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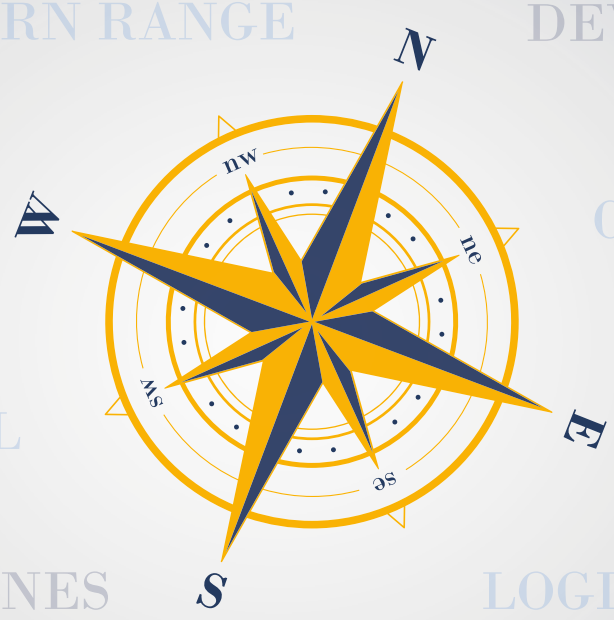
Italian Maritime Economy

Terminals, logistics and its players:
challenges from a pivotal Mediterranean position

2nd Annual Report

2015



NORTHERN RANGE DEVELOPMENT
SHIPPING CONTAINER
TERMINAL PORTS
FREE ZONES LOGISTICS
MEDITERRANEAN SOUTHERN RANGE

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ITALIAN MARITIME ECONOMY

Terminals, logistics and its players: challenges from a pivotal Mediterranean position

Annual Report 2015

GIANNINI EDITORE

The analysis contained in this report represents the result of a specific SRM project and does not claim to be comprehensive. In addition, it does not undertake or represent in any way the thoughts and opinions of SRM's founder and ordinary members.

The research is exclusively aimed at cognitive and informational knowledge, and is not, at any purpose, an opinion, a suggestion of investment, a review of the companies or individuals mentioned. All the interviews carried out for the case studies and whose text have been regularly approved by the interviewees have been edited by SRM, which is, under no circumstances, responsible for the facts, opinions, news and data referred to, as in the case of chapters not directly processed by SRM.

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“Joins the sea that separates the countries”

Alexander Pope

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The annual report *Italian Maritime Economy 2015* is part of a wider web project carried out by SRM called 'Permanent observatory on Maritime Transport and Logistics' that also led to the creation of a specialized portal: www.srm-maritimeconomy.com. Its aim is to monitor and study the economic dynamics and the economic impact of this industry on the Italian economy within a European and Mediterranean framework.

The Observatory is made possible with the support of Compagnia di SanPaolo therefore SRM and all the report's authors thank it gratefully.

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NOTES:

Although the editing and responsibility into the overall design of this work and the subsequent drafting of the entire report is attributed to SRM, the specific assignments of each Chapter are as follows:

- Chapters from I to III by SRM;
- Chapter IV by Livia SIMONGINI;
- Chapter V by Enrico BERETTA and Andrea MIGLIARDI;
- Chapter VI by Bruna MARINANGELI and Antonio THOMAS;
- Chapter VII by Michele ACCIARO;
- Chapter VIII by Oliviero BACCELLI.

See page 187 for further details.

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PREFACE

The "Italian Maritime Economy" annual report has come to its second edition. It is the result of a one-year activity, which once again saw the research team – which I sincerely thank – engaged on this front which has now become strategic for our country.

The Mediterranean is not only a sea, a migration route – as it is too often sadly reported – it is also (and increasingly) a generator of economic growth and opportunities for Italian companies which hunger for the internationalization and thirst for new markets and businesses.

For this reason SRM has rightfully included this issue in its strands of research starting a specific Observatory. If a country wants to compete in Europe it has to guarantee to operators that its logistics assets are efficient and effective: ports, freight terminals, road and railway systems.

For Germany, Spain, Belgium, and the Netherlands, which are Italy's economic competitors, logistics is a permanent expenditure item in their development plans (either in the medium and long term) which include the financing and the investments for the primary and secondary infrastructures. And these are not the only actions they take.

By analyzing the University and Research system in the above-mentioned countries, we can observe that they feature world-class institutions, which deal with logistics and Maritime transport or institutions where these subjects are taught. This is a clear indicator of the development of the human capital which is encouraged, since school age, to understand what "maritime economy" means and what it is able to generate in terms of development and employment.

Programming, finance and human capital are a winning trinomial for the achievement of a complex system which starts with the companies of the dry port, arrives to the port and continues by sea, on the vessel, to reach the farthest destinations; this is the logistics-maritime industry.

We should not forget that Italy is and has always been a maritime country; located at the centre of the Mediterranean, with an enviable geographic position, our ports and shipping industry still represent one of the economic symbols of Italy. Italian maritime imports and exports accounts for € 230 million with 0.5 billion tonnes of cargo handled p.a. In addition, Italy ranks 1st in the Short Sea within the Mediterranean and Black Sea, and many other primacies could be listed.

And what applies to Italy is even truer for the Mezzogiorno, which represents a natural logistic platform in the center of the Mediterranean.

Furthermore, to the trinomial mentioned above another element should be added; it is the integration among infrastructures, commonly known as "intermodality". This is another direction our country should move in if it wants to keep up its competitors' pace. Italian infrastructures should be conceived as able to communicate with each other and to work in team so to make the system genuinely competitive. Hamburg and

the Northern Range countries set the standards in this regard, as our report clearly shows.

Therefore, it is necessary to start a serious reflection upon the fact that many countries in the North of Africa and the Gulf countries, for some years have invested to enhance their ports' infrastructure, like Tanger Med, Piraeus, the Turkish ports and those of the United Arab Emirates, which are pursuing very aggressive policies aimed at attracting investments and container traffic, while Italy finds it hard to give the maritime industry the major role in the economic policy that could lead the country to a possible post-crisis economic revival.

Italy should begin to think about what to invest in, and SRM firmly believes that one starting point could be investing in those industries for which Italy has an established and recognized know-how, just like the entire maritime industry.

Thus, the work to be done in the future implies removing the bureaucratic constraints; creating favorable conditions to attract foreign investment, giving certainty to the ports about the type and amount of resources available and, finally, finding mechanisms which encourage private organizations to manage infrastructure (given the now clear lack of public resources). These are only a few possible routes to follow.

The overt ambition to which our Observatory aspires is to become a point of reference for operators, institutions, industry associations, and clearly, for the banking sector – of which SRM is an expression – by providing ideas, analysis and reflection which may offer a contribution in the understanding of the greatness and importance of the maritime sector for Italy. With the South acting as a protagonist.

Paolo SCUDIERI

Objectives and structure of the Annual Report

SRM's Observatory on the Maritime Economy formulated in 2014 as a research project rooted in the study center's know-how on ports and logistics, with the aim of monitoring and analyzing the dynamics of maritime transport, infrastructures and large economic phenomena which are shaping the world geography of naval and commercial flows.

In order to strengthen our center's ability to analyze and be closer to the industry's operators we began to incorporate research partners with a strong international presence (Grimaldi Group and Contship) in the Observatory project. Simultaneously, we have launched a series of specific research missions abroad to have cognizance of the models of port management and to understand the way other countries conceive logistics so as to clearly identify which infrastructure projects are being realized and what economic impact they will produce.

In the first half of 2015 SRM's researchers stayed in Hamburg to study one of the most successful in Europe, with carriers that constantly berth and operate on the docks unloading and loading cargo and containers. The port, entirely located in the Elbe's channel operates a model which strongly addresses road and rail intermodality; the tractor trailers continuously go in and out of the terminal and reach the highway and the trains departing arrive later full of containers. A real excellence as regards intermodality and megaship hosting; during the mission the CSCL Globe a 19,000 TEUs vessel was at berth in the port of Hamburg, along with it there were Hapag-Lloyd and Hanjin Shipping with 15,000 TEUs vessels. In Hamburg SRM signed a partnership with KLU-Kühne Logistics University which resulted in the conjoined realization of this Report and will be followed by other initiatives.

This mission was followed by that in the Suez Canal which is being doubled; an enormous engineering work which is about to change the Mediterranean maritime scene. Subsequently, SRM's researchers visited the port of Tanger MED, one of the largest hubs in the Mediterranean which exceeded 3 million TEUs in 2014 and is earning a chance to become the point of reference for terminal and naval multinationals, also thanks to the considerable investment made by APM Terminals and Eurogate in innovation and port and logistics infrastructure.

Among the keys to its success the port includes a "light" bureaucracy, substantial funds allocated by the Government and the Free Zones which attract investments and guarantee customs, fiscal and administrative reliefs.

Additional investments will be made in the coming years in the ports of Casablanca and Nador as well. The Nador West project, in particular, involves the construction of a port with a capacity of 3 million TEUs, 25 million tonnes of oil, 7,000,000 tonnes of coal and 3 million tonnes of cargo. In addition, next to the port there will be a Free Zone and a commercial and industrial area. By accompanying the Tanger MED port with Nador

West, Morocco aims at becoming the largest logistics hub in both Africa and in the Mediterranean.

The last mission took place in the UAE and included a series of meetings between researchers and manufacturers and the logistics-related sectors. This country too considers the port economy as a pivotal element in its economic assets along with the Free Zones. The fact that DP World, one of the largest terminal operators in the world, runs in the port enriches with its know-how and professionalism an already successful logistic structure.

The relationships between the Mediterranean and Gulf countries are increasing more and more: the southward passages in the Suez Canal directed to the Gulf enlarged by 339% over the last 14 years, in the same period, the northward passages from the Gulf increased by 175%. All of them amount to over 320.9 million tonnes of goods; a number that expands year after year and is reaching enormous dimensions. Actually, it is one of the main routes followed by the ships passing through the Canal. Therefore the so-called Gulf area is increasingly taking on a strategic position in world trades.

We must not omit saying a few words on the Suez that we have just mentioned; the project for the enlargement, which will also imply the doubling in the number of ships which pass daily through the Canal is intended to propose Egypt as a point of reference in the international port and logistics scene. In terms of turnover, it goes well beyond the increased cash flow deriving from the tolls; the enlargement will be coupled with projects regarding manufacturing, logistics and ports and this may represent an opportunity for companies while for the other ports of the Mediterranean it could offer encouragement to compete for enlarged traffics and maintain market shares.

The results of this mission – both in terms of research and analysis – are condensed in the pages of this rich Annual Report and contribute to define clearly the key message, which we would like to point out: Italy must urgently make operational and tangible choices. We have hitherto discussed about intermodality, Free Zones, port investments and attraction of capital; these are some of the most critical issues which should drive the institutions and all the relevant players. Logistics and port industry, in fact are full of opportunities to grasp but they are also becoming increasingly competitive. Building awareness of the strategic importance of the entire maritime economy – whether on the ground (dry port, port, shipbuilding, logistics) or at sea (shipping maritime operators) – and effectively taking care of the whole industry is now necessary. Italy possesses all the assets to achieve this task and it should deploy them.

In this sense, the Report intends to take stock of the situation of the Italian maritime economy within the competitive Mediterranean context. More in detail, the Report is divided into two parts: the first part concerns the reference scenario while the second represents a monographic part about logistics integration.

As for the first part, chapter one offers an updated picture of the features of the world and European maritime industry also investigating the peculiarities and the value of the sector within the Italian territory with a particular reference to some distinctive aspects of the industry, such as its fleet, handled volume, routes and traffics and including the figures of the economic impact this sector has on the entire national economy. Another very significant phenomenon, which SRM continuously monitors, is that of the alliances between megacarriers. In fact, we have analyzed the context in which we are operating.

In chapter two, the Report shows all the aspects concerning the strategies in maritime transport lingering on two drivers for the development of the port system: the Free Zones and the Terminals. The inquiry carried out in these pages highlights that the implementation of these initiatives in some ports made them more competitive also attracting foreign investments, creating jobs, raising the exports, fostering the creation of new companies, and attracting knowledge, competence and technology to the country.

Chapter 3, with a more statistical tone, analysis Italian maritime trades with the rest of the world. Among the different transport modes available, in fact, the maritime one is one of the most significant as it accounts for 30% of the total, while in the Mezzogiorno it reaches more than 60%. Moreover, an insight considers the analysis of Italian sea trades with three large geographical areas, which are for several reasons ascribable to some of the world's main shipping routes. The analysis, in particular, hinges on Italy's exchanges with the Mediterranean area (also comprising Germany, Belgium, the Netherlands, Spain, Turkey and the countries of North Africa), with the Americas (United States, Argentina and Brazil) and with the area comprising China, India and the Gulf countries.

Chapter 4, edited by Prometeia, focuses in the economic effects that could be brought about by the signing of a free exchange agreement between USA and EU: The United States is the third largest market for the destination of Italian exports to the Center-North and the South alike and for both macro-areas, but especially for the second, the sea is the preferred mode of transport for such trade flows.

In June 2013 negotiations between the United States and the EU initiated with the aim of drawing up a trade agreement, known as the TTIP (Transatlantic Trade and Investment Partnership) which facilitates the exchanges between the two areas. The process leading to the final agreement is still ongoing; it is estimated that such agreement could increase Italian GDP by 0.5%.

Chapter five was edited by Banca d'Italia, in particular by its branch of Genoa which features a research team that often collaborates with SRM in the research projects. The work is based on a study carried out by Banca d'Italia in which a panel of manufacturers took part. The chapter points out that transport fares are the most critical issue in the industry, particularly in the southern regions and for manufacturers. The following criticalities include the availability and quality of transport infrastructures and the congestion which hinders the access to the large urban centers. According to the inquiry, the cost of logistics, on average, accounts for 5.7% of the total cost incurred by manufacturing companies.

Chapter six, containing the essay by Professor Antonio Thomas and Professor Bruna Mariangeli, deals with maritime investment funds. The study intends to monitor the interest shown so far by a specific type of institutional investors i.e. Italian mutual funds in supporting and financing maritime companies, especially maritime transport companies. This latter now also comprises port logistics and transport-related activities by virtue of the trend of maritime companies to expand the range of horizontal, vertical and cross services offered.

To the first six chapters of the Report a monographic part follows; elaborated in partnership with KLU (Kühne Logistic University of Hamburg) and CERTeT-Bocconi. It is a deep analysis of the role of public policies supporting railway intermodality as a

competitiveness element for the port industry and a mitigation of the environment, which affect the connections between port and city center.

The part is introduced by a series of reflections about the role of ports within integrated logistics systems and the institutional governance models, which can enhance or penalize it. The policies here inquired are those regarding the Port Authorities but also those of Regions and States (according to the different administrative levels and to the institutional context). The scope of the analysis includes the European Southern Range and Northern Range.

The study is structured so as to address the issue from a methodological point of view, taking into account technological and organizational evolutions of the port industry caused by the significant growth rates of traffic unitized (container and Ro/Ro) and then to address the operational and management issues, which differ according to the context of the railway network system.

The report closes with the identification of the solutions to overcome the principal criticalities, which especially in Italy reduce significantly the potentiality of use of railway transport for the shipment overland of port traffic.

The ultimate objective is to provide policy indications and to identify from significant experiences some elements, which can be borrowed.

Finally, the monographic part is supplemented with the interviews – published online – reports the results of a scientific mission carried out by SRM in Hamburg in order to have understanding of the strategies and problems affecting the maritime sector of Germany, which is considered one of the top European country as for maritime logistics.

I wish to end the introduction to this volume by thanking SRM's researchers and project partners which believe in us and in this experience we have undertaken, and thanks goes to all the authors who contributed to give this research an added value.

I also wish we are offering a practical support to those who are convinced that the development of maritime transport and logistics economy is a priority for our Country. The challenge remains open.

Massimo DEANDREIS

PART ONE

ECONOMIC SCENARIOS, ELEMENTS OF COMPETITIVENESS AND ANALYSIS OF INTERNATIONAL TRADE

CHAPTER I
INTERNATIONAL AND NATIONAL ECONOMIC SCENARIOS OF MARITIME TRANSPORT

1. Global economy, international trade and the repercussions on maritime transport

In its latest annual report – The *Review of Maritime Transport, November 2014* – the UNCTAD (United Nation conference on trade and development) once again denounces that the displacement of goods by sea is the key to international trade and the primary choice for the global transport industry: as a matter of fact, about 80% of the world trade volume and more than 70% of its total value is transported by sea. The Review states that the overall volume of handled goods by sea across the world was about 9.6 billion tonnes and saw an increase of 3.8% compared to the previous year (9.2 billion tonnes). Most of this growth was generated by the rise in the volume of dry goods, especially dry bulk which grew by 5.6%; the container traffic also increased by 5.6% featuring an overall handling volume which exceeded 651 million TEUs.[1]The world GDP confirmed a positive trend in 2013 and 2014 and estimates forecast the trend will continue in 2015. This condition has also positively influenced the world trade which continues to recover (+3.1% in 2014 according to WTO and with estimates of +4% in 2015[2]).

Within this new geo-economic scenario, the sea continues to play a key role in facilitating the major flow of goods, also bestowing a greater importance to all of the sectors in the maritime economy and making the relationship between industrial production, trade and maritime transport a more intimate one.

The outlook for the world economy, trade and shipping appears to be improving, although there are a number of risks associated with the recovery of the developed economies, with difficulties in the growth of the larger emerging economies, and with the current geopolitical tensions that could degenerate the rest. Amongst the positive signals, instead, there are the commitments of the G20 to take measures in order to stimulate the global growth, the potential gains resulting from the agreements and sales initiatives, the increase in trade relations and investment on the axis South-South of the world, the increase in demand, especially in the countries of West Asia and Africa, the increase in exports of mineral products and raw materials in general.

The pace of growth in the emerging and developing markets is expected to improve in 2015, with forecasts predicting an increase in GDP from 4.4% in 2014 to 5% in 2015. For the advanced economies, a GDP growth of +2.3% in 2015 (compared with a +1.8% in 2014) is foreseen.[3]

[1] UNCTAD, *Review of Maritime Transport*, 2014.

[2] WTO (World Trade Organization), 2014. These estimates were downgraded due to growth of the world's GDP in the first semester of 2014, down if compared to the forecasts. Initially the estimates indicated +4.6% in 2014 and +5.3% in 2015.

[3] BIMCO Forecast, 2015.

GDP, world trade and maritime trade

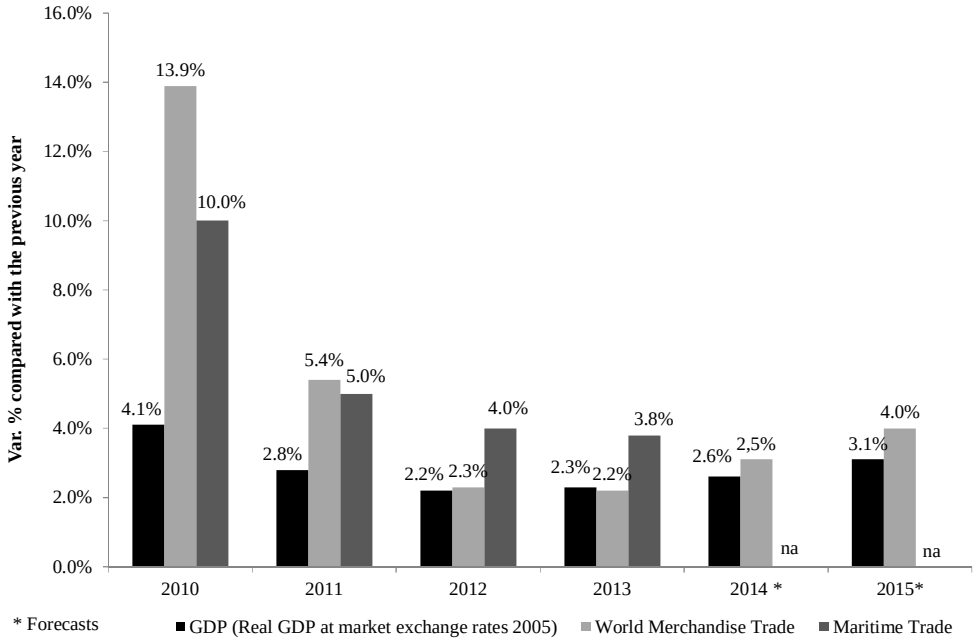


FIGURE 1 - Source: World Trade Organization, 2014; UNCTAD, 2014; Confitarma on Clarkson Research Services, 2014

In 2013 maritime trade was dominated by raw material transport, of which 30% consists of 5 major types of solid cargo (iron ore, coal, grains, bauxite, alumina and phosphate), while the other dry bulk – including containerized cargo – account for less than 40%.

The most evident growth looked at the 5 major types of solid cargo which rose by 6.5% compared to the previous year, followed by containerized goods (+5.5%). The limited development of the oil and gas reflects various divergent trends; on the one hand the drop in crude oil shipping (-1.7%), on the other hand the increase in the volume of oil products (+3.2%) and the invariability of gas exchanges.

Maritime trade. Evolution by year and by business segment (million tonnes)

	2009	2010	2011	2012	2013	*var 2011/2012*	*var 2012/2013*
Container	1,127	1,280	1,393	1,445	1,524	*3.7*	*5.5*
Other dry cargo	2,004	2,022	2,112	2,169	2,260	*2.7*	*4.2*
Five major bulks	2,085	2,335	2,486	2,742	2,920	*10.3*	*6.5*
Oil and gas	2,642	2,772	2,794	2,841	2,844	*1.7*	*0.1*
Total	7,858	8,409	8,785	9,197	9,548	*4.69*	*3.82*

TABLE 1 - Source: SRM elaboration on UNCTAD data, *Review of maritime transport*, 2014

Emerging economies which stand out at careful observation are those that have made a contribution in the various regions of the world maritime trade. These economies keep representing the major reference areas also reflecting the concentration of resources and raw materials of which dry bulk are primarily made up of.

Asia comes out as the most important area for maritime traffic, both in loading (accounting for 41%) and unloading (at 58%), America and then Europe follow.

The observation of the Asian-European routes shows that even if western consumer markets have driven maritime transport on these routes, the future prospects appear different. Up until now the eastbound services have been considered as less important than westbound ones. Ships' cargo plans in these two areas have always been very different; the fuller ships with a higher economic value were those heading to Europe whereas the ones with a lower value were directed towards Asia. It is expected that the rapid growth of the Asian middle class, which therefore now has higher purchasing power may affect these characteristics, redrawing the balance of traffic between the East and West. The first signs of this shift come from the automotive industry; more and more high-value cars travel towards Asian countries. Increasing space in the containers is now dedicated to valuable commodities while ever less space is meant for goods with lower value such as, for example, waste paper, which until recently accounted for about 20% of the volumes transported and now only accounts for about 4%.

The gap between the two routes appears evident not only in the quality and quantity of the goods transported but it is also witnessed by the significant differences in the level of freight rates, much higher on the route to the west. According to the *World Container Index* data, the cost of transporting a 40 foot container to Europe, for example from Shanghai to Rotterdam, is $ 2198 while the opposite journey is only $ 828.[4] If freight rates for the westbound routes are more prone to volatility, those relating to the opposite route appear more stable. This can be easily proved even by the weekly measurement of the rates which lasted four weeks, between January and February 2015.

World Container Index. Weekly trend (US$)

Route	2015-01-15	2015-01-22	2015-01-29	2015-02-05
Shanghai - Rotterdam	1,919	1,910	2,388	2,198
Rotterdam - Shanghai	826	830	844	828

TABLE 2 - Source: *World Container Index*

Traffic concentration on linking routes between Asia, Europe and North America keeps drawing attention to the key role of the new emerging countries (China, India, and Vietnam) in world trade and economy.

The core of the entire container sector is represented, therefore, by the Asian continent, whose ports handle over 85% of the total traffic.

In the first ten places seven Chinese ports, two Asian ports and one from the Middle East rank. Shanghai remains the first container port in the world having handled more than 35.3 million TEUs in 2014 and increased its traffic by 5% compared to the previous year.

[4] Source: World Container Index, *Index data*, February 5th, 2015.

The first European port remains Rotterdam which ranks eleventh, accounting for 12.3 million TEUs but also showing a slight increase by 5.8% compared to the previous year. Not only Rotterdam, but also the other two European ports in the world top twenty, Hamburg and Antwerp, show an increase in container handling, respectively +5.1% (more than 9.7 million TEUs) and +4.7% (over 8.9 million TEUs).

Top 20 container ports. 2010 - 2014
(Thousands of TEUs)

	Port	Country	2010	2011	2012	2013	2014	*% var 2014/2013*
1	Shanghai	China	29,070	31,700	32,500	33,617	**35,300**	*5.0*
2	Singapore	Singapore	28,430	29,938	31,649	32,600	**33,900**	*4.0*
3	Shenzhen	China	22,510	22,540	22,900	23,278	**24,000**	*3.1*
4	Hong Kong	China	23,699	24,384	23,117	22,288	**22,300**	*0.1*
5	Ningbo &Zhoushan	China	13,144	14,700	16,800	17,327	**19,500**	*12.5*
6	Busan	South Korea	14,194	16,185	17,041	17,680	**18,680**	*5.7*
7	Qingdao	China	12,012	13,000	14,500	15,520	**16,600**	*7.0*
8	Guangzhou	China	12,550	14,400	14,700	15,309	**16,200**	*5.8*
9	Dubai Ports	United Arab Emirates	11,600	13,031	13,280	13,641	**15,200**	*11.4*
10	Tianjin	China	10,080	10,604	12,300	13,000	**14,000**	*7.7*
11	Rotterdam	Netherlands	11,146	11,877	11,900	11,621	**12,298**	*5.8*
12	Port Klang	Malaysia	8,872	9,604	10,001	10,350	**10,946**	*5.8*
13	Dalian	China	4,552	6,400	8,060	10,015	**10,100**	*0.8*
14	Kaohsiung	Taiwan	9,181	9,636	9,781	9,938	**10,590**	*6.6*
15	Hamburg	Germany	7,896	9,014	8,864	9,257	**9,729**	*5.1*
16	Antwerp	Belgium	8,468	8,664	8,635	8,578	**8,978**	*4.7*
17	Xiamen	China	5,820	6,470	7,200	8,008	**8,600**	*7.4*
18	Tanjung Pelepas	Malaysia	6,530	7,500	7,700	7,630	**8,600**	*12.7*
19	Los Angeles	USA	7,832	7,941	8,078	7,868	**8,340**	*6.0*
20	Long Beach	USA	6,263	6,061	6,046	6,730	**6,821**	*1.4*

TABLE 3 - Source: Port Authorities, 2015

2. The main events taking place in the shipping industry and the carriers' strategies implemented

The growth of international trade has positively affected the demand for maritime transport, although this increase did not mean, to much of the sector, an increased profitability. The generalized situation of oversupply continued to counter balance this growth; the percentage increase in the tonnage supply continues to be greater than the growth of demand for transport, for all categories of goods. This prolonged overcapacity, along with a growing but still feeble demand and in a world where economic development has had difficulty in taking off contributed to keeping the level of freight rates quite low.

One of the principal phenomena which characterized shipping in 2014 regarded profitability. The revenues per TEU decreased compared to the past and this imposes an even greater search for efficiency by global carrier which, in order to compensate the decline in unit revenues resulting in a still quite depressed freight market, cannot help but reduce the unit cost of transport per each TEU shipped. One of the solutions adopted for this purpose by all companies was to exploit the economies of scale guaranteed by ever larger ships, the so-called Triple E (Economy of scale, Energy efficient and Environmentally improved). Extra large ships featuring 13,000, 16,000 and 18,000 TEUs of capacity have been ordered but they will further increase the excessive tonnage supply on the market with the risk of even more depressed freight rates[5].

According to latest *Dynamar* data[6] the containerships with more than 10,000 TEUs operating on the market (currently the maximum range is around 19,200 TEUs), are 261, while the units under construction are 143. The average tonnage of ULCV (Ultra Large Container Vessels) to date is about 14,000 TEUs but a rapid increase is expected due to the new ship orders by more than 18,000 TEUs. Among other things, according to the Ocean Shipping Consultants' forecast, the Korean shipyards are now ready to build 24,000 TEUs-vessels, that is 5,000 TEUs larger than the 19,000 TEUs-vessels just come into operation. The use of larger and larger ships will also be affected by the expansion of the Suez Canal and the Panama Canal, as well as by the construction of a new canal linking the Atlantic and the Pacific through Nicaragua. At present, the global carriers profits are destined to improve thanks to the collapse of oil prices (and therefore of the naval bunker). Up until now, with high fuel prices it was convenient to adopt strategies of slow steaming. Today, despite a cost of bunker lower than certain thresholds, the strategy of the carrier regarding the reduction of commercial speed was unaffected. Accelerating the average service speed of vessels might not be convenient anyway, as it may be likely to encourage a surplus of ships resulting in an expected increase of the decommissioning units. Besides, we should not underestimate the possible increase of the charges related to the introduction of new regulations on environmental sustainability (the so called ECA zones - *Emission Control Area*).

But, if the recovery of the container sector which is expected in the next two years depends on the reduction of unit costs, to obtain more stable results, the global carrier will somehow try to leverage the growth in the unit revenue per container moved. How? By focusing on better quality services. Convincing a customer to pay a higher rate for an improved quality service could be one possible option.

Cost savings and better quality of service are targets also achieved by exploiting the synergies guaranteed by alliances. The configuration of the container shipping

[5] To clarify to which extent freight rates have dropped – also taking into account the current lower price of naval bunker – consider that the cost for a container transported on the CSCL Globe (with a tonnage exceeding 19,100 TEUs) from Asia to Northern Europe is just below the threshold of the $ 600 (Source: *China Shipping Group*) at the maximum utilization of the ship's hold capacity. A low level if we consider that, according to the Shanghai Containerized Freight Index, the rate on this line is around $ 975 per TEU.

[6] December 2014.

sector is, therefore, increasingly linked to the strategies carried out by large consortia and by the alliances that are springing up especially on the east-west routes.

3. Not only containers. Evolutions and demand perspectives in other sectors of shipping

Maritime transport does not mean only containers. For dry bulk 2014 represented another year of crisis, since the imbalance supply/demand pushed down the dry bulk market which in the summer months reached the levels of 2009. This critical situation of pressure on the market should subside as the estimated demand for growth (more than 5% year on year) and a more balanced expansion of tonnage will create the conditions for an increase in freight rates in this segment from the second half of 2015 and throughout 2016. The key factors that will drive the demand for dry bulk will be the steel industry and the Chinese imports of iron and coal; add to this the estimated increase in the transport of iron to the European Union, Japan and other parts of Asia. The forecasts also predicts an increase of between 6% and 7% in the trade gained, with its obvious positive effects on the balance between supply and demand of the hold for dry bulk carriers.

According to Banchero Costa, in the segment of liquid bulk the primary items of the market for refined products are generally improving thanks to a strong demand for transport particularly supported by US exports fuelled by oil shale and by the opening of new refining centers in the Middle East. This has fostered the rise in freight rates, but there is no guarantee that they will remain at the high levels seen in the last quarter of 2014. In fact, the excessive tonnage supply, stressed by an order book full of newbuilding orders, could once again unbalance the situation. Even for the oil market forecasts are positive, after high freight rates that have characterized the last months of 2014.

As for the LNG segment, 2014 was not a very satisfactory year. In terms of new facilities for the liquefaction and export of gas, there have been few changes around the world (only in Algeria and Angola), while there can be seen a higher degree of flexibility in the traffic routes which appears evident since the decline in demand from the US and Europe has diverted many shipments of LNG to Asia and Latin America. The prospects for traffic in the long term, when the projects for facilities for liquefaction and export of gas in Australia and the United States will have come into business, are better.

4. Tonnage supply: orderbook and current trends

With reference to the size and composition of the world's merchant fleet, at the beginning of 2014 commercial ships in service reached a tonnage equal to 1.69 billion

dwt[7]. Growth over the previous year was 4.1%, the lowest observed during the previous 10 years.

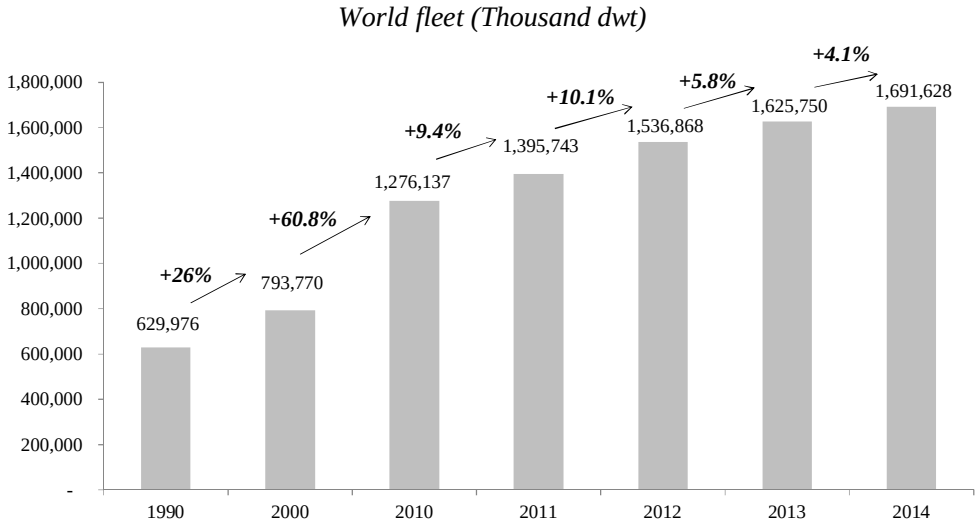


FIGURE 2 - Source: SRM elaborations on UNCTAD, *Review of maritime transport*, 2014

The fleet composition reflects the demand for different products. The bulk carriers account for 42.9% of the total, followed by oil tankers which account for 28.5% and by the container ships (12.8%).

From 1980 to 2014, the weight of bulk carriers has grown significantly, from 27.2% to 42.9%; while the weight of oil tankers has decreased significantly, from 49.7% to 28.5%.

Container ships exceeded the 216 million dwt, up by 4.7% compared to 2013. But bulk carriers are those which showed the highest growth (+5.8%, with over 726 million dwt). Within the category "Other types of ships" the tonnage of gas tankers has increased.

As regards fleet age, 17% of all the operating ships are younger than 5 years and account for 41% of the total dwt. On the other hand, 53% of the total is older than 20 years. Container ships continue to be the youngest ones (69% of total dwt category is under nine years) as well as bulk carriers (69% of total dwt category is younger than 9 years). As a result of the surge in new dry bulk ships, more than half of the sector dwt (53%) are in the range of 0-4 years, surpassing for the first time container ships as a category with the newest ships. Only 5% of the containerships (always in terms of dwt) are older than 20 years. General cargo are the oldest ships, 40% of the total tonnage of the category is older than 20 years.

[7] *Dwt (deadweight tonnage)*: is the maximum weight that a ship can carry safely and at full load. The calculation includes passengers, fuel, crew, provisions and load. Unlikely, the GT (gross tonnage): measures all the internal volumes of the ship, including the engine room spaces, fuel tanks and the areas reserved for the crew. It is measured in tons. Source: Confitarma.

In the ranking of the fleets by shipowner, Japan tops with 151.6 million GT followed by Greece, Germany, China and the United States. These five countries account for more than 50% of the total tonnage; while the top 20 countries sorted by controlled fleet globally represent approximately 81% of the total tonnage. Greek shipowners are the first in the world for tankers, while Japan is the world leader in bulk carriers; along with Greece and China, in fact, it is in the top 3 positions. Italy ranks 14th with 116 vessels and 8.4 million dwt in tonnes. In the container ship segment, the leadership belongs to Germany which controls almost 30% of the overall dwt, followed though at a considerable distance by the Danish and the Japanese fleets.[8] As regards shipbuilding, China, Korea and Japan still hold the leading position as major shipbuilding countries. Together they built 87% of the total tonnage placed on the market in 2014 and China alone accounts for 40%. If we consider the output composition of the new vessels, it shows that about 50% of the new tonnage is made up of dry bulk ships, followed by oil tankers (20.6%) then container ships (16.3%). But when observing this same composition by shipbuilding country, China appears to dominate the bulk carrier production that accounts for 67% of the production of new ships. About 70% of the new Korean ships built are and container ships (40%) and oil tankers (28%). Lastly, for Japan as much as for China, the prevailing type of vessel is dry bulk which accounts for 81% of the total amount of vessels built.

The 2015 outlook for Asian shipbuilding do not sound very encouraging as regards the new contracts to be signed. According to an *IHS Maritime* study on Asian marine engineering, in fact, the possibility to raise the prices of the new vessels are low as the orderbook for dry bulk, liquid bulk and container ships are already considerable. In the third quarter of 2014, the new investments for vessels in the Asian shipyards had already dropped by 30% compared the same period of the previous year and the trend continued for the rest of the year. Even though the capacity per single unit (in particular of container ships) has considerably grown. If, on the one hand, this tendency of ordering extra large ships could be a shot in the arm for Asian shipyards, on the other hand, given the current scenario, the major marine engineering groups might be prepared to reduce their productive capacity by shutting down yards and through mergers and acquisitions.

When observing the new ship orders and the way they have evolved over time according to the various vessel categories, the drop compared to the 2009 peak level appears evident. At the beginning of 2014, the orderbook for new vessels shrank by 55% compared to 2009 while compared to the higher values of the period between 2009 and 2014 the reduction amounted to 42% in the container ship segment, 60% for tankers, 54% for dry bulk and 75% for general cargo ships.

Currently, the ships into service are slightly less than 6,000 with a total amount of over 19 million TEUs.[9]

According to *Alphaliner* projections, in 2015 the overall capacity of the container ships world fleet – also taking into account the ship breaking and the decommissioning which will take place over the year – will rise by +7.8% settling at 5,144 with a capacity of 19.8 million TEUs compared to 5,035 ships and a capacity of 18.4 million TEUs in the

[8] Confitarma on IHS-Fairplay data, 2014.
[9] Alphaliner, February 2015.

previous year. The fleet capacity growth rate will therefore exceed that of 2014 which amounted to +6.3%.

On the basis of the current orderbook, 2016 is expected to grow by +5.3% in the capacity of container ships world fleet followed in 2017 a drop by -0.4% and in 2018 a decline of -0.6%.

