, the competition level is increasing, as discussed in this work. In fact, mainly due to the globalization phenomenon, seaports around the world are increasing the scale, specialization and diversification of their activities, comprising now the provision of logistics, financial and other novel types of services. The containerization trend, further reinforced by the *Belt and Road Initiative*, is resulting in the birth of new, colossal, offshore seaport platforms, in the most strategic points of world trade routes, which is difficult to compete with. The competition is undeniably becoming fiercer.

As described in the precedent paragraphs of this work, a characteristic of the Italian seaports is that they are governed and managed by public entities, namely the Port System Authorities, having the goal of pursuing the public economic and social interest. A result produced by the port reforms is that of bringing together the seaports by integrating some of the minor ports to most prominent ones, resulting in fewer "systems of ports", which manage to reach a greater scale of operations. This is a direction that can produce considerable value, because the ports can now join forces and put to better use the peculiar competitive factors of each port in the system.

Under the same rationale, instituting some forms of collaboration and setting common goals among ports can enhance the competitiveness of those ports, and, in turn, the whole Italian port structure and economy. This falls in the scope of the Port System Authorities' objectives. As of this moment, there aren't clearly defined strategies of this king at the national level for the Italian seaports.

An example of a collaboration already founded is the *North Adriatic Ports Association* (*NAPA*), which comprises also two non-Italian ports. The *NAPA* is an association whose

aim is to create a system of five ports located in the Northern Adriatic Sea. The members are the following:

- North Adriatic Port System Authority (ports of Venice and Chioggia);
- Eastern Adriatic Port System Authority (ports of Trieste and Monfalcone);
- Centre-North Adriatic Port System Authority (port of Ravenna);
- Port of Rijeka Authority;
- Port of Koper.

The vison of the NAPA states: "The *NAPA* will form a European logistics platform, in particular with regard to servicing the markets of the Far East as well as Central and Eastern Europe".[172] However, this collaboration is still at a germinal level, and it could be advantageous for its members to agree to work together on a greater number of areas. In fact, every port member of the *NAPA* has its own competitive advantages, that, if integrated in a "platform of ports" with common projects and goals, can potentially result in a highly competitive system under multiple dimensions. The result can potentially be that of modifying the status quo, converting the competition among the North Adriatic ports, as is mostly the case today, into a competition between a "system of North Adriatic ports" and the North European ports. This could bring the whole platform to reach better results and could potentially be even more relevant considering the influences on the world maritime shipping and container traffic brought by the *Belt and Road Initiative*. The hinterland and markets encompassed by a platform of ports can potentially be very vast, reaching the North-European markets too.

A collaborative "system of ports" produces the possibility to leverage the specificity and know-how of each component, and each member can invest in further enhancing its competitive advantages, for the benefit of the whole system and its own. The Venetian port could, for example, leverage on its know-how and expertise in project cargo handling, and by pursuing a higher degree of specialization, the hinterland and markets reached could further be expanded. According to the head of the environmental area of the Authority, an increased collaboration and more uniformity among the seaports could be advantageous also for the sustainability level of the operations, because there are similar

[172] North Adriatic Ports Association website. Retrieved from http://www.portsofnapa.com/about-napa

issues that characterize the *NAPA* ports. Furthermore, ports' function is also to provide services of general interest, such as waste and urban green management, and a higher coordination in these areas can bring positive mutual results, also at the national level.[173]

In general, under the normative aspect, the North Adriatic Port System Authority has the ability set up collaboration projects with other ports.[174] In fact, in the recent past the port established some agreements with the Piraeus Port, the Port of Alexandria, Syrian ports and others. Moreover, setting up collaboration with other countries' ports belongs to the range of the Port Authority's functions and the port development objectives. The geographical location of Venice is certainly an advantage in this type of agreements.

Considering the intensive containerization phenomenon and the *Belt and Road Initiative*, the offshore platform project idealized for the Port of Venice becomes even more relevant nowadays. The goal of the project was that of building a platform, outside the lagoon inlets, to be used as an offshore commercial port, besides for the oil traffic. The project has never been realized due to difficulties related to the morphological characteristics of the lagoon. Furthermore, another limitation was given by the fact that such project would require huge financial investments, and the high unitary costs of the offshore platform's activities would limit its competitiveness. However, a platform of this kind could be fruitful also for other ports. Therefore, a collaboration among the North Adriatic ports on a project of this kind could overcome the financial limitations, and the return of the investment would be greater, given that it would attract more traffic flows that currently are captured by other ports, bringing advantages to the participants. This is an example of potential advantages of collaboration among ports on common projects.

This preliminary analysis of the Venetian Port System case study has shown that it has kept pace with the evolution of the industry reviewed in the first part of this work. Its specific characteristics and the developments that it has gone through, provide the Venice Port System with multiple and valuable competitive advantages, that render it a case of excellence and an example to follow. However, given the rapidity, and often unpredictability, of the developments in this sector, it must continue to put efforts in order to maintain the high status it held so far.

[173] Citron, M., Rizzo, E. Interview 2020.
[174] Esposito, J. Interview 2020

Conclusion

This thesis discussed the most important evolutionary steps and the current trends in the port and maritime shipping industry. From the literature review emerged that ports have been characterized by important developments in the last decades, mainly driven by the phenomenon of globalization, with a resulting upgraded identity and role.

In fact, seaports' initial role as places for arrival, temporary storage and departure of goods has been integrated by other functions and services. From the early 1950s, ports started to encompass in their business model some industrial and commercial activities, that directly contribute to the value of the goods. Examples of such activities range from cargo packing and labelling services to industrial activities, such as in the iron and steel, oil and agri-food sectors. Starting in the 1980s, seaports began to add additional activities, ranging from nautical and cargo-related to logistics and distribution services, and used more advanced systems of data collection and processing. Moreover, they followed more pro-active strategies in order to increase their efficiency and competitiveness. With the stronger advent of containerization, the race for attracting containerships intensified. In the early 2000s, fourth-generation ports saw an increase in the variety of stakeholders and port operators, further expanded their services, and strengthened the connections beyond the port perimeter. In the pursuit of competitiveness and efficiency, seaports have also made giant steps in the areas of infrastructure developments, technological innovations, and environmental sustainability. For the best-performing ports, these factors still constitute important areas of investments and competition.

The management models of seaports have also been characterized by some developments in the last decades. In fact, in the last century most governments delegated the management responsibility of ports to separate entities, commonly denominated as "*Port Authorities*", which are in general assigned the tasks of administration, construction, co-ordination, regulation and safety. The participation extent of the public and private sector in the port operations gave rise to four main port management models.

A significant and relatively recent variable, destined to disrupt the port and maritime shipping industry, is the *Belt and Road Initiative*, examined in the second chapter of this thesis. One of the objectives of this project is to enhance the connectivity and trade between China and Europe, although many other regions in the world are also included,

in order to promote mutual economic, social and cultural development. The *Belt and Road Initiative* can have enormous influence on the port and maritime shipping industry. In fact, under this ambitious project, multiple and important investments have been made in ports construction, acquisition or development in the whole world, and many other investments are planned for the fourth-coming future. The review of the accomplished investments in ports and related infrastructure suggests some common factors, such as the strategic location of the ports, the interest for industrial areas and special economic zones, the participation of the investor in decision-making, the focus on containerized trade. The effects of such investments can already be seen on the world trade patterns.

The Venice Port System, managed by the North Adriatic Port System Authority, was analyzed as a case study to assess whether it conforms to the evolution and trends described in the first part of this work. The Venetian Port System's case analysis indicates that it belongs to the category of the most evolved ports and it resulted as a very competitive system of ports, endowed with invaluable factors that make it an important player in the Adriatic Sea, but also in the world.

One of the main competitive advantages of the Venice Port System is its geographical position, forming a natural gateway to Europe. Furthermore, it is crossed by three out of the nine *Core Corridors* of the *Trans-European Transport Network*, which identified it as a core port. This provides invaluable advantages in terms of connectivity with the most significant core ports, cities and infrastructural connections throughout the European region. Marghera Port is a pioneer in the industrialization wave in seaports' activities, and is now one of the most important and extended industrial zones in Europe. Moreover, its rich history, know-how, infrastructure, proximity to the market, and consolidated industrial reality both in the port area and in its hinterland, make the Venetian Port System a case of excellence in its area of business.

This preliminary assessment of the Venetian Port System's competitiveness can be built upon and expanded by further, more in-depth analysis. However, considering the competitive factors emerging from the analysis, and in spite of the current main limitation brought by the nautical accessibility issue, the Venetian Port System has the grounds and potential to continue to thrive in the sector and remain competitive, also in consideration to the Belt and Road Initiative phenomenon.

Nevertheless, the world is in continuous evolution, and seaports, analogously to many other businesses, have the obligation of continuously putting effort and innovating in order to be competitive. The same is valid for the Venetian Port System, which has to continue its work in order to better exploit the competitive factors and peculiar attributes that make it unique, to hold on to its glorious history, and reach its full potential.

Appendix – Interviews in the North Adriatic Port System Authority

Interview protocol:

"Questa intervista fa parte di un progetto di tesi magistrale, che mira a studiare l'evoluzione storica e le tendenze attuali del settore portuale, con particolare attenzione al progetto della Nuova Via della Seta. Il Sistema Portuale di Venezia è il caso di studio della tesi, con l'obiettivo di valutare la sua posizione nei confronti dell'evoluzione del settore, e di individuare i fattori specifici che lo rendono competitivo.

Si tratta di un'intervista qualitativa semi-strutturata e le informazioni che emergeranno da questa intervista verranno rielaborate ai fini della tesi, ad integrazione delle conoscenze acquisite durante la mia esperienza di tirocinio presso l'Autorità di Sistema Portuale e tramite altre fonti."