Container ships – Orderbook

Fleet as at:	**31 dec 2014**		**31 dec 2015**		**31 dec 2016**		**31 dec 2017**		**31 dec 2018**		**Rise per annum (3 years)**
TEU nominal	**Ships**	**Teu**	**Ships**	**Teu**	**Ships**	**Teu**	**Ships**	**Teu**	**Ships**	**Teu**	**Teu**
18000-20000	15	276,380	36	670,972	47	881,614	49	919,968	49	919,968	**49.3%**
13300-17999	81	1,147,483	111	1,602,907	135	1,944,272	140	2,015,272	149	2,142,122	**20.7%**
10000-13300	169	2,021,012	182	2,154,468	199	2,330,558	201	2,350,578	201	2,350,578	**5.2%**
7500-9999	404	3,527,503	470	4,130,628	500	4,406,166	502	4,424,966	502	4,424,966	**7.8%**
5100-7499	501	3,086,765	512	3,156,359	512	3,156,359	512	3,156,359	512	3,156,359	**0.7%**
4000-5099	745	3,378,484	753	3,416,068	754	3,421,025	754	3,421,025	754	3,421,025	**0.4%**
3000-3999	255	883,731	272	946,537	273	949,637	273	949,637	275	956,837	**2.4%**
2000-2999	649	1,650,462	680	1,721,599	714	1,808,808	723	1,831,414	723	1,831,414	**3.5%**
1500-1999	575	981,943	598	1,022,604	631	1,080,182	631	1,080,182	631	1,080,182	**3.2%**
1000-1499	679	789,299	703	815,714	715	828,757	719	833,557	719	833,557	**1.8%**
500-999	765	567,434	772	572,296	773	572,836	773	572,836	773	572,836	**0.3%**
100-499	197	63,076	197	63,076	197	63,076	197	63,076	197	63,076	
TOTAL	**5,035**	**18,373,572**	**5,286**	**20,273,228**	**5,450**	**21,443,290**	**5,474**	**21,618,870**	**5,485**	**21,752,920**	**5.6%**
Total expected fleet after provision for future scrappings and delivery slippage	**5,035**	**18,373,572**	**5,144**	**19,809,236**	**5,233**	**20,849,298**	**5,157**	**20,774,878**	**5,068**	**20,658,928**	**4.2%**

TABLE 4 - Source: Alphaliner, *Cellular Fleet Forecast*, February 2015

The naval gigantism trend is confirmed, in fact, the growth of orders for vessels exceeding 13,300 TEUs of nominal capacity is representative. In particular, for vessels featuring a nominal capacity exceeding 18,000 TEUs it is expected a +49.3% over the 2015-2017 three-year period.

The degree of concentration of the industry is evident if we think that the market share of the top 20 companies has continued to grow, reaching about 87% of the total transport capacity in TEUs.

Top 20 Container Shipping Company

		Total			Owned		Chartered			Orderbook		
Rank	**Operator**	**TEU**	**Share of the world liner fleet**	Ships	TEU	Ships	TEU	Ships	% Chart	TEU	Ships	% existing
1	APM-Maersk	**2,983,730**	**15.7**	610	1,627,082	252	1,356,648	358	45.5%	167,602	17	5.6%
2	Mediterranean Shg Co	**2,554,657**	**13.4**	500	1,055,191	190	1,499,466	310	58.7%	660,368	52	25.8%
3	CMA CGM Group	**1,669,070**	**8.8**	454	544,747	83	1,124,323	371	67.4%	318,739	33	19.1%
4	Hapag-Lloyd	**963,853**	**5.1**	182	519,773	78	444,080	104	46.1%	37,296	4	3.9%
5	Evergreen Line	**951,777**	**5.0**	195	539,170	111	412,607	84	43.4%	363,524	24	38.2%
6	COSCO Container L.	**812,845**	**4.3**	160	470,920	90	341,925	70	42.1%	119,500	10	14.7%
7	CSCL	**725,669**	**3.8**	144	493,860	73	231,809	71	31.9%	37,960	2	5.2%
8	Hanjin Shipping	**620,199**	**3.3**	100	278,102	38	342,097	62	55.2%	46,130	5	7.4%
9	MOL	**594,420**	**3.1**	111	194,708	31	399,712	80	67.2%	60,060	6	10.1%
10	APL	**545,270**	**2.9**	89	386,003	50	159,267	39	29.2%			
11	Hamburg Süd Group	**536,803**	**2.8**	112	247,072	40	289,731	72	54.0%	31,500	3	5.9%
12	OOCL	**529,817**	**2.8**	98	339,306	48	190,511	50	36.0%	26,664	3	5.0%
13	NYK Line	**483,743**	**2.5**	102	282,158	49	201,585	53	41.7%	112,000	8	23.2%
14	Yang Ming Marine Transport Corp.	**443,616**	**2.3**	93	195,419	41	248,197	52	55.9%	220,524	17	49.7%
15	UASC	**409,136**	**2.1**	57	243,143	29	165,993	28	40.6%	232,744	14	56.9%
16	K Line	**390,612**	**2.1**	77	122,552	20	268,060	57	68.6%	138,700	10	35.5%
17	Hyundai M.M.	**382,812**	**2.0**	58	153,658	20	229,154	38	59.9%	60,000	6	15.7%
18	PIL (Pacific Int. Line)	**364,285**	**1.9**	152	280,958	118	83,327	34	22.9%	19,445	5	5.3%
19	Zim	**326,004**	**1.7**	76	55,057	13	270,947	63	83.1%			
20	Wan Hai Lines	**203,521**	**1.1**	87	170,837	71	32,684	16	16.1%			

TABLE 5 - Source: Alphaliner, *Top 100: Operated fleets*, February 2015

Danish company Maersk Line remains the world leader although MSC and CMA CGM have experienced strong growth rates, narrowing the gap. While Asian economies are the most represented in the ranking, the top two shipping companies are European. With reference to the orderbook data, the *Alphaliner* forecasts predict that by the end of 2016 MSC may become the first liner in the world as for overall capacity of its fleet (which is expected to grow from 2.5 to million TEUs). However, at the beginning of 2015 Maersk stated its intention to enlarge the fleet with a further 425,000 TEUs on new capacity in the period 2017-2019. Most of this new capacity will be meant for larger vessels, the rest for smaller ships which will be employed as feeders on the European routes operated by its subsidiary Seago Line. The Danish company intends to maintain its leadership this way.

It is evident that the trend of all the major carriers continues to order large vessels. The company which first placed the large vessels on the market was Maersk Line; two years later CSCL, MSC and UASC also convinced about the competitive advantages of this type of vessels started to place their orders. To this, recently Evergreen has been added.

After the primacy of the *CSCL GLOBE* the largest vessels now circulating [10] at the moment are *MSC Oscar* and *MSC Oliver* with a nominal capacity of more than 19,000 TEUs. And on closer inspection, this primacy will not remain so for long. From the market outlooks that *Banchero Costa* released at the beginning of 2015 it is possible to gain information about the future evolution of the fleets in the other shipping segments. Despite the slowdown of the new orders in 2014, the current portfolio of dry bulk amounts to 1,700 units of which 900 are scheduled for delivery in 2015. While new deliveries of liquid bulk amounting to 12 million tonnes of gross tonnage are scheduled in 2015. The 2014 increase of tonnage supply for tankers was low, around 3% but already from 2015 it should speed up to 6% to be back again to 4% in 2016. In particular, it is foreseen a 2% increase for oil tankers in 2015 as well. Finally for ships LNG-gas tankers, after the peak of deliveries in the previous years, in 2014 the world fleet grew by 9%, and a similar growth is expected for this year. In total by 2019 148 new gas tankers will enter into service and will increase by 38% (in terms of cubic meters) the capacity offered on the market. Despite the dead calm of the last years, according to *Banchero Costa,* the segment of LNG maritime transport results as the most promising for shipping in the next years.

5. The great alliances

The need for consolidation in the container transportation industry – to pursue economies of scale, to cope with the reduction in operating costs and to provide better quality of the service offered – was evident to different carriers. Their future strategies revolve, in fact, around alliances and vessel sharing agreements. Being part of a network allows access to more markets, reduces costs when things go wrong, provides flexibility when booking, allows to absorb the oscillations, then gives the best

[10] End of May 2015.

opportunity to dynamically manage the available capacity. On cost containment, Maersk Line, for example, disclosed that, as part of the alliance to which it belongs, it plans to achieve savings of $ 350 million in 2015.

2015 is an important year: the approval of the various international antitrust authorities involved (US Federal Maritime Commission and the respective authority of China and Europe) gave the green to various alliances among which 2M and Ocean Three stand out.

The 2M, whose protagonists are the Danish carrier Maersk Line and the Swiss MSC, is an agreement for a period of 10 years until 2025. They use 185 ships with an estimated capacity of 2.1 million TEUs. Maersk Line contributes with 110 vessels while MSC with 75. The routes covered are in particular Asia-Northern Europe, Asia-Mediterranean and Asia-US (West Coast), while the routes Asia-USA (East Coast), Northern Europe and Mediterranean-USA are still included in the network but to a lesser extent. The *Munkebo Maersk*, with a capacity of 18,270 TEUs, in January 2015 began its journey from the Chinese port of Dalian initiating in fact the 2M.

The Ocean, involving the Marseillaise CMA CGM, the China Shipping Container Lines (CSCL) and the Arab –UASC-United Arab Shipping Company, is an alliance based on vessel-sharing, slot exchange and slot charter agreements. It operates on three traffic routes: Asia-North Europe, Asia-Mediterranean, Asia-North America; 21 lines per week, 195 ships with a total capacity of container traffic of 1.9 million TEUs, it will stop over in 101 ports.

These two new alliances are in addition to the G6 (Hapag-Lloyd, NYK Lines, OOCL, Hyundai, APL and MOL) and the CKYHE (China Shipping, K-Line, Yang Ming, Hanjin and Evergreen).

According to Alphaliner, the 2M and O3 alliances, will add about 19% of weekly capacity to the Asia-Mediterranean traffic, while between Asia and North Europe the increase on the current available capacity will be of 2%. Overall, the 2M and O3 will add 4% to its weekly capacity across all their east-west networks.

The lights are still focused on the Asia-Mediterranean route where competition between carriers for market share could lead to tariff reductions. The members of the 2M are willing to increase their container supply for shippers operating in the Asia-Mediterranean area by 16.4%, while the members of O3 by 24.2% of their current total offerings. The 2M designed the realization of five services between the Far East and the Mediterranean (one more than the number of services originally planned), while the O3 has scheduled four on the same route. The 9 new services will replace the 7 operated by the single companies included in the alliances. Spot freight rates from Asia to the Mediterranean so far have proved more resistant than those heading to North Europe, but the future is unsure.

The 2M and O3 control 68% of the overall weekly capacity of the route from the ports of Asia to those of the Mediterranean, leaving 20% to the rival alliance, the CKYHE and just 8% to the carriers of the G6 alliance. At the same time, the O3 – which also includes a container exchange agreement between the UASC and the north-south

German carrier Hamburg Süd [11] – seems to be more cautious in its outlook for Asia-North Europe by adding a more modest 7.4% of weekly capacity, while the 2M will slightly decrease its weekly offering by 1.6%.

2M also controlls 32% of the markets overall capacity on the Asia-North Europe route. Instead on the Asia-US west coast the other two alliances share the greater part with CKYHE controlling 34% and G6 32% of the market; the 2M and O3 will respectively have 15% and 13% of traffic and will offer slightly less containers than before. In the Asia-US East coast G6 prevails having 36% of the market, followed by CKYHE with 30%, 2M with 17% and by Ocean Three with 13%.

However, the presence of the four alliances on the routes should not be interpreted as if there were only four competitors on each route, because each carrier will continue to compete with all the others, inside and outside alliances.

Nevertheless, according to Drewry, the success of any agreement will depend not only on achieving cost savings, or how quickly they will be able to react to market changes, but especially on how often companies will be able to make companies very different by ownership structure, nationality and their working culture.

6. A focus on European maritime transport demand and supply

The pivot of the entire European container sector is the port of Rotterdam which with 12.3 million TEUs handled in 2014 confirms it as the principal port.

By specifically observing the data regarding the amount of transported TEUs, it is clear that the traffic volumes of many ports have risen, among these, Piraeus (+13.3%) and Barcelona (+10.1%). Genoa (+9.3%) and Marseilles (+7.4%) record significant growths too. The German ports of Hamburg and Bremen combined exceeded 15 million TEUs handled in 2014 although Bremen has experienced a slight decrease in traffic (-0.6%) while Hamburg grew by 5.1%.

Along with that about container handling, the data regarding the tonnes transported sorted by type of cargo can provide further information about the characteristics and the specializations of each port.

[11] The concentration of the industry is not only limited to the vessel sharing agreements it also includes the slot exchange agreements that is to say global cooperation through which two carriers that operate liner services integrate their network on some strategic routes. In September 2014 an agreement between Hamburg Sud and UASC was announced: this implied the access for Hamburg Sud to the routes to Asia-North Europe and Asia-US operated by UASC, starting respectively from December 2014 and January 2015; while, starting from the middle of 2015, the Arab liner will gain access to the routes which connect Europe-East Coast of South America and Asia-East Coast of South America.

Container trade by major European ports 2010-2014 (Thousand TEUs)

	Port	Country	2009	2010	2011	2012	2013	2014	*% var 2014/2013*
1	Rotterdam	Netherlands	9,743	11,146	11,877	11,900	11,621	**12,298**	*5.8*
2	Hamburg	Germany	7,008	7,896	9,014	8,864	9,257	**9,729**	*5.1*
3	Antwerp	Belgium	7,310	8,468	8,664	8,635	8,578	**8,978**	*4.7*
4	Bremerhaven	Germany	4,579	4,888	5,916	6,115	5,830	**5,796**	*-0.6*
5	Algeciras	Spain	3,043	2,810	3,603	4,114	4,340	**4,555**	*5.0*
6	Valencia	Spain	3,654	4,207	4,327	4,470	4,328	**4,442**	*2.6*
7	Felixstowe	United Kingdom	3,021	3,415	3,249	3,700	3,754	**4,000**	*6.6*
8	Ambarli	Turkey	1,836	2,540	2,686	3,097	3,378	**n,a,**	-
9	Piraeus	Greece	665	878	1,680	2,745	3,164	**3,585**	*13.3*
10	**Gioia Tauro**	**Italy**	**2,857**	**2,852**	**2,305**	**2,721**	**3,087**	**2,970**	*-3.8*
11	Marsaxlokk	Malta	2,260	2,371	2,360	2,540	2,750	**2,900**	*5.5*
12	Le Havre	France	2,241	2,356	2,215	2,306	2,486	**2,551**	*2.6*
13	St. Petersburg	Russia	1,340	1,928	2,365	2,525	2,514	**2,375**	*-5.5*
14	**Genoa**	**Italy**	**1,534**	**1,759**	**1,847**	**2,065**	**1,988**	**2,173**	*9.3*
15	Zeebrugge	Belgium	2,328	2,500	2,206	1,953	2,026	**2,047**	*1.0*
16	Barcelona	Spain	1,797	1,948	2,034	1,750	1,720	**1,893**	*10.1*
17	Southampton	United Kingdom	1,381	1,564	1,590	1,473	1,488	**n.a.**	-
18	**La Spezia**	**Italy**	**1,046**	**1,285**	**1,307**	**1,247**	**1,300**	**1,303**	*0.2*
19	Marseille	France	877	953	944	1,061	1,099	**1,180**	*7.4*
20	London	United Kingdom	647	733	736	687	945	**929**	*-1.7*

TABLE 6 - Source: Port Authorities, Espo, 2015

Freight traffic by major European ports. 2013 - 2014 (Thousands of tonnes)

Port	Liquid Bulk	Dry Bulk	General Cargo				TOTAL	TOTAL 2013	*var % 2014/2013*
			Container	Ro-ro	Other General Cargo	Total			
Rotterdam	202,498	88,593	127,598	20,005	6,039	153,642	**444,733**	**440,464**	***0.97***
Antwerp	62,833	13,506	108,317	4,470	9,885	122,672	**199,011**	**190,849**	***4.28***
Hamburg	14,423	28,569	100,676	(*)	2,004	102,680	**145,672**	**139,050**	***4.76***
Bremerhaven	1,801	8,414	59,832	(*)	8,213	68,045	**78,260**	**78,768**	***-0.64***
Algeciras	25,312	1,603	54,435	6,727	-	61,162	**88,077**	**85,865**	***2.58***

(*) Ro-Ro are included in "Other General Cargo".

TABLE 7 - Source: SRM elaborations on 2014 Port Authorities data

The fleet controlled by EU countries accounts for 40% of the world tonnage; it includes 23,000 vessels with 450 million t.l. It grew by more than 70% between 2005 and 2014. The EU fleet accounts for 60% of the total world container vessels, 50% of the multi-purpose vessels and 43% of all the oil tankers.[12] Greece controls the largest

[12] Source: Oxford Economics, 2015.

fleet of the Union, followed by Germany and Norway. With 8% of tonnage, Italy ranks fourth.

With regards to shipbuilding, in the Old continent it has retained its leadership in high value added productions namely cruise ships and ferries, in particular of the Ro-Ro kind, which account for most of its order book. The latest available data updated to 2014[13] sees the European industry conquering 3% of the world demand although considering the value of the orders the quota relating to European shipyards is at least double.

7. Shipping in the Italian economic and regional context

An analysis of the latest data available, as at 2014, show that almost 30% of Italy's foreign trade relies on maritime transport. Out of a total handling of € 750 billion of goods handled in and out of Italy during 2014, a little less than € 223 billion travel by sea. Of this total, more than 20% is exchanged with countries from the European continent and around 40% from and to Asia.[14]

Therefore, the importance of maritime activities for Italy is evident, all the more so when considering the maritime system's impact on the national economy. Within the more general sector of maritime economy, the wealth produced by two of the main sectors – shipbuilding and people and cargo transportation – was equal to slightly less than € 13 billion, while on the employment side they employ almost 225,000 people.

The strategic importance of the maritime industry for the revival of economy of our country is also evident when looking at the ability of activation of the income multiplier effects. The sector for handling goods and passengers has a capacity of activation of 2.9; this means that € 7 billion of value added produced correspond to other 20 directly activated, for a total of 27. Think of the relationships that can exist between this sector and activities such as the manufacture of transport equipment (boats), or activities of the tertiary, such as land transport, in the light of the logistics relations. Think also of the development of the Motorways of the Sea.

As regards shipbuilding this sector is able to activate € 2.4 across the economic system for every extra euro produced. To the € 5.9 billion of value added directly produced it should be added € 14 billion activated and therefore reaching € 20 billion produced either directly or indirectly. The synergic connections that are activated in this scenario involve the metallurgical industry for the production of goods and engineering, research and development for the know-how upgrading as a boost to the innovation capacity in addition to the many activities associated, i.e. to the interior design of ships.

[13] IHS Fairplay, 2014.

[14] A study on the data of maritime trade between Italy and the rest of world is contained in a separate chapter.

Among the advantages of the Italian maritime system, the multitude of services offered is certainly one of the most important offered, thanks to the high number of commercial ports in operation.

As regards the port system, in 2014 almost all the country's ports performed well.

Container trade in main Italian ports
(Thousands of TEUs)

	2010	2011	2012	2013	2014	*2014/2013*
Gioia Tauro	2,851	2,305	2,721	3,087	**2,970**	*-3.8*
Genoa	1,759	1,847	2,065	1,988	**2,173**	*9.3*
La Spezia	1,285	1,307	1,247	1,300	**1,303**	*0.2*
Cagliari	629	614	621	656	**706**	*7.6*
Livorno	628	637	549	559	**577**	*3.2*
Naples	534	527	547	477	**432**	*-9.4*
Trieste	282	393	408	458	**506**	*10.5*
Venice	394	458	430	447	**456**	*2.0*
Salerno	235	235	209	263	**320**	*21.7*
Ravenna	183	215	208	227	**223**	*-1.8*
Taranto	582	604	263	197	**149**	*-24.4*

TABLE 8 - Source: Port Authorities, 2015

When we talk about Italian ports we cannot exclusively look at the container transport situation. Italian ports have a strong inclination towards bulk carriers; bulks, and particularly liquid bulk are a significant part of the total tonnage handled. The table below show the tonnes of cargo handled for the first 5 Italian ports[15].

As regards the shipping industry on the supply side, merchant fleet tonnage of Italian ownership includes 1,564 ships totalling more than 18.6 million gt. Of the total, 778 ships have a gross tonnage exceeding 1,000 tsl, whereas the other 786 vessels fall in the range between 100 and 999 tsl.

Compared to 2012 data, at the end of 2013 there was a 1% reduction in the number and a 2% in tonnage.

Dry bulk ships, in particular, stand out in terms of tonnage; within this category only bulk carriers and ferries top the table at respectively 4.5 million gt and 2.6 million gt. As regards the liquid bulk segment, oil tankers and chemical tankers stand out at 3.2 million gt and 1.7 million gt respectively.

[15] The ranking of the top 5 Italian ports was compiled based on the 2013 data, available for all the ports.

Freight traffic by major Italian ports. 2013 - 2014
(tonnes)

2013

Port	Liquid Bulk	Dry Bulk	General Cargo				TOTAL 2013
			Container	Ro-ro	Other General Cargo	Total	
Trieste	41,992,066	986,614	6,040,355	6,847,383	719,290	13,607,028	**56,585,708**
Genoa	16,860,560	4,009,270	19,387,170	7,749,987	516,756	27,653,913	**48,523,743**
Cagliari-Sarroch	23,500,871	609,893	10,219,237	460,513	10,129	10,689,879	**34,800,643**
Gioia Tauro	626,644	46,426	32,773,944	305,960		33,079,904	**33,752,974**
Taranto	4,162,990	16,693,671	1,731,587	-	5,896,732	7,628,319	**28,484,980**

2014

Port	Liquid Bulk	Dry Bulk	General Cargo				TOTAL 2014
			Container	Ro-ro	Other General Cargo	Total	
Trieste	42,400,894	790,057	6,153,468	7,286,668	522,844	13,962,980	**57,153,931**
Genoa	16,945,436	3,786,607	21,643,793	7,969,345	623,560	30,236,698	**50,968,741**
Cagliari-Sarroch	-	-	-	-	-	-	-
Gioia Tauro	-	-	-	-	-	-	-
Taranto	4,137,916	16,039,678	1,700,706	-	5,976,766	7,677,472	**27,855,066**

% var 2014/2013

Port	*Liquid Bulk*	*Dry Bulk*	*General Cargo*				*TOTAL 2014*
			Container	*Ro-ro*	*Other General Cargo*	*Total*	
Trieste	*1.0*	*-19.9*	*1.9*	*6.4*	*-27.3*	*2.6*	*1.0*
Genoa	*0.5*	*-5.6*	*11.6*	*2.8*	*20.7*	*9.3*	*5.0*
Cagliari-Sarroch							
Gioia Tauro							
Taranto	*-0.6*	*-3.9*	*-1.8*		*1.4*	*0.6*	*-2.2*

TABLE 9 - Source: Port Authorities, 2015

Private ship-owners own over 99% of the fleet as the privatization of Tirrenia has significantly reduced the share owned by public bodies. Over time the fleet has become younger with a gradual reduction in the share of older vessels and an increase in newer tonnage 62% per cent of the total tonnage is less than 10 years old and 40% less than 5 years old.

Despite the significant contraction in investments observed in recent years, between 2008 and 2013 Italian ship-owners placed orders with national and foreign shipyards for over 370 ships, worth a total of about $ 20 billion.

A more up-to-date situation is offered by Clarkson[16] according to which Italian shipowners have 183 vessels under construction for an amount of 4.6 million tonnage of slc. Italy is 8th in the world ranking, behind China, Greece, Japan, Norway, the US, Singapore and Germany. The data here highlighted is very high as it also takes into

[16] Source: Clarkson's "*Shipowner Orderbook Monitor*", December 2014.

account the orders from Gruppo Scorpio (classified as Italian even though the Group is based in Monte Carlo) which amounts to 111 vessels and 2.7 million tonnes of CGRT.As regards Italian shipbuilding instead, still according to Clarkson, in Italy 17 ships with 1.2 tonnes of CGRT are currently being built. The shipbuilding scene is dominated by Fincantieri. In 2014 there was an increment in the number of orders the company received (by the end of the year the portfolio included € 5.64 billion against the € 5 billion of the end of 2013). Clarkson's "*Shipowner Orderbook Monitor*" includes MSC's order among those placed to the Italian shipyards, which ordered 5 new cruisers, 2 of which will be built by Fincantieri for the overall cost of € 1.4 billion. In addition, the Carnival Group confirmed an order with an Italian shipyard of 5 new buildings to be realized between 2019 and 2022.

8. Conclusions

The rapid shifts in the global economic geography have led to profound changes in the mobility of trade flows over large distances. On the one hand there is an increase in transport demand, influenced by the development of economy and trade, on the other hand there is the fast increase in the tonnage supply, characterized by ships with greater tonnage capacity.

The carriers' strategies revolve firstly around the improvement of the sector's profits for the pursuit of which they are based on two main core requirements: slow steaming (despite the lower price of naval bunker compared to the past) and the defence of the individual shares of the market; secondly, they are aimed at containing costs and at the exploitation of the economies of scale, objectives achieved thanks to the synergies offered by the alliances. Being part of a network provides the shipping companies with flexibility and the ability to optimize the routes, to dynamically manage market fluctuations, the criticalities and the opportunities that arise.

The operational partnerships among the main shipping companies at a global level are now leading towards the concentration of intercontinental trade in a few transhipment hubs, able to host the largest vessels, to keep costs of sea and land operations low and to guarantee high quality and short times. As a result of the alliances and the use of ever-larger ships, carriers are becoming more demanding in the selection of ports and make more pressure on the terminal in terms of demand for quality of the service. As not all the ports are able to host mega vessels, trans-shipment and thus freight rates rise provoking a reduction in the profit margins of the big logistic operators (which, over the last years, have been the biggest beneficiaries of the competition between companies).

In this scenario, port systems can be considered as a factor of transformation and progress for the economy.

The competition among ports for the conquest of accessible markets is played on the ability to provide adequate services to the ship and to efficiently move goods, ensuring smooth logistics chains running through them. The more a port can guarantee accessibility, large areas for the handling and storage of goods, efficient rail and road

connections to connect with target markets, the greater its ability to attract trades will be.

What is then the future of Italy's maritime system considering that the traffics are more and more concentrated?

The WTO estimates of growth in international trade (+4% in 2015) and the increase in the flow of goods in transit in the Mediterranean are still an opportunity for Italy, which enjoys a major geographical advantage, overlooking the "southern shore" of the basin and at the same time, close to the heart of Europe.

Most of the ports of our country, despite the proximity to the countries of final destination of the goods and despite being a natural access gate for goods coming from the Far East, it lacks an adequate offer of capacity (both in the port and in the dry port). It is not easy to intercept the traffic in competition with the Mediterranean and the North European ports. The Italian ports where the vessels of the alliances stop over are several but the transiting ships are larger and larger. If port infrastructure cannot host them, the future stop-overs in these ports may be at risk.

It is then necessary to start from the definition of the lines of governance, removing all the bottlenecks that prevent adequate support activities related to sea transport in order to continue to create opportunities for development and to strengthen the role of Italy in the international context.

CHAPTER II
COMPETITIVENESS IN PORT AREAS: TERMINALS AND SPECIAL ECONOMIC ZONES

1. Foreword

The analyses illustrated in this chapter intends to outline a knowledge framework of competitiveness in port areas, as regards their ability to attract an international flow of good and with reference to the potentialities of the container terminals' supply and to the SEZ (Special Economic Zones).

The process of liberalization and privatization which took place in many ports has widespread globally fostering the attraction of the capital from foreign countries, especially in the developing countries, and encouraging and attracting the investments of companies which are unrelated to the logistics and transport business. So, these new players are now coupled with public bodies which, as institutions, are the principal economic players able to allocate the funds to be invested in the infrastructures even though in the last few years they reduced their intervention due to the meager financial resources.

The goal of this work is a synthetic and clear description of the economy of the container terminals and of SEZs, with an eye to the opportunity that companies and investors have to enter the port industry.

2. The value of container terminals for port competitiveness

The transformations which maritime transport underwent, led ports to a profound restructuring and reorganization after which they passed from being places for cargo loading and downloading to hubs integrated in a complex system of business, institutional, technological and infrastructural relations.

Within this framework, a growing number of internationally oriented terminal operators has embarked on a path of global expansion. Among these players it is possible to distinguish[1]:

- *Pure stevedores* whose core business is the port management and which seek in the process of international diversification a tool to better manage the operational and trading risks.
- The *integrated carriers* which set out to defend their investments in maritime assets by purchasing shares of terminals (and often also by having the operational and managerial control over the port) in order to keep the quality standards of handling high and to control port fares.

[1] Satta, G., & Parola, F. (2013), *I processi di espansione internazionale nella container port industry. Analisi delle determinanti delle scelte di ingresso*, FrancoAngeli.

- Besides, some financial traders, investment banks, and sovereign wealth funds entered the port industry attracted by the profit prospects, through operations which aimed at controlling different facilities and thanks to their availability of considerable financial resources.

The choice of ports and container terminals that the shipping and logistics companies make is affected by many factors: geographical location, proximity to markets, port fees, freight rates, response times, value and volume of the goods, frequency of liner services, trade routes.

Since the launch of the 18,000 TEUs mega ships and the carriers' great alliances, maritime container transport has seen a change in the rules of the game which had implications for the port sector as well. Add to this fact a slowdown of the economy and trade due to the recession, a faltering recovery, the crisis and the sovereign debt restructuring. The result was a prolonged period of container oversupply and, as a consequence, volatile and reduced freight rates. Faced with such tough conditions, many carriers require terminal companies a higher productivity and greater cost-effectiveness in order to save money and guarantee a quick and reliable service during the calls.

Just like ship owners increase the size of ships, ports make the investments necessary to obtain a higher productivity.

The latest news report that the gigantic Arabic terminal operator Dp World is ready to invest $1.9 billion in its terminals to adapt the infrastructures and to make its quays more capable.

To define the efficiency of a container terminal it can be used the *Berth Productivity Data* [2] from JOC, which points out how seriously these operators are taking the need to offer a timely and efficient service in the age of mega vessels not to risk to lose this business.

The JOC Port Productivity database contains the data of 771 terminals, 483 ports and 17 global shipping companies and shows that Asian container terminals are much more productive compared to their US and European counterparts, and explains their efficiency with the high degree of automation, the large volumes of transhipment in the region and with the fact that ports are operational in all their procedures h24 d7.

If JOC measures the efficiency through the berth productivity, in its report "*Container Terminal Capacity and Performance Benchmarks*" Drewry calls attention to the operational performance of the container terminal all over the world focusing on their infrastructures and showing a significant disparity depending on the location, the dimension, and the type of traffic. The report, which analyzed a sample of about 500 terminals, investigates the actual performance of the ports regarding three benchmarks: quay-lines, yard, and ship-to-shore gantry cranes, over a three-year period (2011-2013).

[2] *Berth Productivity* is defined as the average of the gross moves per hour for each call recorded. Gross moves per hour for a single vessel call is defined as the total container moves (onload, offload and repositioning) divided by the number of hours for which the vessel is at berth.

Top terminal ranking based on average 2013 berth productivity

Rank	Terminal	Port	Country	2013 Berth Productivity
1	APM Terminals Yokohama	Yokohama	Japan	163
2	Tianjin Port Pacific International Terminal	Tianjin	China	144
3	Ningbo Beilun Secon Container Terminal	Ningbo	China	141
4	Tianjin Port Euroasia International Container Terminal	Tianjin	China	139
5	Qingdao Qianwan Container Terminal	Qingdao	China	132
6	Xiamen Songyu Container Terminal	Xiamen	China	132
7	Tianjin Five Continents International Container Terminal	Tianjin	China	130
8	Ningbo Gangji (Yining) Terminal	Ningbo	China	127
9	Tianjin Port Alliance International Container Terminal	Tianjin	China	126
10	DP World - Jebel Ali Terminal	Jebel Ali	United Arab Emirates	119
11	Khorfakkan Container Terminal	Khor al Fakkan	United Arab Emirates	119
12	Xiamen International Container Terminal	Xiamen	China	117
13	APM Terminals Port Elizabeth	New York	U.S.	104
14	Euromax Terminal Rotterdam - ECT	Rotterdam	Netherlands	100
15	APM Terminals Rotterdam	Rotterdam	Netherlands	99

TABLE 1 - Source: JOC

The table below gives a worldwide summary of the average performance in 2013. On all three measures, terminals in Asia and the Middle East generally achieved higher figures than the world averages.

Global container terminals, key asset performance metrics (2013)

Performance measure	Global average
TEU per meter of quay p.a.	1,072
TEU per hectare p.a.	24,791
TEU per gantry crane p.a.	123,489

TABLE 2 - Source: "Container Terminal Capacity and Performance Benchmarks", Drewry

The difference is most marked in TEU per hectare where the highest performing regions saw up to 70% more than the world averages. Regions which achieved lower figures than the world averages included North America and parts of Europe.

As Drewry points out, there are several reasons behind these differences in the performance at regional level.

- The location.
- Dimensions: for example, the performance of large terminals is markedly higher than small ones. Average terminal size in Asia is much higher than in Africa or South America.
- The type of traffic: the performance of transhipment terminals is markedly higher than gateway ones, for several reasons, including larger vessel sizes and container

exchanges per call, low container dwell times, and also because most transhipment terminals are much larger than most gateway ones.

In addition, Drewry's report makes clear that automation has a deep impact on the performance improvement, just like the working hours: as a matter of fact, Drewry found out that the facilities with the lower results do not operate 24 hours or 7 days but have downtimes. However the operator has no room for maneuver because the issue of the working hours has to do with wider questions as the rights and the cost of the labor which changes according to the country.

Drewry also examines the new trend of ports which cooperate in order to face the carriers' alliances and the risks underlying naval gigantism.

I The phenomenon of market concentration of shipping companies and terminal operators is not recent, although today it is quite evident; 66% of transiting containers all over the world is handled by the first 10 terminal operators, while 60% of the world fleet is controlled by the first 10 shipping companies.

Fleet control and port handling

Rank	Terminal operators	Throughput (million Teu) 2014	Var. % 2014/ 2013	Shares	Shipping companies	Cellular fleet (feb 2015)	Shares
1	Hutchinson Port Holdings	82.9	5.90%	12.2%	APM-Maersk	2,983,730	15.7%
2	China Merchant Holdings	80.839	13.40%	11.9%	MSC	2,554,657	13.4%
4	COSCO Pacific	67.326	9.90%	9.9%	CMA CGM Group	1,669,070	8.8%
3	PSA International	65.44	5.80%	9.7%	Hapag Lloyd	963,853	5.1%
5	DP World	59.878	8.90%	8.8%	Evergreen Line	951,777	5.0%
6	APM Terminals	38.3	5.30%	5.7%	COSCO Container Lines	812,845	4.3%
7	China Shipping Terminal Development	24.34	-	3.6%	CSCL	725,669	3.8%
8	Eurogate	14.839	4.20%	2.2%	Hanjin Shipping	620,199	3.3%
9	HHLA	7.5	0.00%	1.1%	MOL	59,442	0.3%
10	ICTSI	7.4	17.90%	1.1%	APL	54,527	0.3%
	TOP 10	**448.762**	**7.8%**	***66.3%***	***TOP 10***	**11,395,769**	***59.9%***
	Global container market 2014	**677**	**5.30%**		World liner fleet	**19,039,641**	

* CSID data refer to 2013.

TABLE 3 - Source: SRM elaborations on data from the websites of the following companies: Shanghai International Shipping Institute, Drewry Shipping Consultants, Alphaliner

Despite the difficulty for ports to handle the pre-crisis volumes of goods. the terminal operators industry appears profitable and very dynamic: the table above shows that in 2014 the first 10 achieved better performances compared to the previous year in the wake of the slight recovery of global economy.

The ranking of Global container terminals by throughput is quite changeable as they are very active in terms of acquisitions, mergers and divestitures. operations that

they perform to seize the opportunity of growth in the emerging markets. The Hutchinson Port Holding Group is still the world leader while China Merchant Holdings International – which in 2013 had a lead role in the largest merger in the world for the industry having bought from CMA-CGM 49% of Terminal Link for $532 million – ranks second. This operation allowed the Hong Kong giant to hold the shares of 22 terminals of Terminal Link featuring an added production capacity of more than 18 million containers.

Drewry estimates that the volume *per annum* of the containers handled by the global terminals will increase by 5.6% in the next 5 years and will reach 840 million TEUs within 2018. This increase will boost the terminal's utilization rate from 68% of 2013 to 75% in 2018. The key trend identified by the British consultant company includes the naval gigantism, the alliances, the financial pressure on the shipping lines, mergers and acquisitions as well as terminal automation.

West Africa, North Africa and China are the areas where the growth in the investments in global terminal operators is higher. In East Africa, North West Europe and on the West Coast of North America the growth is expected to be slower.

A lever which attracts the investors is industry profitability. Data available to 2014 confirms a net profit of $ 782 million (+8.4%) for the group DP World from Dubai. The Singaporean PSA International finished its financial year with $ 1 billion net profit. down by -1.7% compared to the previous financial year. The Philippine terminal operator ICTSI recorded a net profit amounting to $ 142.3 million up by 4.9% against 2013. The Chinese COSCO Pacific ended 2014 with $ 312.9 million of net profit, dragged down by 56.4% compared to $ 717.3 million of the previous financial year, but it pays the exclusion of discontinued operations (completed on June 27th 2013) which amounts to 21.8% of the share capital of CIMC, an intermodal containers producer. The group's only activity related to terminals generated revenues for $ 517 million. up by 13.6% against 2013.

As for Italy, the principal terminal operator is Contship Italia. belonging to the Eurogate Group, which closed 2014 with 5.1 million TEUs (+0.3%), that is half of the container volume handled in the whole country.

2.1 Investments and the involvement of private capitals in ports

The considerable investment in infrastructures and innovation required to manage the containerized goods laid emphasis on the ability of ports to attract and take advantage of foreign direct investment (FDI).

The World Bank offers an indication about the most common ways for privates to participate in port projects. through its database "Private Participation in Infrastructure (PPI)" [3] which contains detailed and specific information about all the projects

[3] The Private Participation in Infrastructure (PPI) Project Database has data on over 5.000 infrastructure projects in 139 low and middle-income countries as classified by the World Bank. Countries are also classified in six regions (East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, South Asia, and Sub-Saharan Africa). Projects included in the database do not have to be entirely privately owned, financed or operated. Some have public participation as well. With few exceptions, the investment amounts in the database

connected with the realization of infrastructure in general and so of port infrastructure as well, all over the world. with the participation of private capitals.

The types of projects that the World Bank identified and analyzed include:

- *management & lease* - a private entity takes over the management of a state-owned enterprise for a fixed period while ownership and investment decisions remain with the state;
- *concessions* - a private entity takes over the management of a state-owned enterprise for a given period during which it also assumes significant investment risk;
- *greenfield projects* - a private entity or a public-private joint venture builds and operates a new facility for the period specified in the project contract. The facility may return to the public sector at the end of the concession period;
- *divestitures* - A private entity buys an equity stake in a state-owned enterprise through an asset sale, public offering, or mass privatization program.

The first valuable piece of information that emerged from the World Bank data is that in 2013 total PPI in infrastructure in emerging markets amounted to US$ 33.2 billion. This represents a 39% decline from 2012 levels; but if we only refer to the port industry. the total of private investments amounts to $ 9.335 billion, that is almost five times the 2012 value ($ 1.903 billion); about 50% of these investments are allocated in Sub-Saharan Africa while another significant share (39%) is meant for Latin America and the Caribbean.

The ability of these areas to attract foreign capital, which has become more marked over the last few years, follows the strategy pursued by their government to reform the model of port governance in order to make the access for privates easier and in so doing to overcome criticalities such as low productivity, inefficient use of resources, high fares for clients, delays and inefficient services.

Private capitals. according to World Bank's data, are concentrated in the implementation of terminals – which represent 92% of the number of interventions realized and 84% in terms of value – while the residual share regards dredging or coordinated interventions of excavation and construction of new quays.

The graphs below show that the most common form of involvement of private capital on the overall number of interventions is concession which amounts to 45%, while in terms of value the greenfield project 4 accounting for 57% of the total investments realized is the most common.

represent the total investment commitments entered into by the project entity at the beginning of the project (at contract signature or financial closure), not the planned or executed annual investments.

For projects that involve investments, the database figures reflect total project investments encompassing the shares attributable to both the private and the public parties.

[4] The case of the participation of the Inframed fund to the Special Purpose Vehicle falls into this category; this latter was responsible for the implementation of the works for the expansion of the capacity of container handling in the Turkish port of Iskenderun.

Source: Cassa Depositi e Prestiti, *Porti e Logistica*, 2012.

Type of port works funded with private capitals sorted by mode of participation 1990-2013 – cumulative data

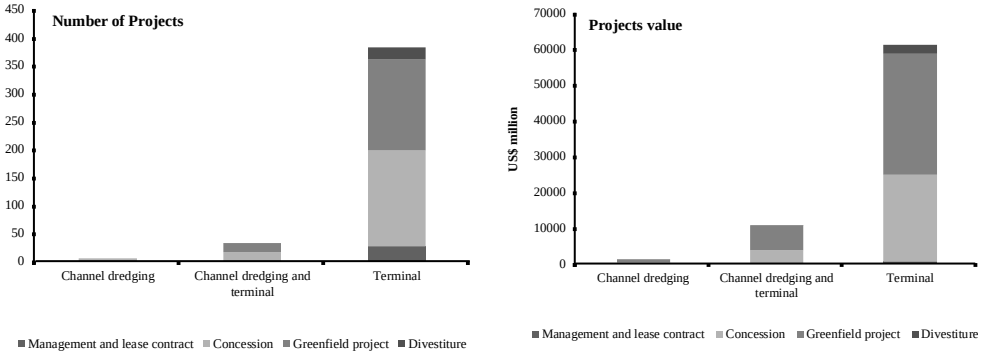


FIGURE 1 - Source: World Bank, 2015

A comprehensive analysis of the World Bank's PPI database allow us to point out that at a global level privates mainly invest their capitals in ports through terminal concession taking on the responsibility for investment and management for a definite period of time. Compared to public bodies and national investors, Global Terminal Operators can achieve potential economies of scale. have access to less costly financing, possess more sophisticated knowledge, competence, and a more advance IT and make use of more streamlined and evolved methods of management and operational practices.

The extent to which private investment in port terminals achieve positive results requires an estimation of several variables: among these, the financial results, the dwell time, the cargo throughput, the user's fares, the quality of port services and the effects on the public finance are of utmost importance. Other results may take into account the impact on employment, the upstream and downstream supply chain integration, the transfer of knowledge and technology to the local economies.

However, the challenges associated with the involvement of private investors in the terminals should not be underestimated as they imply a change in the model governance of ports, often accompanied by a relevant legislative model, institutional adjustments and sometimes with revisions to labor laws. In those ports which are completely private, the company has full ownership on all the port's assets: in these cases financial risks are totally on the private investor. The sale of a whole port activity is rare, and have been noticed only in a few countries (like, for example in the U.K. where the regulatory function too is entrusted to the industry players).

Public-private partnerships represent an important opportunity of growth for Italian ports. Nonetheless, in order to attract private capital. it is crucial to define a favorable context able to guarantee:

system's reliability; meaning a set of firm rules which remains stable over the time and which represent a precondition for whichever entrepreneurial activity and a determinant in a sector which features long times for the return on investment;

- service reliability; a crucial issue. particularly for the transport industry in which competitiveness – whether it regards the whole country, a port or an integrated logistics chain – is played mainly on the reliability that only an interconnected and streamlined system of infrastructure is able to guarantee.

The Italian legal system has recently provided for innovative tools such as project bonds (private sector bonds issued by the company that carries out the project), or the *contratto di disponibilità* (literally, "availability contract") and for rules of tax relief for infrastructural works exceeding € 200 million and which do not benefit from any public contribution; all with the aim of facilitating the spread of PPP (public-private partnership). However such relieves are necessary but not enough for the diffusion of PPP; it is necessary to ensure the certainty of timing for closing the loan agreements of the works carried out.

This issue is also addressed to in the new "Strategic Plan for ports and logistics" provided for in the *Sblocca Italia* decree; the approval process of the document has not been concluded yet.

3. The role of the Special Economic Zones in port competitiveness

The latest forecasts estimate a rise in the international maritime traffic of containerized goods in the Mediterranean[5], which will imply a further development of transhipment in the *Mare Nostrum* and an increased potential demand. Thus the enhancement of port competitiveness becomes significant also for the repercussions that ports can guarantee to the economy of their states.

Certainly some elements affecting EU ports' competitiveness are the result of different types of governance and rules which regulate the various subjects diversely in the countries which line the opposite shores of the basin: 1) the unevenness of the cost of labor (in African ports this accounts for less than one tenth of the cost of a worker of any Italian terminal); 2) the unevenness of carriers' and mooring taxation; 3) the burden of excise duties on energy and fuels.

Anyway there are other factors which allow ports to emergence in the international scene: among the most effective levers to support ports. logistics and the industrial areas there are the Special Economic Zones (SEZ), an umbrella term which conventionally includes Strategic Economic Zones, Export Processing Zones (EPZ), Foreign Trade Zones, Free Trade Zones, Free Trade Areas, etc. that are all the areas where policies which provide for the suspension of the application of customs laws and tax relief are applied in order to facilitate trade and commerce. In order to speed the import and export procedures, SEZs are usually located nearby ports and airports.

[5] According to a research titled "*Intra-Mediterranean Container Trades*" published by Dynamar in November 2014, the Mediterranean basin is progressively gaining importance in terms of international maritime traffic of containerized goods. As a matter of fact, according to the Dutch consultancy firm in 2015 regional traffic and feeder traffic in the Mediterranean will reach 15.6 million TEUs, up compared to 14.9 million of the current year but by 2017 they will rise to 17.1 million.

All over the worlds, there are many examples of logistics/industrial areas located in the dry ports where the industrial, entrepreneurial, productive, logistics-related activities are fed by the goods handled in the neighboring port. Such areas can be located in the Free Trade Zones as in the case of Barcelona, Tangier, Malta and Càdiz, which generally are areas separated from the rest of the country where any kind of cargo can be stocked without incurring taxes of imports or local taxes. Another type of area – which is meant for logistics activities closely related to the handling of containers and which are therefore located near the terminal – are the so called Logistic Activity Zones (or LAZ) located. for example, in the dry port of the Spanish container terminals of Barcelona, Valencia, Algeciras.

The logistics/industrial areas near the ports above mentioned are in some cases managed by developers which. in turn. grant the concession for a certain number of years which can vary according to the local situation, plots of land or warehouses (outdoor or indoor) to an occupier (companies in general or transport and logistics international companies) which run their trade, handling, storage, maintenance and repair of goods businesses as provided in special regulations defined by the developer.

The establishment of the SEZs which is now common in many non-EU countries lining the Mediterranean shores increased their competitiveness. attracted foreign direct investments, created jobs, increased the non-oil-related exports and fostered the creation of new businesses also importing knowledge, competence and technology to the country. In particular, for the world investors the SEZs are extremely desirable, in fact, under certain conditions the tax laws provide for several and differentiated preferential treatments. Privileges mainly concern taxation; exemption, reduction, tax refund – tax on corporate income tax, value added tax, income tax, customs duties, tax on the possession of urban property, turnover tax, tax on transfer of real property, value-added tax of land, tax on urban infrastructure development, etc. – the granting of rights to land use, and the grant of loans and financial etc. Other relieves address some categories of workers and their families, (obtaining of the permanent residence, assessment of the value of the acquired real estate in order to calculate the taxable income and the relevant personal income tax, etc.), or can be applied to certain industrial sectors or to specific infrastructural projects or to some business categories.

At world level, such areas have widespread and currently are more than 1,000 although with the due local differences.

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) found that many Asian countries established the FTZs with the purpose to attract foreign investments and develop infrastructures.

Also the Free Zones in the UAE were created to promote foreign investments. As a consequence, the procedures to establish a business in these areas are relatively simple and fast. Currently, there are more than 36 Free Zones within the UAE territory; some of these are “generic”, this means that any business is allowed while others, instead, are “specialized” as they only allow certain economic activities. The most important is Jebel Ali, which was established in 1985 by the Dubai Emirate and which counts, today, more than 1,300 companies from more than 80 countries. In 2015, Dp World, the Arab terminal company which ranks 5th in the world purchased the gigantic

industrial and logistics platform Economic Zones World in Dubai, for $ 2.6 billion with the objective of creating in the Middle East an integrated area operating worldwide.

The Tangier Free Zone (TFZ) in Morocco, next to the port, comprises an industrial and logistics area (MedHub). The Zone comprises different export-oriented businesses in the automotive, aerospace, electronic, textile industry with a turnover accounting for €1.2 billion and which led to the creation of 40,000 new jobs. In the industrial area there is the so called Tanger Automotive City (TAC), a platform entirely meant for the automotive sector which also includes the Renault-Nissan industrial complex which represents the highest investment within the Mediterranean basin. worth € 1 billion.

In Italy, the debate about the establishment of a SEZ in Gioia Tauro has gone on for years: the dry port area offers a great deal of development opportunities besides its proximity to one of the large port of the Mediterranean, it features large available areas and the links to the road and rail networks. However, in order to attract foreign investors. measures to stimulate logistics and industrial initiatives in the area of Gioia Tauro should be introduced, consistently with the European regulations which provide for State aids. The establishment of a SEZ could be – for a complex economic situation like that of Calabria region – the ideal recipe to revive the foreign direct investment, catalyzing the interest of major international groups that at the moment don't operate Italy thus creating employment and economic development.

4. Conclusions

The analysis in this chapter allowed a deepening of the possible port development issue in all respects, from the economic and entrepreneurial to the political and strategic point of view in a national, European and above all, Mediterranean perspective. The chapter investigated the terminal productivity and the SEZ characteristics in the assumption that Italy can fully understand how crucial is the role it should take on, taking advantage of its favorable geography and becoming, not just the "door to Europe", but the center of the Mediterranean and a "flywheel" for the Euro-Mediterranean economy.

In the light of the results of this analysis it can be stated that the lack of infrastructure, which undoubtedly exists and that hinders the Italian "logistics smoothness" is not the only obstacle that is holding back the potential of the country. Given the characteristics and the nature of Italian economy and entrepreneurial system, the most influential factors affecting the port/logistics performance are bureaucracy and the procedures that prevent Italy from being perceived as "appealing" for their investment. The Italian port system – which is mainly devoted to bulk carriers but have also a significant container segment market share – is marked by a number of mainly small structures besides featuring some ports with a primary role in the European scene: it is no coincidence that Italy, despite having experienced a growth halt compared to other ports remains the 3rd in the European ranking as for maritime transport of goods. The observation of the overall performance of Italian ports shows that the bottlenecks of competitiveness and the difficulty in attracting foreign investments lie primarily in bureaucracy and in the administrative system.

The successful cases about container terminals discussed above should not make us lose sight of the economic environment: if, on the one hand trade is on the rise, on the other hand the shipping market is increasingly more concentrated with vessels getting larger and larger and causing a consequent pressure on the performance of terminal operators who have to invest in innovation and technology. However, it should be also considered that the risk linked to the infrastructural oversupply which brings about a drop in the fares in order to withstand the competitors leading into a spiral where a higher investment corresponds neither to a growth of profitability nor to increased revenues. The extent of the importance of oversupply and the fact it was unrelated to demand appears clear in the case of a German port, Wilhelmshaven, which in spite of its cutting-edge infrastructure is not able to attract traffic yet. In the light of this example, it seems important to calibrate the infrastructural supply on the demand and this leads to the need for an adequate planning able to distinguish between the needs of transhipment ports and that of the end ports in order to better invest the scarce public resources and appeal foreign capitals.

The prospects regarding the economic growth possibly arising from the establishment of a SEZ appear undoubtedly interesting. Tangiers proves it: despite its social and economic fabric, which is more complicated than the Italian one, in a few years it achieved outstanding results thanks to the tax relief policies (regarding customs. administration and bureaucracy) adopted in the SEZ. Because regulatory simplification is an important point for companies that want to invest, in Tangier a one-stop facility was created; a single interlocutor that addresses the company and that deals with the grant of concessions on several levels. The SEZ is a project suitable for areas that lack financial resources and where the companies which decide to invest there can kick start the economy in the region. Therefore the SEZs in the Mediterranean may bring substantial advantages to its economy as a development factor and logistics enhancement.

Nevertheless it should be noted that when choosing the country where to invest. investors consider a series of elements – and not only tax relief, whether they are granted nationally or at a local level with the authorities which negotiated them – such as the cost for the use of land, the existing infrastructure, the availability of skilled labor in certain commodity sectors, the human capital, the proximity and the quality of communication facilities and, last but not least, the availability of adequate public utility services.

CHAPTER III

MARITIME SECTOR AND THE ECONOMY: ANALYSIS OF THE COMMERCIAL EXCHANGES

1. Foreword

The objective of this chapter of the report is to analyse the sea trade relations between our country and the rest of the world. Among the various modes of transport available maritime is one of the most important, making up 30% of the national total, worth over €220 billion. This chapter is concerned with investigating various aspects such as the amount and dynamics of trade (in terms of goods' value) for each individual geographic area, and their composition from a qualitative point of view. The objective is to define Italy's main trading partners for maritime transport and the principal product categories traded.

A specific insight is then dedicated to export flows (at the level of macro areas and Italian regions) to better investigate the importance that maritime transport has for the internationalisation of each area. In fact it is possible to note that in some cases this mode represents a first class outbound channel for goods.

Finally, a second insight considers the analysis of Italian sea trades with three large geographical areas, which are for several reasons ascribable to some of the world's main shipping routes. The analysis, in particular, hinges on Italy's exchanges with the Euro-Mediterranean area (comprising of Germany, Belgium, the Netherlands, Spain, Turkey and the countries of North Africa), with the West (United States, Argentina and Brazil) and with the East (China, India and the Gulf countries).

Such statistical analyses refer to Coeweb Istat database, in relation to the year 2014.

2. Italian maritime trade within the international context

Italian maritime trade toward the rest of the world in terms of exchange amounted to about €223 billion in 2014. The data from the last decade showed that after the decline due to the crisis of 2009 and the subsequent recovery, there was a further reduction of seaborne, but despite a decline of 1.8 percent compared with 2013, it recorded a 31.3% growth compared to ten years ago.

As part of the overall national trade maritime transport plays an important role that is evident if one looks at the Italian trade flows against the different modes of transport. In fact sea is along with road, one of the main items accounting for 29.6% of the total.

However, it should be specified that the national datum is only a partial reflection of the situation of each single area. As a matter of fact, if we consider only the south the weight of the carriage by sea over the total trade rises to 60%, compared with a weight of 22.1% for road.

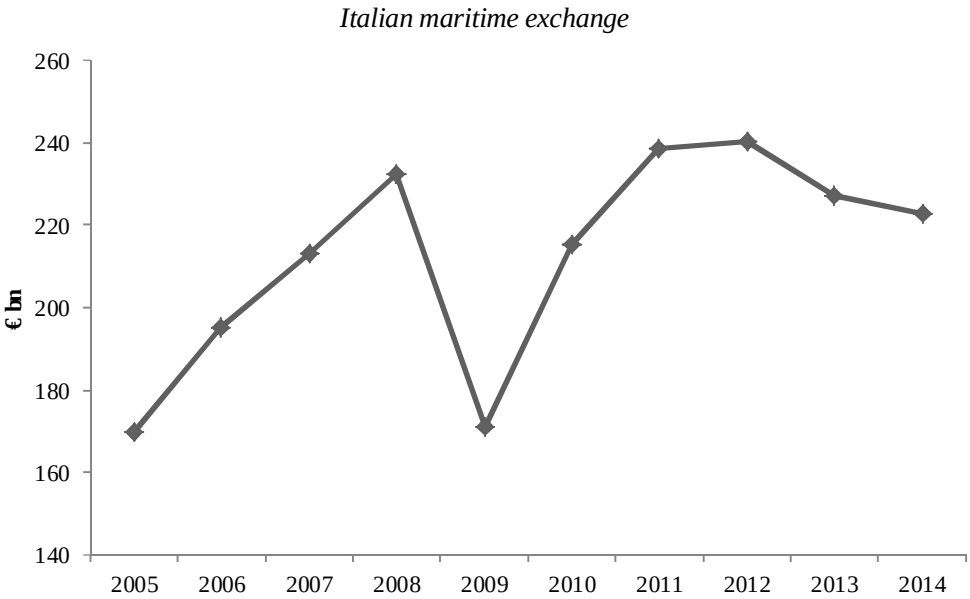


FIGURE 1 - Source: SRM elaborations on ISTAT Coeweb data, 2015

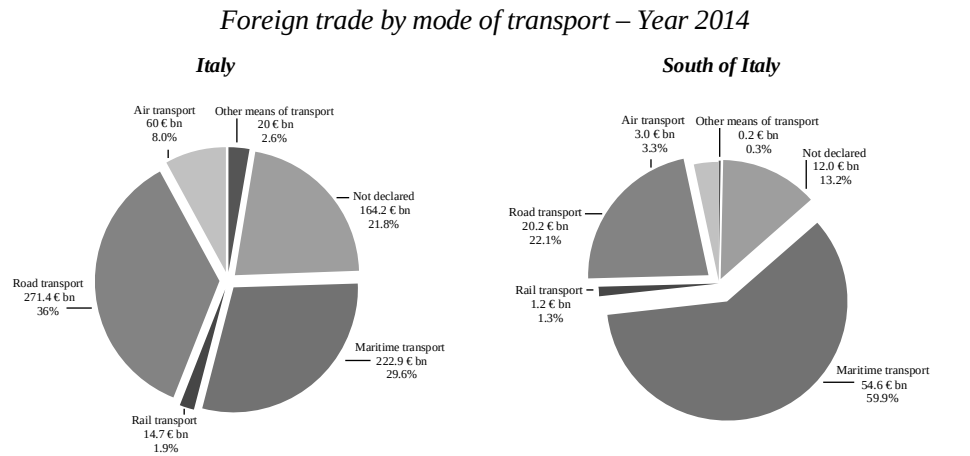


FIGURE 2 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Moving on to analyze what are the main areas of origin/destination of traffic under consideration, the Asian continent is the one that weighs more (39.4%); followed by America and Europe with, respectively, 22.1% and 19.9% and then Africa (15.3%) and Oceania (3.4%).

Data also revealed that between 2010 and 2013 seaborne trade between Italy and most of the target areas has albeit only slightly, intensified at the expense of those with Asian countries whose share saw a drop of 5.6%.

The main increase has involved American countries, whose interchange to and from Italy went from a weight on the total world-Italy trade by 18.6% in 2011 to 22.1% in 2014.

Italian seaborne trade by target area

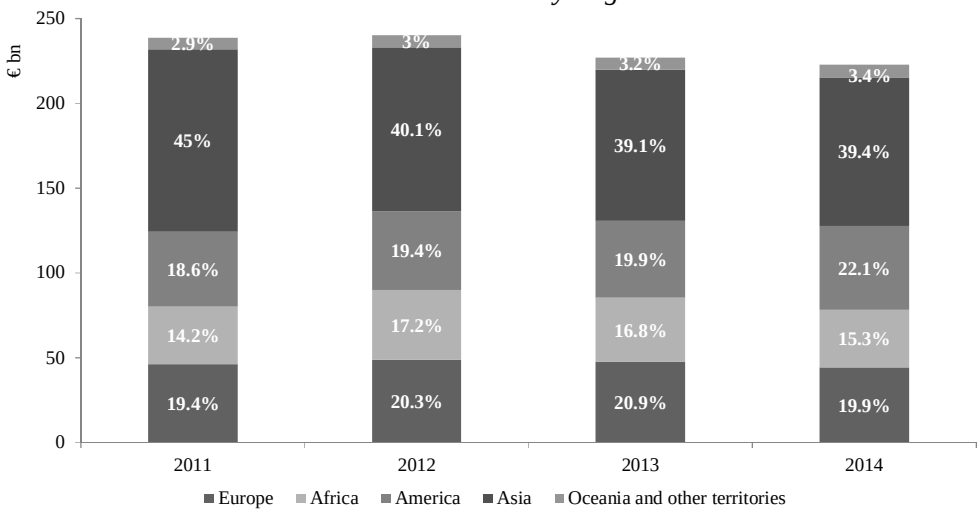


FIGURE 3 - Source: SRM elaborations on ISTAT Coeweb data, 2015

By further analysing the 2014 data, it is possible to notice that the primacy of the Asian countries is mainly due to imports from East Asia and the Middle East; while the share of European countries is mostly related to non-EU countries.

Data also shows that with the exception of north and south-central America, north Africa and Oceania, inflows to our country prevail.

Italian seaborne trade by target area in import export - Year 2014

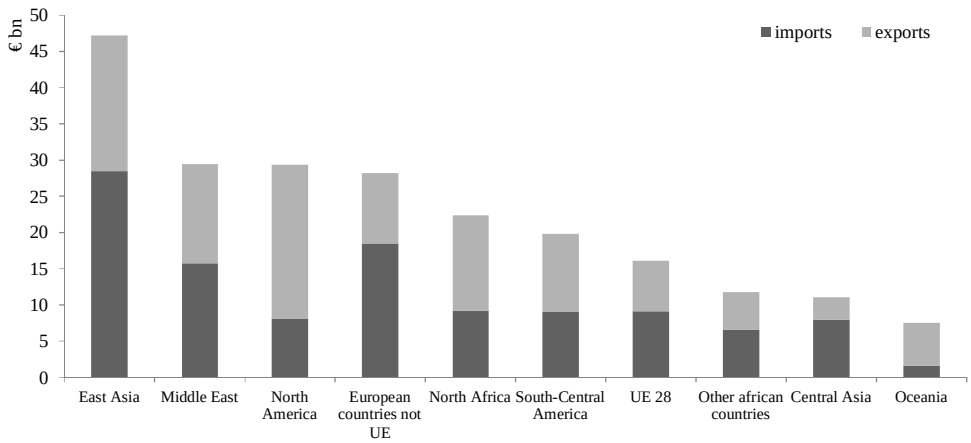


FIGURE 4 - Source: SRM elaborations on ISTAT Coeweb data, 2015

As part of the considered areas, China, United States and Turkey are the three main partner countries for Italy as regards the exchange of goods by sea.

The trade with China, in particular, exceeds €25 billion and is attributable to 72.3% of our imports. A reverse situation is that of the United States, with a total traffic of almost €25 billion, consisting for the most part of trade inflows of Italian origin (about 77% of the total).

Italian seaborne trade: world partners top ten - Year 2014

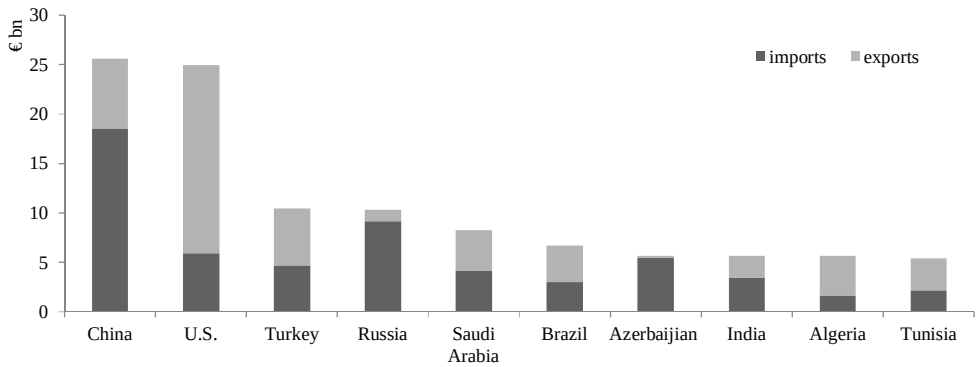


FIGURE 5 - Source: SRM elaborations on ISTAT Coeweb data, 2015

The ranking of the principal partners changes when separately considering import and export flows. In particular, in the former case China confirmedly tops the ranking with a volume worth €18.5 billion, followed by Russia and U.S. from which Italy imports goods worth 9.1 and €5.9 billion, respectively. In addition, in the top 10 positions no longer appear Algeria (which now occupies the 20th place) and Tunisia (15th place), while there are Iraq and Spain, which export goods to Italy for a volume amounting to €3.2 billion.

Italian seaborne import: world partners top ten - Year 2014

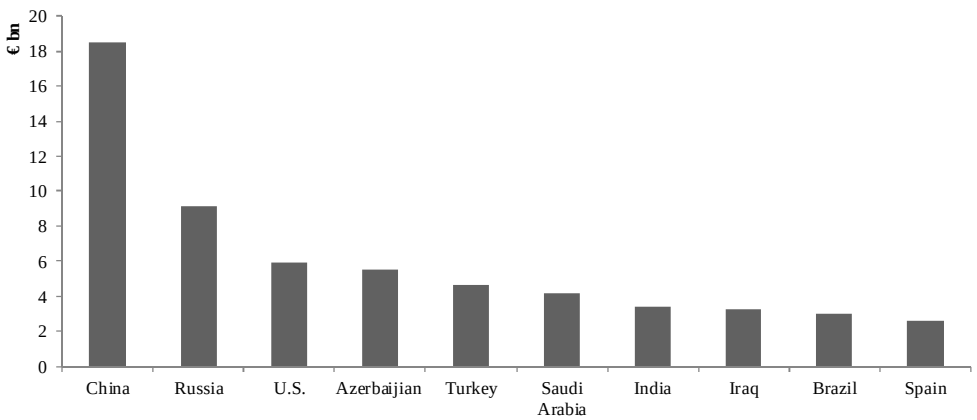


FIGURE 6 - Source: SRM elaborations on ISTAT Coeweb data, 2015

As regards the export flows alone, however, United States, China and Turkey rank respectively first, second and third as they are the recipients of Italian origin products worth a total volume of nearly €32 billion. The overall ranking no longer includes India, Russia and Azerbaijan (now at the 15th, 24rd, and 67th position), replaced by Australia, United Arab Emirates and Egypt.

Italian seaborne export: world partners top ten - Year 2014

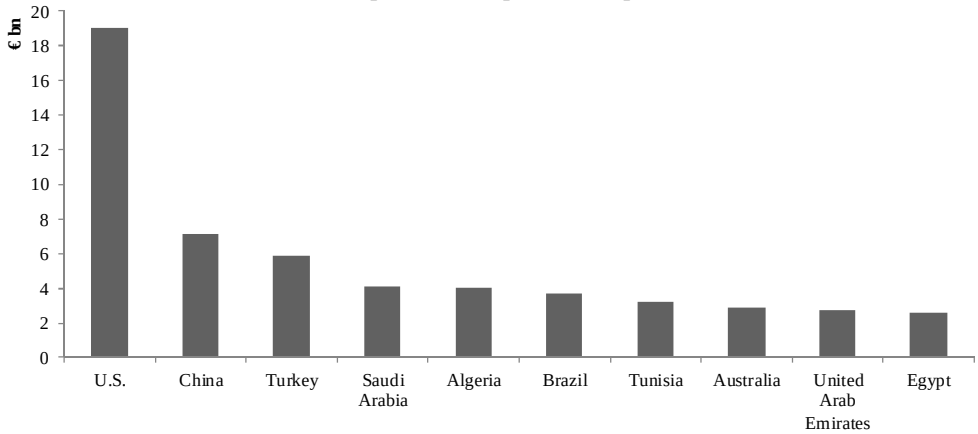


FIGURE 7 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Moving on with the analysis of the sole Europe, Turkey and Russia are the countries with the largest trade with a trade flow estimated at approximately €10.5 billion for the former and 10.3 billion for the latter. While relations with Turkey are fairly balanced in terms of inflows and outflows (44.5% of the total Italian imports against 55.5% of exports), those with Russia are characterised by the predominance (about 88%) of inflows to our country.

In addition, if the analysis range is shrunk to 28 EU countries alone, we observe that the three main counterparts of the Italian maritime trade are Spain, France and the United Kingdom, with a total turnover of more than €8.8 billion. Of this amount, approximately 42% (3.68 billion) is generated by trade with Spain.

In this case too, the relationships were studied only in terms of import and exports separately.

Italy's top three European partners, with reference to incoming flows are not the same as for the total exchange; instead of France there is Ukraine and then U.K. As regards export, albeit with different weights, the partners are the same as for the total flows except for U.K. which is replaced by Albania.

The import from the 28 EU countries, albeit with different weights, the partners are the same as for the total flows. For outbound flows however, next to France, Spain and the United Kingdom, there are Slovenia and Croatia.

Italian seaborne trade: European partners top five - Year 2014

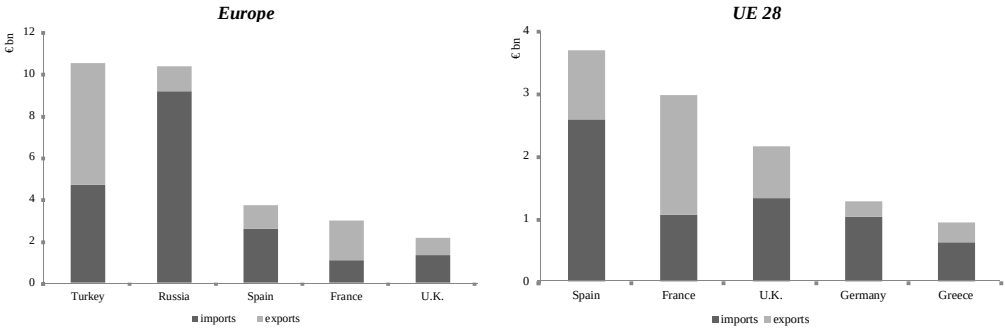


FIGURE 8 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Italian seaborne import and export: European partners top five - Year 2014

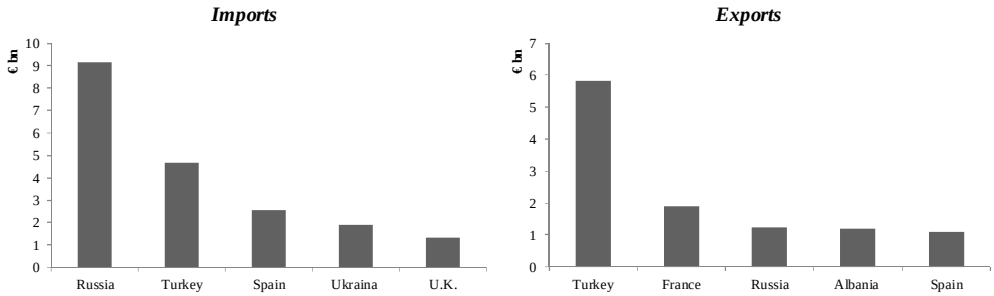


FIGURE 9 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Italian seaborne import and export: EU 28 top five partners - Year 2014

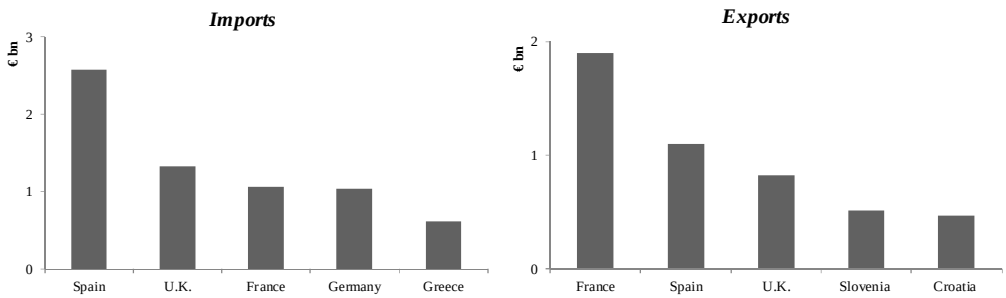


FIGURE 10 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Italy's top five partners in the EU 28 (i.e. Spain, France, UK, Germany and Greece) account for nearly 70% of the total seaborne exchange from our country to that area. The flows in these five countries are in decline compared with 2011 (-8.1%), but are quite stable compared to data recorded in 2013 (-1.6%).

The country that has consolidated its maritime interchange with Italy the most is the Germany, moving from a weight of 4.1% in 2011 to 7.9% in 2014; smaller increments are recorded for United Kingdom, while exchanges with other countries decreased.

Italian seaborne trade with the top five EU 28 partners

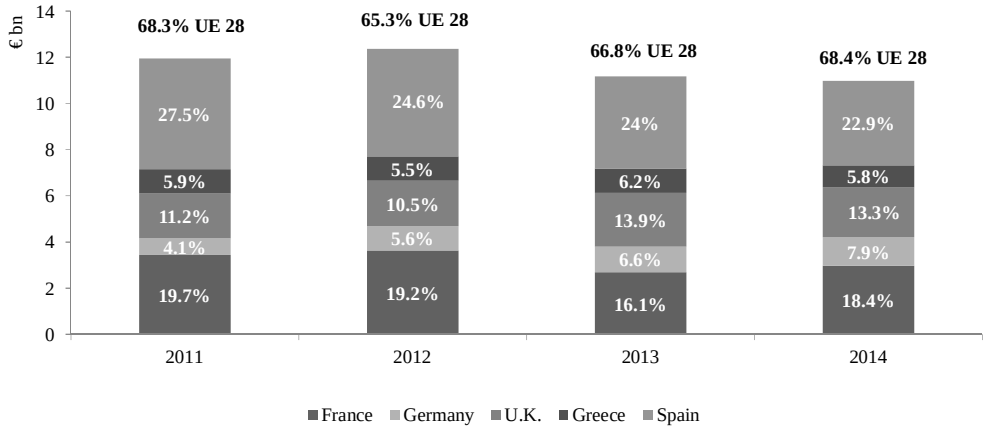


FIGURE 11 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Again with reference to the EU 28, it is noteworthy that unlike what was seen for the global context, the maritime mode affects the total traffic of only 3.8%; a percentage corresponding to a trading volume of €16.1 billion attributable to 48.2% in inflows and the remainder in outflows. Even considering that approximately 40% of total traffic affecting the area under consideration does not mention the mode of transportation used, the majority of goods travel by road with a weight of 51.1% of the total.

If one only analyses the top five partner countries, however, the weight of shipping increases by 4.4%, corresponding to €11 billion out of a total of about 250 billion.

Italian foreign trade by mode of transport in EU 28 - Year 2014

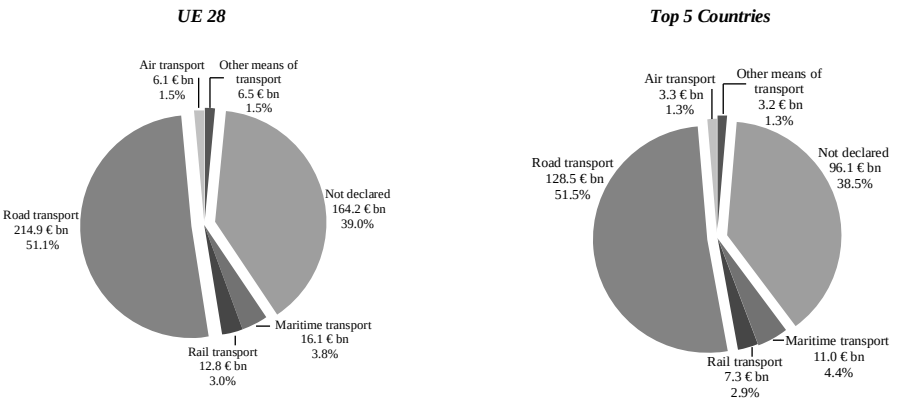


FIGURE 12 - Source: SRM elaborations on ISTAT Coeweb data, 2015

3. Exchange analysis by product sectors

With reference to the quality of goods carried by sea to and from Italy, we observe that the first 5 categories account for over 65% of the total value and concern, first and foremost, machinery and mechanical equipment. The exchange of these goods involves, in particular, East Asia, North America and Middle East countries and it regards mostly outflows.

Coal, crude oil and natural gas, metal, coke and refined oil products and, finally, means of transport follow. The importance among these, of petroleum products is noticeable; they alone account for almost 25% of the total.