Marta Citron e Erika Rizzo – Area Ambiente

Le chiedo cortesemente di presentarsi e di descrivere il Suo ruolo all'interno dell'Autorità di Sistema Portuale.

Io sono Erika Rizzo e lavoro nell'area ambiente. L'area si occupa di una serie di tematiche ambientali, come qualità dell'aria, consumo ed efficienza energetica, rumore e gestione dei rifiuti (che possono essere di diverso tipo), gestione dei sedimenti, qualità dell'acqua. Tutto viene in qualche modo inquadrato nel contesto di un sistema di gestione ambientale che ormai è da qualche anno che permea le nostre attività.

Come si è evoluto nel tempo il rapporto tra il Porto di Venezia e l'ambiente?

Erika Rizzo: Ho citato il sistema di gestione ambientale che permea la gestione dei vari aspetti ambientali. Se parliamo di evoluzione nel tempo, l'introduzione di un sistema di gestione ambientale, conforme allo standard internazionale ISO 14001, è stata un momento significativo, perché ha fatto mettere a sistema gli aspetti ambientali di interesse. Questi erano già gestiti in precedenza, però l'introduzione di una gestione conforme ad uno standard internazionale e riconosciuto in tutto il mondo ha permesso di

avere una modalità standardizzata di gestione che prevede una serie di attività secondo il cosiddetto "ciclo di Deming", che prevede delle attività ripercorse nel ciclo del "plan, do, check, act". Pertanto, c'è stata una evoluzione da questo punto di vista che ha portato a una maggiore organizzazione delle attività. Sicuramente, lo sviluppo tecnologico su vari fronti ha fatto sì che gli aspetti ambientali venissero gestiti sempre in maniera più efficiente, sempre con priorità il rispetto della normativa. Lo sviluppo delle attività va di pari passo con lo sviluppo della normativa. Un sistema di gestione permette di avere tutto organizzato in modo sistemico e monitorato.

Dal punto di vista ambientale, come minimo deve esserci il rispetto della normativa, sia quella nazionale che quella speciale per Venezia. Sicuramente bisogna attivarsi in maniera tale da essere in linea. Per esempio, l'Autorità di Sistema Portuale, per quanto riguarda la qualità dell'aria, ha creato uno standard ad hoc, Il Venice Blue Flag, che è più esigente della normativa nazionale. Se pensiamo alla flessibilità o ad azioni volontarie, se ci sono, portano a delle performance migliori rispetto a quelle che sono da normativa. Quelli della responsabilità sociale e ambientale sono dei temi caldi e vengono affrontati da tanto tempo; ci sono porti, e più in generale vaste porzioni di territorio, dove certe tematiche sono molto sentite da anni. Il fatto di porre particolare attenzione a tematiche ambientali, che poi si collegano strettamente al tema della salute della popolazione, il poter dimostrare un impegno serio e costante, e che va al di là e che ti dimostra ancora più virtuoso, possono essere considerati degli aspetti di competitività, perché ti danno un'immagine che risulta in linea con i tempi e con le esigenze create nel tempo. Penso che i tempi ora siano abbastanza maturi per poter dire che certe visioni e certi impegni diano un valore aggiunto a quella che è la realtà che li fa propri.

Si potrebbe dire che in generale il tema della sostenibilità è diventato un vantaggio competitivo per le imprese, perché aiuta ad attirare investimenti, clienti, ad essere più competitivi in generale. Questo si può traslare anche al settore portuale?

Erika Rizzo: Sì. Prima abbiamo fatto un ragionamento più legato all'importanza di calarsi in un momento storico in cui è importante dimostrare un determinato tipo di impegno. C'è anche da dire che guardando questo tema da un punto di visto pragmatico, tu hai citato la sostenibilità. La sostenibilità si basa su tre pilastri: economico, sociale e ambientale. Se

guardiamo quello ambientale, risultare sostenibili e nel tempo migliorare performance di sostenibilità ambientale implica anche una riduzione dei consumi in termini di energie e materie prime (per chi ne fa uso), e quindi una maggiore efficienza nell'uso di energia e materie prime, e questo implica a sua volta una diminuzione di costi, una minore produzione di rifiuti e di tutti i vari residui della produzione che possono creare delle diseconomie. Quindi la sostenibilità ambientale, in realtà, per certi aspetti va di pari passo con quella economica perché ti permette una maggiore efficienza anche a livello di processo.

Quanto potere decisionale ha l'Autorità riguardo all'impatto ambientale delle operazioni interne in confronto alla legislazione nazionale e locale?

Erika Rizzo: La normativa detta la strada maestra, che deve essere seguita da tutti. Un esempio di un'azione aggiuntiva nel porto di Venezia è lo sviluppo dello standard per migliorare la qualità dell'aria a seguito dell'esigenza che si è creata nel tempo. Questa azione ha portato alla creazione della "*Venice Blue Flag*". Si tratta di un accordo volontario tra Autorità Portuale, il comune, la capitaneria di porto, e le maggiori compagnie di navigazione passeggeri, che ha portato negli anni a un utilizzo sempre più condiviso (tutte le compagnie adesso firmano questo accordo volontario), di combustibili a basso tenore di zolfo, dall'entrata delle navi nella bocca di porto fino all'arrivo all'ormeggio. Questa è una regolamentazione aggiuntiva rispetto a quello che chiede la normativa, ed è un'azione portata avanti per rispondere a un'esigenza condivisa da vari stakeholders per migliorare la qualità dell'aria nelle zone dove le navi vanno ad ormeggiare, ma che possono essere viste in maniera più estesa. Questo è un esempio di un'iniziativa che ha portato alla creazione di un accordo volontario che è più restrittivo rispetto alla normativa ed è in atto dal 2007.

Come si potrebbe descrivere l'evoluzione delle imprese portuali di Venezia nel tempo sotto il profilo ambientale?

Erika Rizzo: Mi viene in mente che a un certo punto è stato creato il VEGA come polo per il terziario, a supporto del sistema industriale. A un certo punto evidentemente si è vissuta un'esigenza da parte del sistema industriale di un polo terziario che potesse racchiudere

start-up, centri di ricerca, laboratori, e servizi di consulenza ambientale. All'inizio, con la creazione delle prime zone industriali, si trattava di un sistema prettamente a vocazione industriale; negli anni 90, ci fu l'esigenza di supportare le varie industrie anche con sistemi che le potessero coadiuvare o fornire consulenza, proprio per rispondere a una normativa ambientale che stava diventando sempre più importante dal punto di vista delle risposte che le industrie avrebbero dovuto dare. Pertanto, è significativo l'esempio della fondazione di questo polo che nasceva come punto di raccolta di società di consulenza ambientale, ma anche di tipo tecnologico per aumentare l'efficienza delle industrie, per rispondere a tematiche ambientali che potevano crearsi e quindi rispondere anche alla normativa, e start up, che stavano a cavallo del mondo dell'industria e del mondo dell'università. Quindi era un punto che permetteva e permette tuttora un dialogo tra il mondo dell'industria, della consulenza e della ricerca.

Una tendenza recente importante è l'introduzione di nuove tipologie di produzione permeate dal concetto dell'economia circolare. In questo momento, questa è la tendenza di chi si deve riconvertire o nascere (come la riconversione in bioraffineria) che permette che le materie di scarto possano rientrare nel ciclo produttivo e quindi diventare degli esempi di economia circolare.

Marta Citron: Gli impatti ci sono, qualsiasi attività impatta. Negli anni sono stati fatti molti sforzi per migliorare e per diminuire gli impatti. Un esempio è la Venice Blue Flag per la parte crocieristica. Per quanto riguarda la parte commerciale, tutte le attività svolte a terra avevano dei grossi impatti in passato, mentre attualmente si presta più attenzione per esempio alla creazione di polveri e al trattamento delle acque meteoriche, che vengono tutte mandate a smaltimento o a trattamento. Gli sforzi sono stati fatti, bisogna continuare a studiare e a migliorare.

Ci sono vincoli ambientali, morfologici e/o strutturali al prosperamento futuro del porto di Venezia? Se sì, quali sono e come si potrebbe superarli?

Marta Citron: Il vincolo principale che si ripete negli anni, sia morfologico che normativo, è dato dai canali. Essendo un porto all'interno della laguna, l'accessibilità nautica attraverso i canali di grande navigazione viene garantita con delle importanti operazioni di dragaggio. Il fondale medio della laguna è intorno a un metro, mentre i canali del porto

sono intorno a 12 metri. Il piano regolatore prevede poi diverse profondità. Ci sono canali che devono essere mantenuti con dei fondali importanti per garantire l'accessibilità nautica. Questo implica che siamo costretti a movimentare grandi volumi di sedimenti a causa del fenomeno di interramento. Un grande deposito di sedimenti implica la necessità di frequenti lavori di manutenzione. Il grosso problema è di tipo normativo, perché bisogna gestire i sedimenti. All'interno della laguna i sedimenti vengono ancora attualmente gestiti secondo il protocollo 93 derivante dalla legge speciale per Venezia, che classifica i sedimenti in base alla loro qualità dal punto di vista chimico, e prevede che vengano refluiti a seconda della qualità in alcune tipologie di siti. I sedimenti migliori vengono adibiti a ricostruzione morfologica, come barene, velme e tutte le opere di naturalizzazione della laguna. Se la classe peggiora, i sedimenti possono essere utilizzati solo ed esclusivamente per il ripristino di isole emerse, che non abbiano contatto con la laguna. I sedimenti peggiori, oltre classe C, vengono utilizzati per casse di colmata, oppure, se sono pericolosi, vengono trattati come rifiuti.