Italian maritime exchange with the rest of the world: principal commodities sectors
Year 2014

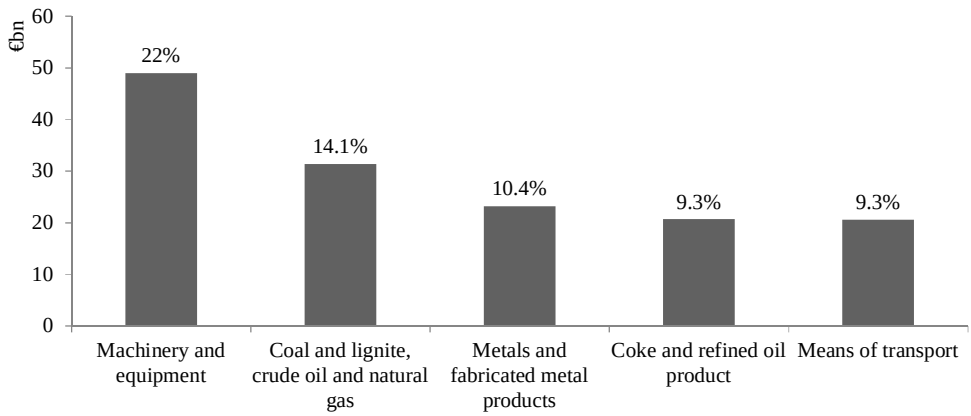


FIGURE 13 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Down in the detail, one can see that each geographical area of the world is the point of reference for specific product categories.

Considering the European area, it is the category of refined petroleum products and coke to have the greatest weight over the global interchange; means of transport and of coal, crude oil and natural gas follow.

In EU 28, to first place there are means of transport (30.5%), followed by coke and refined oil product (27.9%) and metals (13%).

Italian maritime exchange with Europe: principal commodities sectors - Year 2014

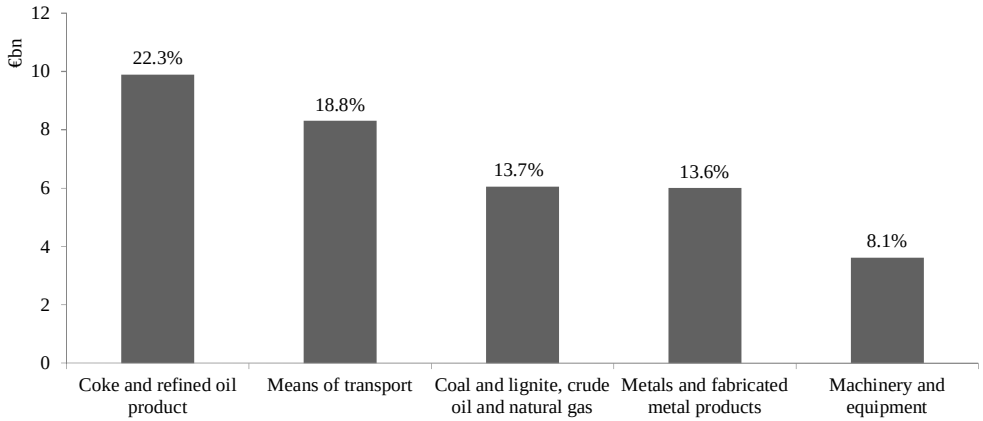


FIGURE 14 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Italian maritime exchange with EU 28 countries: principal commodities sectors Year 2014

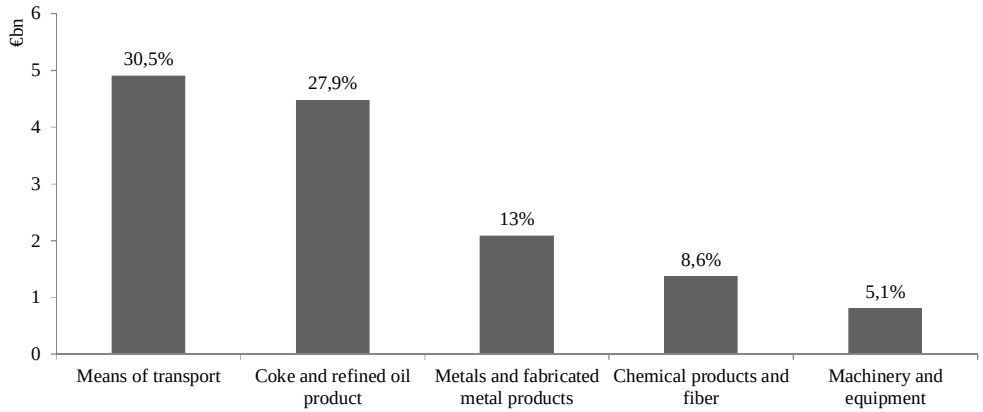


FIGURE 15 - Source: SRM elaborations on ISTAT Coeweb data, 2015

As for relations with East Asia countries, it emerges that more than 60% of the total value of the goods exchanged is attributable to only three categories, namely the products of the textile industry (mostly imported), the chemical ones (which are also increasingly incoming) and machinery. A similar concentration can be noticed with the countries of North Africa and the Middle East. In the former case, in particular, the first 3 categories evaluated (refined petroleum products and machinery) reach 60% of the total trade with Italy. In the latter case, instead, almost 65% of the total is related to two categories, namely machinery (almost exclusively exported), coal and crude oil (almost exclusively imported). Finally, Italian exchanges with the non-European countries are based, by approximately 53%, on the exchange of oil products (refined and raw) and metals.

4. Italian regions: the importance of maritime transport for exports

As previously seen, sea transport has a primary role for Italian trade with the rest of the World. In fact it accounts for 29.6% of the value of total trade and exports affects 48.7% of cases. Focusing only on outgoing flows, it is possible to notice that, even in relation to individual geographic contexts of reference, Italian exports in various areas rely on seaborne shipping differently.

While the national average is 27.1%, in the south it reaches 49.7%, mostly due to the commercial performance of the two islands that individually reach a maximum share of 80.9%.

Unlike the rest of the area, where road transport prevails, for the south (and especially for the two islands) sea is the main channel chosen to convey the outgoing flow of goods.

Italian export by mode of transport – Year 2014

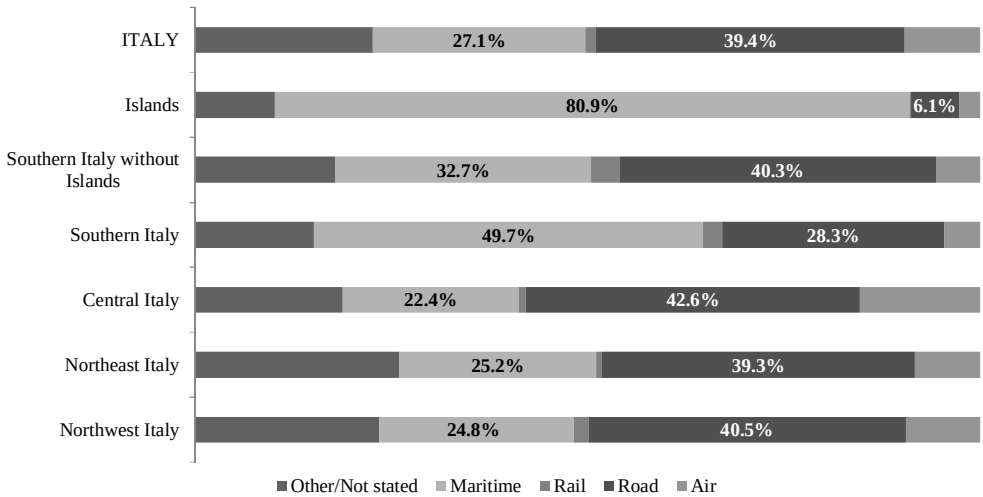


FIGURE 16 - Source: SRM elaborations on ISTAT Coeweb data, 2015

This scenario reflects what was recorded for the single regions. Data from Sardinia and Sicily stand out with a weight of total maritime exports on the outgoing flows amounting respectively to 91.9% and 75.6%.

Liguria (56%) and Campania (40%) – headquarters of some major national ports – come soon after, followed by most of the remaining national regions, with a weight ranging between 20% and 40%.

Italian maritime export by region: market share percentage of the total – Year 2014

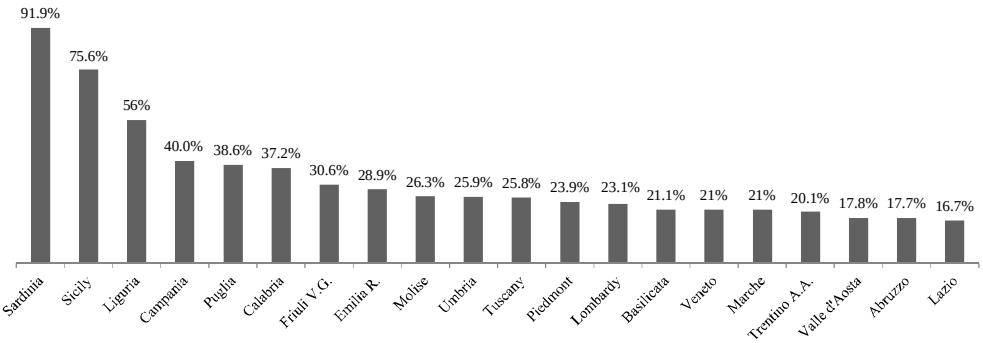


FIGURE 17 - Source: SRM elaborations on ISTAT Coeweb data, 2015

5. Italian maritime trades with three macro areas

As already previously, a study of three main areas of particular significance affecting the routes to our ports was carried out in order to gain a full picture of the economic effects of Italian maritime relations with the rest of the world. It includes 18 countries which represent 50% of the overall value of Italian trade which are grouped into three main areas.

The three reference macro areas of Italian maritime trade

FIGURE 18 - Source: SRM elaborations

Italy trade with the countries of these area is valued at over €108.8 billion, slightly down compared to the figure of 2013 (-1.1%) and each region absorbs about a third of that value.

Maritime trade between Italy-rest of the world: the significant three areas – 2014

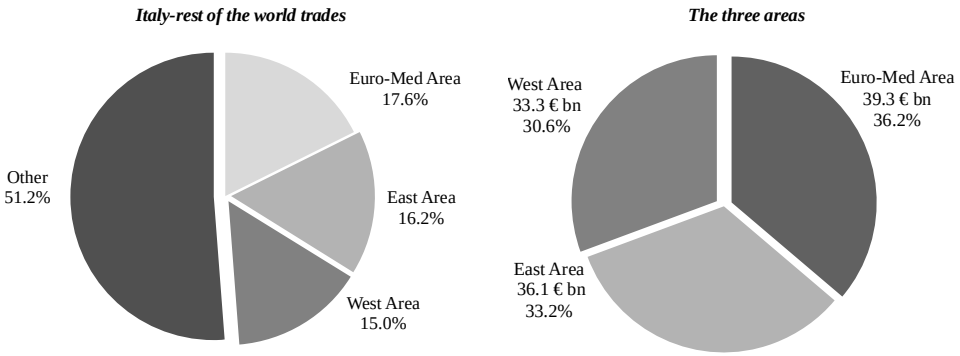


FIGURE 19 - Source: SRM elaborations on ISTAT Coeweb data, 2015

If we observe the data by single area, it emerges that the decrease is mainly due to a reduction in trade with the Euro-Mediterranean area which, between 2013 and 2014 recorded -10.2%, only partly balanced by the two remaining areas (+2.9% for the East Area and +7% for the West Area).

If, instead, we extend the analysis for a longer time span, the situation outlines a different scenario: compared to four years ago, the countries in the West recorded the best performance with a +12.8% entirely due to a substantial increase in trade with the United States (+29%). Those with Brasil (-14.4%) and Argentina (-28.6%), on the contrary, are declining.

Trade with the Euro-Mediterranean countries (+1.7%) is also increasing, while the relations with the East (-16.5%) are falling.

Italian maritime trade with the three large areas: recent trend

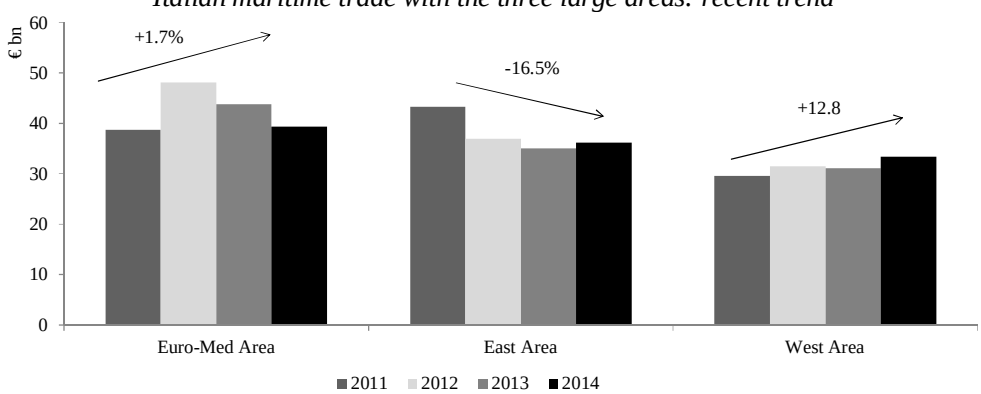


FIGURE 20 - Source: SRM elaborations on ISTAT Coeweb data, 2015

As for the goods traded, machines, means of transportation (11.1%) and metals (10.6%) top the ranking with more than a quarter of the total value.

This situation only partially reflects the context of the three macro areas which show different weights, and sometimes different categories.

Italian maritime trades with three large areas: total amount of goods traded - 2014

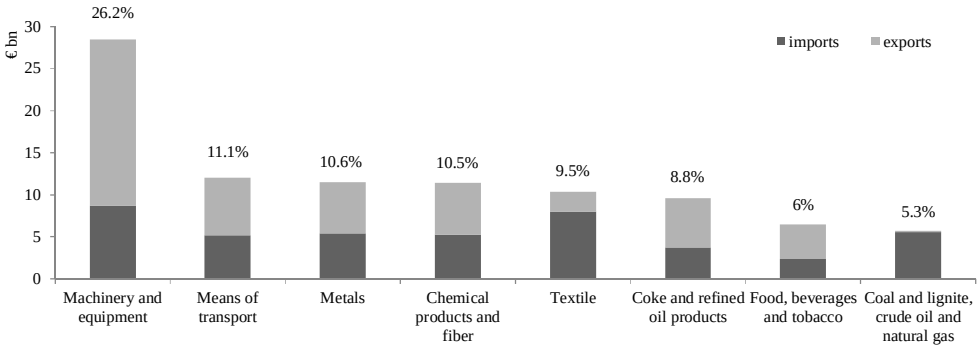


FIGURE 21 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Italian maritime trade with the three areas: traded goods by single area – 2014

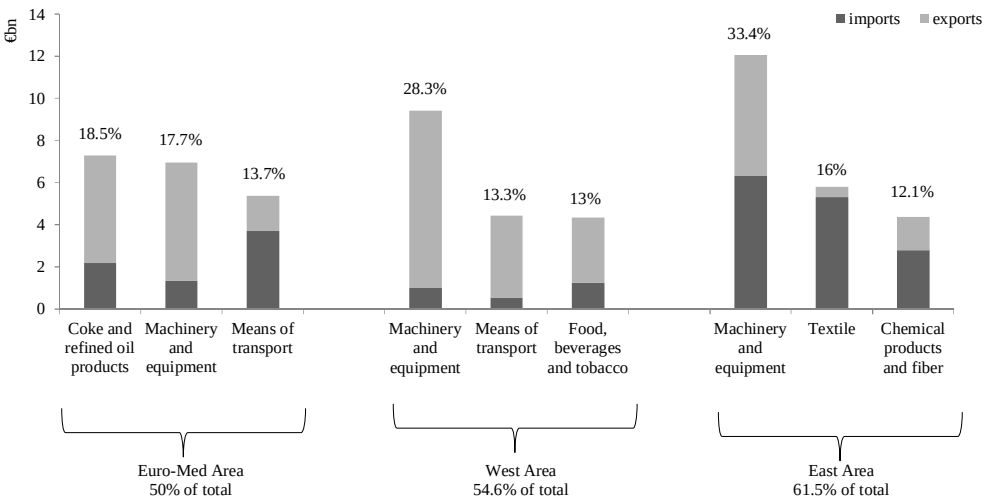


FIGURE 22 - Source: SRM elaborations on ISTAT Coeweb data, 2015

6. Conclusions

The analysis carried out reveals the importance that maritime transport plays in the Italian economy. It is, in fact, not only one of the principal modes of transportation used for Italy's import and export, but also a key sector for the economy of many areas.

To appreciate the magnitude of impact that exports have, you only have to consider the weight they carry in some Italian regions.

Looking at the international context, it is possible to identify three major macro-areas where nearly half of the overall trade between Italy and the rest of world is concentrated. They include, specifically, three groups of countries "touched" by a number of routes that also affect Italian ports. Central to this is the Euro-Mediterranean area, the remaining countries are grouped in to the West and East. The data shows that trade with these latter areas record a positive annual change whereas those with the Euro-Mediterranean record a double-digit decline.

The three referenced macro areas of Italian maritime trades: the weight and the variation compared to 2013

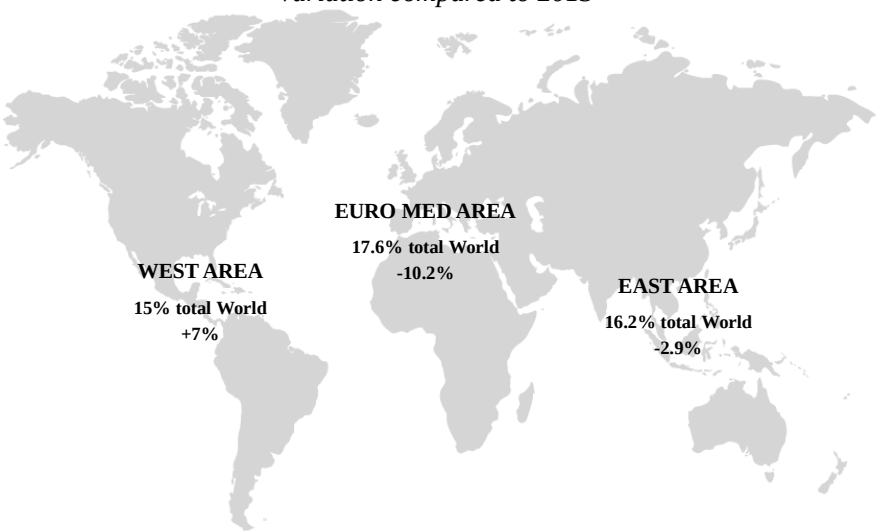


FIGURE 23 - Source: SRM elaborations on ISTAT Coeweb data, 2015

Within this framework, China and the U.S. are the two most relevant partners with a total exchange estimated at approximately €50 billion. In particular, from China, Italy imports machinery and mechanical equipment and products derived from the textile and clothing industries; in contrast with the United States, where Italy mainly exports machinery, mechanical equipment, and transportation. Narrowing the field of observation to the European Union (EU 28) it appears clear that the principal transactions are held with Spain and France, and in both cases they mostly involve coke, refined petroleum products and the means of transport.

In conclusion, the data regarding trades, despite being only one of the possible indicators of how important sea transportation is for the economy of a country, also shows its strategic nature within the wider scope of national logistics. Consequently, it can be interpreted that both would benefit from the stimulus of further investment in Italy's infrastructure and the implementation of policies to support this sector.

CHAPTER IV

THE US-EU FREE TRADE AGREEMENT: THE ECONOMIC IMPACT ON THE TERRITORY[1]

1. Foreword

The United States is the third largest market for the destination of exports to the Center-North and the South alike and for both macro-areas, but especially for the second, the sea is the preferred mode of transport for such trade flows.

Although in the last twenty years new countries have imposed on the international scenario as important reservoirs of potential demand, the US market continues to play a central role for Italian goods. The intense and historically significant trade relations between the US and Europe are still limited by a number of barriers to the exchange of goods and services. Tariff barriers between the European Union and the United States, despite being on average very low, reach high values in some categories; the real brake on trade is, instead, non-tariff barriers i.e. a series of restrictions to international trade, such as different technical standards and regulations regarding the products.

In June 2013 negotiations between the United States and the Europe Union initiated with the aim of drawing up a trade agreement, known as the TTIP (Transatlantic Trade and Investment Partnership), which facilitates the exchanges between the two areas. The process leading to the drafting of the final agreement is still in progress: eight rounds of negotiations have already taken place in order to make clear the objectives and share the proposals but the negotiation phase will last much longer, presumably at least throughout the current year.

If the precise content of the agreement is still subject to debate between the parties, the outcome of the negotiations will have an impact on international trade flows and the different economies involved. The following analysis aims to provide an initial assessment of the effects on the Italian economy, but also on that of the Centre North and the South, which could arise from the implementation of the agreement. The first aspect assessed here is the direct effects that a partial or total removal of barriers could generate on exports, while later we will focus on the overall effects deriving from the multiplier processes related to the initial increase in demand.

Before going into the details of the work it would be appropriate to highlight the main considerations that emerge from the analysis.

[1] This work was written by Livia Simongini (Senior Economist of Prometeia) and it is based on "*Stima degli impatti sull'economia italiana derivanti dall'accordo di libero scambio USA-UE*" (*Estimation of the impacts on the Italian economy arising from the US-EU Free Trade Agreement*), made in June 2013 by Prometeia on behalf of the Ministry of Economic Development.

The article shows the 2013 data about export in order to facilitate the comparison with the other sources used.

- Compared to other major European partners the merchandise mix of direct exports to the United States penalizes Italy, which is subject to higher overall tariff barriers (tariff and non-tariff).
- Tariff barriers play a modest overall role on the Italian exports to the United States (2.1%). At sector level, however, some exceptions have been found as in the case of the fashion system or especially for food exports from the South.
- Non-tariff barriers account for 22% of the Italian exports to the US and reach a higher weight even in sectors which are particularly significant to the Italian production system (fashion, food and mechanics, for example).
- As a result of different product composition exports to the US, the North-Central region endures trade barriers which are relatively higher than in the South and, therefore, it would benefit more from the implementation of the agreement.
- In the South, tariff barriers weigh more than in the North-Central area but the latter is more adversely affected in terms of non-tariff barriers which are its main obstacle to trade.
- The only abolition of tariff barriers, from which the South would benefit relatively more than the North-Center, would not imply either significant direct effects on exports or indirect effects on other macroeconomic variables.
- Only in the event of the abolition of all trade barriers (tariff and non-tariff) will there be significant direct effects on Italian exports; actually, the North-Center will benefit more from such a positive return because it bears higher overall barriers.
- A time horizon of at least three years is required for the indirect effect of the agreement to completely spread. After this time, and under the assumption of a broad liberalization of trade, the impact on Italian GDP would be around 0.5% with a slight advantage of the North-Center compared to the South when evaluated in terms of percentages, but much larger in absolute terms, with the South that would earn 1 billion in GDP compared to the 6 that would be obtained in the North-Center.

This chapter is organized as follows. Paragraph 2 centers on the role of maritime shipping in the international trade of the South and the North-Center focusing in particular on the direct flows bound for the US market. The consequences of an agreement that modifies the extent of exports will inevitably involve, in fact, the most important international trade flows for the South. Paragraph 3 shows the weight of tariff and non-tariff barriers on the value of goods exported sorted by sector, while Section 4 presents the results of the direct impact on the export resulting from the agreement. Finally, paragraph 5, describes the direct and indirect effects on the main aggregates of the Italian economy, in the North-Center and in the South.

2. The role of sea shipping in the international trade of the South and the North-Center

In 2013 53.5% of the goods exported from the South was transported by sea; the North-Center, the percentage is much lower: 24.2% The importance of maritime

transport is also evident at the industry level[2]: as a matter of fact, in mining, in refined petroleum products and metals, the incidence of shipping on the overall exports in the South is higher than that referred to the total of the sectors and, in some cases, close to 100% (see. Figure 1). Except for mechanics and agriculture – two sectors for which the weight of sea shipping is approximately the same for the South and the North-Center – for all sectors sea shipping has a more significant role in the South than in the rest of the country.

Exports of South and North-Center in 2013 by transport mode: % weight of sea shipping

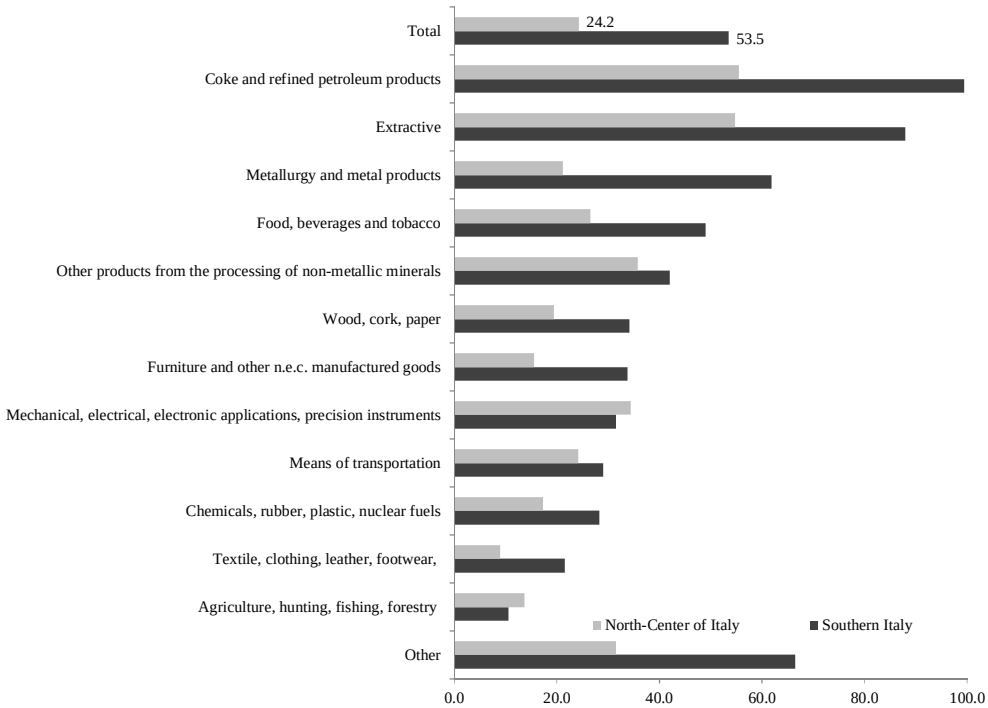


FIGURE 1 - Source: Prometeia elaborations on Istat data

If instead of the overall export we analyze the export bound for North America, the weight of sea shipping grows as much in the South as in the North-Center of Italy, accounting, respectively for 74.7% and 62% (see Figure 2). The importance of maritime shipping is also very high in almost all sectors of the exports from the South of Italy to North America, with the highest shares concentrated in oil products, mining and in the food industry.

[2] The trade flows by mode of transport are classified on the basis of the uniform nomenclature for transport statistics (NST 2007) which differs from that of commodities used later in this chapter and given in the Appendix.

South and North-Center export to North America: % by mode of transport in 2013

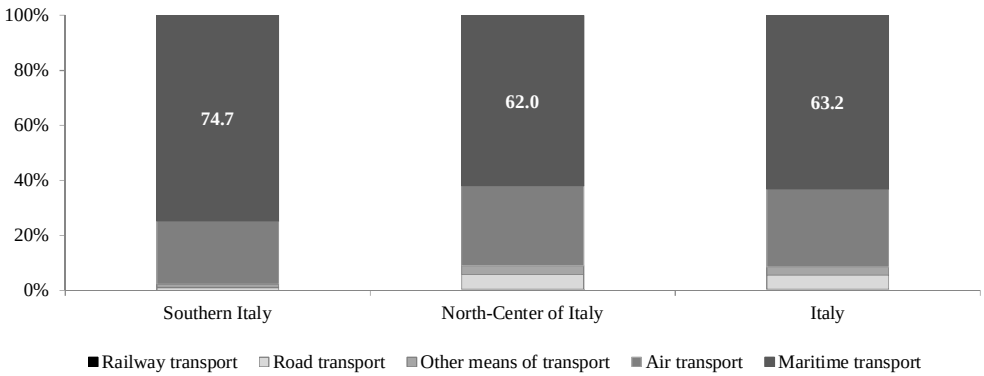


FIGURE 2 - Source: Prometeia elaborations on Istat data

Export of the South to North America by sector: % weight of sea shipping in 2013

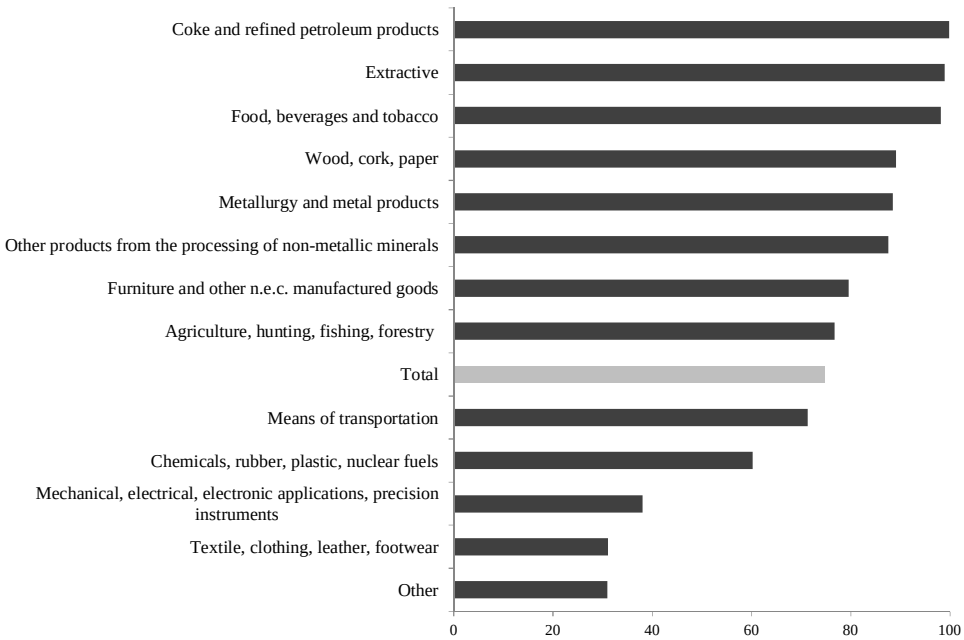


FIGURE 3 - Source: Prometeia elaborations on Istat data

2.1 Export to the United States

Once that we have ascertained that maritime transport has a primary role, especially for the South, within international trade and even more within trades directed to North America, it is appropriate to focus on the extent of such exchanges.

In 2013 for the South and the North-Center alike, the United States represented the third target market after France and Germany. Moreover, in the two Italian macroareas, the weight of the US on the total export is the same (around 7%).

There are several differences, instead, regarding the sectors of the export. The production of trains, planes and ships accounts for about 30% of the southern export to the United States and significant shares regard also refined petroleum products (18%) and food and beverages (17%). To the North-Center, the more significant sectors are mechanics (27%) and fashion (12%) followed by food and beverages (9%). More in detail, it can be observed that in the food industry the South has a higher incidence in the other food industry which also includes pasta, followed by fruit and vegetables and milk and dairy products, while the North-Centre's direct exports to the United States in the food industry are made up of beverages by 55%. If you take into account the exports of the fashion system to the US, the greatest weight is covered by clothing which impacts on the export sector by 58% in the South, and by 36% in the North-Center.

The South exports and the North-Center in the first three target markets:2013

North-Center of Italy			South of Italy		
	€ million	% on total export		€ million	% on total export
Germany	44,180	12.9	France	4,486	10.5
France	37,318	10.9	Germany	3,897	9.1
United States	24,016	7.0	United States	2,938	6.9

TABLE 1 - Source: Prometeia elaborations on Istat data

% composition by export to the United States:2013

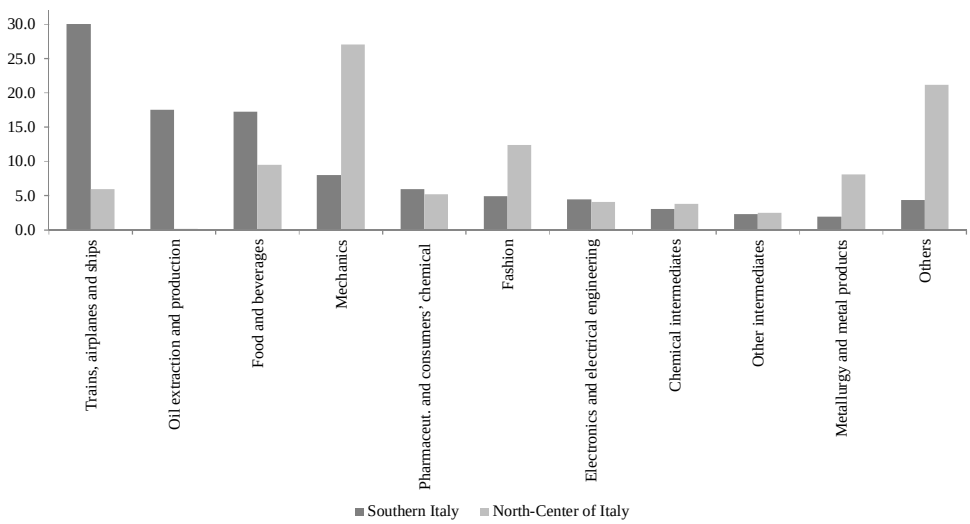


FIGURE 4 - Source: Prometeia elaborations on Istat data

% composition of the export to the United States: food and industry fashion, 2013

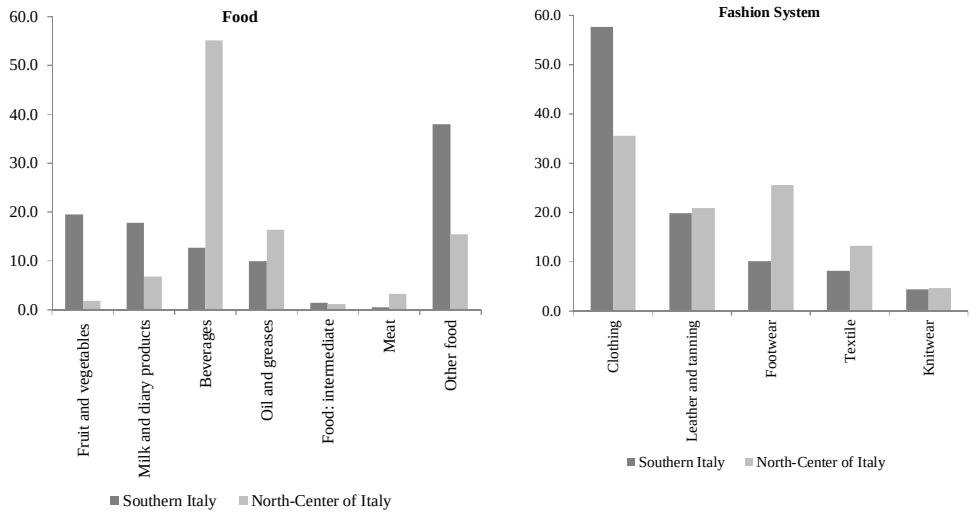


FIGURE 5 - Source: Prometeia elaborations on Istat data

3. Tariff and non-tariff barriers

The overall tariff and non-tariff barriers for the export bound for the US hinders Italy more than it does with other major European partners. As a matter of fact, on Italian goods such obstacles account for 24%, compared to 21% in Germany, 19% in the UK, 18% in France and 16% in Spain.

Tariff barriers and non-tariff barriers of direct exports to the United States: % value of goods, 2013

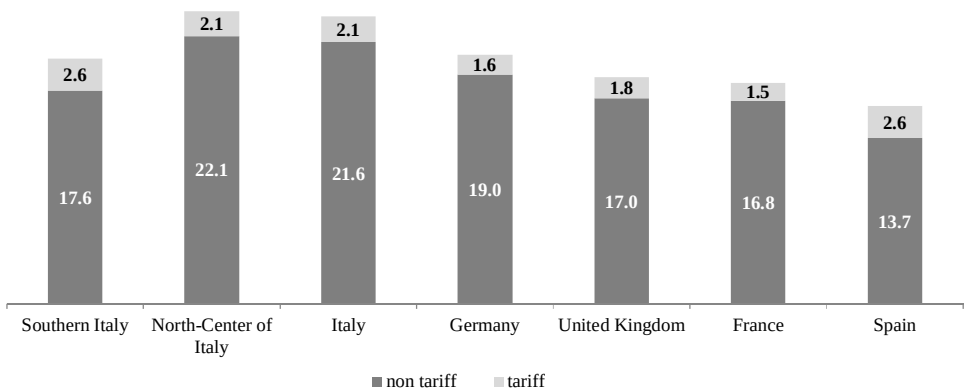


FIGURE 6 - Source: Prometeia elaborations on WTO, ECORYS and Ifo Institut data

Within the Italian territory the weight of trade barriers is relatively lower in the South (20% compared to 24% of the North). As we shall see later in this chapter, in the southern area this situation springs from a relatively lower weight of non-tariff barriers which everywhere else represent by far the most significant obstacle to the expansion of exports.

3.1 Tariff barriers

Apart from specific cases, the influence of tariff barriers on the EU-US trade is not very high. The specialization of Italian exports towards the United States, however, involves tariff barriers which are, on average, higher for Italy. The average duties applied to the exports to the US, always associated with the value of goods, stood at 2.1% in Italy: among the leading European partners it is the highest after that of Spain (2.6%).

Average duties on export bound for the US
% value of goods, 2013

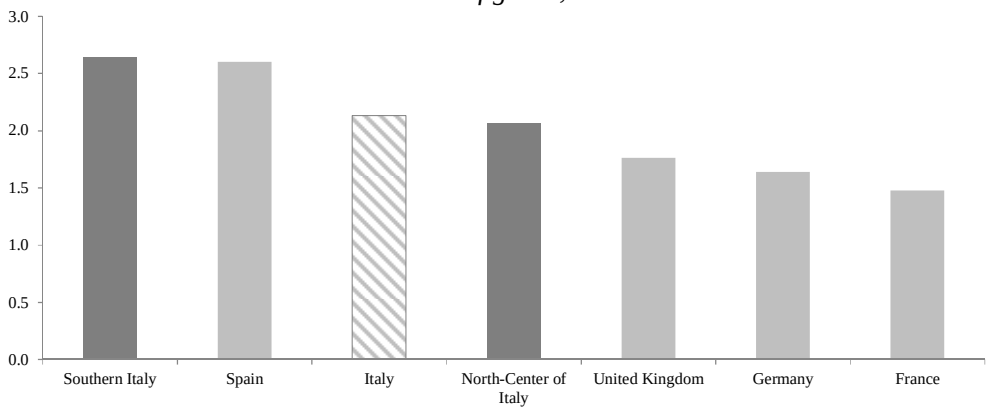


FIGURE 7 - Source: Prometeia elaborations on WTO data

The fact that the export towards the US is involve only specific sectors penalize the South in a relatively greater measure: in the area where duties are applied it amounts, in fact to 2.6% (2.1% in the North-Center). At the sector level, tariff barriers are higher (around 7% nationally) in the fashion industry and petroleum products, while they play almost no role in the export of trains, planes and ships and in that of furniture. The southern regions bear tariff barriers which are, on average, higher compared to the North-Center, as in the fashion and especially in the food sector which recorded an average duty of 4.3% compared to 1.6%.

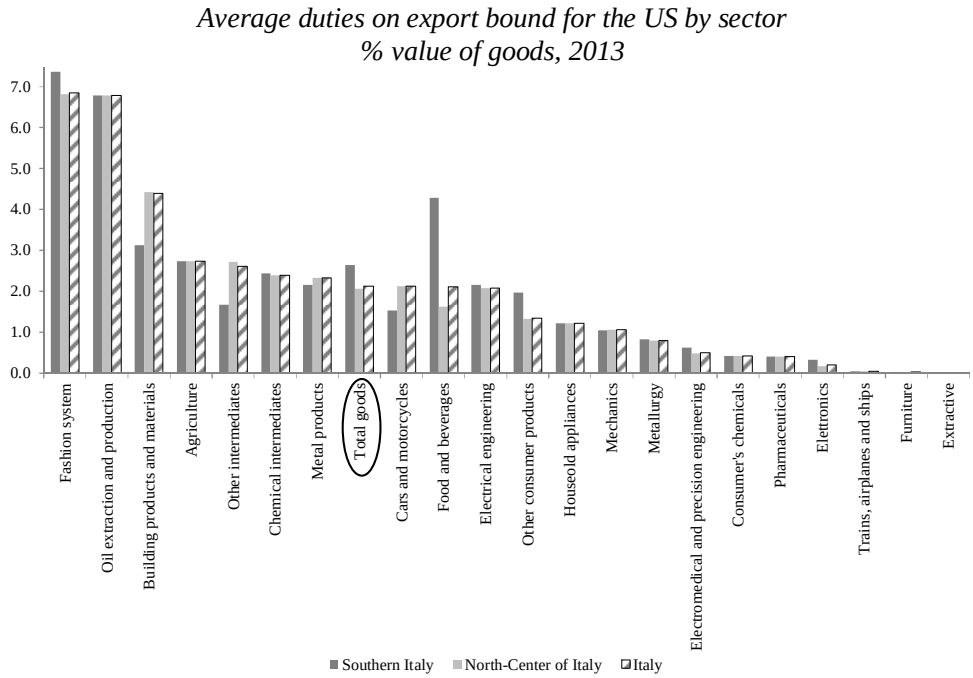


FIGURE 8 - Source: Prometeia elaborations on WTO data

3.2 Non-tariff barriers

If the duties applied to the trade bound for the United States are generally modest, the same cannot be said for non-tariff barriers. The latter, in the first place, are not always easy to identify as they hit different products and are not indicated as a measure of formal regulation of trade. Some examples of non-tariff barriers are the health restrictions on food and agricultural products, the demand for special requirements for the supply of goods or services to the Public Administration, and all the technical regulations and standards of products and services. If the identification of non-tariff barriers is not easy, their quantification is even more difficult. The estimates reported in the analysis derive from the work of two different institutions, ECORYS (2009) and Ifo Institut (2013), which use a mixed approach, based on qualitative and quantitative tools.

As previously mentioned, the impact of non-tariff barriers on the value of the exported goods is significantly higher than that of the tariff barriers. Again, Italy suffers a higher penalty than other major European countries. The weight of non-tariff barriers is indeed the highest, 21.6%; followed by Germany (19%), the UK (17%), France (16.8%) and Spain (16.8%). Albeit slightly, the impact of barriers on goods bound for the United States from Central and North (22.1%) is still higher than the national average, while the weight is more modest in the South (17.6%).

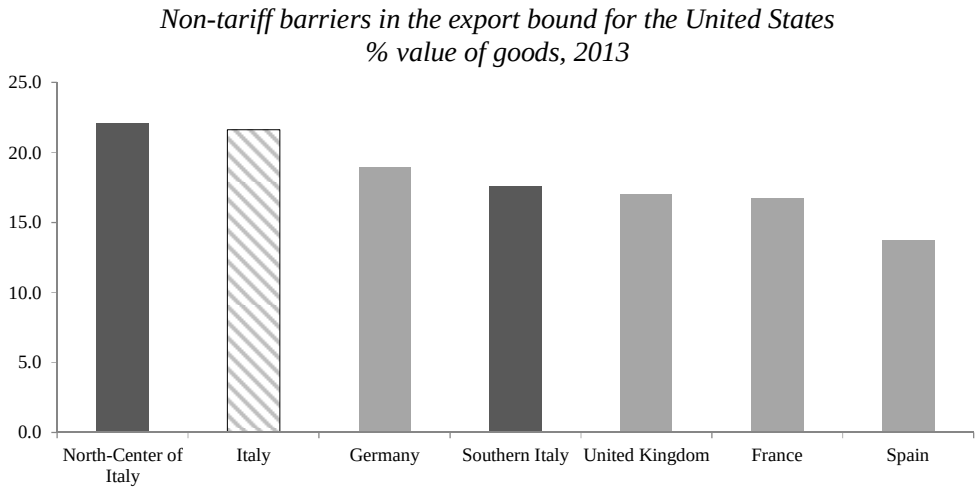


FIGURE 9 - Source: Prometeia elaborations on ECORYS and Ifo Institut data

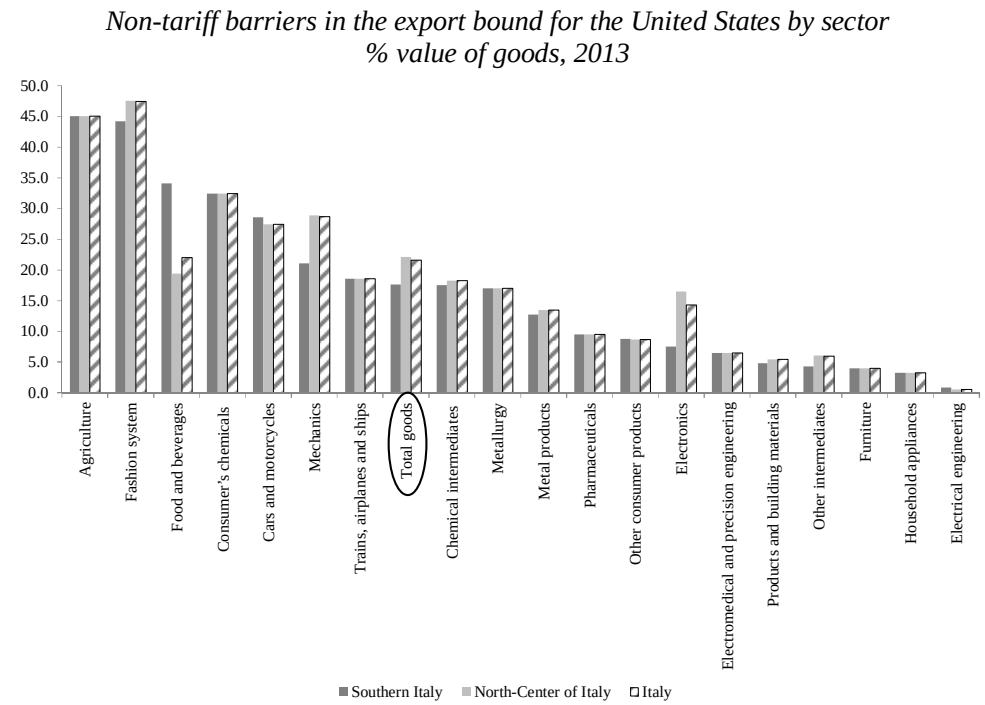


FIGURE 10 - Source: Prometeia elaborations on ECORYS and Ifo Institut data

At a sector level, Italy experiences high non-tariff barriers in some key sectors to its production structure, such as mechanics, agro-food and fashion system. In some cases, the sectoral composition of exports penalizes more the North-Center than the South.

For example, the mix of exports within mechanics generates non-tariff barriers which are, on average, higher for the North-Center. By contrast, very low barriers for beverages contribute to lowering the average on food industries in the North-Center, while in the South that function is less effective given the more limited weight of the beverages export compared to food industries (see. Figure 5).

4. The direct effects on exports

The impact of the application of TTIP (Transatlantic Trade and Investment Partnership) on the Italian exports has been estimated based on the three assumptions below.

- Cautious hypothesis: the agreement includes the removal of all tariff barriers, but there are no agreements on non-tariff barriers.
- *Intermediate hypothesis:* in addition to the cancellation of duties, the agreements would lead to a 50% reduction of the impact of non-tariff barriers, evenly spread on all the areas affected by these measures.
- *Optimistic hypothesis:* the result of the negotiations leads to the cancellation of tariff and non-tariff barriers between the European Union and the United States.

The scenarios resulting from these hypotheses should, therefore, be considered as indicative, as they are aim at providing the scope within which the final agreement will be.

In this section we consider the direct effects of North-Center and South's short-term export related to the changes of trade barriers between the EU and US, and calibrated on the three assumptions above. The results are presented in terms of percentage deviations from the baseline scenario, i.e. one in which the levels of (tariff and non-tariff) barriers would not suffer any change.

In all the three scenarios, the overall impact on the export derives from two components of opposite sign: on the one hand, the abolition/reduction of trade barriers promotes Italian exports bound for the United States, but on the other hand, it makes US exports to EU markets more competitive and the latter represents the main reservoir of demand for Italian exports.

In the cautious scenario the direct impact on exports is very modest, amounting to only 0.04% for Italy. At the regional level, the cautious scenario is characterized by a slight advantage of the South on the North-Center, because the underlying assumption only provides for the abolition of tariff barriers which are higher in the South than in the North-Center (see. Section 3.1). The extent of the impact progressively increases in the intermediate scenario and in the optimistic one; in the latter, the deviation from the baseline scenario is 0.43% for Italy, 0.44% for the North-Center and 0.33% for the South. With the intermediate and optimistic hypothesis, instead, the South looses the slight advantage it had compared to the North-Center: the removal of non-tariff barriers, which generally are a more significant obstacle than tariff barriers and that in the North-Center weigh more than in the South, and fosters the exports of the North-Center of the country.

The sectors that would benefit more from the signing of the agreement are those characterized by higher barriers: in the optimistic scenario, Italian fashion and agriculture exports bound for the United States are higher in the baseline scenario by 14-15%, while the food exports from the South to the US (again in the most favorable scenario), would show a deviation of around 12%, compared with the national average of 7%. The greatest stimulus on food exports from the South comes from the higher weight that trade barriers hold in the industry, compared to what happens in the North-Center (see. graph 8 and 10). Among the other major sectors, also mechanics sees an increase in the exports to the United States which in the optimistic scenario show a deviation from the base of around 10% for Italy (9% for the South).

As already indicated, the impact on total exports stems from the combined effect of the increase in exports to the United States and the loss of export competitiveness of Italian exports compared to the US ones against the other European countries. At the sector level, the simulation results which also take into account this second effect are presented in the graph 12. In general, there is no difference between the South and the relevant national average. The highest profit – around 1.9% – for both Italy and for the South, in the optimistic scenario, regards the trains, airplanes and ships sector. Other sectors that are advantaged by the signing of the agreement are fashion, food and mechanics, while, among the most important sectors, only agriculture would show an overall negative effect on exports in the optimistic scenario as well.

Export of the South, North-Center and Italy:
% deviations from the baseline scenario, constant prices

	Cautious		
	South of Italy	North-Center of Italy	Italy
Bound for the US	0.77	0.73	0.73
Bound for other EU countries	-0.05	-0.03	-0.03
Total	0.05	0.03	0.04
	Intermediate		
	South of Italy	North-Center of Italy	Italy
Bound for the US	3.59	4.25	4.18
Bound for other EU countries	-0.14	-0.13	-0.13
Total	0.19	0.24	0.23
	Optimistic		
	South of Italy	North-Center of Italy	Italy
Bound for the US	6.22	7.55	7.41
Bound for other EU countries	-0.21	-0.20	-0.20
Total	0.33	0.44	0.43

TABLE 2 - Source: Prometeia elaborations

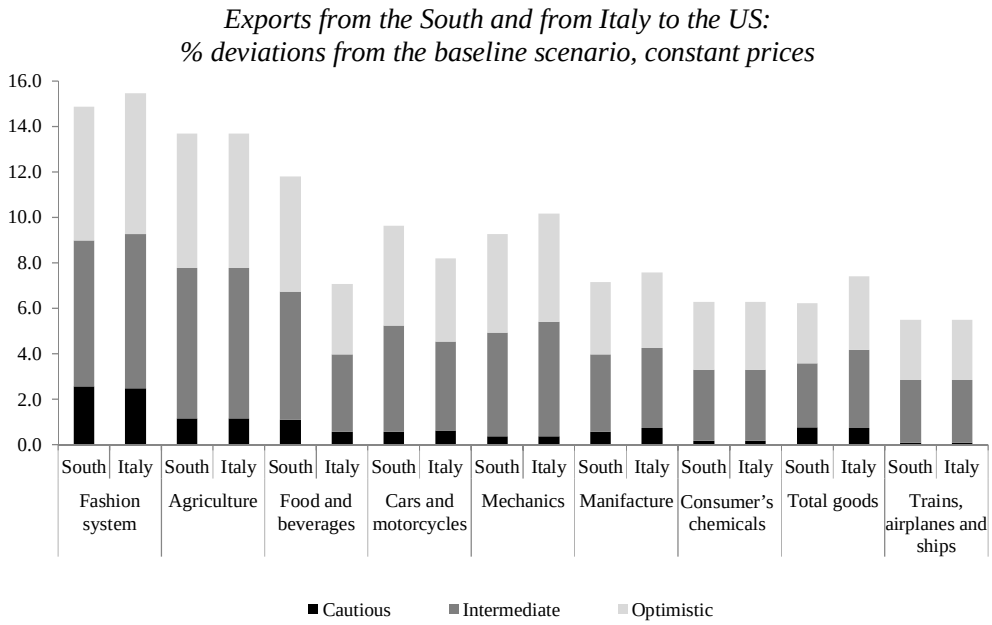


FIGURE 11 - Source: Prometeia elaborations

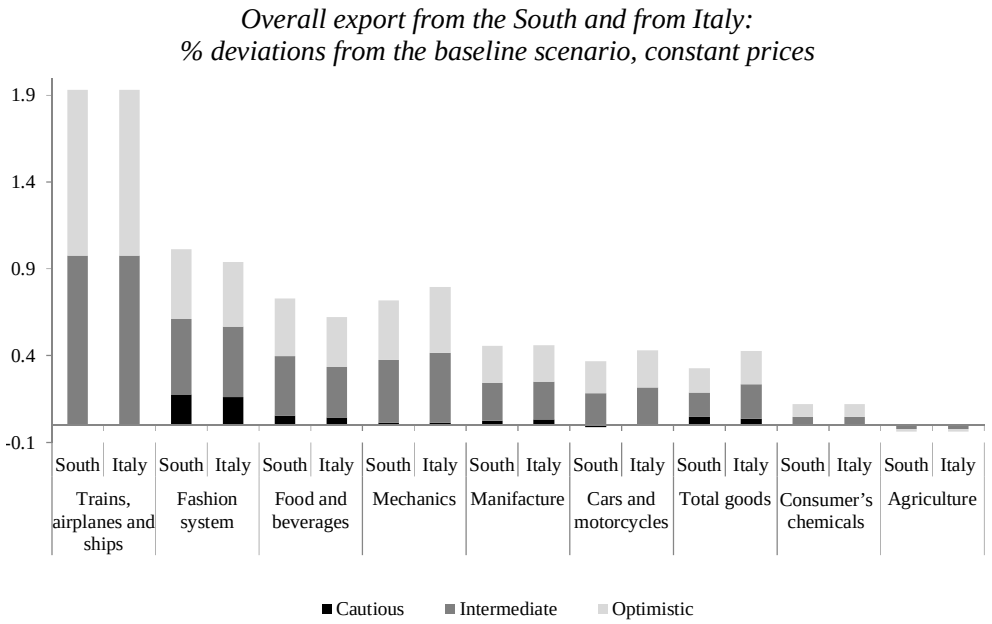


FIGURE 12 - Source: Prometeia elaborations

5. Direct and indirect effects on economy

In the previous paragraph it was estimated the direct impact on the amount of exports after the TTIP signing. The increase of trade, however, causes multiplier effects on the other demand components: the increase in exports between the European countries and the United States has a positive impact on investments and, thanks to the increase of the income, even on household consumption. In order to assess the direct and indirect effects on the Italian economy is necessary to go through an international model that, taking into account the interrelationships between countries, is able to assess the multiplier effects of demand within the countries and the effects arising from the growth in the global trades. The impact of these changes on the Italian and more specifically on the two Italian macroregions depends on a number of factors: the degree of openness of the outlet markets, the type of goods that these latter are importing and the flexibility of their imports to the aggregate demand. Therefore an increase in the other countries' GDP has positive effects on the Italian economy, firstly by increasing the export and secondly through the activation of the different components of domestic demand. Among these, the ones which receive the largest boost from the increased exports are investment although the increase in demand, through employment growth, reflects positively on household consumption which helps to stimulate further investment growth. Thanks to these multiplier effects the final impact on the economic activity is greater than that related directly to the increase in exports.

The simulation of the direct and indirect effects, modulated on the three hypotheses (see above), was performed using econometric Prometeia models on the international economy, on the Italian economy and on the local Italian economies.

Table 3 provides the main results of the analysis three years after the agreement's signing. Which is the necessary time, in fact, to achieve the effect at "operating speed", that is to say for the impact of TTIP to unfold completely.

As it would be reasonable to expect, the more extensive is the process of trade liberalization, the greater is the impact on the main economic variables. Moreover, even considering the full effect, the only reduction of duties, which would have a relatively higher impact on the export from the South, would imply marginal effects on the economy of Italy as a whole and on its macro-areas. By contrast, the optimistic scenario, i.e. the one characterized by a broad liberalization of trade, foreshadows a significant effect, equal to about 0.5% of Italian GDP. In this scenario, the North-Center is relatively more advantaged (+0.53% compared to the hypothesis of the absence of the agreement): on the one hand, in fact, the area bears overall higher trade barriers than in the South and therefore would receive the greatest benefit from their cancellation on the other hand, the greater export orientation of the North-Center compared to the South helps strengthen the activation of the investments. The multiplier effects that lead to an increase in employment (+0.18% in the South, in the North-Center +0.19) and in household consumption (+0.04% for both the macro-areas) act in a substantially homogeneous way. These percentage deviations result in an increase in absolute terms that, for the North-Center is nearly 6 billion in terms of GDP and reaches 34.000 units in terms of total employment, while the gain for the South –

always considering the full effect within the optimistic scenario, would be much lower, approximately 1 billion of GDP and 10 thousand job units.

The economy of the South, North-Center and Italy:
% deviations from the baseline scenario,
constant prices three years after the signing of the treaty

	Cautious		
	South of Italy	North-Center of Italy	Italy
GDP	0.04	0.04	0.04
Export	0.22	0.16	0.17
Gross fixed capital formation	0.09	0.10	0.10
Household expenditure	0.01	0.01	0.01
Total employment	0.02	0.02	0.02
	Intermediate		
	South of Italy	North-Center of Italy	Italy
GDP	0.17	0.25	0.23
Export	0.74	0.94	0.92
Gross fixed capital formation	0.49	0.53	0.53
Household expenditure	0.02	0.02	0.02
Total employment	0.07	0.08	0.08
	Optimistic		
	South of Italy	North-Center of Italy	Italy
GDP	0.37	0.53	0.49
Export	1.23	1.64	1.60
Gross fixed capital formation	0.90	0.98	0.96
Household expenditure	0.04	0.04	0.04
Total employment	0.18	0.19	0.19

TABLE 3 - Source: Prometeia elaborations

Economy of the South and the North-Center within the optimistic scenario,
three years after the signing of the treaty:
absolute deviation from the baseline scenario, constant prices, in million of € and for the employment in millions of units

FIGURE 13 - Source: Prometeia elaborations

APPENDIX

Below is the commodity classification used in the analysis (par. 3 and 4).

Agriculture	**Metal products**
Mining	Metal building material
Food and beverages	Metal products
Meat	Metal household products
Food, other	**Mechanics**
Fruit and Vegetables	Weapons
Oils and greases	Machines for mechanical energy
Milk and dairy products	General-purpose machinery
Food: intermediate	Agricultural machinery
Beverages	Machine tools
Fashion system	Special purpose machinery
Textile	**Electronics**
Clothing	Microelectronics
Knitwear	Computers and peripheral units
Leather and Tanning	Telecommunication equipment
Footwear and leather goods	Consumer electronics
Chemical intermediates	**Electromedical and precision engineering**
Basic chemicals	Measuring instruments and watches
Chemical intermediates for the industry	Electromedical devices
Chemical fibers	Optical instruments and photographic equipment
Consumer's chemicals	Medical and dental instruments and supplies
Other intermediates	**Electrical engineering**
Wood and wooden products	Equipment for the generation and transmission
Paper	Electrical equipment for industrial use
Paper products	Wires and cables
Rubber and plastic	Lighting
Farmaceuticals	Electrical equipment for industrial use
Basic pharmaceutical products	**Household appliances**
Pharmaceutical preparations	**Cars and motorcycles**
Petroleum products and coke	Motor vehicles
Products and building materials	Parts and components
Glass	Motorcycles and bicycles
Ceramics	**Trains, airplanes and ships**
Non-metal building material	Ships and boats
Metallurgy	Locomotives and rolling stock
Iron and steel industry	Aircraft, spacecraft and related devices
Tubes, foundries etc.	**Furniture**
Non-ferrous metals	

CHAPTER V

TERRITORIES, LOGISTICS SERVICES AND INFRASTRUCTURES: A SURVEY OF THE STATE OF MANUFACTURERS[1]

1. Foreword

Logistics (which includes transport[2], storage, distribution, handling of goods and the management of related information flows) has a major importance in the economy for its impact on GDP, for the absorption of employment and especially for the impact that it may have on the competitiveness of the national production system. According to Istat data available for 2010 the transport and storage branches produced 5.6% of the added value of the country and they employed 4.1% of the total workers. An efficient functioning of the phases of supply, storage and distribution of goods reduces business costs, facilitates the planning of the production cycle, gives reliability to the relations between firms and promotes exports[3].

This is the main reason why it is important to have information on the cost of logistics services, on the way in which they are carried out and on the factors that may influence their functioning. To date there has been little evidence in the literature of these aspects. This is mainly due to the fact that in our country there are no broad and systematic surveys designed to collect and describe the opinions of users about these aspects. Most of the works available are based on surveys conducted into the different categories of logistics operators that represent the supply. Demonstrating important information that must be integrated with the point of view of demand. The main aim of this work is to fill this gap by using the results of a survey carried out by the regional subsidiaries of the Bank of Italy in 2012 into a large sample of industrial firms. Compared to other works based on specific surveys into the suppliers (see par. 2), the survey we have done has taken into account a high number of manufacturers located throughout the national territory while other works usually focus on a lower number of firms located in specific regions or areas.

This has allowed us to reliably evaluate the bearing of logistics costs on the total costs of user firms and to collect their opinions about the quality of the logistics

[1] This work was written by Enrico Beretta and Andrea Migliardi (Bank of Italy, Genoa branch). It reflects the authors' opinions and no committment on its content is expected on behalf of the institution they work for. The authors would like to thank Antonio Accetturo, Luigi Cannari, Paolo Sestito, Alessandra Staderini and an anonimous referee for the valuable suggestions they have given.

[2] The survey is mainly concerned with the analysis of logistics and transport. In this text we will refer to logistics in general for simplicity's sake. The survey is comprised with both the costs of internal logistics activities and with those paid to external logistics operators.

[3] In Beretta *et al.* (2011) we can find an analysis of these aspects as well as information on the positioning of our country according to the Logistics Performance Index of the World Bank, on the in-depth analysis regarding the Italian Industrial Federation and the Government, who published a National Plan for Logistics in 2010 and a series of in-depth analysis studies in 2011.

services they use as well as the problems connected with them[4]. This work also allows us to provide reliable information on a large-scale area, so as to highlight the varied efficiency of logistics in the different territories.

The second aim of this work is to connect the information from the Bank of Italy survey with the different types of indicators available in the literature and related to the supply of infrastructure as well as to the accessibility of territories. The prerequisite to this comparison is to be found in the assumption that if areas are more easily accessible and connections more efficient, ceteris paribus, producer firms should benefit from better and cheaper logistics services. Through the use of different types of indicators[5] we can notice that logistics costs are generally higher in the South than in the North and that in the South the values of accessibility indicators are lower.

The chapter is organized as follows: paragraph 2 summarizes some literature references about logistics costs analysis and infrastructure facilities of the territories. The next section outlines the three main profiles surveyed by the Bank of Italy: a) incidence of logistics costs on the total costs that firms bear, b) firms' opinions on the factors that may influence the effective functioning of logistics, c) level of outsourcing of logistics. The fourth section describes some of the main indicators of infrastructure facility and accessibility available in the literature which, in the fifth section, are descriptively compared to the costs and problems of logistics at a local scale as outlined by Bank of Italy. It can be expected that logistics costs are negatively correlated with the availability of efficient infrastructure and that the feedback on factors affecting the functioning of this branch may be more favorable in contexts where efficient transport networks are available. That section will also present some econometric estimates aimed at outlining an analytic study of the operations of the different characteristics identified. The sixth section presents some conclusions.

2. Some food for thought in the literature

Many different studies available in the literature are comprised of surveys similar to the one on which this work is based. But they either concern a lower number of firms (i.e. Transitects of Regione Veneto, 2012) or address simultaneously suppliers, carriers and logistics operators (i.e. Appetecchia and De Ascentiis, 2009; Bergantino, 2007; Freight Leaders Council, 2008). More analytic information is available regarding the situation of some foreign countries: i.e. in France every five years the INRETS carries out surveys into a high number of big manufacturers and wholesale trade firms on similar aspects to the ones we deal with here.[6]

Regarding the infrastructure facility indicators it is useful to refer mainly to the work of Bronzini *et al.* (2012) which, apart from outlining the different types of

[4] It is also interesting to compare the opinions of the users with those of the suppliers: the authors of a previous work (Beretta et al. 2011) analyzed Italian logistics hubs based on a survey of the carriers.

[5] In par. 4 there is a brief analysis of the infrastructure supply and accessibility indicators of the territories.

[6] Guilbault and Soppé, 2004 and 2009.

indicators elaborated in the literature, provides us with a framework of the possible interpretative keys and of the connected limits as well as of the difficulties that arise about possible policy measures. Different contributions, mainly descriptive, have surveyed the relations between the competitiveness and costs of the logistics sector and the accessibility of territories. According to OCSE (2007) investments in infrastructure networks have a significant impact on economic growth and may favor productivity. Their effects are also dependent on the development of the reference territories.

A similar report regarding the US (National Chamber Foundation, 2008) arrives at the same conclusions and highlights the negative effects for exporters (lower competitiveness) and for importers (higher prices of goods to be purchased) that arise from high transportation and logistics costs. According to some authors (i.e. Boscacci-Pesaro, 2002) better quality of logistics services means not only better accessibility of the territories but also higher competitiveness of the manufacturing sector.

Interesting contributions to these topics are given by Wilmsmeier *et al.* (2006), Wilmsmeier-Hoffmann (2008), Wilmsmeier-Sanchez (2009) and by the World Bank (2009): these works are mainly concerned with maritime transportation and highlight the negative relations between the infrastructure facility of the ports and the level of freight (that can be interpreted as *proxy* of costs of transport for sea shipments). The first of these works analyses the situation of some Latin American ports and states that higher efficiency and better infrastructure facility of the ports reduce the cost of freight. The elasticities estimated amount to -0.38 and -0.24 (an increase of 1% in the facility indicator results in a 0.24 reduction of the costs of freight)[7].

3. The Bank of Italy survey of costs and problems of the logistics services

3.1 The survey of user firms of logistics sectors

In the "survey of industrial and service firms"[8] carried out by regional subsidiaries of the Bank of Italy between march and may 2012 (henceforth *Invid*) there is a monographic section dedicated to logistics and transportation[9] that addresses half of the sample of the industrial firms. The section has been written up by 1200 manufacturers[10]: a large and variegated sample (in terms of territories and industrial sectors) represented by the views of user firms of logistics and transport services rather

[7] The different models used in a *cross section* on almost 76 thousand observations take into account also the typical explicative variables that influence maritime transportation costs such as distance, unit value of the goods, volumes transported, type of good and trade exchange between the countries.

[8] The "survey of industrial and service firms" are carried out yearly by the regional subsidiaries of the Bank of Italy. Further information is available at:
http://www.bancaditalia.it/statistiche/indcamp/indimpser.

[9] The text of this section is attached to this work.

[10] The firms of the sample are distributed as follows: 281 in the North West, 227 in the North East, 280 in the Center, 412 in the South. The distribution according to size is as follows: 451 firms with 20-49 workers, 466 firms with 50-199 workers, 235 firms with 200-999 workers and 48 firms with 1000 workers or more.

than by the transport operators' opinions on which most of the literature is focused. The survey has mainly focused on the three following profiles: a) the effect of the logistics burden on the overall costs born by firms; b) the views of industrial firms on the role played by some factors in favoring or obstructing the efficient functioning of logistics and, as a consequence, the competitiveness of the entire productive sector, c) the actual and prospective level of outsourcing in logistics by manufacturers. The main indications arising from the survey are briefly described below.[11]

3.2 Logistics cost

According to the survey, logistics costs influence total costs of firms by 5,7% at a national scale (tab. 1). This figure is generally lower for medium firms but considerably higher for the bigger ones depending on the territorial width and dispersion of their trade relations. Logistics costs are high for the firms that produce traditional goods (textiles, apparel and edibles) and for staple industries (chemicals, minerals handling, metallurgy) also due to the high ratio between weight and value of the goods produced; these costs are lower for the productions with a higher value added such as mechanics and electronics.

At a local scale, the influence of logistics costs is considerably higher in the South (7,8%, tab. 1) due to the further distances to be covered in order to reach the main markets, the problems arising from the choices of the firms in terms of infrastructure availability, cost and quality of the services as well as the different territorial composition of the firms. The North East, on the other hand, is the area where logistics costs are the lowest (4,8%), followed by Central Italy (5,2%).

The differences in average logistics costs depend partly on the non homogeneous composition of the local manufacturing network. Since logistics costs vary according to the dimension of the company, his sector of activity and the distance from its trade counterparts it stands to reason to assume that the different average configuration of these factors may explain some of the differences in the influence of logistics costs. To account for this phenomenon, we have built a comparison between the macro areas simulating a homogeneous composition of the industrial network according to manufacturing and export-oriented types of industry. To this end, we have divided the universe of manufacturing of each macro area into 24 cells, based on the parameters outlined[12], and for each cell we have calculated an average influence of logistics costs. Then we have calculated the value of this influence for the entire area as the weighted average of the 24 values of cell. The weight given to each cell is determined by the number of firms that are active there not at a local but at a national scale. The result of this exercise is shown in the right-hand part of fig. 1. The composition of

[11] The sample data was made by attributing to each firm a weighting coefficient that takes into account the relation between the number of units measured and the number of units present in the universe of reference in terms of size class, geographical area and sector of economic activity.

[12] To avoid having empty cells, or cells containing too few observations the allocation has occurred on the basis of two dimensions (up to 49 workers and 50 and more), six macro sectors of activity and two types of conditions with regard to export (considering as export-oriented firms the ones that gain at least 30% of their turnover on foreign markets).

the productive fabric being equal, the influence of logistics costs on the overall production costs remains the same in the South, decreases in the North East and in the North West and increases in the regions of Central Italy.

3.3 The factors that influence logistics efficiency

The manufacturers of the sample have given their views on the role played by many factors in favoring or obstructing the good functioning and efficiency of the logistics services they use. For each of the eight factors that are listed below the manufacturers were asked to say how it influenced the functioning of logistics at a scale from 1 (very negatively) to 5 (very positively). Tables 2 and 3 summarize the answers of the firms sorted by geographical area and dimension of the company, using three levels of assessment (negative, neutral, positive)[13].

At a national scale, the factor on which the highest number of negative answers focused was the costs of transport: more than three quarters of the sample (with negative peaks in the South and for smallest firms) consider them a problem. The views of the firms on *availability, quality and efficiency of road and rail infrastructure* are negative for almost half of the sample. About 40% of the firms has stated negative views on *accessibility of urban centers* (with higher percentages in the North), even though 57% of the sample rated it as neutral. The 37% of the manufacturers has negatively rated the *functioning of intermodal hubs*, with higher percentages for bigger and southern-based firms; half of the sample, however, rates this factor neutrally for the efficient functioning of logistics. The views on *length and predictability of deliveries* were mainly neutral (39% of the sample) and negative (37%) and considerably heterogeneous according to macro areas and firm size (the views are less positive for southern and bigger firms). The *functioning of customs* is not perceived as a disadvantage for the functioning of logistics: a quarter of the sample rates it negatively but 56% of the firms rates it neutrally. Positive ratings can also be found, especially in the North and in medium size firms. *Availability and distribution of logistics hubs on the territory* is not perceived as a problem either: half of the sample rates it neutrally and more than 30% of the firms rates it positively (a high number of firms in the South rates it negatively). Finally, the factor that is most positively rated is *traceability of goods flow* for which neutral and positive rates prevail (47% and 45% of the firms respectively); this factor is rated less favorably by big and Southern-based firms.

Figures from 3a to 3h represent the differences according to macro areas in the views of manufacturers on the factors that influence the efficiency of the logistics chain. Further specific opinions can be identified and analyzed on the functioning of hubs (penalizing in the North Western and Southern territories), on the length and predictability of timings (rated more positively in the North Eastern and Central territories), on the functioning of customs (most negatively rated in the North Eastern regions) and on the availability of logistics hubs.

[13] The answers “very negatively” and “negatively”, as well as “positively” and “very positively” have been merged into one to make the description easier to follow.

The situation changes if the comparison is made under the assumption of a homogeneous composition of size, sector and propensity to export of the manufacturing network, in a manner similar to that illustrated in par. 3.2. As illustrated on the right-hand side of the figures, in this configuration the average view of the firms tends to get worse for most of the variables surveyed in the Center-North regions while it tends to improve in the South.

Both for Italy and for the single areas it is right to read the results obtained from the surveys that address logistics services users with the ones that report the views of carriers, who are their commercial counterparts. Manufacturers are mainly concerned about the costs of transport while professional logistics operators and carriers focus their attention on the bottlenecks that influence their operability. According to the survey carried out into a sample of carriers (Beretta *et al*., 2011) they rate the cost of transport as a medium level problem and assign customs procedures the poorest ratings together with transport reliability and transport infrastructure quality. The different opinion about the problems reflects the fact that most of the time manufacturers outsource a relevant share of logistics functions, as reported below.

3.4 Outsourcing logistics functioning

The last boundary surveyed concerns the use of outsourcing for the execution of logistics services on behalf of the manufacturers. In Italy more than 70% of the firms of the sample resorts to at least one external supplier for logistics services (fig. 2). The share of firms that outsource part of the logistics increases with the increase of the company's size, the complexity of the functions to manage e the wider territorial articulation of its trade. The firms that resort to outsourcing, however, maintain a share of in house logistics activities and services (about 46%). The data ostensibly reflect the normal resort to outsourcing for most of the activities linked to the transport of goods which is also due to the competitive conditions at which the transport service is carried out while other functions are better conducted in house. Firms that outsource logistics services seem generally satisfied with the choice: almost all reported that, over a period of three years, they intend to retain unchanged or increase the share of outsourced logistics activities currently conferred.

As far as the national composition of the manufacturing network is concerned (see Par. 3.2), the situation of the territories does not change significantly. In all areas, with the exception of the North East, there is and increase in the share of the outsourced functions for firms that have decided to outsource.

4. Facility indicators and infrastructure accessibility

Transport infrastructures are a precondition for the competitiveness of the production system; investments made in them also exert direct and indirect macroeconomic effects of large scale (cfr. Di Giacinto *et al.*, 2011). It is therefore important to have objective measures for the infrastructural facilities of the individual

territories and for their actual accessibility, which is only partly dependent on the amount of infrastructures present in them.

The literature has developed several indicators to measure the physical infrastructure equipment based on variables such as GDP, population and territorial size (Istituto Tagliacarne – Unioncamere, 2012). These indicators, though, are influenced by the variable chosen for the standardization and do not take into account the geographical position of an infrastructure in respect to the market of its potential users.

There are some alternative indicators that focus more on the accessibility of an area rather than on the analysis of its mere physical equipment. They refer to the interconnections with local target markets for its productions[14]. Local accessibility can be divided in two components: (1) the time necessary to access the primary network of transport (road and rail long haul communication routes), (2) interconnection with target markets.

Component (1) can be analysed through an indicator elaborated by Isfort (2006) and based on the connection timings between the single Local Labour Systems (LLS) and the nearest hubs of the primary network (airports, ports, tool booths, railway stations)[15]. As far as Component (2) is concerned, some studies of Bank of Italy (Messina, 2007; Alampi-Messina, 2011) have elaborated interconnection indices with national target markets for each province. They are based on esteems of the average times needed to reach the other province capitals that represent the local target markets for goods and services and whose economic relevance is approximated by the provincial added value. These indices are based on the idea that road transport infrastructures for goods are as efficient as their capacity to shorten transport times towards the target markets, geographical distance being the same. These indices, inspired by the analytic scheme of the New Economic Geography, are available both for road and rail transport.