E' una normativa locale molto stringente, perché i siti di destinazione non sono tanti e devono essere individuati da un organo competente, il Provveditorato. E' estremamente complesso muoversi in questa fotografia. Un'ulteriore complessità è data dal fatto che la maggior parte dei sedimenti ricadono nella classe B, che è di difficile soluzione perché c'è mancanza di siti con capacità sufficiente dove andare a refluirli. Il vincolo è quindi sia normativo che tecnico, rendendo più difficile garantire l'accessibilità nei canali. Questo vale per la parte commerciale, perché viceversa il canale del Lido si mantiene per una questione idraulica. Attualmente il protocollo è in fase di revisione. E' un approccio completamente diverso. Prima c'erano solo dei limiti chimici, classificazione semplici, adesso è tutto spostato verso la tutela dell'habitat, orientato verso i microorganismi e gli organismi che ci abitano. Questa tematica è molto importante, perché entra in atto ogni volta che bisogna movimentare i sedimenti per qualsiasi opera, da costruzione di banchine a scavi manutentori, e i costi sono ingenti, soprattutto per sedimenti di caratteristica oltre C.

In generale, risulterebbe vantaggioso creare delle norme che tengano conto della specificità del porto di Venezia e di tutto il know-how e la conoscenza ambientale esistente riguardo alla laguna, perché è evidente che il porto deve coesistere con la laguna. Venezia e il porto sono realtà molto legate dal punto di vista fisico e geografico. Ritengo

che bisognerebbe sfruttare tutta la conoscenza ambientale sulla laguna, per creare una normativa sensata di sviluppo sostenibile di Venezia e del porto.

Come si può paragonare il Porto di Venezia ai competitors del Nord Adriatico dal punto di vista ambientale e cosa si può migliorare?

Marta Citron: Tutti i porti del nord adriatico sono porti datati e si sono ritrovati a gestire infrastrutture vecchie, che gradualmente si sta andando a trasformare. La maggior parte del traffico in uscita dal porto di Venezia avviene su gomma. L'impatto a valle dell'arrivo della nave (lato terra) è legato al tipo di trasporto che è in uscita. Stiamo lavorando da anni per migliorare. Siamo core port delle reti TEN-T, quindi sono stati attuati degli sviluppi per quanto riguarda il trasporto su rotaia. E' stato, per esempio, fatto un grossissimo investimento a livello di bonifica e riconversione di un'area che era contaminata, per la realizzazione e l'ampliamento del parco ferroviario, con l'obiettivo di aumentare il traffico su rotaia, e di conseguenza ridurre le emissioni del porto.

Dal punto di vista dell'impatto ambientale, bisogna prendere in considerazione le emissioni che riguardano sia lato nave che lato gomma, quindi per quando la merce viene sbarcata. C'è stato un miglioramento nel porto di Venezia, come negli altri porti, perché c'è il rispetto normativo. Infatti, è stato applicato uno switch verso i carburanti migliori utilizzati dalle navi. Si tratta però comunque di carburanti molto impattanti dal punto di vista ambientale. Inoltre, si potrebbe lavorare ancora su una migliore infrastrutturazione delle banchine per diminuire l'impatto.

Riguardo alle emissioni, è stata fatta una fotografia dello stato di fatto con il Documento di Pianificazione Energetica Ambientale del Sistema Portuale (DEASP), previsto dall'ultima revisione della legge portuale, che riguarda quindi tutti i porti italiani, e da essere redatto secondo le linee guida emanate dal Ministero. Questo documento fa una fotografia dei consumi e delle emissioni di CO2 in particolare, ma viene analizzata anche l'emissione di polveri. L'obiettivo è quello di individuare i progetti più importanti e più performanti, che già secondo il porto sono stati pianificati per ridurre il carbon footprint. E' stato fatto qualche studio negli anni passati, ma mai una fotografia dettagliata dell'impatto dei singoli terminal, quindi non solo dell'autorità portuale, ma del porto per intero.

La problematica degli impatti ambientali è sentita in tutti i porti, soprattutto a livello di emissioni e rumori, perché è quello che la gente percepisce; riguardo alla parte commerciale, le emissioni di polveri costituiscono un grosso problema. Si tratta sicuramente di un'attività impattante, ma lo sono tutte le attività.

Quali sono gli obiettivi e la strategia di breve e lungo termine del porto di Venezia per quanto riguarda la sostenibilità ambientale?

Erika Rizzo: Il piano energetico, già inviato al Ministero ma su cui continuiamo a lavorare, ci permetterà di mettere in luce quali azioni possono essere intraprese sia in termini di misure che di interventi: di misure come azioni che vanno a regolare o regolamentare in qualche modo la dinamica; interventi a livello tecnico di infrastrutture. Più specificamente, il piano pone in stretta relazione l'efficientamento energetico con la riduzione di emissione di CO2. Più efficiente è il sistema dal punto di vista energetico, minori sono le emissioni di CO2, che sono quelle maggiormente additate come la causa del cambiamento climatico, un tema caldo e strettamente collegato all'efficientamento energetico. Quindi la valutazione dei progetti all'interno del piano energetico permetterà di tracciare delle linee future di indirizzo, e quindi alcuni di quei progetti sono già degli obiettivi, che portano all'efficientamento energetico e pertanto ad una riduzione di CO2.

Marta Citron: Parlando di obiettivi di breve-medio termine, è programmata una serie di efficientamenti energetici, che andranno a migliorare le vecchie infrastrutture esistenti. Dal punto di vista pratico, è quello che ha effetto nell'immediato e costi inferiori, perché c'è un tempo di ritorno breve, partendo per esempio da un piano dell'illuminazione che stiamo attuando. Sono interventi che dal punto di vista tecnologico richiedono molto poco e si ha un ritorno veloce. Sul lungo periodo, ci sono dei ragionamenti più ampi riguardo al cold ironing, su fornitura di energia da banchina; quindi fare un piano più organico rispetto a quello che era stato valutato negli anni passati. Erano stati fatti delle valutazioni di fattibilità a riguardo, tuttavia ragionamenti anche in considerazione del calendario navi e della tipologia di navi che vengono ad attraccare coinvolgono il medio-lungo termine, considerando anche il costo delle infrastrutture.

Erika Rizzo: A livello di transizione, penso anche al gas naturale liquefatto (LNG), che risponde a delle esigenze per esempio di qualità dell'aria, perché è un carburante con un

tenore di zolfo molto inferiore rispetto a quelli utilizzati al momento. Quindi ti permette di avere un miglioramento delle polveri e della qualità dell'aria. In considerazione del cambiamento climatico, c'è da migliorare con qualcosa che può guardare al lungo periodo, come l'onshore power supply. Per tutti questi interventi sul lungo periodo è necessario che si creino anche le premesse favorevoli a poter portarli avanti.

Marta Citron: Un'altra cosa importante è che vengano definiti degli standard che ancora mancano, in modo da ridurre il rischio che alcuni interventi non rispettino eventuali standard futuri. E' fondamentale anche che la fornitura di energia elettrica da banchina provenga da fonti pulite; se brucio carbone, è vero che l'efficienza è migliore rispetto a bruciare carburante, ma non è sostenibile dal punto di vista ambientale. In un'ottica di economia circolare, di life-cycle assessment, si sposterebbe il problema da un'altra parte.

Il porto di Venezia è un porto multi-funzionale. Che considerazioni si possono fare riguardo alle specifiche tipologie merceologiche dal punto di vista dell'impatto ambientale e su quali si potrebbe investire maggiormente?

Marta Citron: Si può potenzialmente investire su una qualsiasi tipologia di merce se c'è una specializzazione e se si hanno risposte positive dal mercato, l'importante è che ci sia un cambiamento di mentalità dal punto di vista della gestione operativa della merce. Per esempio, si potrebbe investire su dry bulk, ma in cicli chiusi, che limitano gli impatti. Molti dei terminalisti qui hanno investito a livello impiantistico in questo senso. I container sono più neutrali dal punto di vista ambientale perché non hanno grossi impatti essendo chiusi, escludendo ovviamente il loro trasporto, che vale per qualsiasi merce. Quello dei colli eccezionali è il segmento in cui funziona meglio il Porto di Venezia, ha ripagato molto negli anni, e spingere su quello è sensato. Per esempio, anche il dry bulk ha un buon mercato per la parte alimentare.

Colli eccezionali è la parte in cui va meglio il Porto di Venezia. Però anche il dry bulk ha un buon mercato per la parte alimentare. Un investimento in questo senso può produrre un potenziale rischio riguardo la competitività dei terminal e richiederebbe una trasformazione importante delle infrastrutture esistenti. Nell'ottica della revisione del piano operativo portuale che modifica completamente il porto, si potrebbe anche ragionare, più che della specializzazione verso una singola tipologia, in una

razionalizzazione del porto attuale. Quindi si potrebbe agire verso una ottimizzazione delle infrastrutture per tipologie di merci, in modo da creare una diversificazione ma anche un'ottimizzazione degli impianti. Si possono attuare degli investimenti, però con delle infrastrutture che siano sostenibili e ottimizzate dal punto di vista ambientale, per velocizzare tutte le operazioni di carico/scarico, ma senza impatti. Ritengo che attualmente l'area portuale non è organizzata in modo ottimale, e questo non permette di gestire bene né dal punto di vista ambientale, né della gestione operativa. Viceversa, in un'ottica di strategie di revisione dell'ambito portuale complessivo, un'ottimizzazione infrastrutturale di quello che è il puzzle attuale potrebbe semplificare l'operatività.

Un limite per questo tipo di operazione è sicuramente dato dai costi notevoli. Inoltre, si dovrebbero riorganizzare le concessioni. Ma considerando anche il punto di vista ambientale, avere un'ottimizzazione dei terminal, per esempio organizzando ed infrastrutturando con un impianto ad hoc tutti i terminal che contribuiscono maggiormente all'inquinamento delle acque, sarebbe un miglioramento.

Quali vantaggi potrebbe portare una collaborazione tra il porto di Venezia e i porti limitrofi, anche dal punto di vista della sostenibilità ambientale?

Marta Citron: Io ritengo che una collaborazione, come lo è il North Adriatic Port Association (NAPA), per la tipologia di configurazione che i porti del Nord Adriatico, sia estremamente proficua, considerando anche la diversificazione di ognuno di questi porti. Avendo delle caratteristiche diverse, una collaborazione potrebbe richiamare più soggetti. Secondo me, bisognerebbe aumentare il grado di collaborazione, penso a livello di NAPA, perché tematiche simili accomunano i porti del Nord Adriatico, ma anche a livello di Assoporti. Sarebbe proficuo se all'interno del NAPA ci fosse un tavolo permanente sul tema ambientale, che affronti diversi aspetti, come emissioni, rifiuti, ecc. Noi ci ritroviamo a gestire a servizi di interesse generale (raccolta dei rifiuti dalla nave, pulizia delle aree comuni, gestione del verde, ecc.) che sono dei servizi resi da parte dell'Autorità Portuale, tramite il concessionario individuato, all'utenza. Questo è fatto tramite bandi disciplinati da noi, però senza un coordinamento a livello nazionale. Sarebbe molto utile, invece, se ci fosse un tavolo permanente in modo che ci sia uniformità.

Giulio Stella – Area Pianificazione Strategica e Sviluppo

Le chiedo cortesemente di presentarsi e di descrivere brevemente il Suo ruolo all'interno dell'Autorità di Sistema Portuale.

Sono Giulio Stella. Mi occupo prevalentemente di analisi economico-statistiche, quindi tutto quello che riguarda il monitorare i traffici, le navi che arrivano al porto, e di tutte le filiere logistiche e i vari settori merceologici trattati dal porto, di studio dei flussi, anche a livello di previsioni sul futuro per quanto possibile.

Negli ultimi decenni ci sono stati dei cambiamenti sostanziali del ruolo del porto. Qual è stata l'evoluzione in termini di ruolo e attività del Porto di Venezia?

L'evoluzione è stata molto influenzata dall'aspetto legale, con delle riforme di legge, andando da quando era Provveditorato, quindi un ente pubblico, fino all'apertura dei porti al mercato. Ora i terminal sono soggetti privati che hanno delle aree in concessione.

A livello di merci, abbiamo sempre coperto tutte le tipologie merceologiche, rinfuse, prodotti, contenitori, Ro-Ro. Noi abbiamo una parte di industria localizzata nel porto, che negli ultimi anni ha visto una ristrutturazione. Per esempio, in passato c'era tutta la parte di petrolchimico che negli anni è andata scemando; molti cicli della chimica sono venuti meno, si trattava di chimica industriale; la raffineria ora è più simile a un deposito costiero. Quindi ci sono meno industrie, ed è invece più polo logistico. Nel passato il traffico industriale andava per la maggiore. A un certo punto il traffico commerciale ha superato quello industriale, quindi l'avvento dei container ha sicuramente cambiato il mercato.

In generale, la containerizzazione per Venezia è stato un tema un po' particolare, perché per tutte le merci che prima arrivavano in navi convenzionali e sono state containerizzate, noi non siamo riusciti ad avere un effetto sostitutivo uno-a-uno, ma siamo andati perdendo merce. Una delle ragioni, per esempio, è che il traffico del Nord America mal si sposa con l'Adriatico perché ci sono porti geograficamente più comodi. Quindi considerando l'Italia, il Tirreno è più comodo; altrimenti, il nord-Europa è sicuramente il naturale approdo per questi traffici. In seguito, si è aperta tutta la parte da est. Però comunque dato che i porti del Nord Europa hanno un vantaggio competitivo che gli è nato

dai traffici con il Nord America (in passato erano i traffici Atlantici quelli più sviluppati), sono riusciti a crescere in maniera consistente. Quindi anche le rotte da est passano per il canale di Suez, e dovendo andare a terminare nei porti nel Nord Europa, i porti del Tirreno si trovano lungo la rotta, penso a Marsiglia, Barcellona, Valencia. Chiaramente lì si riesce ad avere moli di traffico più importanti, a fare massa critica, e quindi anche l'Italia è più facilmente servita dal Tirreno che dall'Adriatico.

Per quanto riguarda le rinfuse liquide, la maggior parte del traffico la fanno Eni e Versalis. Le dinamiche in questo caso dipendono un po' dai settori. Una volta c'era la raffineria, poi non è stato più conveniente raffinare in Europa, è convenuto far arrivare il prodotto, e così si sta facendo. Venezia è un buon punto logistico, quindi tutto sommato abbiamo tenuto il mercato, anche se abbiamo perso parte dei traffici. Infatti, dagli 11 milioni che si facevano siamo ora sugli 8 milioni di tonnellate. Questo va in base a come va il settore automobili e ai relativi consumi, e lo stesso discorso vale per la parte chimica.

Il porto di Venezia può essere definito sia come un porto di consumo che manifatturiero, dato che serviamo sia le aree di consumo qui attorno che l'industria manifatturiera di Brescia, Bergamo, Lombardia orientale, Veneto. Non abbiamo hinterland enormi come dimensione. L'hinterland per i contenitori è il Veneto. Per altri prodotti invece si allarga un pochino, andando anche verso Lombardia ed Emilia-Romagna. In passato avevamo dei mercati, come l'agroalimentare per l'Austria. Lo sviluppo del porto di Koper ha chiaramente cambiato qualche equilibrio, e anche da questo punto di vista è un competitor.

Guardando la performance nel corso degli ultimi anni del porto di Venezia sui traffici di merci, come si possono descrivere i trend avvenuti ultimamente e quali potrebbero essere le cause principali?

Ci sono certi fenomeni che sono inarrestabili. Se si pensa ai combustibili fossili, ci sono direttive, orientamenti macro, che vanno a condizionare questi settori e quindi le movimentazioni. L'esempio più lampante riguarda il carbone, perché la strategia energetica nazionale prevede che si elimini il carbone per la produzione di energia elettrica. Avendo una centrale termoelettrica alimentata a carbone, chiaramente vedremo sparire quei quantitativi. Quando i quantitativi industriali spariscono, sono difficilmente

sostituibili. Questo può essere un esempio di orientamenti macro che vanno a condizionare i movimenti di un porto, che vanno aldilà della competitività o meno dello scalo. Qui non è un problema di Venezia se tiene un mercato o no, ma è una decisione che coinvolge la politica energetica dell'Italia o dell'Europa, per cui condiziona i freddi numeri a livello di tonnellate movimentate. In ogni caso, tutto il discorso riguardante i combustibili fossili avrà degli impatti sul porto. Questo è un esempio immediato. Per il resto vale l'andamento industriale, l'andamento dei diversi settori e sub-settori. Pertanto, per esempio in base all'andamento dei sei settori siderurgico, di elettrodomestici, automobili, costruzioni, si può capire a grandi linee cosa succederà ai volumi del porto.

Oltre agli andamenti più o meno macro, per cui nazionali, regionali, internazionali, quindi dai dazi sui prodotti siderurgici alla salute dell'industria del Nord Italia a quant'altro, c'è la competitività dei singoli scali, per cui se si riesce a migliorare da quel punto di vista, si riesce a trarre traffico. Quindi ci sono le dinamiche dei settori e in più la competizione tra i porti che vanno a delineare il totale merci movimentate.

Guardando i traffici del porto di Venezia, intorno al 2008 eravamo sui 30 milioni di tonnellate, mentre più recentemente siamo a circa 25, 24, 26 milioni. Parte di questi 5 milioni di tonnellate perse è dovuta al discorso di prima riguardo al settore petrolifero, per cui da 11 milioni siamo andati a 8 milioni. C'è da dire però che non è stato perso il settore. Una decina di anni fa, c'era anche la coda della chimica, c'era qualche ciclo produttivo in più. Per lo più è il traffico industriale di industria pesante che è venuto meno, poi sicuramente ci sono stati altri cambiamenti, anche specifici ai terminalisti. Il traffico commerciale svolge sempre di più la parte da leone. Infatti, è sempre stato in crescita negli ultimi anni, ma con una crescita inferiore rispetto a questi cali di politiche industriali che spesso non dipendono dalla competitività del porto. Tutto sommato il porto negli anni ha tenuto discretamente, quindi si è sempre arrivati a un punto di equilibrio per quanto riguarda le tonnellate totali, che dipende anche dalla crescita del territorio.

Quali sono i vantaggi competitivi specifici del porto di Venezia che fanno sì che riesca a servire il suo mercato, paragonato ai porti vicini del nord Adriatico? E quali sono invece le principali limitazioni al prosperamento del porto?

Un vantaggio competitivo importante è l'entroterra e la vicinanza dell'industria al porto, come dicevamo il Veneto, la Lombardia orientale. Quindi la localizzazione geografica è sicuramente un vantaggio. Dall'altro lato i volumi di traffico sono limitati da problemi di accessibilità, altrimenti sarebbero più importanti, perché per esempio per le rinfuse siderurgiche, Venezia è il porto per l'industria Veneto-Lombarda. Ma anche per i contenitori Venezia sarebbe la scelta migliore se potesse disporre di pescaggi. Per l'agroalimentare serviamo ad esempio il gruppo Veronesi che è tra i primi consumatori in Europa, per cui il tessuto industriale che sta dietro il porto è particolarmente ricco. I problemi di accessibilità fanno sì che il porto si limiti a servire il retroterra strettamente limitrofo; se ci fosse un'accessibilità migliore probabilmente serviremmo Milano, la Baviera, aree molto più vaste.