Facility infrastructure of the territories. – According to the data available in Tagliacarne-Unioncamere and referred to the 2011 road network, in Italy there is considerable variability in the facility infrastructure of the areas and regions. If we set the national value at 100, the North West turns out to be the area with the highest value (114.6), followed by the North East (106.5) while the Center (97.3) is slightly below the national average and the South has a lower value (88.1). The analysis that we do is focused on the provision of road network since the vast majority of goods are distributed in the country by road transport. However, if we include the data referring

[14] Bronzini *et al.* (2012) provide a broad overview on the indices of infrastructure facility and accessibility available,illustrating the methodological differences between them and their limits of information, of which it is necessary to take account especially when they are aimed at outiling a policy.

[15] Isfort index aggregates infrastructure accessibility (proxy of offer) and "hierarchic" accessibility (proxy of the volumes handled). The former is calculated on the basis of availability and dimensions of the hubs dedicated to the transport of goods, which constitute the main connection gates of the LLS to the transport network. "Hierarchic" accessibility is calculated on the basis of volumes handled in the LLS (goods, passengers, tolls) taking into account the effective demand of the territory. For further information, see Isfort (2006).

to the railway network[16], the lower-than-average level of the South is confirmed, while the positioning of the Centre is significantly better.

Accessibility of the territories to the primary network of transport. – If we consider the normalized values (Italy = 100) of the index of accessibility to the primary network (Isfort) a high value stands out in the North West, where it outranks the national average by almost 30%. The value turns out to be high in the North East as well (116,9) while on average in the Center and below average in the South (83,4 – fig. 4); no Local Labour System of the Center and the South is ranked among the first 50 of the country according to accessibility.

Interconnection of the territories with national markets. – The indicator elaborated by Alampi and Messina as to the transport of goods in 2008, the national value being 100, registers values above the national average in the Center-North while the value of the South turns out to be 90.5. The North-West (103.7) registers the highest value followed by the North-East (103.3). The analysis proposed in figure 5 highlights that there has been a progress over time in the provision of infrastructure facility for road transport, mainly in the Northern and Central areas that are more centrally located with respect to the main markets and in particular along the main arteries of international traffic. The differentials in the provision of the single areas have not changed significantly over forty years: the situation of 1970 shows a difference between macro areas that is almost equal to that of 2008 though with lower values for all of the areas.

5. Territories, infrastructures and opinions of the firms on costs and problems of logistics

As mentioned in the beginning, the functionality and efficiency of the infrastructure network is necessary, though not sufficient, to ensure the quality of logistics services. It is therefore useful to analyze the correlations between the opinions of firms about costs and problems of logistics services (as they emerge from the results of the survey conducted by the Bank of Italy) and infrastructure accessibility in their area of settlement.

We have made two types of descriptive comparison within the landscapes of regions and macro areas: 1) links between logistics costs born by industrial firms and infrastructure facility/accessibility of their territories; 2) links bewtween the opinions expressed by industrial firms about problems of logistics and infrastructure facility/accessibility of their territories. In this way we look into whether and how infrastructure availability and simple accessibility of the area of settlement influence: a) the cost of logistics services used by producers and b) their perceived quality. Due to the big number and micro nature of the data provided by the survey of Bank of Italy it

[16] On the other hand, we do not use the index of total economic infrastructure because it includes also information that is weakly linked to the functioning of logistics in the country and in the macro areas. Apart from port and airports it also includes the bank and telecommunication network facility as well as energetic-environmental plants.

has seemed appropriate to carry out some simple econometric analyses that – thanks to the heterogeneousness of the information available at a single-company scale – have allowed a first analytic study of the links between some of the variables investigated.

5.1 Logistics cost and infrastructure facility/accessibility

The literature highlights that costs linked to the distribution of goods turn out to be lower in the areas where accessibility is higher due to the availability of efficient connections. In order to test this hypothesis we have compared the relation between logistics costs and total costs as reported by the manufacturers that took part in the Bank of Italy survey with the four indicators of infrastructure facility and accessibility described in the previous paragraph. Figure 6 shows the correlations that have been found out and confirms that logistics costs tend to decrease in the regions and macro areas with better connectivity. The four indicators are in agreement about the fact that the situation is worse than average in the South.

Indicators of accessibility to the primary network of transport and above all indicators of interconnectivity with target markets are related to the influence of logistics costs which is much higher than that of the quantitative index of infrastructure facility which carries an expected sign but a low value. This confirms that the simple physical presence of transport infrastructure on a territory is not a sufficient condition for the improvement of the logistic situation of the firms located there. A simple motorway or a railway may give the firms of the territory a reduced service. What is more important is the ability of the infrastructure to shorten the distance between the potential local users and their target markets: this is exactly the aspect that accessibility and interconnectivity indicators try to get.

The relation examined has also been tested through a simple econometric verification made of a set of OLS regressions based on the following model:

$$Ctilog_i = \alpha + \beta_1 Qexp_i + \beta_2 Ddim_i + \beta_3 Dset_i + \beta_4 \boldsymbol{IndInfra}_r + \varepsilon \qquad (1)$$

$Ctilog_i$ being the incidence of logistics costs on the total costs born by company "*i*"; $Qexp_i$ being the share of turnover exported by company "*i*"; $Ddim_i$ is a set of dummy variables which gets the size of company "*i*" (distinguishing between 4 categories: table 1); $Dset_i$ is a set of dummy variables that differentiates firms according to sector of activity (there are 14 sectors of economic activity: table 1); $\boldsymbol{IndInfra}_r$ is a vector defined according to each region *r* and includes three of the four indicators of infrastructure facility/accessibility outlined before[17]. Since the indicators included in the vector $\boldsymbol{IndInfra}_r$ are defined regionally, we have used neither regional dummy variables nor area dummy variables because they would have got the whole

[17] To avoid extending too much the number of estimates, with reference to the Tagliacarne data, we have used only the index of road facility. However, we have also experimented alternative specifications based on the index of rail facility: the differences turned out to be slight, at least for the main results. The three indicators have been inserted one by one in three equations solved separately. It was not possible to merge them into one because of the high correlation between them, which would have resulted in multicollinearity problems.

variance even though the latter would have been less seriously affected by this problem. This choice was made because of the big difference between the macro areas of the country (especially between the Center-North and the South) in terms of infrastructure facility and accessibility of the territories. The econometric analysis has been carried out by referring exclusively to the whole national sample. Finally, since the dependent variable is defined at single-company scale while the vector $\boldsymbol{IndInfra}_r$ is defined at regional scale we have clustered standard errors by regional scale.

The exercise (table 4) shows that the parameters of infrastructure facility, accessibility and interconnectivity are all negative, as expected. This confirms that these factors tend to limit the incidence of logistics costs. The parameter is statistically meaningful only for the interconnectivity index but such would be also the accessibility one if there wasn't any regional clustering.

These results confirm the ones arisen from the descriptive analysis. They reaffirm that indices of interconnectivity (and, partly, the ones of accessibility) have a higher explanatory power than those of mere provision in outlining the ease/difficulty – here represented by the relative costs of logistics – that firms face in carrying out the logistics function.

5.2 Logistics problems as perceived by firms and infrastructure facility/accessibility

The second type of survey has compared the views of firms on some factors that can influence logistics with the different indices of territorial facility/accessibility. Among the factors analyzed in the survey we have chosen to focus our attention on the ones that may be more directly relevant to the condition of infrastructure: availability of road and rail infrastructure, of multimodal hubs and logistics centers; accessibility of urban centers; costs, length and predictability of transport times. An ex ante estimate suggests a positive correlation: positive opinions on the role played by the factors used in the survey should arise from objective conditions of better reachability of the territories.

Our assumption has indeed found confirmation: for each of the three main infrastructure indicators the correlations with the average opinions of the firms about logistics profiles have marked the expected sign (figure 7). In almost all the cases of the South low levels of infrastructure indices are associated with a weakness of the logistics factors. The regions of the Center occupy a middle position while those of the North-East and North-West are ranked quite highly both for infrastructure indices and for the opinions about the factors that influence the functioning of logistics. As far as the indicators of accessibility to the primary network of transport are concerned, the highest correlations regard the availability of logistics centers and multimodal hubs as well as length and predictability of transport times. This appears to be coherent with the indicator Isfort which represents a way to measure how easy it is to reach the hubs, the doors to the primary network of transport of goods.

Indices of interconnectivity with national markets are linked to the opinions that the manufacturers of the sample have expressed about all the factors that usually obstruct logistics except accessibility of urban centers. This is due to the fact that, according to the way in which the interconnectivity index is designed, this variable does not seem to be

relevant. Generally speaking, accessibility of urban centers is the least correlated variable even if we take into account the other infrastructure indicators. On the one hand, this could be due to the low dispersion of the opinions that characterizes this factor; on the other, negative opinions about this factor arise mainly from normal congestion, which is impossible to solve by simply improving infrastructure facilities.

Once again, the relations surveyed have been tested with the help of a simple set of OLS regressions that have the following form:

$$\boldsymbol{ValutLog}_i = \alpha + \beta_1 Qexp_i + \beta_2 Ddim_i + \beta_3 Dset_i + \beta_4 \boldsymbol{IndInfra}_r + \varepsilon \quad (2)$$

$\boldsymbol{ValutLog}_i$ being a vector that comprises all the opinions of the company *i* about the profiles of logistics efficiency examined, while the definition of the other parameters is equal to that of equation (1). Once again, standard errors have been clustered at regional scale. Since the opinions expressed by the firms (on a scale from 1 to 5) grow higher according to how much that factor is thought to be responsible for the efficiency of the supply chain, we expect to find a positive relation.

Table 5 shows four sets of regressions carried out by using different dependent variables based on the opinion of the firms on the condition of: a) roads and railways, b) multimodal hubs, c) availability of logistics centers, d) timing and reliability of transport. In the descriptive analysis these four profiles turn out to be more strongly linked to the infrastructure facility and accessibility of the territory where the company is based. Even if we take into account all the tests described our a priori assumption is still confirmed: the signs given to parameters of infrastructure facility and accessibility are still positive. The index of road infrastructure facility is positively and significantly linked to the opinions of the firms about quality of road and rail infrastructure, logistics centers and transport times. The index of accessibility to the primary network of the region positively reflects on the opinions of the local firms about the availability of logistics centers. The index of interconnectivity with the markets positively reflects on the opinions of the firms about the functioning of multimodal hubs, the availability of logistics centers and times/reliability of transport.

In the light of these results we can conclude that there is substantial coherence – also statistically significant – between the indices of infrastructure facility and accessibility of the territories and the opinions of the firms there located.

6. Conclusions

Efficient functioning of the logistics industry represents a crux to the competitiveness of the country because it reflects on the costs born by manufacturers. In Italy the logistics system is affected by problems that can be grouped under three fundamental categories: a) the low interconnection between the different transport networks which obstructs intermodality and is sometimes cause of congestion, especially along the motorway and road network around big urban centers; b) some malfunctions of the overall structure of the logistics chain which reflect on the quality of the services offered; c) specific flaws in programming and regulation.

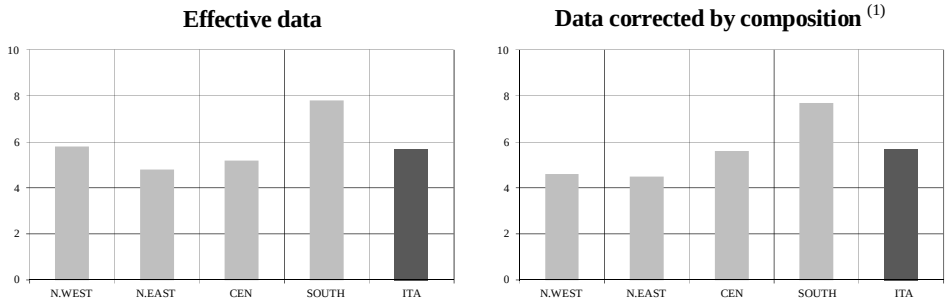
In this framework, a survey carried out by the Bank of Italy in 2012 into a large sample of Italian manufacturers has made it possible to use analytic information about the level of logistics costs born by the production chain and about the opinions of the firms on the main factors that obstruct the functioning of the logistics chain. Such indications can be read simultaneously with those coming from other surveys carried out previously into transport operators[18].

The opinions expressed by the firms about the costs born for logistics, about the condition of infrastructure and the efficiency of transport show a high degree of congruence with the indicators of facility infrastructure and with the indices of accessibility to the primary network of transport and interconnectivity with target markets[19] recently elaborated by the literature. In other words, firms that operate in territories that are more easily accessible and better connected with the target markets tend to bear lower logistics costs and to benefit from better quality services.

[18] Cfr. Beretta *et al*. (2009), Beretta *et al*. (2011).
[19] Cfr. Isfort (2006), Alampi and Messina (2011).

STATISTIC FIGURES AND TABLES

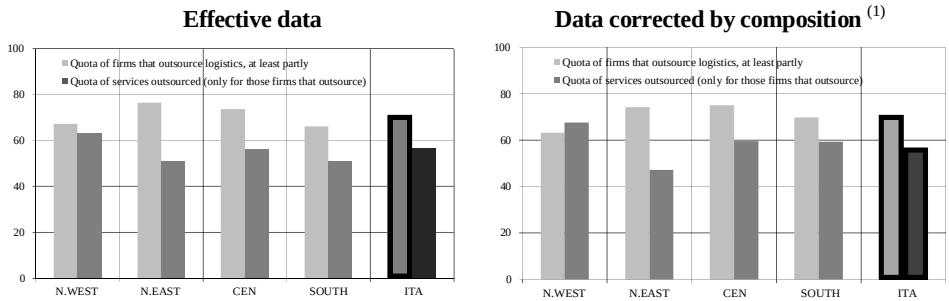
Influence of logistics costs on total costs born by manufacturers according to area (percentages)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 1 - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

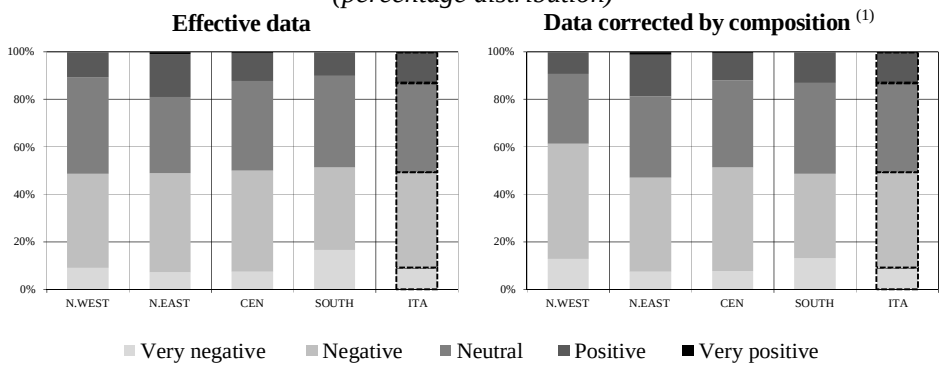
Levels of outsourcing of logistics function, according to area (percentages)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 2 - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

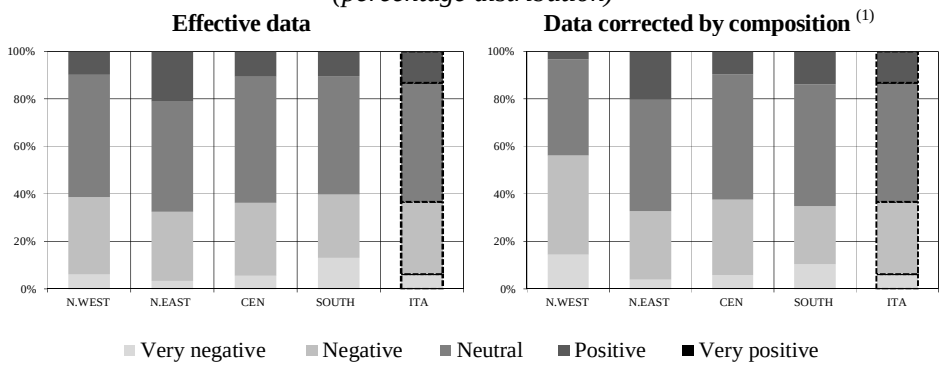
Opinions of the firms on road and rail infrastructure, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3A - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

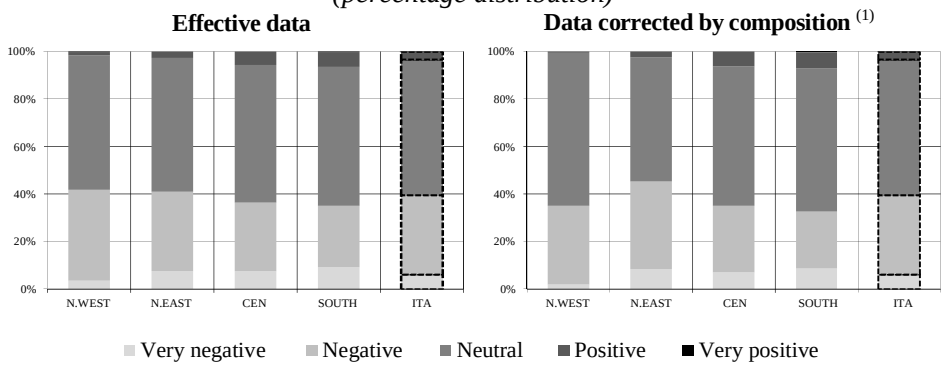
Opinions of the firms on multimodal junctions, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3B - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

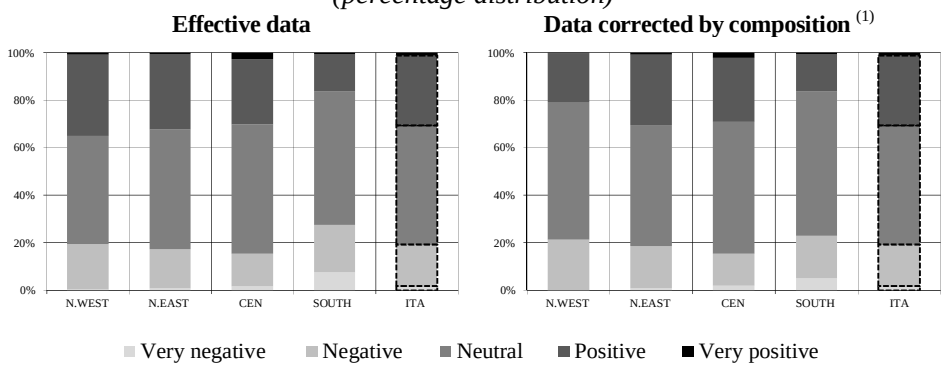
Opinions of the firms on accessibility of urban centers, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3C - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

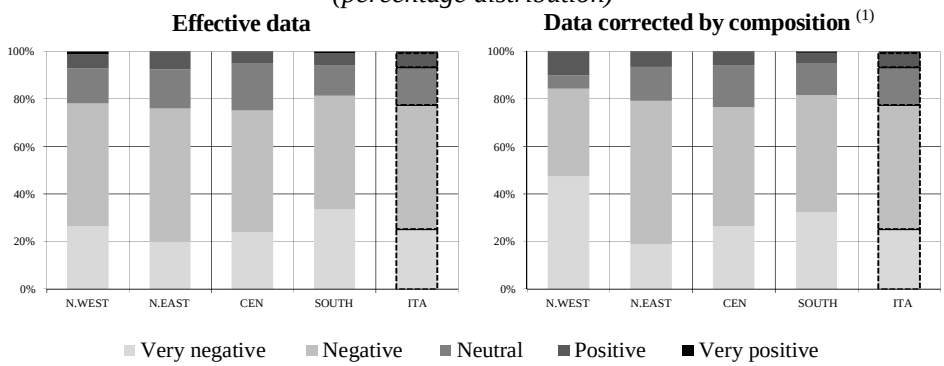
Opinions of the firms on availability of logistics centers, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3D - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

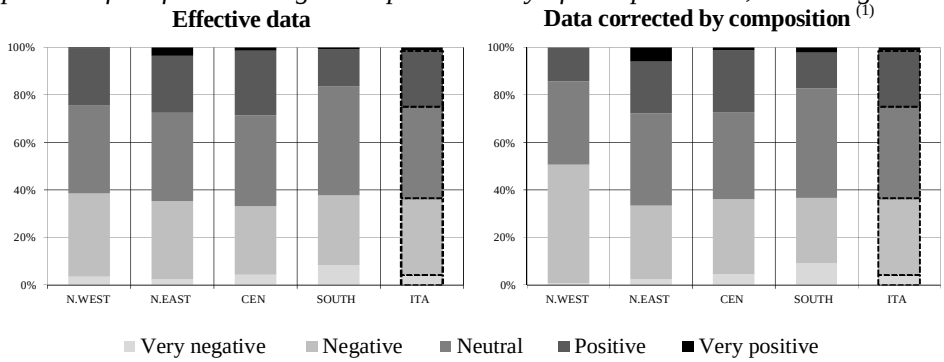
Opinions of the firms on transport costs, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3E - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

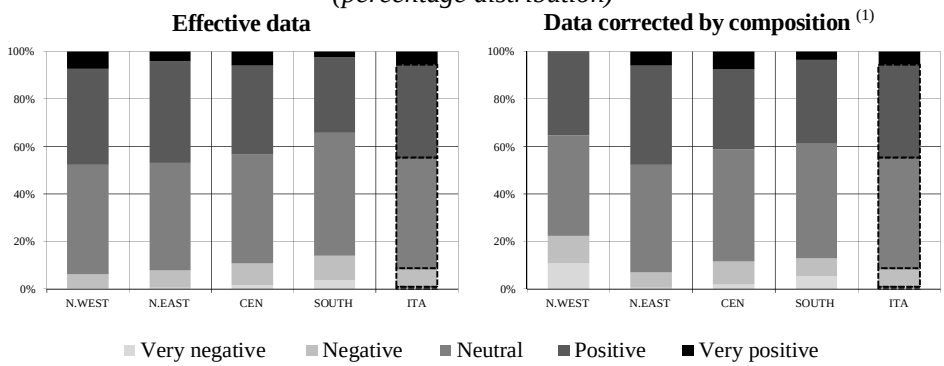
Opinions of the firms on length and predictability of transport times, according to area



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3F - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

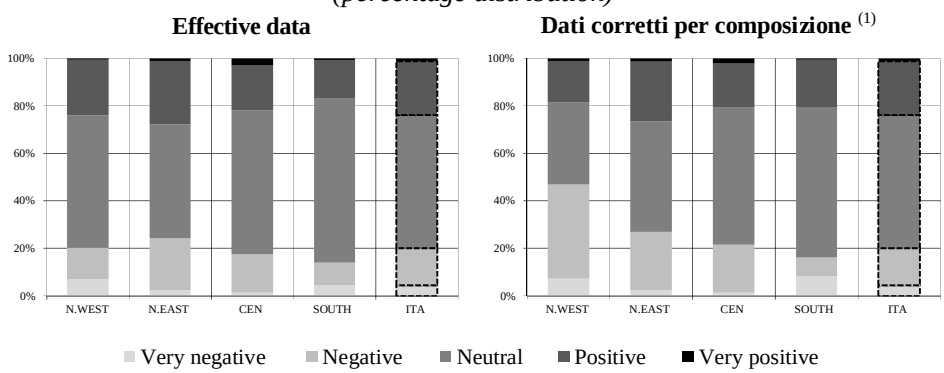
Opinions of the firms on traceability of flow of goods, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3G - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

Opinions of the firms on the functioning of customs, according to area (percentage distribution)



(1) Data calculated for each macro area through reproduction of average composition of sector, dimension and of export quota of the country (see par. 3).

FIGURE 3H - Source: elaborations based on data from the Bank of Italy, *Survey on industrial and service firms* (2012)

Index of accessibility to the primary network – 2006

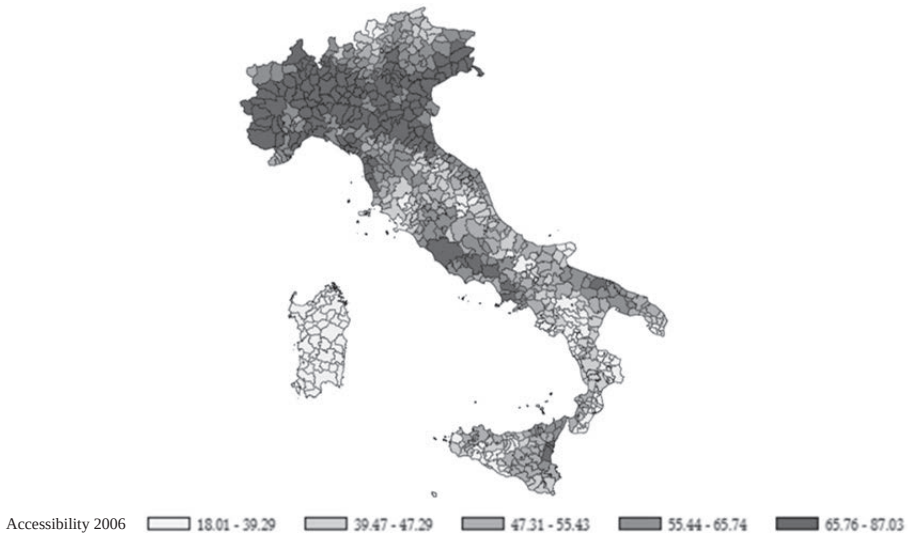


FIGURA 4 - Source: elaborations based on Isfort data

Index of interconnectivity with target national markets (relative to road transport of goods)

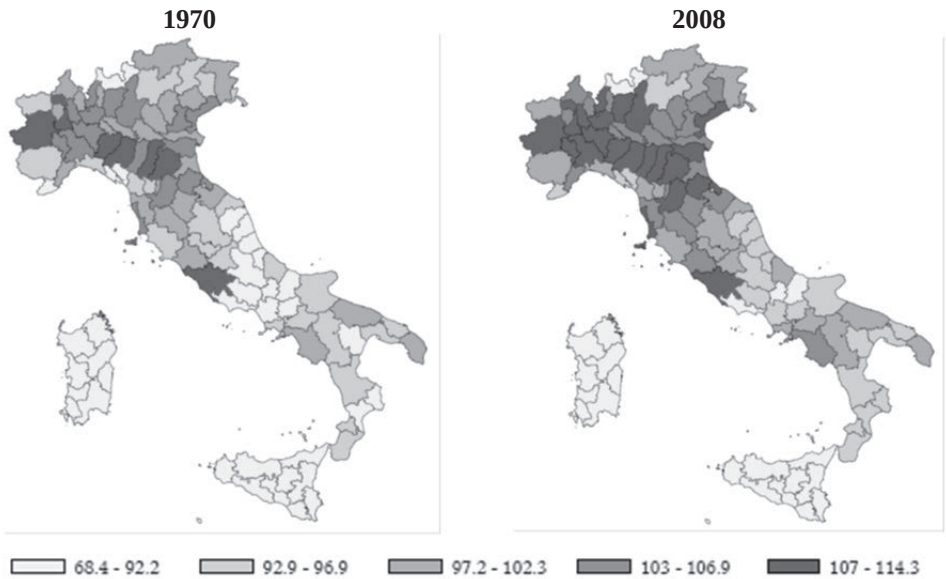
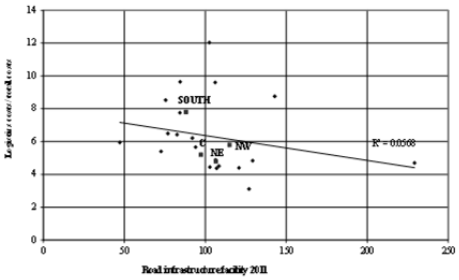


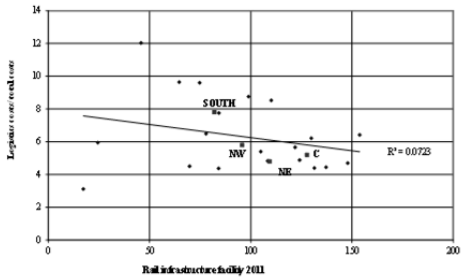
FIGURE 5 - Source: Bank of Italy, *Infrastructures in Italy: facilities, planning and completion*, Seminars and conferences, No. 7 2011; chapter edited by Alampi D., & Messina, G.

Relations between some indicators of regional infrastructure facility and incidence of logistics costs on total costs for the firms of the Invid-logistica survey

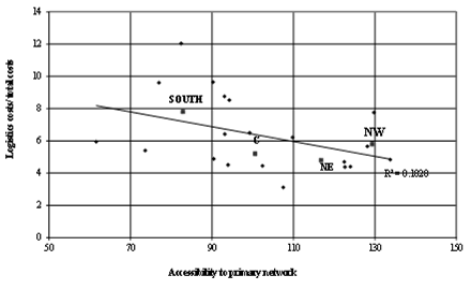
Index of infrastructure facility for road transport (Tagliacarne-Unioncamere)



Index of infrastructure facility for rail transport (Tagliacarne-Unioncamere)



Index of accessibility to primary network of transport (Isfort)



Index of road interconnectivity with national target markets (Alampi-Messina)

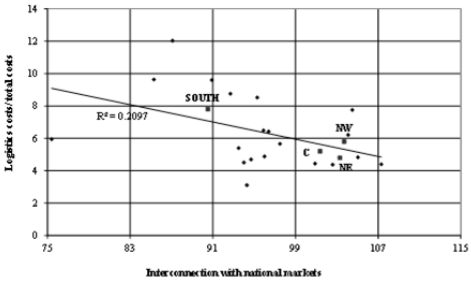
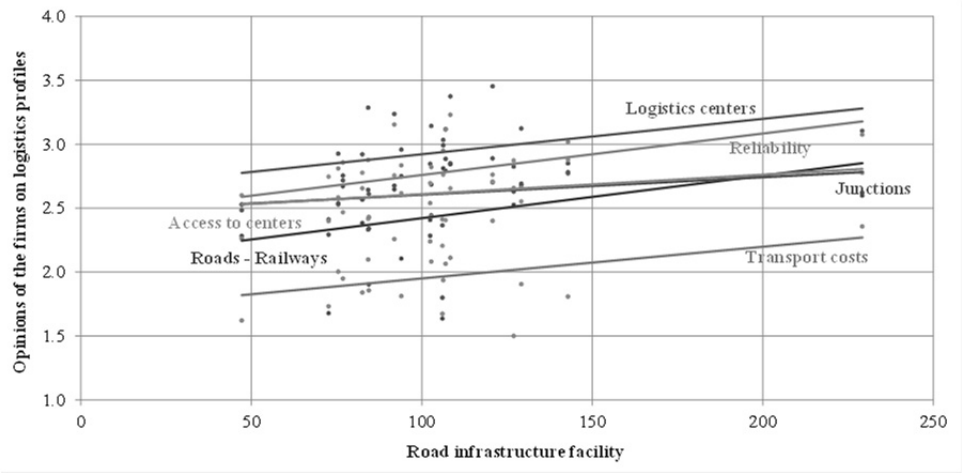


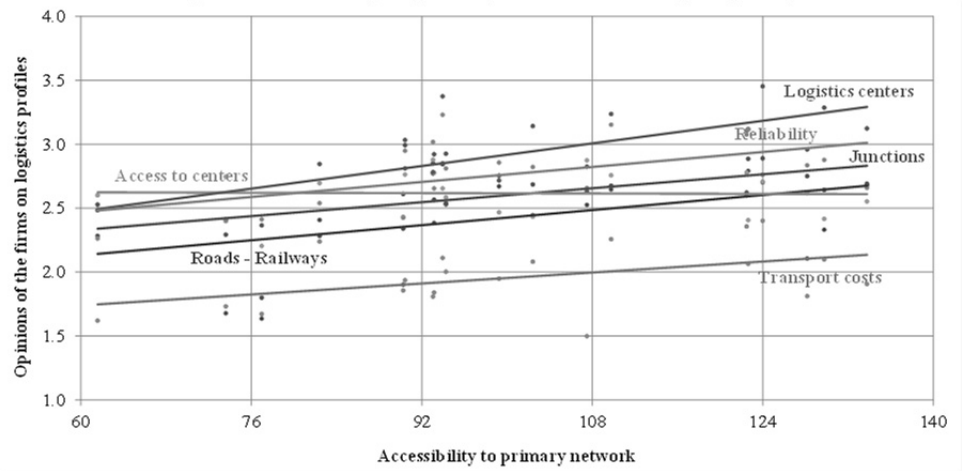
FIGURE 6 - Source: Bank of Italy, *Survey on industrial and service firms* (2012); Istituto Tagliacarne – Unioncamere (2012), Isfort (2006), Alampi e Messina (2011)

Relations between infrastructure facility/accessibility of the territories and opinions expressed by the firms in the Invid-logistica survey

Regional road infrastructure facility (Tagliacarne-Uniocamere)



Regional accessibility to primary network of transport (Isfort)



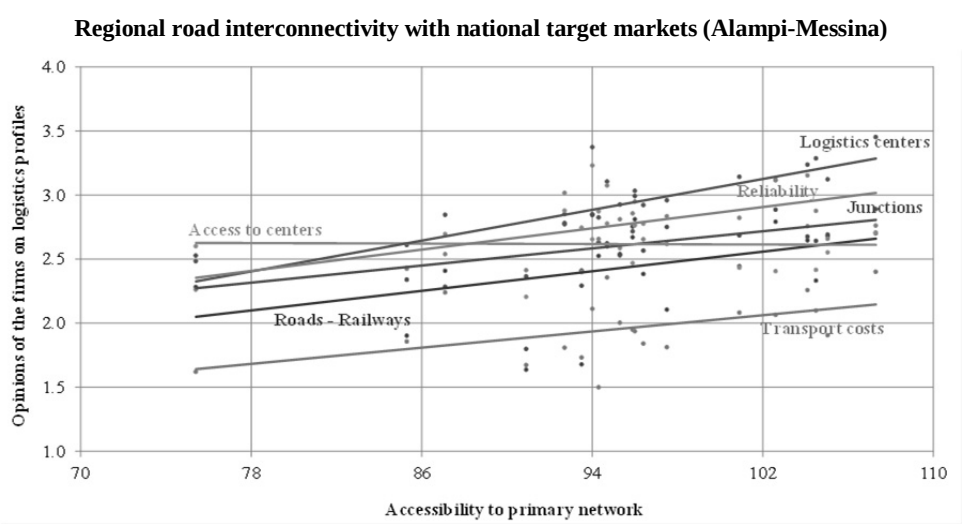


FIGURE 7 - Source: elaborations on Bank of Italy's data, *Survey on industrial and service firms* (2012); Istituto Tagliacarne – Unioncamere (2012); Isfort (2006); Alampi-Messina (2011)

Logistics costs and use of outsourcing
(average incidence and percentage distribution of answers)

Group	Relation between logistics costs and total costs [1]	Quota of firms that outsourced at least part of logistics services in 2011	Firms that outsourced logistics services in 2011			
			Expense quota for logistics services carried out by external operators [1]	Predictions on evolution of quota by 2014		
				Decrease[2]	Stability[2]	Increase[2]
Italy and geographic areas						
North West	5.8	67.4	63.5	5.69	72.96	21.35
North East	4.8	76.4	51.1	0.96	73.78	25.26
Center	5.2	73.8	56.4	5.25	69.83	24.92
South	7.8	66.1	51.1	4.18	71.60	24.22
Total Italy	**5.7**	**70.9**	**56.6**	**4.02**	**72.38**	**23.61**
Size of firm						
From 20 to 49 workers	5.9	69.9	54.0	5.22	69.86	24.93
From 50 to 199 workers	5.3	70.7	62.8	1.35	77.73	20.92
From 200 to 999 workers	5.0	82.9	58.5	2.38	77.44	20.18
1.000 workers and more	6.9	95.7	71.2	1.66	74.25	24.09
Industrial sector						
Food, beverages, tobacco	8.0	80.6	59.5	4.32	65.99	29.69
Textiles, apparel	8.5	67.7	57.3	10.63	67.78	21.59
Tannery, leather goods	3.4	83.6	52.4	3.61	74.33	22.06
Timber and wooden products	2.9	35.9	64.1	7.13	81.29	11.58
Paper, print and publishing	6.7	59.0	69.9	9.67	46.45	43.88
Coke, oil and other fuels	4.3	85.5	82.7	0.00	100.00	0.00
Chemicals, synthetic and artif. fibers	8.2	80.4	63.4	1.23	89.68	9.09
Rubber products and plastic materials	5.3	65.0	51.9	0.00	78.35	21.65
Non-metallic mineral products	8.2	63.9	41.5	9.16	76.10	14.74
Metallurgy and metal products	5.2	69.2	49.9	4.82	66.12	29.06
Machines and mechanical equipment	4.1	79.3	61.6	0.18	68.65	31.16
Electric machines, optical and electronic equipment	3.5	64.5	50.9	4.00	82.73	13.27
Means of transport	4.7	72.0	66.8	0.66	93.72	5.62
Other manufactures	5.2	81.1	69.2	0.00	83.82	16.18
Outsourcing of at least part of logistics services						
Firms that outsource	6.2					
Firms that do not outsource	4.5					

[1] Percentage incidences. – [2] Quota of firms that have provided the answer here required.
TABLE 1 - Source: Bank of Italy, *Survey on industrial and service firms*, 2012 (Possible flaws in the balancing of accounts are due to the approximation of decimals)

Factors that influence the functioning of logistics:Italy and geographic areas (percentage distribution of the answers)

	Negatively [1]	Negligibly	Positively [2]
Availability, quality and efficiency of road and rail infrastructures			
North West	*48.86*	*40.65*	*10.49*
North East	*49.05*	*31.99*	*18.97*
Center	*49.99*	*37.96*	*12.06*
South	*51.43*	*38.41*	*10.16*
Total Italy	**49.50**	**37.50**	**13.00**
Functionality of multimodal junctions			
North West	*38.72*	*51.43*	*9.86*
North East	*32.44*	*46.54*	*21.02*
Center	*36.22*	*53.26*	*10.52*
South	*39.91*	*49.80*	*10.28*
Total Italy	**36.71**	**50.21**	**13.08**
Accessibility to urban centers			
North West	*41.75*	*56.58*	*1.67*
North East	*41.16*	*56.26*	*2.59*
Center	*36.35*	*57.94*	*5.71*
South	*35.21*	*58.52*	*6.27*
Total Italy	**39.58**	**57.04**	**3.38**
Availability and distribution of logistics centers on site			
North West	*19.53*	*45.39*	*35.07*
North East	*17.27*	*50.44*	*32.29*
Center	*15.31*	*54.56*	*30.14*
South	*27.53*	*56.30*	*16.17*
Total Italy	**19.30**	**50.15**	**30.56**
Costs of transport (fees)			
North West	*78.39*	*14.73*	*6.88*
North East	*75.98*	*16.51*	*7.51*
Center	*75.31*	*19.88*	*4.80*
South	*81.51*	*12.66*	*5.83*
Total Italy	**77.58**	**15.93**	**6.49**
Length and predictability of transport times			
North West	*38.67*	*37.19*	*24.13*
North East	*35.35*	*37.16*	*27.49*
Center	*33.27*	*38.26*	*28.48*
South	*37.72*	*45.82*	*16.46*
Total Italy	**36.57**	**38.63**	**24.79**
Traceability (also informatics) of the flow of goods			
North West	*6.39*	*45.97*	*47.63*
North East	*7.84*	*45.44*	*46.72*
Center	*10.99*	*45.73*	*43.29*
South	*14.14*	*51.75*	*34.12*
Total Italy	**8.77**	**46.60**	**44.63**

	Functioning of customs		
Nord Ovest	*20.17*	*55.75*	*24.09*
Nord Est	*24.29*	*48.07*	*27.64*
Centro	*17.65*	*60.46*	*21.88*
Mezzogiorno	*13.99*	*69.27*	*16.74*
Totale Italia	**20.05**	**56.22**	**23.72**

(1) Answers “very negatively” and “negatively” have been merged into one; (2) Answers “positively” and “very positively” have been merged into one.
TABLE 2 - Source: Bank of Italy, *survey of industrial and service firms*, 2012. (Possible flaws in the balancing of accounts are due to the approximation of decimals)

Factors that influence the functioning of logistics: according to size of firm (percentage distribution of the answers)

	Negatively [1]	Negligibly	Positively [2]
Availability, quality and efficiency of road and rail infrastructure			
From 20 to 49 workers	*46.52*	*39.07*	*14.40*
From 50 to 199 workers	*55.75*	*33.94*	*10.31*
From 200 to 999 workers	*54.98*	*36.31*	*8.71*
1.000 workers and more	*52.22*	*33.50*	*14.29*
Functionality of multimodal junctions			
From 20 to 49 workers	*35.09*	*49.93*	*14.99*
From 50 to 199 workers	*39.46*	*51.58*	*8.97*
From 200 to 999 workers	*41.56*	*48.61*	*9.83*
1.000 workers and more	*51.59*	*34.23*	*14.18*
Accessibility to urban centers			
From 20 to 49 workers	*39.24*	*56.82*	*3.94*
From 50 to 199 workers	*40.33*	*57.53*	*2.14*
From 200 to 999 workers	*40.03*	*58.59*	*1.38*
1.000 workers and more	*41.22*	*48.50*	*10.28*
Availability and distribution of logistics centers on site			
From 20 to 49 workers	*19.27*	*48.66*	*32.07*
From 50 to 199 workers	*20.25*	*53.96*	*25.80*
From 200 to 999 workers	*14.35*	*51.66*	*33.99*
1.000 workers and more	*22.31*	*40.17*	*37.52*
Costs of transport (fees)			
From 20 to 49 workers	*78.18*	*15.50*	*6.32*
From 50 to 199 workers	*76.29*	*16.52*	*7.18*
From 200 to 999 workers	*77.08*	*17.47*	*5.44*
1.000 workers and more	*70.96*	*24.68*	*4.36*
Length and predictability of transport times			
From 20 to 49 workers	*35.94*	*37.16*	*26.91*
From 50 to 199 workers	*37.96*	*41.11*	*20.93*
From 200 to 999 workers	*36.17*	*47.09*	*16.73*
1.000 workers and more	*51.60*	*24.53*	*23.87*
Traceability (also informatic) of the flow of goods			
From 20 to 49 workers	*8.03*	*44.24*	*47.73*
From 50 to 199 workers	*9.61*	*53.39*	*37.00*
From 200 to 999 workers	*12.89*	*45.85*	*41.25*
1.000 workers and more	*20.68*	*27.72*	*51.60*
Functioning of customs			
From 20 to 49 workers	*18.94*	*57.38*	*23.69*
From 50 to 199 workers	*21.17*	*55.40*	*23.42*
From 200 to 999 workers	*28.56*	*46.64*	*24.80*
1.000 workers and more	*19.29*	*50.11*	*30.60*

[1] Answers “very negatively” and “negatively” have been merged into one; [2] Answers “positively” and “very positively” have been merged into one.