Il problema dell'accessibilità nautica è il limite principale che non fa cambiare di scala dimensionale al porto, perché poi secondo me tutto il resto è superabile eventualmente. E' chiaro che noi abbiamo ampi spazi che dovrebbero essere resi utilizzabili, ma dipende anche dalla mole di traffico che arriverebbe, quindi direi accessibilità nautica in termini di pescaggi ma in termini anche di MOSE. Chiaramente l'accessibilità nautica, dato che si tratta di un porto localizzato nella laguna, ha costi maggiori. Sono necessari, per esempio, dei servizi tecnico-nautici per le navi che arrivano, impiegando molto spesso rimorchiatori per i trasferimenti che durano più di un'ora, pertanto si tratta di un costo molto diverso rispetto al costo di un porto dove si arriva direttamente in banchina. Chiaramente poi questi costi vengono compensati dal fatto che la parte terrestre è particolarmente breve, per cui siamo più vicini alla destinazione, o all'origine. L'accessibilità nautica coinvolge soprattutto i servizi di linea, che trattano prevalentemente contenitori e Ro-Ro, e che sono quelli che hanno meno possibilità di attendere una eventuale chiusura del MOSE di un numero di ore. Il motivo è che hanno una tabella di marcia ben delineata e dovrebbero fare meno ritardi possibili, mentre una nave di agroalimentare o di rinfuse siderurgiche non ha tutti i porti da scalare che ha un servizio contenitori, e quindi è più gestibile. Quando le navi stanno ferme, la merce si carica di costi. Quindi sostanzialmente le navi per le rinfuse hanno più margine per riuscire a gestire una problematica come le chiusure del MOSE, anche se comunque negativo. Quindi più si riuscirà a programmare il funzionamento del MOSE, ad avere previsioni per tempo e a renderlo efficiente da quel punto di vista, più si riuscirà a gestire

nel modo migliore il traffico, o ottimizzare gli arrivi e le partenze, in modo da non avere extra costi.

Il porto di Venezia è un porto multifunzionale. Quali sono le tipologie di merce su cui si potrebbe investire maggiormente, considerando i vantaggi competitivi del porto di Venezia e i suoi limiti?

Il porto di Venezia è leader nel campo dei colli eccezionali. Per questo tipo di merce è importante l'accessibilità al porto lato terra, quindi non devono esserci per esempio ponti, colli di bottiglia, e altri tipi di ostacoli alla viabilità. Da questo punto di vista, Venezia è spesso scelto come porto di origine, essendo perlopiù in export. Quindi la parte di infrastrutture lato terra è fondamentale.

Sicuramente si tratta di pezzi pregiati, per cui serve esperienza e dotazioni di un certo tipo da parte del terminal per le movimentazioni, perché sono tutti pezzi voluminosi e di un grosso valore aggiunto, quindi bisogna evitare di danneggiarli. E' fondamentale pertanto saperli movimentare. Qui conta più l'accessibilità terrestre che la localizzazione geografica, nonostante molto spesso i colli eccezionali vadano nel Medio Oriente, per cui Venezia geograficamente lato mare è dal lato giusto. Però la differenza la fa proprio il lato terra, perché è fondamentale che si riesca a trasportare la merce da e verso il porto. L'hinterland dei colli eccezionali è molto più esteso rispetto agli altri tipi di merce, proprio perché non ci sono molti porti in grado di gestirli e perché è fondamentale la possibilità di raggiungere il porto con questa merce. Questo fa sì che arrivino pezzi un po' da tutto il Nord Italia, ma anche da oltre confine.

Inoltre, per le rinfuse noi siamo un porto di elezione. Le navi ad oggi riescono ad arrivare, non abbiamo problemi particolari, per cui sicuramente tutto quello che serve l'industria manifatturiera, in navi convenzionali qui ci sta benissimo. E' chiaro che il lato contenitori per potersi specializzare e avere dei volumi decisamente superiori a quanto abbiamo attualmente, non si può che dover accogliere servizi diretti. Per avere servizi diretti serve un'infrastruttura in grado di poter ospitare questi servizi, quindi navi sempre più grandi, che è a vantaggio delle compagnie perché riescono a diminuire il costo unitario, e a svantaggio degli operatori portuali a cui aumentano i costi. La tendenza di aumento nelle dimensioni delle navi mette in difficoltà tutti i porti in generale. Però non si può

prescindere da un progetto che accolga questo tipo di navi, visto che decidono ancora le compagnie il tipo di nave che desiderano costruire. Qui questo aspetto è ancora dominante, e quindi per essere un porto contenitori è necessaria soprattutto un'infrastruttura lato mare che permetta alle navi di arrivare. Se si deciderà che Venezia dovrà avere o potrà avere questa infrastruttura, può sicuramente specializzarsi anche in quello. Venezia è sicuramente vicina ai punti di consumo e all'industria. In caso di una adeguata infrastruttura lato mare, il più è fatto perché i collegamenti ferroviari e stradali ci sono.

Nel corso degli ultimi anni sono stati ideati dei progetti verso lo sviluppo una piattaforma offshore riguardante il tema dei container. Quali sono i principali limiti per un'applicazione di un progetto di questo tipo?

Quello dovrebbe essere, secondo me, un progetto che va al di là del porto di Venezia. Noi siamo il posto geograficamente più comodo, però se riuscisse a essere utile come piattaforma anche per altri porti, sicuramente l'investimento si giustificherebbe meglio. Il problema principale riguarderebbe i costi della movimentazione unitaria, diminuendo la competitività del progetto. Chiaramente se questo progetto avesse un cappello più nazionale, risolvendo in qualche modo il problema dei costi, farebbe più massa critica e potrebbe essere utilizzato anche dai porti limitrofi.

Se Venezia avesse questa grande infrastruttura probabilmente andrebbe a prendere anche parte della domanda soddisfatta da altri porti, e quindi da qui nasce il bisogno di misurare bene questa domanda e capire quanto si ha necessità. Con un'infrastruttura di questo tipo, si potrebbe espandere il mercato, e servire una località come la Baviera per esempio. Sarebbe anche da capire se una grande nave che arriva, per esempio, dal Far East utilizzerebbe un porto offshore di questo tipo, oppure lo utilizzerebbe ma poi comunque farebbe scalo in altri porti. E' chiaro che più cooperazione c'è, più si giustificano i costi, e quindi bisognerebbe misurare tutto questo. Mediterraneo e Far East sono i mercati principali, ma Venezia è comunque collegata a tutto il mondo, infatti attraverso il transhipment da Venezia si può arrivare ovunque.

E' inevitabilmente presente una competizione tra i porti del Nord Adriatico. Potrebbe essere vantaggioso, secondo te, trasformare la competizione in una collaborazione, fissando qualche obiettivo comune?

La competizione e le differenze tra i porti del Nord Adriatico influenza sicuramente i traffici. Ti dicevo per esempio che in passato l'agroalimentare per l'Austria lo faceva Venezia, quello è stato perso. Koper ha il vantaggio che è l'unico porto in Slovenia, quindi gli investimenti nel settore portuale sono diretti verso un porto. Credo che dal punto di vista doganale, siano porti più semplici rispetto a quelli italiani, quindi questo distorce un po' il mercato. Questo perché per merci un po' particolari, per esempio, si scelgono porti più semplici da quel punto di vista, perché sono più permissivi e il rischio di avere la merce ferma è minore. Questa differenza, percepibile anche tra diversi scali italiani, diventa una variabile di mercato. Quindi forse quei porti hanno delle norme un po' più permissive e riescono a trarre vantaggi anche da questi punti di vista.

Non credo che una collaborazione di questo tipo sia svantaggiosa. Potrebbe essere vantaggioso nel momento in cui unendo le forze si riuscisse a trovare un effetto virtuoso moltiplicativo per cui si riesce a offrire un servizio su scala più grande, quindi si riesce a catturare di più. Prima parlavamo dei contenitori, probabilmente si riuscirebbe a prendere un po' di traffico appartenente al Tirreno. Quindi ci sarà sempre un competitor, ma si sposta di scala, perché se ora la competizione è all'interno dell'Adriatico, in quel caso si sposterebbe verso il Tirreno e Nord Europa. Fare massa critica nella gestione delle varie merci potrebbe essere traslato a una scala più grande, quindi potrebbe portare dei benefici.

Jacopo Esposito – Area Affari Legali

Le chiedo cortesemente di presentarsi e di descrivere brevemente il Suo ruolo all'interno dell'Autorità di Sistema Portuale.

Io sono Jacopo Esposito. In questo momento sto lavorando nello staff del Presidente e del Segretario Generale. In particolare, sto coadiuvando il Segretario Generale in una serie di tematiche particolari e specifiche, oltre a continuare a dare supporto a tutta la parte legale dell'Autorità Portuale.

Il concetto di porto ha avuto degli sviluppi sostanziali nel corso degli ultimi decenni. Come si è evoluto il concetto di porto in Italia e quindi del Porto di Venezia, definito dalla regolamentazione nazionale e locale?

Quando io sono arrivato in Autorità Portuale nel 2008, era già vigente la legge 84/94, che è la legge nazionale che contiene tutta la disciplina riguardante le Autorità Portuali. Prima delle Autorità Portuali, c'erano degli enti che avevano varie denominazioni, in generale "Enti-porto", in particolare per quanto riguarda il caso di Venezia, si chiamava "Provveditorato al Porto di Venezia", che differentemente dalle Autorità Portuali e dalle Autorità di Sistema Portuale, svolgevano anche attività oggi affidate ai terminalisti. Questa era una prima differenza.

Nel 1994, c'è stata questa grossa riforma, e ultimamente ci sono state una legge di riforma nel 2016 (il decreto legislativo 169/2016) e poi un correttivo nel 2017. A mio avviso, soprattutto l'ultimo passaggio, cioè la legge di riforma del 2016, ha inciso notevolmente sulla parte che riguarda la pianificazione dell'Autorità Portuale. Infatti le Autorità Portuali hanno, tra i vari compiti e poteri attribuitegli dalla legge, quello di pianificare l'attività. A Venezia, c'è il piano regolatore portuale che è alquanto risalente. In questo momento siamo in una fase di rielaborazione del piano regolatore portuale. Questo è uno strumento che incide notevolmente sulla politica che l'amministrazione intende intraprendere riguardo a come sviluppare il porto. Era così anche nella legge 84/94 pre-riforma, però sono stati cambiati leggermente gli strumenti di pianificazione, e soprattutto è stata data la possibilità al porto di intervenire in materia di autorizzazione all'esecuzione delle opere nei porti. Questo significa che, mentre prima c'era bisogno di rivolgersi al comune per permesso di costruire, adesso non avviene più così. Chi vuole realizzare un'opera in un

porto, ovviamente opere che siano attinenti all'attività portuale, si rivolge direttamente all'Adsp in questo caso, la quale poi provvede ai sensi di legge a convocare una conferenza di servizi nell'ambito, alla quale partecipano vari soggetti coinvolti. All'esito di questa conferenza, è potere dell'Autorità autorizzare la realizzazione dell'opera. Ci sono ovviamente degli obblighi di rispettare normative in materia ambientale, di beni culturali, e altri ambiti. Però secondo me è molto importante che il primo soggetto chiamato a valutare l'utilità dell'opera, e quindi anche la corrispondenza alla pianificazione delle strategie del porto, sia il porto stesso.

Un'altra differenza di rilievo, secondo me, è data dal fatto che c'è un rapporto un po' più robusto tra l'Autorità ed il Ministero vigilante. In questo momento, differentemente dalla legge 84/94, si è creato un rapporto più centralizzato, cioè le strategie generali passano sempre per il Ministero delle infrastrutture, quindi le Autorità sono autonome ma in maniera un po' inferiore rispetto a quella che era la legge 84/94.

Come si potrebbe definire attualmente la funzione e l'obiettivo del porto di Venezia, come definito dalla legge?

Gli obiettivi sono chiari, sono quelli che derivano dai compiti che la legge attribuisce all'Autorità di Sistema, di cui all'art. 6 della legge. I compiti sono quelli di programmare, organizzare le attività, ma tutto, secondo me, deriva dalla pianificazione che la pubblica amministrazione intende fare di un determinato territorio. Stiamo parlando di un territorio particolarmente vasto per quanto riguarda Venezia, che include sia la parte di Marghera che il centro storico. Gli obiettivi dei porti sono sempre quelli di espandere le attività il più possibile, anche perché sappiamo bene che l'attività di un porto è strettamente connessa a un'economia che non è solo locale, ma nazionale. Da qui la rilevanza delle attività portuali con ad esempio tutti i progetti comunitari, le reti TEN-T, e quindi trasporto di merci verso Nord Europa, Far East, ecc. Quindi l'obiettivo è quello di facilitare gli operatori portuali, facilitare nel senso di consentirgli di aumentare la loro capacità operativa, nel rispetto di quelle che sono le normative vigenti, e di sviluppare l'economia locale, e nazionale soprattutto. Poi ci sono anche degli obiettivi che non sono legati tanto agli operatori, ma c'è una volontà da parte dell'amministrazione dell'autorità di sistema di sviluppare anche le infrastrutture esistenti e di migliorarle, o di crearne di

nuove. Questo sempre nell'ottica di favorire lo sviluppo del porto, quindi come attività commerciale o attività turistica. Faccio riferimento, ad esempio, al progetto proposto dal precedente Presidente dell'Autorità, Paolo Costa, con l'idea di fare un porto offshore fuori dalle bocche di porto. Si tratta di investimenti, perché di fatto noi ragioniamo su un progetto che al momento è solo sulla carta, ma in realtà a suo tempo l'autorità portuale ha acquistato un'area molto vasta a Marghera, proprio per creare una piattaforma logistica molto importante, che è connessa al porto offshore. Quindi è chiaro che le amministrazioni investono per realizzare nuove infrastrutture che servono a migliorare le attività commerciali, con delle incidenze sull'economia.

Chi sono i soggetti coinvolti nello sviluppo e nell'approvazione progetti infrastrutturali come quello della piattaforma offshore?

Non c'è una regola di base. La collaborazione è sempre la benvenuta, quindi se c'è una idea comune la si può portare avanti congiuntamente. Per quanto riguarda l'offshore, c'era un primo progetto iniziale, molti anni fa, che era dell'allora Magistrato alle acque, che aveva approfondito sulla base di un articolo della legge speciale per Venezia, che prevedeva l'obbligo di portare fuori dalla laguna i traffici petroliferi. E quindi si era previsto di fare un porto offshore per questi. Quel progetto poi si è arenato. Lo ha ripreso il Presidente Costa, proponendo di sviluppare, oltre per i traffici petrolchimici, anche un porto commerciale. Questo nasce da una visione complessiva della città di Venezia, che è legata a vari aspetti. Uno dei più importanti è proprio quello di salvaguardia della laguna di Venezia.

E' da tenere in considerazione il discorso MOSE, che una volta che entrerà in funzione, renderà un po' più difficile l'ingresso di navi commerciali a Venezia, perché se si chiudono le bocche di porto a causa dell'acqua alta, la nave non passa. Da qui sono state valutate delle soluzioni alternative, come allargare le conche, e diventava un discorso più complesso. Quindi si è pensato di intervenire in maniera diversa. I progetti sono a lungo termine ma tengono conto sempre delle situazioni contingenti che si manifestano di volta in volta.

Non c'è una regola generale. In questo caso, è un progetto che abbiamo portato avanti noi come tanti altri progetti, e però non abbiamo mai problemi a condividere, anche perché

trattandosi di opere di grande infrastrutturazione, si devono rendere pubblici e c'è sempre una partecipazione da parte di altre amministrazioni, enti o operatori privati. Infatti, operatori privati possono venire in autorità portuale con un progetto, sottoporlo alla nostra attenzione, dopo di che spetta a noi valutare se quell'opera proposta ricopre o no un interesse pubblico. Se ce l'ha, lo mettiamo a gara e ci lavoriamo. L'ultima parola spetta sempre a noi, per quanto riguarda il porto, però la possibilità di collaborare, parlare anche con i cittadini c'è sempre.

Come potrebbe essere descritto il rapporto tra regolamentazione nazionale e locale e le attività del porto di Venezia? Quali potrebbero essere i limiti, se ci sono, in termini di regolamentazione al prosperamento del porto di Venezia?

Oltre al fatto che potrebbero esserci dei problemi interpretativi sulla norma, io non vedo grossi problemi nella regolamentazione attuale. Vedo più che altro problemi nella gestione dei rapporti tra amministrazioni, perché io ho l'idea che si sia un po' perso il senso del pubblico, e che questo porta inevitabilmente a dei problemi di gestione tra i vari soggetti che sono chiamati a discutere sulle varie questioni. Non è tanto il testo di legge o il regolamento che incide, ma è la volontà di collaborare e trovare delle soluzioni. Ci dovrebbe essere una visione più concorde, unanime, ai fini del perseguimento dell'interesse pubblico. La cosa principale è proprio questa, noi siamo la pubblica amministrazione e dobbiamo perseguire un pubblico interesse. Se mi chiedi cosa si può migliorare, probabilmente bisognerebbe trovare dei modi, a livello normativo, per riuscire a disciplinare in modo più preciso ed equo questi determinati aspetti, per facilitare le decisioni e risolvere i problemi.

In che misura può l'AdspMAS intraprendere iniziative di cooperazione con altri porti, nazionali ed esteri?

Su questo c'è libertà. Noi abbiamo stipulato anche accordi recenti con il porto del Pireo per sviluppare i traffici. In passato ne abbiamo siglati altri, per esempio con Alessandria d'Egitto, porti siriani, ed altri. Da questo punto di vista abbiamo massima libertà di accordo, anzi, fa proprio parte dei nostri compiti istituzionali, rientra sempre nel concetto di sviluppo dei porti e dei traffici. È importante intraprendere rapporti con le

amministrazioni centrali di altri paesi, e Venezia da questo punto di vista è molto avvantaggiata dalla posizione geografica, che l'ha sempre aiutata nel commercio, vedi la Via della Seta. Quindi c'è massima libertà in questo aspetto. Per esempio, anche gli accordi con i porti NAPA dovrebbero servire a sviluppare una strategia comune del Nord Adriatico. Non sono stati siglati accordi commerciali, però c'era di sottofondo un'idea di unione delle forze. Mettendo insieme i porti del Nord Adriatico, si diventa più competitivi. Quindi c'è sempre massima possibilità per l'Autorità Portuale di stringere accordi di sviluppo dei traffici con altri stati.

Il porto di Venezia è multifunzionale. Quanta libertà avrebbe l'Adsp ad attuare una strategia di specializzazione verso una certa funzione?