TABLE 2 - Source: Bank of Italy, *Survey of industrial and service firms*, 2012. (Possible flaws in the balancing of accounts are due to the approximation of decimals)

Incidence of logistics costs regressed to regional infrastructure facility

Dip: **Incidence of logistics costs on total costs**	**Base**	**Facility**	**Accessibility**	**Interconnect.**
Index of Facility		*-0.006*		
		(0.010)		
Index of accessibility			*-0.025*	
			(0.017)	
Index of interconnectivity				*-0.090**
				(0.052)
Constant	*10.123****	*10.693****	*12.472****	*18.878****
	(1,708)	*(2,233)*	*(2,899)*	*(5,888)*
Observations	*1.043*	*1.043*	*1.043*	*1.043*
Adjusted R^2	*0.072*	*0.072*	*0.074*	*0.076*

TABLE 4 - The controls carried out include also the share of turnover exported, the dimension dummy variables and the sectorial dummy variables

Opinions of the firms regressed to regional infrastructure facility

(a) Dip: **Opinions on roads and railways**	**Facility**	**Accessibility**	**Interconnect.**
Index of Facility	*0.002**		
	(0.001)		
Index of accessibility		*0.002*	
		(0.002)	
Index of interconnectivity			*0.009*
			(0.006)
Constant	*2.188****	*2.270****	*1.551***
	(0.175)	*(0.324)*	*(0.675)*
Observations	*1.033*	*1.033*	*1.033*
Adjusted R^2	*0.027*	*0.021*	*0.025*
(b) Dip: **Opinions on multimodal junctions**	**Facility**	**Accessibility**	**Interconnect.**
Index of Facility	*0.001*		
	(0.001)		
Index of accessibility		*0.001*	
		(0.002)	
Index of interconnectivity			*0.006**
			(0.003)
Constant	*2.571****	*2.583****	*2.100****
	(0.104)	*(0.224)*	*0.340*
Observations	*949*	*949*	*949*
Adjusted R^2	*0.025*	*0.024*	*0.026*
(c) Dip: **Opinions on logistics centers**	**Facility**	**Accessibility**	**Interconnect.**
Index of Facility	*0.002**		
	(0.001)		
Index of accessibility		*0.006****	
		(0.002)	
Index of interconnectivity			*0.019****
			(0.003)
Constant	*2.804****	*2.487****	*1.154****
	(0.156)	*(0.199)*	*(0.319)*
Observations	*947*	*947*	*947*
Adjusted R^2	*0.048*	*0.056*	*0.068*
(d) Dip: **Opinions on times and reliability of transport**	**Facility**	**Accessibility**	**Interconnect.**
Index of Facility	*0.002***		
	(0.001)		
Index of accessibility		*0.003*	
		(0.002)	
Index of interconnectivity			*0.011**
			(0.005)
Constant	*2.548****	*2.492****	*1.732****
	(0.137)	*(0.229)*	*(0.532)*
Observations	*1,007*	*1,007*	*1,007*
Adjusted R^2	*0.029*	*0.027*	*0.030*

TABLE 5 - The controls carried out include also the share of turnover exported, the dimension dummy variables and the sectorial dummy variables

THE QUESTIONNAIRE

Logistics and transports

How do you think each of the following factors influenced the functioning of logistics services in Italy in 2009-2011?. (*Give an answer for each entry)* [1]

a - availability, quality and efficiency of road and rail infrastructures ☐

b - functionality of multimodal junctions (connections between different modalities of transport) ☐

c - accessibility to urban centers ☐

d - availability and distribution of logistics centers on site ☐

e - costs of transport (fees) ☐

f - length and predictability of times of transport ☐

g - traceability (also computerized) of the flow of goods ☐

h - functioning of customs ☐

i - Other ☐

Legenda: *(1) 1=very negatively; 2=negatively; 3=in no way; 4=positively; 5=very positively; 8=no applicable.*

With reference to 2011, which was the incidence (even approximate) of logistics costs on total costs born by your firm? ☐☐☐%

Logistics costs*:* costs born for the supply and distribution of goods. Costs for transport and storage are included (i.e. administration, packaging and other added value services, inventory). Logistics costs are comprised of logistics activities carried out in house and of money paid to external logistics operators (transporters, mediators, storage centers, etc.).

Did your firm have relations with external logistics operators in 2011? Y ☐ N ☐

What was the incidence of costs born for logistics services carried out by external operators on the total of logistics costs in 2011? ☐☐☐%

Until 2014 you predict that this relation will...

☐ decrease ☐ remain stable ☐ increase

CHAPTER VI

THE ROLE OF INVESTMENT FUNDS FINANCING MARITIME COMPANIES: AN OVERVIEW OF THE ITALIAN SITUATION[1]

1. Foreword

The peculiar geographical connotation of Italy, the center of gravity in the Mediterranean, has always made the country a hub for European and international maritime commercial traffic. Thanks to this privilege, national shipping companies have historically had a leading role on the world stage adding an important contribution to the level of economic and social wealth of the country. Over recent years, though, they have had to face some issues that have seriously questioned their primary role, aggressively undermined by some maritime companies from the various countries of East Asia and Northern Europe.

Among the most serious issues there is the difficulty in finding adequate financial resources to support the indispensable paths of evolution and development. Similarly to what occurs for companies operating in other sectors, the main source of supply of capital for shipping companies is, still today, bank financing. A source that has undergone a marked rationing over the last years, both in terms of quantity – with increased difficulties in obtaining the necessary credit volumes – and in terms of quality – making the payment of finance charges more onerous. This has been made worse by the recent economic-financial crisis and by the Basel accord on banking property requirements.

It is no coincidence that the Governor of the Bank of Italy, in concluding his remarks to the Annual Report 2014, invited Italian businesses to further diversify funding sources by increasing their capital base in order to align the financial leverage to the average European one.

Taking into account the need for companies to find other reliable sources of financing that could also be less onerous, we need to consider – as it occurs in other sectors and/or countries – whether the obtainment of contributions to the capital through private equity contract can represent a valid alternative complementary to bank credit. We are talking about a financial instrument through which a specialized operator – i.e. private equity fund or company – takes over shares of a target company by capital injection with the aim of creating "value" and realizing capital gain when those shares are liquidated.

This research is therefore aimed at monitoring the interest shown so far by a specific type of institutional investors – Italian mutual funds – in supporting and financing maritime companies that operate in the sea transport sector. A sector that nowadays comprises also many activities of port logistics and auxiliary transport due to

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the fact that maritime companies tend to expand the range of their services not only horizontally but also vertically and even crosswise.

To date, this research field reveals completely lacking in terms of specialized literature; probably also because of the extreme scarcity of this type of investment by the funds. It is therefore justified to try to analyze its trend over time as well as the geographical distribution and peculiarities. This contribution intends to verify if, in the operations carried out, the above-mentioned type of investment tends to take on similar or recurring characteristics that qualify as emblematic of the interest of funds into the sector of maritime economy. The utmost ambition of this work is therefore to outline prospects as well as weaknesses and strengths of the investment in question. This would make it possible to recommend to each company operating in the sector whether they can access credit from a mutual fund or, in alternative, which efforts they should make in order to access it. As a consequence, we will also highlight the main issues that limit the diffusion of the type of financing in question.

The chapter is organized as follows: in paragraph 2 we report briefly on some peculiarities of sea companies. Paragraph 3 reminds us about the role and the activities of funds by analyzing their primary role as meeting points between the savings of families and other interlocutors and the needs for financing of different sizes and types of companies. Paragraphs 4 and 5 talk about the methodology and the main confirmations of the research. Some conclusions follow.

2. Role and issues of maritime companies

Despite the current phase of high competitive pressures, the national maritime companies show a vitality that allows the country to be the third, after the United Kingdom and the Netherlands, as in seaborne handling of goods. Moreover, the country maintains the first place for imports by sea, and the third for exports. Figures certainly helped by the large number of ports located along the 8,000 km of sea coasts and 4,000 km of inland coastline; on the Tyrrhenian, the Ionian and the major islands areas.

Given these volumes, the position of the Italian shipping companies may be considered prominent because in 2011 it was 6th worldwide in terms of tonnage of the fleet under the national flag and 15th for number of ships written down in the main registers. The importance is further increased when we consider the foreign-flagged vessels attributable to the 245 shipping companies and shipping groups for domestic purposes, 96.9% of which are privately owned. Moreover, Italy is by far the first in the world for passengers carried by cargo and passenger RO/RO ferries (Confitarma, 2012).

The market prospects of the sector, despite possible interruptions, tend to appear rosy; parallel to the progress of globalization internationally. However, as mentioned above the domestic shipping companies are confronted with a variety of items that jeopardize their competitiveness (Fadda, Garelli, 2011; De Forcade, 2014).

If we compare the actual market share of sea transport with that of 1990 we find out that a clear reduction has taken place: for goods and especially for passengers

(Coppola, Terzulli, 2010). In some areas of the country, such as the South, the impact of the downturn on shipping companies has been more serious, which has contributed to widen the gap between the North and the South of the country (Passaro, Thomas, 2007; SVIMEZ, 2013). The age of the fleet has increased as well bringing the country above the world average from 2000 (Confitarma, 2012).

Among the most insidious problems that shipping companies are facing compared to their counterparts in other countries not least we must consider the difficulties in collecting the necessary financial resources aimed at boosting development processes (Kavussanos, 2006; Passaro, Thomas, 2007; Grammenos, 2010). Similarly to what occurs for other companies operating in different sectors, the main source of supply of capital for shipping companies is, still today, bank financing (Ferrara, Morvillo, 2002; Albertijn *et al.*, 2011; Shachmurove, Vulanovic, 2015); especially for small and medium size companies that represent the predominant modes of the national maritime sector. Despite the fact that in this sector there have not been any signs of downsizing – which characterizes many manufacturing sectors – and that gigantism is still predominant worldwide, in Italy the shipping activity is still carried out by a large number of small companies. Moreover, their assets are typically concentrated in the hands of one or few partners (Confitarma, 2014).

This situation contributes to the increase of the dependence from bank financing (Di Vaio, 2011; Drobetz *et al.* 2013), even because the cyclical and structural rigidities in the financial sector make the business of shipping particularly risky and therefore do not facilitate access to the capital market for unknown or not sufficiently patrimonialized companies (SRM, 2014; Saunders *et al.*, 2015).

From the point of view of demand, smaller companies are usually wary towards the capital market or towards alternative and less common ways of financing. Since they are usually family run they are often not willing to modify the property organization and the dilution share to the benefit of external investors (Corbetta *et al.*, 2012; Drobetz, Merikas, 2013). We also have to take into account that the transport sector – due to austerity policies in public finances and to the antitrust regulations imposed by the EU – is increasingly less supported by public contributions both in terms of direct subsidies and of real guarantees towards third party investors (Coppola, Terzulli, 2010).

It is therefore easy to understand how such excessive dependence on traditional financial intermediaries risks to determine disastrous effects for the companies' future prospects in periods of credit rationing. In the last decade this has been the path taken by the economic-financial crisis and by Basel II and III Capital Accords (Brealey *et al.*, 2011; Confindustria, 2013; Munari, 2015). In particular, these accords have regulated the minimal capital requirements for banks imposing a discriminatory treatment towards naval mortgage because in the weighting of credit risks registered assets are not considered equivalent to real estate.

To this regard, *Confitarma*, *European Community Shipowners Associations* and *Union of Greek Shipowners* have launched a joint campaign to raise awareness of EU bodies on this issue and for a revision of the rules of Basel III. They are indeed in opposition to the increasing need of shipping enterprises for more resources due to the higher safety standards to be met, to the increase in world trade and to the expansion of the duties that maritime companies must fulfill (Marcucci, Musso, 2011).

In order to survive, some of them have had to shift their core business from an activity of mere handling to one closer to logistics multifunctional operator (Multimodal and Combinated transport operator, Third and Fourth party logistics) (Sweeney, Evangelista, 2005; Passaro, Thomas, 2012). A process that requires additional investments to expand the services offered and renews the fleets and other infrastructures, but that has allowed some of them to become global players (Tongzon, Sawant, 2007; Drobetz, Merikas, 2013).

However, it is important to highlight how the fear of losing control on the companies or the difficulty in accessing bank credit make internal self-financing forms predominant with respect to credit. A point confirmed by the fact that there are no domestic financial intermediaries specialized in assessing the risks and the potential of the maritime companies. Only in recent times, not surprisingly, some leading Italian banks have felt the need to establish specific business units for the financing of equipment and shipping (Bank of Italy, 2009). Therefore, despite the fact that banking resources represent the main exogenous source for maritime companies, national banks do not have sufficient sectorial expertise. An aspect that represents a clear problem for the collection of resources and that confirms the penalizations of domestic companies in their attempts to get rid of local operatively scales.

This is the reason why – apart from the leasing operations which seem to be costly and rarely achievable – a certain interest could arise towards the research of capital through private equity contracts as an alternative to bank credit (Boyer, Baigent, 2008; Drobetz *et al.*, 2013). This is particularly true for small companies, usually more restrained in accessing credit (Bank of Italy, 2009) – even though the instrument of private equity tends to reveal a cyclic behavior as well (Lowry, 2003; Jog, Sun, 2007).

At international scale, maritime companies have been collecting equities on public markets since 1980s (Grammenos, Marcoulis, 1995). In the US, for example, financing through private equity spread particularly during the boom period of shipping, between 2002 and 2008 as a consequence of some tendencies that had characterized the two previous decades. On the one hand, there were the dimensional expansion and the need to replace the shipping with cheaper and more environmentally friendly units; on the other there were some management problems, which led to the exhaustion of own capital in many maritime companies. These facts produced an increase of the requests for bank credit that financial institutions were not able to fulfill and this led to the research of other sources. The entrance in the companies of a new generation of owners with higher levels of education and therefore with more knowledge and skills on the functioning of financial markets as well as a management approach more open to external capital was certainly a great help in the process of opening to external partners (Grammenos, Papapostolou, 2012a; 2012b). To date, in fact, most of the shipping companies consider the capital markets as an essential part of the strategy aimed at optimizing the finance function.

3. Mutual funds

A mutual fund is an institutional investor, a trader who, like banks, foundations, insurance companies or pension funds collects in a continuative and professional way significant financial resources from a large community of investors and then proceeds to their productive investment. Managed in a unified manner by a specialized intermediary, the fund allows money savers to invest in a collective capital. The broker takes the money raised in a diversified portfolio of securities and / or real rights and procures the subsequent disinvestments and investments as well as the periodical proceeds and the relative management of incomes.

Financial assets purchased are filed at a "depositary", which is a licensed bank in Italy, an Italian branch of a community bank, a brokerage firm or a national subsidiary of an investment company, which has also a control function to the manager. Each investor participates in the accumulation fund with one or several installments, and will receive a return, which is determined by a measurement of the acquired tools as well as the collection of dividends and / or interest and/or other forms of remuneration. This income is periodically reinvested or distributed depending on whether the fund is a distributing or accumulation of income one (Nadotti *et al.*, 2013).

In Italian law, the service of collective portfolio management is entrusted to the "Società di gestione del risparmio" (Investment Management Companies) – which establish and operate one or more mutual funds – to the SICAV and SICAF (Investment Companies with variable capital and Investment Companies with fixed capital), or to managers of Italian products of collective saving authorized abroad. Alternative investment funds are entrusted to EU and non-EU management companies. Mutual funds with autonomous assets, SICAV and SICAF are the bodies for collective investment (in Italian OICR).

The difference between the three types of bodies is of a structural nature and concerns the type of security issued in respect of the collection of savings. After the provision of resources, the fund issues bearer or nominative shares, which represent fractions equal to its capital. The SICAV and SICAF, on the other hand, allow investors to participate in their capital as holders of nominative or bearer shares. The SICAV are a body for collective investment of open type because they allow investors to invest or disinvest by issuing or paying off shares at any moment.

The SICAF are a body for collective investment of closed type because they issue shares only at the moment of constitution or on pre-fixed forthcoming dates. Similarly, they only withdraw shares in circulation upon termination or on previously determined dates that coincide with new issues (Onado, 2000).

Each mutual fund or each sub-fund enjoys administrative and legal autonomy. Each fund or sub-fund, indeed, remains separated from the assets of the company and from that of any other asset or fund managed by the company as well as from the assets of the participants. The company is liable for the obligations contracted on behalf of the fund only with the fund's assets, while actions by creditors of the manager or of the custodian/sub-custodian are not allowed on the fund. Actions by creditors of each participant are allowed under the quota of the latter (Fabrizi *et al.*, 2000).

Similarly to the articulation of SICAV and SICAF, which can be open or closed

bodies for collective investment, also the funds can be open or closed, depending on whether investors can join in or get out at any moment (open) or buy and sell existing quotas only through negotiations on the secondary market. As a general rule, closed funds invest at least 10% of their portfolio in unlisted securities, real estate, real property rights, shares of real estate agencies, bank deposits and other assets that have a market and whose value is determined with certainty and precision at least every six months. The closed funds that invest mainly in unlisted securities are aimed at supporting the flow of savings towards high-risk instruments, usually issued by small and medium size companies that are relatively young whose growth is sustained by the fund in the perspective of a subsequent quotation (Nadotti *et al.*, 2013).

Legally, the assignment of capital to the fund by investors refers to the contract of mandate without representation, while the ownership of the assets acquired with the capital of the fund is up to the same fund. Each fund has its own regulations governing features and operatively.

For the purposes of this survey reserved funds are particularly relevant. There are open or closed funds whose shares are reserved for certain categories of qualified investors, i.e. investment companies, stockbrokers, Investment Management companies (in Italian SGR), SICAV, pension funds, banks, insurance companies, financial companies etc. These funds may provide a minimum entrance quota aiming to combinations of high risk/high return, since they can waive a large part of the discipline of risk concentration but can not engage in short selling (Boyer, Bigent, 2008).

Having said that, for the purpose of this investigation a particular category of funds is worthy of attention: those closed funds that collect capital from private and institutional investors to invest in unlisted securities with a high potential of growth (targets) with the aim of supporting their development in the critical periods of their life cycle. They are also named private equity funds. The use of this capital by the target companies may comprise both the start-up phase and the extraordinary or critical phases of their lives, i.e. generational transition, acquisition, restructuring, development of new products or technologies. The intervention of an institutional investor does not end with a significant though not sufficient provision of funds but extends to the accessibility of a managerial know-how that contributes to a better address and management of the resources provided. It also plays a major role in the event that the target company intends to proceed to listing in the stock exchange by contributing to achieve the best performance of the practices necessary to enter in the official markets.

4. Methodology

Depending on the objective stated above, this investigation was developed through several stages. Firstly, we consulted the register of bodies for collective investment (OICR) of the Bank of Italy. That list includes 1595 funds managed by 144 investment management companies (SGR). The second step was to identify the areas and countries in which each of the funds on the list invests. To this end, we resorted to the indications provided by Morningstar database, an independent site of financial information, and to

those of the websites of the individual investment management companies or of the funds.

This second step aimed at extrapolating, from the list of all funds supervised by Italian authorities, those that meet two requirements: 1) they invest all or part of their portfolio in Italy; 2) they invest in the sectors of logistics, transport or tourism. For the funds that meet both requirements we have subsequently proceeded to verify whether the investment in one of the two sectors mentioned above consists in a maritime activity based in Italy.

Morningstar database and, when this type of information is available, also the websites of the individual investment management companies only indicate the sectors and the reference countries of the first five stocks according to their incidence on the total portfolio that the fund is investing. The examination of the sectors and the reference countries was not carried out for the funds that exclusively operate either in emerging markets or in international markets because domestic investments are excluded from their portfolios.

We have proceeded to determine the composition of the portfolios for bond funds as well, for which main investments are in government bonds and sometimes in private companies, but in the top five stocks of the portfolios we have found no case of investments in companies operating in the maritime sector or, more generally, in the area of transport and logistics. Indeed, even among the real estate funds there has been a growing tendency to invest in plants and spaces dedicated to logistics or to maritime activity. A comparison of these funds was not possible, however, because their managers do not broadcast details about the nature and type of their investments. In general, it was not possible to obtain information on the composition of the portfolio for 30% of the funds listed in the register of the Bank of Italy because of the lack of sources.

Finally, we have obtained a list of the funds that invest in Italian maritime companies, at least for what concerns the first five stocks in their portfolios. Through a further phase of the research – in which the database of the *Associazione Italiana del Private Equity e Venture Capital* was consulted – other information was collected on each operation of financing of these companies by the above-mentioned funds.

5. Main results

Thanks to the analysis carried out following the phases mentioned above we found out that national mutual funds invest, in Italy, in a rather heterogeneous series of sectors: from finance to energy to ICT to medical and hospital services. The share of real estate investments resulted significant too. Even though there is such high variety we can also notice a greater propensity to invest in the tertiary and quaternary sectors. Maritime companies belong to the tertiary sector but can also be allocated to the quaternary one when they offer high-value added logistics services (Passaro, Thomas, 1999). The funds that have invested or that are investing in the maritime sector, though, are today in very small numbers.

We are about to list as follows the ones that present the type of investment desired and to describe the main characteristics of both the target companies and of the funds.

1) *Ersel Investment Club* is a closed reserved fund that makes investments of *private equity* in small and medium size Italian companies. It also candidates itself for the implementation of development plans of companies with a high potential of growth and of those that tend to change the structure of their property assets. The fund, which has invested in eight companies, includes in its portfolio producers of highly innovative goods and services as well as traditional companies. Since 2009 it has held a share of D'Amico International Shipping (DIS), a subsidiary of D'Amico Group specialized in international maritime transport and leader in the tanker market for refined petroleum products and vegetable oils and chemicals on behalf of major companies such as ExxonMobil, Total, Shell, Glencore and Vitol. The company was funded in 1937 in Salerno while the actual holding of the group was funded in 1952 in Rome. DIS has many overseas branches (India, Ireland, Luxembourg, Morocco, Principality of Monaco, UK) and is listed in the MTA market under the segment "Industrial services and products" of the Italian Stock exchange. It employs a fleet of 45 modern double-hulled vessels, in compliance with the standards of prevention of pollution of the IMO and with an average age of just 4.4 years, compared to 9.5 in the world.

2) *Fondo Italiano di Investimento* (FII), managed by the homonymous SGR and reserved to qualified investors, is the first private equity fund to be promoted by the Ministry of Finance in cooperation with the Italian Banking Association, Cassa Depositi e Prestiti, Confindustria , Intesa San Paolo, Monte dei Paschi di Siena and Unicredit.
   FII was funded with the aim to gather together small sized companies in order to create bigger units. Also, it creates direct investment and participates in private equity funds or closed funds. As far as direct investment is concerned, FII addresses Italian companies with a high growth potential, mainly international, with a turnover between € 10 and 100 million operating both in industry and in trade and services. The fund usually invests in minority positions even though it is also attentive to operations of buy-in (acquisition of a majority share) and buy-out (acquisition of a partner's share), to substitutions in case of generation change and to the problems of corporate governance that may influence the development of the firm. In 2011 FII acquired 27% of Cartour S.r.l., a firm based in Messina that deals with commercial ferry transport between Sicily and the continent. In 2013 the fund exercised a right to swap participation in Cartour Srl giving it in exchange for a 10% stake in the parent company Caronte & Tourist SpA. Through the new company Ferry Investments S.r.l. Caronte & Tourist manages the ferry connection between Salerno-Messina and, from 2010, Salerno-Termini Imerese.

3) Clessidra Capital Partners (CCP), through the funds CCP and CCP II, qualifies as the leading manager of private equity funds dedicated fully to the Italian market, raising the membership of high-standing Italian and foreign institutional investors. CCP has invested in medium and large companies, all leaders in the market of their

sectors and with a high growth potential, all very different as of activity, market of reference, longevity of business and membership activity, mainly belonging to the secondary sector. These are investments for medium to long term aimed at creating value and joining companies operating in fragmented industries, family businesses, and companies of Made in Italy and spin-off of industrial and financial groups. In 2006 CCP acquired a share of Moby spa, maritime firm based in Naples and 130 years old. Moby is a national leader in passenger and cargo transportation from Italy to the islands of the Tirreno (Sardinia, Corsica and Elba). Since 2005 it has also been active in the port towage, offshore and rescue coverage in all ports of Sardinia. It has a fleet of 13 ferries of different sizes and scope. In 2010 it was about to complete the process of IPO for the listing in the stock exchange, but the process was not successful.

4) In 2012 Clessidra Capital Partners, together with Moby, made another investment in Tirrenia, today completely owned by the Compagnia Italiana di Navigazione (CIN), the first maritime firm of the country. With a modern and reliable passenger and goods fleet, Tirrenia connects many Italian and Mediterranean ports and is entrusted to run the public service to connect Sicily and Sardinia. In 2012 it was completely acquired by CIN, which is now composed for 40% by Moby Lines, for 30% by Clessidra, for 20% by Gruppo Investimenti Portuali and for the remaining 10% by a private entrepreneur.

5) Investitori Associati IV, Idea Opportunity Fund, Charme Investments SCA. Investitori Associati is a mutual fund of investment securities of closed type specialized in private equity that acquires 100% or majority shares of target companies individually or together with other investors. It may also acquire a minority share provided that it can clearly identify and realize a disinvestment strategy. With a purchase value of more than € 100 million, the fund addresses medium-large Italian companies belonging both to industrial and service sectors, usually in mature type sectors. Born in 2002 on initiative of the brothers Cordero di Montezemolo, Charming Investment SCA is, instead, a Luxembourg fund of venture capital and private equity firm active mainly in the fields of luxury and interior design, which acquires both majority and minority shares. Finally, Idea Opportunity Fund is a closed-end fund that invests in Italian qualified minorities independently or jointly with leading private equity operators. The share that the fund reserves to the service sector is 25.8%. These three funds share quotas in Grandi Navi Veloci (GNV): a company dedicated to maritime transport of passengers and goods based in Genoa (this is the only job in the maritime sector for Idea Opportunity Fund). Founded in 1992 by Aldo Grimaldi culminating a long and prestigious shipping activity, GNV was the first national shipping firm to proceed to listing in the stock exchange to finance the development of its fleet, today among the most modern in Europe. But in 2004 GNV proceeded to delisting and the following year passed under the control of Permira, an international private equity fund that acquires 80%, leaving the remainder to Grimaldi Holding. In 2006 the share of Permira is sold to new shareholders: Investitori Associati, De Agostini, Charme and part of the management. In 2009 the Grimaldi family definitely gets

out of the shareholders and IDeA Opportunity Fund acquires management board of GNV, a quota of the firm. In 2011 it was resolved to increase the capital in favor of the shipping company Marinvest srl, which was attributed a 50% stake in return for a contribution in cash and three ships. As a result of two capital increases in the following two years, at the end of 2013 the shareholding was divided between Marinvest (57.39%), Investitori Associati (36.97%), IDeA Opportunity Fund (3.12%), Charme Investment S.C.A. (1.56%) and other shareholders (0.96%). Today the company boasts a fleet of 10 newly built ferry-cruise 8 of which owned by the same company, and is one of the main operators in the Mediterranean. Its main homeport is Genoa from which it serves long-distance routes both domestic – especially towards Sicily and Sardinia – and international (Spain and North Africa). It has also contributed to the development of the Motorways of the Sea; a new concept of maritime transport, which combines, speed and comfort on board.

6) *Fondo I2 Capital Partners* is a closed-end mutual fund for securities investment of reserved type dedicated to special situations. It has operated with a budget of € 200 million signed in July 2007 for about a third by Italian institutional investors and about two thirds by leading international institutional investors. The duration of the fund was 10 years, with an investment period of five years, which ended in July 2012. The fund has been an articulation of the Intek Group, a holding company listed on the Milan stock exchange. Its primary purpose is to invest in companies with characteristics of value investing, i.e. with intrinsic value potentially greater than the purchase price. In 2008 I2 Capital Partners took over a share of Festival Cruises, known as Festival Crociere, subject to bankruptcy agreement. The activity of the Fund made it possible to enter into transactions with banks and suppliers welding, thus, all the creditors of the bankruptcy and repaying in full the financing of the operation. Founded by a Greek entrepreneur, Festival Cruises was an Italian-Greek shipping company that operated between 1994 and 2004, when it declared bankruptcy and the entire fleet was confiscated and auctioned.

7) Fund Cape Region of Sicily, built in 2008, was the first Italian private equity dedicated to investments in private companies of the island that operate in the sectors of logistics and transport, agribusiness, tourism, manufacturing, healthcare and alternative energy. The investment management company was built thanks to a mixed venture divided between a 49% owned by the Region and by another 51% privately owned, but it is currently in liquidation. In March 2009 the fund invested in T-Link Navigation in its start-up phase. T-Link, which suspended its activity in 2011, mainly dealt with ferry transport between Palermo and Genoa.

Table 1 summarizes the funds that in their portfolios have held or still hold shares of maritime companies, indicating the budget as a representative parameter of the size. Each fund reflects the target company (or companies) whose name, location and turnover in the year of investment are specified. The latter indication is intended to highlight the performance deemed "attractive" by individual investors. For two companies, now out of business, no accounting data is available.

As it is clearly stated in table 1, the funds that have invested in maritime companies

so far result widely diversified as for dimension, with a financial provision that goes from € 40 million to over € one billion. The geographical locations of the target companies are very diversified as well even though most of them have their headquarters in Southern Italy. A further significantly heterogeneous element is the turnover of the target companies that goes from € 12.5 million to € 297 million.

Even though the investigation addresses only a small number of funds and a narrow type of investment we can also deduce that it is not possible to establish a direct relation between the dimension of the fund and that of the target company. We have in fact come across the case of big funds that invest in small companies, smaller funds that invest in big companies as well as funds investing in different financial companies with a similar turnover to theirs.

Dimensional characteristics of the funds interested in investing in shipping companies and of the corresponding target companies

Fund		**Target company**		
Name	*Financial provision (000 €)*	*Name*	*Headquarter*	*Turnover in year of acquisition (000 €)*
Ersel Investment Club	85,000	D'Amico International Shipping	Rome	180,000
Fondo Italiano d'Investimento	1,200,000	Cartour	Messina	44,000
Clessidra Capital Partners	820,000	Moby	Naples	180,000
		Tirrenia	Naples	170,000
Investitori Associati IV	700,000	Grandi Navi Veloci	Palermo	265,000
IDeA Opportunity Fund	217,000	Grandi Navi Veloci	Palermo	297,000
I2 Capital Partners	200,000	Festival Crociere	Genoa	Out of business
Cape Regione Siciliana	40,000	T-Link	Palermo	Out of business

TABLE 1 - Source: Elaborations of the authors

6. Conclusions

This survey was created with the intention to provide an initial response to the need of many national maritime companies to find sources of funding alternative to bank credit. A need made more urgent by the current sectorial dynamics that oblige companies who want to be international players to proceed with the expansion of the scale of operations, of the services offered and to the constant renewal of the fleet.

In this context we aimed at analyzing the interest shown so far by Italian mutual funds in supporting the above-mentioned maritime companies. The surveys made it possible to verify that, as expected, funds that are investing (or have invested) in national maritime activities are, today, in very small number. In some cases, these are private equity funds reserved to qualified investors, some of which specialized in investing in small and medium-sized companies, while in other cases the investment is directed towards medium-sized and large units that qualify as leaders in their market.

The common feature is the search for companies with high growth potential or sometimes with prospects of international expansion, from which it is possible to obtain a significant capital gain on liquidation of the investment. Only on one occasion it was an investment in exceptional situations of restructuring.

A significant element is that the investments made by the various funds were finalized at different times, even after the spread of the current economic and financial crisis. It follows that, unlike what is happening with bank credit, the difficult situation that Italy is still suffering from does not seem to have affected the availability of financial resources from the funds for the benefit of shipping companies.

Funds investing in shipping companies are also extremely different in terms of dimensional characteristics, as significantly different are the target companies in terms of scope. It follows that the great maritime company has not, in the current situation, more opportunities to receive funding from a fund than a small or medium-sized one. To this end, as mentioned above, is evidently more significant to take into account its intrinsic value, namely the growth potential inherent in the economic entity, where it has characteristics such as to be perceived by the investor. Also with reference to the characteristics of the funds we can infer that there is no standardized dimension for the fund that invests in maritime activities, since this parameter has proved rather heterogeneous. Similarly, it does not seem to be possible to outline a connection between the size of the fund and that of the company.

Therefore, a shipping company that aspires to obtain resources from the market through intermediary of a fund does not have a benchmark to refer to. In fact, it seems to be clear that raising funds through investment funds is not a daunting operation in itself for shipping companies, even when they are small. The extreme scarcity of the method of funding in question is therefore more reasonably attributable to the distrust of the companies towards the opening of the capital to external partners, or to a weak attractive revealed to investors, although not necessarily absolute. We are talking about a possible defensive attitude adopted by the company property worried about losing control of the economic unity or about not knowing how to manage a more complex organizational and decision-making structure and also fearful of excessive “visibility”.

On the contrary, it is of course possible that some funds potentially interested in investing in the sector are being themselves cautious, due to a certain opacity which sometimes marks the social structures; with difficulties in tracing the origin of the corporate ownership and sometimes even the strategic choices. Namely, it is sometimes impossible to clearly understand the long-term objectives of the management, above all when the companies operate with fleets that fly flags of convenience or enjoy any income position and seem to want to limit themselves to carry on with them in time.