C'è massima libertà per l'Autorità Portuale per farlo. È chiaro che sono decisioni che fai sulla base dei risultati di traffico. Se arrivano solo container, si cerca sicuramente di specializzarsi su container, quindi fare le infrastrutturazioni dovute. Allo stesso tempo però si deve anche capire se ci sono delle possibilità di sviluppo dei traffici ulteriori. L'idea è sempre quella di allargarsi con i traffici. La specializzazione può essere sicuramente praticata, non è un problema, ed è un discorso legato alla pianificazione. È nel piano regolatore che si stabilisce le funzioni delle aree che fanno parte dell'ambito portuale. Se c'è bisogno di molto spazio per sviluppare una determinata funzione, in sede di pianificazione si individua l'area e la sua destinazione funzionale. È già in quella sede che si valutano le strategie a lungo termine. Per questo il Piano Regolatore Portuale è fondamentale secondo me. Da noi è un po' datato, però stiamo intervenendo in questo senso.

Quanto potere decisionale ha l'Autorità nell'ambito dell'impatto ambientale delle operazioni portuali, in confronto alla legislazione nazionale e locale?

Rispetto alle operazioni portuali in senso stretto, direi nessun potere, perché le operazioni portuali sono di gestione esclusiva degli operatori, gli stakeholder. Ci è vietato per legge intervenire sulle operazioni portuali. Quello che noi facciamo lì è soltanto una vigilanza in termini di security. Per quanto riguarda il discorso ambiente più in generale, a Venezia è un caso particolare, quindi bisogna sempre confrontarsi innanzitutto con la legge speciale

per Venezia. Sono state prese molte iniziative a tutela dell'ambiente dal porto, vedi per esempio il protocollo per le emissioni dei fumi delle crociere, il Venice Blue Flag. Il protocollo per il settore crocieristico è stato siglato tra l'Autorità, la Capitaneria di porto, e le compagnie di crocieristica. Noi perché gestiamo il porto, quindi l'area è nostra, la capitaneria perché è il soggetto che va a fare i controlli (se le emissioni superano il limite), e ovviamente le compagnie perché devono adeguarsi a questo accordo. Sono accordi firmati qualche anno fa, e che vanno rinnovati. Ci siamo adeguati all'utilizzo di questo combustibile molti anni in anticipo.

Sicuramente è un compito nostro intervenire a tutela dell'ambiente, e ci vuole una particolare attenzione riguardo a Venezia. In particolare, mi viene da pensare ad esempio al dragaggio dei fanghi, che possono essere inquinati, quindi bisogna trovare una allocazione, come trattarli, ecc. Venezia ha un equilibrio ecologico molto debole, e quindi se si scava troppo, ci si ritrova con l'acqua alta; se si scava poco non passano le navi. Bisogna sempre puntare ad intervenire nel modo migliore. Non è semplice perché gli equilibri e gli interessi sono tanti. L'autorità ha piena libertà da questi punti di vista, che esercita sempre confrontandosi con le leggi o con i soggetti che sono più titolati dell'autorità stessa in materia di ambiente, perché noi non ci occupiamo di ambiente. Ci hanno dato come compito ad esempio quello di fare la manutenzione dei fondali. In questo caso, si incide sull'ambiente, quindi ci si confronta sempre con i soggetti competenti, il Ministero dell'ambiente, Ministero dei beni culturali, e altri. Anche considerando eventuali opere di infrastrutturazione che l'Autorità vuole fare, c'è quasi sempre una valutazione di impatto ambientale che deve essere fatta, ed è un argomento di un certo rilievo qua a Venezia.

References

Abi-Habib, M. (2018, June 25). How China Got Sri Lanka to Cough Up a Port. *The New York Times*. Retrieved from https://www.nytimes.com/2018/06/25/world/asia/china-sri-lanka-port.html

Amaro, S. (2019, November 15). China bought most of Greece's main port and now it wants to make it the biggest in Europe. *CNBC*. Retrieved from https://www.cnbc.com/2019/11/15/china-wants-to-turn-greece-piraeus-port-into-europe-biggest.html

Asian Infrastructure Investment Bank. Articles of Agreement. Retrieved from https://www.aiib.org/en/about-aiib/basic-documents/articles-of-agreement/index.html

Blanchard, J. M. F., & Flint, C. (2017). The geopolitics of China's maritime silk road initiative.

Brooks, M. R., & Faust, P. (2018). 50 Years of Review of Maritime Transport, 1968-2018: Reflecting on the Past, Exploring the Future (No. UNCTAD/DTL/2018/1)

Capuzzo, N. (2019, Dicember 17). Inaugurato a Vado Ligure il nuovo terminal container di Apm Terminals – Maers e Cosco. *Il Giornale della Logistica*. Retrieved from https://www.ilgiornaledellalogistica.it/news/aziende/inaugurato-a-vado-ligure-il-nuovo-terminal-container-di-apm-terminals-maersk-e-cosco/

Commission of the European Communities (2007), Communication on a European ports policy – COM(2007)616, European Commission, Brussels

COSCO, Abu Dhabi Ports Open New Terminal at Khalifa Port. (2018, December 10). *World Maritime News*. Retrieved from https://worldmaritimenews.com/archives/266410/cosco-abu-dhabi-ports-open-terminal-at-khalifa-port/

Cosco entra in terminal in Cina e Spagna. (2017, June 13). *Trasporto Europa*. Retrieved from http://www.trasportoeuropa.it/index.php/home/archvio/14-marittimo/16612-cosco-entra-in-terminal-in-cina-e-spagna

Cosco Ports entra nell'Euromax Terminal di Rotterdam. (2016, May 12). *Informazioni Marittime*. Retrieved from https://www.informazionimarittime.com/post/cosco-ports-entra-nelleuromax-terminal-di-rotterdam

COSCO Shipping Ports Buys Stake in Peruvian Chancay Terminal. (2019, January 25). *World Maritime News*. Retrieved from https://worldmaritimenews.com/archives/269604/cosco-shipping-ports-buys-stake-in-peruvian-chancay-terminal/

COSCO Shipping to Buy 51 Pct Stake in Spain's Noatum Port. (2017, June 13). *World Maritime News*. Retrieved from https://worldmaritimenews.com/archives/222627/cosco-shipping-to-buy-51-pct-stake-in-spains-noatum-port/

De Forcade, R. (2019, December 12). Inaugurato Vado gateway, il maxi terminal di Savona con soldi dalla Cina. *Il Sole 24 Ore*. Retrieved from https://www.ilsole24ore.com/art/inaugurato-nuovo-terminal-savona-ACtHpx4

De Langen, P. W. (2004). Analysing the performance of seaport clusters PW DE LANGEN: Defining clusters. In *Shipping and Ports in the Twenty-first Century* (pp. 104-120). Routledge.

Derudder, B., Liu, X., & Kunaka, C. (2018). *Connectivity along overland corridors of the belt and road initiative*. World Bank.

EPSC. (2015). The Asian Infrastructure Investment Bank. A New Multilateral Financial Institution or a Vehicle for China's Geostrategic Goals. *European Political Strategy Centre*, (1), 24.

European Commission. Simpson, B. (2018). Motorways of the Sea. Detailed Implementation Plan of the European Coordinator Brian Simpson.

Fallon, T. (2015). The new silk road: Xi Jinping's grand strategy for Eurasia. American Foreign Policy Interests, 37(3), 140-147.

Gazzetta Ufficiale della Repubblica Italiana. Decreto Legislativo 4 agosto 2016, n.169. "Riorganizzazione, razionalizzazione e semplificazione della disciplina concernente le Autorita' portuali di cui alla legge 28 gennaio 1994, n. 84, in attuazione dell'articolo 8, comma 1, lettera f), della legge 7 agosto 2015, n. 124".

Gazzetta Ufficiale della Repubblica Italiana. Decreto Legislativo 13 dicembre 2017, n. 232. “Disposizioni integrative e correttive al decreto legislativo 4 agosto 2016, n. 169, concernente le Autorita' portuali”.

Gazzetta Ufficiale della Repubblica Italiana. Legge 28 gennaio 1994, n. 84. “Riordino della legislazione in materia portuale”.

Godement, F., & Kratz, A. (2015). *" One Belt, One Road": China's Great Leap Outward*. European Council on Foreign Relations (ECFR).

Haeun Sanŏp Yŏn'guwŏn (Korea). (2005). *Free Trade Zone and Port Hinterland Development*. United Nations Publications.

Haezendonck, E., Pison, G., Rousseeuw, P., Struyf, A., & Verbeke, A. (2001). The core competences of the Antwerp seaport: an analysis of" port specific" advantages. *International Journal of Transport Economics/Rivista internazionale di economia dei trasporti*, 325-349

Harel, A. (2018, September 17). Israel Is Giving China the Keys to Its Largest Port – and the U.S. Navy May Abandon Israel. *Haaretz*. Retrieved from https://www.haaretz.com/israel-news/.premium-israel-is-giving-china-the-keys-to-its-largest-port-and-the-u-s-navy-may-abandon-israel-1.6470527

Huang, Y. (2016). Understanding China's Belt & Road initiative: motivation, framework and assessment. *China Economic Review*, *40*, 314-321.

Karuri, K. (2019, October 19). Tanzania Open to Talks Over $10 Billion Port Project, Daily Says. *Bloomberg News*. Retrieved from https://www.bloomberg.com/news/articles/2019-10-19/tanzania-open-to-talks-over-10-billion-port-project-daily-says

Kuo, M. A. (2019, March 25). China in Djibouti: The Power of Ports. *The Diplomat*. Retrieved from https://thediplomat.com/2019/03/china-in-djibouti-the-power-of-ports/

International activities boosted COSCO Ports annual growth. (2019, January 28). *The Medi Telegraph*. Retrieved from https://www.themeditelegraph.com/en/transport/ports/2019/01/28/news/international-activities-boosted-cosco-ports-annual-growth-1.38071938

Lamu Port, Kenya. *Ship Technology Global*. Retrieved from https://www.ship-technology.com/projects/lamu-port-kenya/

Levinson, M. (2016). *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger-with a new chapter by the author*. Princeton University Press.

Lloyd's List Intelligence, Top 100 Ports 2018, Retrieved from https://lloydslist.maritimeintelligence.informa.com/one-hundred-container-ports-2018

Louppova, J. (2018, July 9). China finalises talks on Kyaukphyu port in Myanmar. *Port.today*. Retrieved from https://port.today/china-finalises-talks-kyaukphyu-port-myanmar/

Merk, O., Kirstein, L., & Salamitov, F. (2018). The impact of alliances in container shipping

Ministero dell'Ambiente. (1993). Criteri di sicurezza ambientale per gli interventi di escavazione trasporto e reimpiego dei fanghi estratti dai canali di Venezia (art. 4, comma 6, Legge 360/91), "Protocollo d'intesa sui fanghi".

Ministero dello Sviluppo Economico. Ministero dell'Ambiente e della Tutela del Territorio e del Mare. Ministero delle Infrastrutture e dei Trasporti. (2019) Piano Nazionale Integrato per l'Energia e il Clima.

Napoli e Salerno, due porti che si completano crescendo. (2018, September 19). *The Medi Telegraph*. Retrieved from https://www.themeditelegraph.com/it/transport/ports/2018/09/19/news/napoli-e-salerno-due-porti-che-si-completano-crescendo-1.38081842

National Development and Reform Commission, Ministry of Foreign Affairs and Ministry of Commerce of the People's Republic of China. (2015). Vision and actions on jointly building Silk Road Economic Belt and 21st-Century Maritime Silk Road. *State Council of the People's Republic of China*. Retrieved from http://english.www.gov.cn/archive/publications/2017/06/20/content_281475691873460.htm

Nidera acquires terminal in Port of Constanta. (2014, December 18). *World Grain | Sosland Publishing Company*. Retrieved from https://www.world-grain.com/articles/3889-nidera-acquires-terminal-in-port-of-constanta

Notteboom, T. E., & Winkelmans, W. (2001). Structural changes in logistics: how will port authorities face the challenge?. *Maritime Policy & Management*, *28*(1), 71-89.

Pane, A. (2016, July 8). Cosco lascia il porto di Napoli ad Aponte tutto il Conateco. *Il Mattino*. Retrieved from https://www.ilmattino.it/napoli/cronaca/cosco_lascia_napoli_aponte_tutto_conateco-1843855.html

Pinder, D., & Slack, B. (Eds.). (2004). Shipping and Ports in the Twenty-first Century. Routledge

Piraeus Port Authority. (2016). Financial Report 2016. *Piraeus Port Authority*. Retrieved from: http://www.olp.gr/en/

Port of the Month: Israel Ports Company (IPC). (2017, March 31). *ESPO*. Retrieved from https://www.espo.be/news/port-of-the-month-israel-ports-company-ipc

Porter, M. E. (2000). Location, competition, and economic development: Local clusters in a global economy. *Economic development quarterly*, *14*(1), 15-34

Raval, A., Spero, J., Campbell, C. (2019, May 30). Pollution: the race to clean up the shipping industry. *Financial Times*. Retrieved from https://www.ft.com/content/642b6b62-70ab-11e9-bf5c-6eeb837566c5

Raza, S. I. (2013, February 18). China given contract to operate Gwadar port. *DAWN*. Retrieved from https://www.dawn.com/news/786992/china-given-contract-to-operate-gwadar-port

Russon, M.A. (2019, April 5). Djibouti: Building Africa's shipping centre. *BBC News*. Retrieved from https://www.bbc.com/news/business-47803765

Shanghai Wins Haifa Terminal Concession. (2016, April 13). *Port Technology International*. Retrieved from https://www.porttechnology.org/news/shanghai_wins_haifa_terminal_concession/

Sri Lanka signs deal on Hambantota port with China. (2017, July 29). *BBC News*. Retrieved from https://www.bbc.com/news/world-asia-40761732

Sri Lanka's Hambantota International Port – Gateway to the sub-continent. (2019, May 09). *Lloyd's List Maritime Intelligence*. Retrieved from https://lloydslist.maritimeintelligence.informa.com/LL1127423/Sri-Lankas-Hambantota-International-Port--Gateway-to-the-subcontinent

Summers, T. (2016). China's 'New Silk Roads': sub-national regions and networks of global political economy. *Third World Quarterly*, *37*(9), 1628-1643.

Tan, W. Z. (2015, November 19). Cosco and China Merchants complete Turkish terminal acquisition. Lloyd's List Maritime Intelligence. Retrieved from https://www.lloydsloadinglist.com/freight-directory/news/Cosco-and-China-Merchants-complete-Turkish-terminal-acquisition/64818.htm

The Belt and Road Initiative. Hong Kong Trade Development Council (HKTDC). Retrieved from http://china-trade-research.hktdc.com/business-news/article/The-Belt-and-Road-Initiative/The-Belt-and-Road-Initiative/obor/en/1/1X000000/1X0A36B7.htm

Thompson, C., Htoo, T. (2018, November 09). Kyaukphyu port: What happens next?. *The Myanmar Times*. Retrieved from https://www.mmtimes.com/news/kyaukphyu-port-what-happens-next.html

UNCTAD (1992), Port marketing and the challenge of the third generation port. In United Nations Conference on Trade and Development, Geneva

UNCTAD (1999) Technical note – The Fourth Generation Port (Geneva: UNCTAD)

UNCTAD. Review of Maritime Transport, 2019 (UNCTAD/RMT/2019)

Vaggelas, G., Pallis, T. (2018, April 17). Details of a port privatization: Thessaloniki port. *PortEconomics*. Retrieved from http://www.porteconomics.eu/2018/04/17/details-of-a-port-privatisation-thessaloniki-port/

Verhoeven, P. (2010). A review of port authority functions: towards a renaissance?. Maritime Policy & Management, 37(3), 247-270

Wagner, J., Caslin, O. (2019, March 20). "Investment is not limited to ports": Jingtao Bai, director general of China Merchants Port Holdings. *The Africa Report*. Retrieved from

https://www.theafricareport.com/10475/investment-is-not-limited-to-ports-jingtao-bai-director-general-of-china-merchants-port-holdings/

Wang, Y. (2016). Offensive for defensive: the belt and road initiative and China's new grand strategy. *The Pacific Review*, *29*(3), 455-463.

White N. (2018, April 11). The world's biggest automated port terminal opens in Shanghai. Retrieved from https://www.dailymail.co.uk/news/article-5604199/The-worlds-biggest-automated-port-terminal-opens-Shanghai.html

World Bank. (2007). *Port Reform: Toolkit*

Yellinek, R. (2018, November 27). The Israel-China-U.S. Triangle and the Haifa Port Project. *Middle East Institute*. Retrieved from https://www.mei.edu/publications/israel-china-us-triangle-and-haifa-port-project

Yu, H. (2017). Motivation behind China's 'One Belt, One Road'initiatives and establishment of the Asian infrastructure investment bank. *Journal of Contemporary China*, *26*(105), 353-368.

Sitography

APM Terminal website. See: https://www.apmterminals.com/

Asian Infrastructure Investment Bank website. See: https://www.aiib.org/en/news-events/news/2019/20191231_001.html. (Last accessed in January 2020).

Autorità di Sistema Portuale del Mar Ligure Occidentale website. See: https://www.portsofgenoa.com/it/porti/porti-vl/porti-apm-vl.html

China Communication Construction Company Limited website. See: http://en.cccccltd.cn/

China Merchants Port Holdings Company Limited website. See: http://www.cmport.com.hk/en/

China Overseas Ports Holding Company Pakistan Ltd website. See: http://cophcgwadar.com

CMA CGM Group website. See: https://www.cmacgm-group.com/en/

COFCO International website. See https://www.cofcointernational.com/

Colombo International Container Terminals Ltd website. See: http://www.cict.lk/

COSCO SHIPPING Ports Limited website. See: https://ports.coscoshipping.com/en/

DP World Antwerp website. See: http://www.dpworldantwerp.com/our-businesses/antwerp-gateway

East Port Said Development website. See: https://www.ep-egypt.com/

European Commission. See: https://ec.europa.eu

Federazione del Mare website. See: http://www.federazionedelmare.it

Gwadar Port Authority website. See: http://www.gwadarport.gov.pk/home.aspx

International Organization for Standardization website. See: https://www.iso.org

Italian Infrastructures and Transportation Ministry. See: http://www.mit.gov.it/

Kenya Ports Authority website. See: https://kpa.co.ke/Pages/Default.aspx

Kuantan Port Consortium Sdn Bhd website. See: http://www.kuantanport.com.my/en_GB/

Luxembourg Maritime Cluster website. See: http://maritime.lu/maritime-cluster

Maritime by Holland website. See: https://www.maritimebyholland.com

MOSE website. Retrieved from https://www.mosevenezia.eu/

North Adriatic Ports Association website. See: http://www.portsofnapa.com/about-napa

North Adriatic Port System Authority website. See: https://www.port.venice.it/

PSA Singapore website. See: https://www.singaporepsa.com/

Sri Lanka Ports Authority website. See: https://www.slpa.lk

The Global Facilitation Partnership for Transportation and Trade (GFP) website. See: https://gfptt.org/

UNCTAD database. See: https://unctadstat.unctad.org

Venice Gateway for Science and Technology website. See: https://www.vegapark.ve.it/

World Shipping Council website. See: http://www.worldshipping.org/