Despite the clear limits of this empirical verification – based on a small number of cases that nevertheless constitute the current universe according to the parameters set – it is possible to bring out some policy guidance for the benefit of the maritime system and the same potential investors. As far as demand is concerned, on the basis of the US experience it would be desirable that the trade associations and other institutions started to promote initiatives of financial education aimed at increasing the knowledge of the financial system by the management of the maritime companies. Also aimed at spreading a philosophy and a corporate culture marked by a greater openness of

ownership to the markets, such initiatives have proved able to intensify the relationship between shipping companies and mutual funds, increasing the propensity of the companies involved to collect resources through the use of private equity funds.

As far as offer is concerned, the main issue is to arouse the interest of investors, especially institutional ones, to allocate their resources to this type of businesses, often unfairly accused of being under-capitalized, too firmly managed by the owner and with unsafe and obsolete fleets. Assuming that the unstoppable progress of the processes of international globalization lets us predict volumes of freight and passengers on the rise in the medium to long term – and untouched by the competition of the modal alternatives – it is clear that public authorities could give a contribution to this end. Not necessarily a direct financial aid, the support to the maritime sector would find ample justification in the weight of the sector in terms of economic developments and substantial leverage. To this end, a first step would be to strengthen the control bodies on business operations, but also to stimulate the pursuit of higher terms of efficiency and effectiveness on the part of the privileged partners of shipping companies, such as port concessionnaires.

It goes without saying that in the current economic cycle and in the light of the trends and sectoral dynamics, each increment and improvement of relations between the national maritime companies and institutional investors could only represent an undeniable boost to the potentiality of development of the sector. It is clear that in the face of a tendency toward gigantism and the expansion of services offered – not only related to the handling of goods and people –, the shipping companies that will propose valid paths of development and increase in size, even with appropriate acquisitions, will have many chances to come across as attractive investments. However, for this to become evident in the future, these same companies need to have immediate access to reliable and affordable sources of financing to act against the fierce competition of competitors from other countries.

PART TWO

LOGISTICS INTEGRATION BETWEEN PORTS AND THE RAILWAY SYSTEM

INTRODUCTION TO THE MONOGRAPHIC PART

The monographic part of the Report is structured into two sections:

The first section, published in this report, addresses the issue of logistics integration between ports and railways and was edited by CERTeT and by Kühne Logistics University which collaborated with SRM in the research project.

This section aims at going deep into the role of public policies supporting railway intermodality as a competitiveness element for the port industry and a mitigation of the environment, which affect the connections between port and city center.

The section is introduced by a series of reflections about the role of ports within integrated logistics systems and the institutional governance models, which can enhance or penalize it. The policies here enquired are those of Port Authorities but also those of Regions and States (according to the different administrative levels and to the institutional context). The scope of the analysis includes the European Southern Range and Northern Range.

The study is structured so as to address the issue from a methodological point of view, taking into account technological and organizational evolutions of the port industry caused by the significant growth rates of traffic unitized (container and RO/RO) and then to address the operational and management issues, which differ according to the context of the railway network system. The report closes with the identification of the solutions to overcome the principal criticalities, which especially in Italy reduce significantly the potentiality of use of railway transport for the shipment overland of port traffic.

The ultimate objective is to provide policy indications and to identify from significant experiences some elements, which can be borrowed.

The second section, which instead is published online, reports the results of a scientific mission carried out by SRM in Hamburg in order to have a better understanding of the strategies and problems affecting the maritime sector of Germany, which is considered one of the top European country as for maritime logistics.

In particular, interviews have been carried out with three major players in the industry. They are all available online at www.srm-maritimeconomy.com/interviews:

- *Dirk Max Jhons, Managing Director of VDR* (Verband Deutscher Reeder is the industry association representing the German shipowners);
- *Dennis Kogebhon* from *HPC* (Hamburg Port Consulting), a logistic company that is headquartered in the HHLA terminals in Hamburg, one of the largest in Europe;
- *Bengt Van Beuningen* from *Port of Hamburg Marketing*, the harbour's communication officer.

CHAPTER VII
THE EXPERIENCE IN NORTHERN EUROPE[1]

1. Ports and logistics integration

Ports are one of the key elements in the transport system of a country, not only as a link between maritime and land transport, but often as a logistics hub. Following the globalization of production activities and the expansion of world commerce, there is the increasing need for an integrated transport system that enables mainly freight, but also passengers, to fully exploit the benefits and specific features of the various means of transport available. It is therefore here that the port becomes an inter-modal hub *par excellence*, where the movement of freight between land and sea is no longer enough in itself to guarantee the success of a port, and where transport to the hinterland becomes a decisive factor in this same success.

This is because with the development of competition between ports, the efficiency of connections with the hinterland becomes a battlefield in which the port can effectively increase its market share. While in the past the hinterland depended mostly on a single port, the development of logistics networks, particularly transport, has meant that the port hinterland now stretches to such an extent that it often overlaps with that of other ports, at times up to hundreds of kilometers away. Thanks to logistics integration, the hinterland is therefore no longer served exclusively by nearby ports, in a *captive* hinterland scenario, and rather becomes a *contestable* hinterland for several ports.

Behind this change in the maritime transport sector lies the development both in logistics and transport infrastructures. In fact, where there is the possibility of transporting goods by other logistic chains using, for example, various ports, the freight will tend to be concentrated on the logistic chains that generate value. The ports that find themselves within these chains are those destined to be more successful.

However, the port should not be seen only as a passive entity without control or impact on the creation of value. On the contrary, it is evident that the port needs to be able to actively contribute towards the creation of logistic value by improving efficiency in port operations, the visibility of information and the standard of customer services, even if this ability does not necessarily translate equally into the ability of the port to capture the generated value (Robinson, 2002).

Freight handling in the port is just one of the aspects that influence the creation of logistic value, for example through improving the efficiency of trans loading operations. The possibility of reducing transport costs can also arise, such as by offering different modes of transport, in order to enjoy the benefits of each.

One of the distinctive traits of a port is not only the fact that it lies at the centre of the intersection of various modes of transport, but that there is also the possibility of developing its role as an inter-modal transport control centre, thereby guaranteeing

[1] This work was written by Michele Acciaro, Kühne Logistics University (KLU) Hamburg, Germany.

optimal levels of transport efficiency and effectiveness. Here lies the ability of the port to generate value within the relevant logistics chains, and as a result also boosting development of production activities in the hinterland.

Furthermore, environmental imperatives are becoming increasingly urgent in the port sector. Ports are often characterized by congestion, emissions and other negative external factors, so that they need to focus on green logistics and more environmentally friendly transport modes. European policies aimed at promoting intermodality have for some time seen intermodal transport as one of the alternatives to congestion and transport solely by road. Ports play an essential role in aiding intermodality and the choice of greener modes of transport, and even in the not too distant future it is possible that the level of a port's sustainability may have a decisive impact on the choice of logistics operators and clients.

Therefore, the success of a port depends in equal measure on three interdependent logistics systems:

1. *The maritime system* for mooring vessels: The logistics involved in the entry of vessels in the port, and maneuvering and mooring procedures depend greatly on the characteristics of the port, the availability of tugs and pilotage services, weather conditions and the levels of port congestion. Where just one of these systems lacks in efficiency, delays can occur which would have a substantial impact on the prompt start of trans loading operations;
2. *Logistics of the terminal* in the port: The terminal areas, both for bulk goods and containers have developed levels of specialization that now guarantee a high degree of efficiency. Vessel loading and unloading operations, freight handling and quayside storage, and the subsequent operations for loading onto road vehicles are the main areas of activity, which through the improvement of processes, the use of state-of-the-art equipment, and the development of new IT technologies have led to significant improvements in the efficiency of terminals;
3. *Logistics of links with the hinterland*: The complexity of the logistics linking the hinterland not only regards freight loading and unloading in the terminals, but also the coordination of transport to and from the port, infrastructural development and the prevention of congestion issues. Ease of access to the port by all users is a fundamental requisite to fully exploit the potential of a port in its role as a connection hub for all means of transport. This role can be enhanced by the presence of internal rail stops in the port itself, and efficient road junctions/branches and freight loading/unloading structures that enable transit of the vessels to the semi-trailers or trains in the shortest time possible.

A complementary but distinct flow can be added to these three systems:

4. *Information* concerning the freight, passengers, vessels and other means of transport, the financial flows and all general documentation of the vessels and freight. Over recent years much attention has been paid to the development of integrated information management systems that enable the various users of the port, the authorities and operators to quickly access the information required for freight clearance, for example through customs, or to identify the position of a container. There have also been significant efforts by the International Maritime

Organization (IMO) and the European Commission to reduce bureaucratic inefficiency within the maritime and port sectors.

It is important to note that the four described logistics systems cannot, and must not, be considered as systems in themselves, but should be seen as an integrated part of the same port logistics system, or as a component of the logistics chain of which the port is a part. Along the same lines, the port and transport to the relative hinterland is just one of the components of the logistics chain.

Furthermore, within each of these systems other related sub-systems can be identified, such as the operations for freight clearance through customs, or the quayside handling of freight. For example, the logistics operations in a container terminal are further divided into three main systems: container handling by means of quayside cranes, container handling within the storage area, and container handling operations to the land transport (rail, road and possibly waterway).

The efficiency of the logistics system thus depends on the efficiency of each sub-system, and it is the weakest link of the chain that determines the overall efficiency of the system. However, while the port authorities can intervene more or less directly in the case of systems related to maritime activities and freight loading and unloading operations, the same cannot be said of the overall efficiency of the systems linked to the hinterland, where the authorities remain simply stakeholders. The coordination of local and national authorities, transport operators and port authorities therefore becomes a necessary condition for the port to remain competitive (van den Horst & de Langen, 2008).

The success of the port in fact is tied to the efficiency of the hinterland's transport network, both on rail and road, which in turn depends not only on the efficiency of the interfaces with the port areas, but also, among others, on the infrastructures and the competition regime between rail and road operators.

2. The role of the Port Authorities

The areas of competence of the port authorities can be divided into three roles (Baird, 2002):

1) The role as *authority*, which refers to the role of port authorities as an entity for regulating and controlling operations carried out within the port; for example, regarding the application and control of port laws and regulations, permits, emergency services, and evaluating the competition regime between port operators;
2) The role as *landowner*, or administrator of the port areas, including management of the port areas and development of the infrastructures;
3) The role as *utility*, which embraces all activities with a commercial dimension, but which are necessary to perform the freight loading and unloading operations or safe navigation, as well as the supply of services related to the safety of navigation and freight within the port district, freight trans loading when not possible by licensed operators, vessel towing, maintenance of the infrastructures, waste management and disposal etc.

In particular for the development of integrated logistics, it is important to consider the role as *landowner* of the port areas. In most countries of the world, this role covers all aspects related to the maintenance and development of port infrastructures, of the quaysides, the port waters and points of access to the port not only from the sea but also on land and also in the development of the role played by the port as an intermodal hub. This commonly accepted definition involves an important task for the port authorities; that of planning and developing the port's network of links to the land in agreement with local institutions, transport operators, network managers and the government of the country where the port is located, and in addition to act as a mediator for local communities and lobby groups.

Obviously the port alone would not be able to independently develop all infrastructures useful for the port itself, although the degree of intervention needed in the development of land infrastructures varies greatly from country to country, and from port to port. While the dominant model sees the port authority responsible for the development of the infrastructures within the port, often exclusively the port authority itself does not cover the costs involved in this development, especially in the case of *green field* projects. In the United Kingdom, for example, the port authority of Felixstowe, one of the main British ports, is an example of an entirely private port responsible for the modernization of the rail infrastructures for a total of over 184 million pounds, of which 40 million was invested directly by the owners of the port, Hutchinson Port Holding, in the *North Rail Terminal*, with the exception of some European funding. The network manager, *Network Rail*, has contributed to part of the work needed to modernize the Ipswich-Peterborough line, specifically the tracks and capacity allocated for freight traffic.

In the cases of the Netherlands and Belgium, which will be dealt with in more detail below, the attempt to entirely develop the dedicated rail networks of the *IJzere Rijn* and *Betuweroute* stems from the plans of the respective port authorities, which, with public contributions but also by means of innovative tariff schemes, have enabled the completion, with no small effort, of the *Betuweroute*, and the re-opening of discussions on the *IJzere Rijn*. In these cases, the complex relations between the port authority, local authorities and governments of the bordering countries (Holland, Germany and Belgium) are a demonstration of the importance of the port authority in pushing forward the development of infrastructures.

In Sweden, the success in the development of shuttle trains from the port of Gothenburg to over 26 dry ports, not only over long distances typically preferable by rail, is an example of the role that can be played by the port authority in the development of intermodal networks. In fact, the decision to favor rail over road arises from a clear strategy adopted by the port of Gothenburg, which through a policy of incentives has enabled the rail's share of the market to be increased and maintained (Bergqvist & Woxenius, 2011).

3. The success of Northern European ports

The development of ports in Northern Europe is undoubtedly due in part to historical and geographical factors. On the other hand, it is also by virtue of a strategy for growth and development aimed at maintaining competitiveness. The ports between Hamburg and Le Havre in particular have shown how their role is essential in the European logistics chains. This success has been largely characterized by a policy of the port authorities aimed at the reduction of inefficiencies and the improvement of services supplied (Notteboom, 2010).

A large number of the terminal activities in the ports of Northern Europe are assigned to specialized operators, who have achieved high levels of efficiency in this sector. The arrival of major international groups, such as Hutchison, PSA, DP World, Odfjell, APM Terminals, Vopak and Eurogate, alongside top local entities, such as HHLA and NHS, guarantees an exceptionally high level of quality in the terminal services provided.

As regards maritime services, some of the ports in Northern Europe enable the provision of nautical services, for example pilotage and mooring by specialist companies, normally with a semi-public set-up. This set-up was partly debated over recent years on a European level as the Commission takes the view that in some European ports there are some inefficiencies in the sector of port services, not terminal-related, which have an impact on the competitiveness of the ports. The debate at the European level is ongoing, but when dealing with policy intervention the response of the sector and users of the port does not seem to consider a possible reform as a particularly urgent matter (Haralambides & Acciaro, 2015).

An important aspect in carrying out port operations within the Hamburg-Le Havre port range appears to be related to speeding up bureaucracy, not so much aimed at, for instance, the elimination of inspections, but rather towards guaranteeing a system of inspections that is efficient and focused on the principles of risk. Again in this case the European stance seems to be clear in terms of maintaining the efficiency of port operations, which must be aimed at reducing redundant and ineffective procedures.

The speeding up of bureaucracy is also tied in with the role of ICT and the creation of single points of contact that enable the efficient handling of information on the vessels and cargo. The ports of Rotterdam, Antwerp and Hamburg have developed specific strategies aimed at the use of ICT to improve efficiency of the port. For example, in Hamburg the development of a new SmartPort strategy focuses on the real-time collection of information and new methods of sharing data.

As regards links on land, the ports within the Hamburg-Le Havre range have developed a dense infrastructural network that has enabled the constant growth of port traffic, with the exception of 2009 when the economic crisis led to a reduction in volume of certain ports. The coordination of the land networks and infrastructures, with long-term plans and the involvement of public and private resources, constitutes one of the most successful strategies of these ports (Wilmsmeier, *et al.* 2011). Notwithstanding some infrastructure development delays and some conflict between local authorities, port authorities and private operators, the ports nevertheless

developed a high level of accessibility on land to complement the maritime networks (van der Horst & van der Lugt, 2011).

Furthermore, in the last decade the main European ports have invested in logistics for the purposes of participating in the value chain, reducing transport costs, increasing reliability and offering opportunities for the development of logistics activities in the vicinity of the port. It is perhaps the port's ability to speak the language of logistics that has enabled it to prioritize these most urgent areas of intervention.

4. The distinctive traits of rail transport in the ports of Northern Europe

The development of transport to and from the hinterland of the Northern European ports is characterized by significant differences in terms of modal shift, history, and strategies for the development of transport networks. On the one hand we find common elements, such as the need to reduce environmental impact and maintain competitiveness of the port itself, while on the other we are faced with ports each with very specific historical, geographical and local features.

The rapid growth of traffic in the ports of Northern Europe can be traced as far back as the 1970s to the study of ambitious projects for expansion in the port areas, and a boost to rail traffic. These projects arose alongside the need to solve problems of increasing congestion in the port areas and conflicts with the urban areas. Hence from the 1980s the role of the rail network was clearly defined, with numerous projects instigated in the 1990s.

In Belgium and the Netherlands, the vicinity to other highly industrialized areas of Germany (Ruhr), which already in the previous century saw the need to develop links with the coast for the export of coal and subsequently for the import of raw materials, as well as the presence of a dense network of navigable waterways enabled the ports of Flanders and Holland to develop a preferential position towards the area of Europe that for much of the last century constituted the industrial engine of the continent (van der Horst & van der Lugt, 2011).

In the case of the railways, both the Netherlands and Belgium over the last 20 years have made efforts to develop freight traffic by rail to address the need to diversify modal supply of the port. A large part of traffic both from Antwerp and Rotterdam moves on road, and another significant part on the waterways. The development of railway infrastructures was the first step towards boosting the modal shift from road to rail transport. The role of the road and river transport is particularly evident in the case of container traffic (Table 1).

Trasferimento modale nei principali porti Europei, Container, 2012

Transport Mode	Port						
	Hamburg	*Bremer-haven*	*Rotterdam*	*Amsterdam*	*Antwerp*	*Zeebrugge*	*Le Havre*
Road	61%	48.4%	35.3%	50%	56%	55%	84%
Rail	37%	47.3%	10.7%	7%	9%	44%	7%
River	2%	4.3%	54%	43	35%	1%	9%

TABLE 1 - Source: Port Authorities

In Germany, the selection of the ports of Hamburg and Bremen as the principal ports of the Federal Republic of Germany and following the post-Second World War reconstruction and the Cold War, the development of electrification and the role of the two independent *Länder* of Hamburg and Bremen in supporting rail transport, resulted in Germany to becoming one of the most advanced countries in terms of rail transport. In fact, the political choices, to some extent compulsory, of the German Democratic Republic to rely on diesel (partially backed by Soviet Union funding) meant that the railways were in serious difficulty at the time of unification. However, today the traditional link between Germany and the countries of Central and Eastern Europe have enabled the ports of Hamburg and Bremen to develop their own influence in the Baltic areas.

Another interesting case is that of Sweden, where intermodal development has been aided by the long distances and a significantly developed rail network, involving interventions for the modernization of dry ports and an environmental protection policy. This advance has enabled the main port of the country to develop shuttle trains to the main production sites of the nation. Despite the relative success of intermodal container transport, there are still numerous opportunities for rail transport. The increased interest of several large industrial groups, until now limited, as well as the possibility of improving the efficiency of truck transport could lead to an increased use of the network (Bergqvist & Woxenius, 2011).

In the United Kingdom, the role of the railways and the integration of rail and ports have been facilitated by the existence of "rail" ports, i.e. ports owned by rail companies, such as Felixstowe, and the premature development of rail transport in the country. Despite the vicissitudes of the British rail system following the privatization policies of the early 1990s, freight traffic on rail remains a major component of transport to and from ports, with a substantial funding policy, aimed at reducing environmental impacts.

It is important to note that the development of rail traffic, despite the relative success in some ports, has involved a progressive decline in the percentage of rail transport on a European scale. Rail transport thus requires not only development of the infrastructures on a European level, but also a policy of price incentives, which will enable the development of long distance corridors between the European states. As briefly explained at the start of this introduction, the improvement of transport networks does not necessarily mean the growth of port traffic, but rather an increase in competition between the ports.

5. The main experiences in Europe

This section deals in more detail with the experiences of the major ports in Northern Europe. Each comparison of European countries and of ports, which for geographical, economic and historical reasons have developed different competencies and specializations, requires special attention, but it is nonetheless possible to look into the main cases of success for inspiration when selecting the best policies for development

in the rail sector. The following section evaluates a number of case studies for Belgium, the Netherlands, Germany and the United Kingdom.

Table 2 shows the main traffic of northern European ports. Even from this limited information a large variety of traffic can be noted, also with consequences on the possibilities for intermodal transport. For example, liquid bulk is largely transported via pipelines or destined for the refineries and the chemical industries in the vicinity of the port. On the other hand, container traffic is mostly directed to the hinterland, with the exception, of course, of transìshipment.

Total freight handled in the main ports of Northern Europe, expressed in millions of tons and percentages, 2013

Freight	*Port*						
	Hamburg	*Bremer-haven*	*Rotterdam*	*Amsterdam*	*Antwerp*	*Zeebrugge*	*Le Havre*
Metals	9.5	4.6	8.9	35.9	2.9	0	0
Coal	5.7	1.3	21.6	30.7	2.2	0	1.4
Agribulk	8	0.7	8.4	10.3	0.8	0.1	0
Other dry bulk	4.6	1.7	7.3	12.3	8.5	1.2	1.5
Total dry bulk	*27.8*	*8.3*	*46.2*	*89.2*	*14.4*	*1.3*	*2.9*
Petrol	2.5	0	0	91.1	4.7	0	23.7
Mineral oils	9.5	1.6	38.7	81.6	43.1	3.2	12.3
Natural gas	0	0	0	0.8	0	3.3	0
Other liquid bulk	2.6	0	2.4	33.4	11.7	0.3	1.9
Total liquid bulk	*14.5*	*1.6*	*41.1*	*206.8*	*59.5*	*6.9*	*37.9*
Total bulk	***42.3***	***9.9***	***87.3***	***296***	***73.9***	***8.2***	***40.9***
Containers	94.8	61	0.8	121.3	102.3	20.4	24.8
Roll on/Roll off	0	0	0.5	18.5	4.6	12.5	0
Other non-container freight	1.9	7.9	7.3	4.7	10.1	1.7	1.5
Total breakbulk cargo	***1.9***	***7.9***	***7.7***	***23.2***	***14.7***	***14.2***	***1.5***
Total	**139.1**	**78.8**	**95.7**	**440.5**	**190.8**	**42.8**	**67.2**
Market share (%)	11.8	6.7	8.1	37.3	16.1	3.6	5.7

TABLE 2 - Source: Port Authorities

1.1 The case of Antwerp and the IJzeren Rijn

The port of Antwerp

Antwerp is one of the major ports in the world, and represents one of the principal outlets for import and export traffic for the entire European Union. As regards general cargo, such as fruit, fertilizers, steel products, coal, etc., the port is ranked in second place on a European level and fourth place worldwide. Here 190 million tons of goods are handled per year (58% imports and 42 % exports).

From a point of view of the sources and destinations of the goods transported, it is significant to note that over 50% of the traffic originates from or is directed to the Benelux area, while the main remaining destinations are Germany, France, Switzerland, Austria and Italy. Significant traffic can also be noted with Great Britain, Canada, and the United States.

Overall, the port layout covers an area of 13,455 hectares north of the city centre, and offers 130 km of quaysides, half of which are equipped for deep draft vessels. As

Antwerp is a river port, it has two sets of quays on each of the banks of the river Schelde, both equipped with container terminals.

In addition to the handling and distribution of freight, numerous other activities are carried out in the port area, as is the case of many other ports. Belgium Opel, for example, has built one of its largest industrial plants in the vicinity of the port of Antwerp. However, the majority of industries are petro-chemical or chemical based, to the extent that the port of Antwerp is ranked among the top in the world for this sector. Industrial activities generate approximately 23% of port traffic, but in compensation virtually all raw materials for these industrial facilities arrive by sea. Petroleum products cover approximately 70% of the total port throughput. In addition to the above, there is also the freight transported on inland waterways, of which half of the total traffic is generated by industrial input, while five refineries are located in the port area. Overall, the total upstream industry generated by the port in terms of employment counts for nearly 30,000 units.

The port authority of Antwerp was created as a company entirely owned by the municipal authority of Antwerp in 1997. Previously, as in the case of other ports in northern Europe, the port authority had been a department of the municipal authority of Antwerp. Although the port authority is totally autonomous, it still has very close ties with the municipal authority, with the Ministry (*alderman*) of the ports heading the port's board of directors. The port authority is responsible for developing the infrastructures within the port, a complex task in view of the fact that the port borders on three different municipalities. The port authority has the right of pre-emption guaranteed by decree for the purchase of areas in the vicinity of the port.

Antwerp as an intermodal hub

To all intents and purposes, Antwerp can be considered an intermodal hub, integrating transport by sea, inland waterways, rail, road and air. As regards maritime transport, the vessels passing through Antwerp amount to over 16,000, from over 100 different countries.

In the case of transport via inland waterways, given that the port stands at the mouth of the rivers Schelde, Meuse and Rhine, it is evident that the port has preferential access to the 15,000 km of waterways in Belgium as well as the European network. The canal connecting the Rhine to the Danube, easily reached by the Schelde and completed in September of 1992 enables navigation from Antwerp right through to the Black Sea. Container traffic in particular benefits significantly from this mode of transport, and around a third of the total handled is transported via inland waterways.

In terms of road traffic, the central position of Antwerp with respect to Northern Europe makes this location one of the centers of the motorway system. More specifically, three main motorways meet in the vicinity of the port, these being the E-313/314 linking with Germany, the E-17/34 Lisbon-Stockholm, and the E-19 between Paris, Brussels and Amsterdam.

There is also notable traffic through the 100 oil pipelines, stretching 350 km within the port area. 15 different products are conveyed through the pipelines, including methane gas, petrol, hydrogen, ethylene, propylene, etc. The pipeline connecting

Rotterdam with Antwerp (RALP) alone carries 29 million tons of crude oil every year. Also worth noting is the air traffic guaranteed by the airport of Deurne, a few minutes away from the port, and that of Brussels around 45 minutes away, both specializing in freight transport to the main European destinations. Brussels is also one of the largest air freight traffic control centers of Europe.

As regards the rail traffic, Antwerp boasts a particularly favorable position, lying on 12 international rail lines and situated at the centre of three European corridors. Each day the port sees the transit of 120 freight trains, 650 thousand wagons annually, for a total freight on rail of 24.3 million tons. Since December 2000 container traffic has also increased considerably, thanks to the completion of a rail terminal complex capable of handling 650,000 containers per year. Modal distribution benefited from these interventions, and consequently the share of transport on rail grew from 9.3% in 1999 to 11% in 2011. River transport has also seen an increase in its market share, reaching 33% in 2011 from the more modest share of 22.5%. However the objective of the port is to further reduce the percentage of container traffic on roads to 43% by 2020. The modal distribution plan envisages a share of 15% for rail and 42% for waterway transport.

In order to improve modal distribution, the port authority has implemented various measures aimed at promoting rail, such as the increase in rail companies operating in the port (from 10 to 13), the project for partnerships between port authorities, some operators and terminal groups, known as the *Antwerp Intermodal Solution* (AIS). In addition, the initiative *Port of Antwerp Connectivity Platform* aims to simplify the choice of intermodal supply.

The development of rail traffic and the IJzeren Rijn

The intermodal development plan for the port of Antwerp envisages an increase in rail traffic. To date, the main link between the port of Antwerp and the German area (Mönchen-Gladbach) is via the Montzen line, a 211 km railway (figure 1) built between 1915 and 1917 and recently electrified. Some sections of the Montzen line are subject to the heaviest traffic in Europe, with over 35,000 trains each year, 40% of which are destined for or depart from the ports of Antwerp and Zeebrugge. Despite the high volumes on this line, it has limiting characteristics that render expansion impossible. In particular the gradient on some sections restricts the quantity of freight that can be transported to 800-1300 tons per convoy. The intermodal development planned for Antwerp would mean doubling the number of trains on this line by 2030, an unlikely scenario considering the already intense use of certain sections of this line.

One of the alternatives would be the development of the *IJzeren Rijn* (the Iron Rhine), which would effectively shorten the lines by approximately 50 km and increase the maximum weight capacity for transport per convoy to 2000 tons. The IJzeren Rijn had already been in discussion on some sections since 1991, when in 2000, the port of Antwerp and the Belgian government again proposed its opening. One of the problems with the IJzeren Rijn is that part of the line crosses Dutch territory, and therefore it is re-opening and the work for modernization of the line would also be the responsibility

of the Dutch network operator ProRail. The line would also cross areas subject to landscape protection in the area of Roermond.

The stretch of IJzeren Rijn and the Montzen line

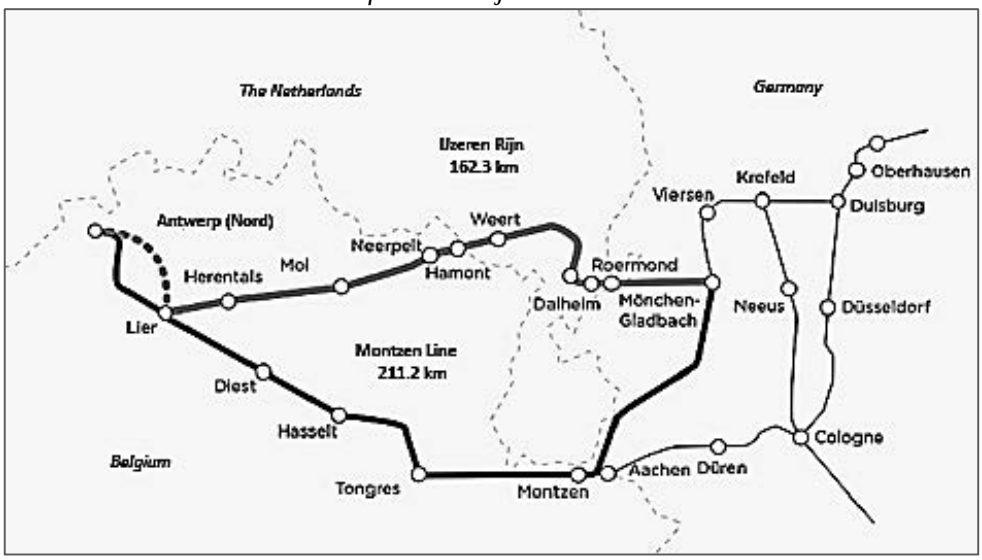

FIGURE 1 - Source: Infrabel

Following a dispute between the Dutch and Belgian governments on the re-opening of this line, the decision went to arbitration in 2005, which despite an initial decision against it, still did not lead to a final resolution of the issue. The importance of the line for the port of Antwerp is evident, above all with regard to the prospected congestion of rail traffic and the potentially wasteful efforts of the port authorities in upgrading traffic on rail.

1.2 The case of Rotterdam: Container Transferiums and the Betuweroute

Development and traffic in the port of Rotterdam

The port area of Rotterdam is among the most extensive in Europe and covers an area of over 10,500 hectares, stretching 40 kilometers from the port entry, and offering over 80 kilometers of equipped quaysides with over 300 cranes of various types.

In terms of economics, the port and activities in this area generate 2% of the Dutch GNP, and 25 % of that of the entire area of Rotterdam, corresponding to around 12,000 million euro. The port provides employment for over 35,000 people in the transport sector, around 9,000 of whom are actively involved in port operations. Overall it is estimated that the port is the source of employment for over 88,000, of which the port authority alone employs 1,100.

Each year around 30,000 vessels pass through Rotterdam, for a total of 440 million gross tons, of which 310 million are imports and 130 million for exports. As regards the make-up of traffic, 89 million are dry bulk, 296 liquid bulk and 120 million are

containers. It is the containers that constitute the most important traffic, considering that the freight transported is normally of value, and growth in this sector is the most significant. In 2013, approximately 11.6 million TEUs were handled, amounting to a total of over 7 million containers. The port is the largest in Europe for this sector, surpassing both Hamburg (9.2 million TEUs) and Antwerp (8.5 million TEUs).

As regards inland transport, the port is at the cutting edge in terms of intermodal transport, combining road, rail, pipelines, rivers, and in certain cases even air. The entire system is organized by means of highly advanced ICT and remotely control systems (EDI systems, IT platforms, etc.).

The road transport system is able to join Rotterdam with all corners of Europe within 24 hours, with 12,500 vehicles departing daily from the port area. The port is located at the centre of one of the densest motorway networks in the world, covering over 230 thousand kilometers. Road transport represents one of the most flexible and economic means of transport here.

Nevertheless, the greatest strength of the port of Rotterdam lies in the possibility of exploiting transport on the inland waterways to all areas of continental Europe accessible on the Rhine and the Danube and their navigable tributaries. Waterway transport although not particularly quick and flexible, offers significant economic advantages and relatively low pollution. The port offers 27 operators specializing in waterway traffic and 110 regular communication lines with 40 centers throughout the continent. River transport is particularly suitable for containers and Ro-Ro cargo.

The port is also connected not only by inland waterways but also by sea on feeder vessels, which enable access to the ports of Great Britain and the Scandinavian peninsula, the Baltic states, as well as all ports of the Mediterranean basin (Greece, Spain, Italy, Turkey, and North Africa). This type of transport is also ideal for trucks and cars (Ro-Ro) enabling a door-to-door service.

In terms of rail transport, which undoubtedly represents the safest, most economic and reliable means for the transport of large quantities of long haul freight, Rotterdam finds itself at the centre of the European rail network, linking all main industrial centers. Over 300 convoys depart each week from Rotterdam, transporting containers for which the port is equipped for trans loading with rail terminals at all container stops.

In all sectors of transport the port of Rotterdam is well equipped and integrated in the European network. The exchange hubs with various transport modes are particularly well-organized. The entire infrastructural system is constantly upgraded and its efficiency maintained, also thanks to the participation of the Dutch government, which invests directly in the port infrastructures (de Langen, *et al.* 2012).

The constant expansion of traffic throughout Europe requires ongoing investments in physical infrastructures, and in the organizational and managerial capacities in order for the port to maintain its dominant position. Work is currently under way to double the rail lines, expand the quays and carry out routine maintenance work. Special attention is also paid to environmental protection (Notteboom, 2010).

The port is also promoting and re-launching all services on offer, keeping all operators up to date on changes, the new infrastructures available and the management logic applied. There are agents or representatives of the port of Rotterdam in all the

main countries involved in traffic with the port, dealing with relations and local promotion initiatives.

The entity assigned to manage and coordinate development of the port, also in infrastructural terms, is the port authority of Rotterdam, a company 70% owned by the municipal authority of Rotterdam and 30% by the Dutch government. The port authority mainly deals with keeping up the competitiveness of the port, acting as *regulator* within the port and responsible for development of the infrastructures.

The development of rail traffic and the Betuweroute

The competitive position of the port of Rotterdam depends on the ability of the transport operators to handle freight quickly at the terminal and ensure delivery across the borders within prompt and foreseeable time frames. This is assured mainly by inland barge and road transport. However, over recent years the port has made considerable efforts to improve its performance in the area of rail transport. One of the most ambitious infrastructural projects is the construction of the Betuweroute rail line dedicated to freight traffic between the port of Rotterdam and Germany (Figure 2).

The ECL shuttle connection network

FIGURE 2 - Source: ProRail

This stretch, taking the name from the area crossed, is the result of a project developed in the mid-1980s, and was inaugurated in 2007. The line reconnects with the German rail network in the vicinity of Emmerich, along with the *Hollandstrecke*,

which is currently being completed, and constitutes part of one of the TEN-T routes, included as project no. 5 of the European policies.

The *Betuweroute* is a double track line in part constructed by developing existing lines (between Rotterdam and Kijfhoek), three quarters of which are brand new (the line between Kijfhoek and the German border). Although the first studies of the line date back to the 1980s, the work only really started in 1998. Before and after construction, the new railway was subject to numerous protests by local communities affected by the line, and by environmental groups, with the consequent delays and increases in costs animating the Dutch political debate for more than a decade. In 2000 the Dutch Supreme Court of Appeal even went as far as stating that it would probably have been better to invest in river transport, while in 2004 it became clear that despite the initial intentions, the line would never have been able to repay the investments made. On completion in 2007, with a delay of over two years, the total cost of the line amounted to 4.7 billion euro, more than double the estimated cost (Acciaro, 2005).

Keyrail manages the line, a company 50% owned by the Dutch network company (ProRail), and 35% by the port authority of Rotterdam with the remaining 15% owned by the port authority of Amsterdam. The line covers a total of 120 km, and in 2013 saw the transit of 32,300 trains from Rotterdam and 5,700 trains from Amsterdam, representing a slight drop with respect to the total of the previous year. The total number of trains on the line cannot be increased until 2022, the envisaged date of completion for the corresponding third line on the German route. However, over recent years there has been a considerable growth in traffic, with an increase of around 100 trains per month (10%) until 2011 (Brooks, *et al.* 2014).

Such a high growth rate was achievable thanks to electrification and a tariff incentive policy of the Port Railway Line, i.e. the section of the new port terminal complex (Maasvlakte) and the marshalling yard of Kijfhoek. Thanks to these policies, many operators have abandoned the mixed lines in favor of the Betuweroute. The completion of the connection with Amsterdam in 2011 also enabled the line to serve the port of Amsterdam, the second port in northern Europe for coal handling (Merk, 2013).

Container Transferium

Another successful concept in the policy for improving connections with the hinterland of Rotterdam was the creation of a container transferium. Transferiums are container terminals located in the hinterland of the port, which avoid the need to enter the port's main area. The principal aim of the transferium, located just a few kilometers from the port of Rotterdam, is to fully exploit the opportunities offered by river transport, in terms of reducing environmental impact and congestion in the port areas. The port of Rotterdam, after evaluating the increase in costs deriving from a drop in traffic reliability due to the increase in traffic on the main road link with the port (the A15), developed this new logistics concept to enable road traffic to avoid the need to enter the port, thereby reducing delivery or pick-up times by more than 4 hours. The transferium is managed by BCTN, an operator specialized in the management of river terminals (de Langen, *et al.* 2012).

Particularly instrumental to success of the transferium is the cooperation with the customs offices which enable the transit of containers on barges between the terminals of Maasvlakte and the transferium without the need of any additional documentation, as well as the cooperation between the port authority, barge operators, BCTN and the terminal operators in the port of Rotterdam.

1.3 Support of the rail sector in the United Kingdom and the case of the Southampton – West Midlands corridor

The British port system

When considering the geography of the United Kingdom, it comes as no surprise that the logistics system depends greatly on efficiency of the ports. There are approximately 120 main British ports, which over the last year jointly handled over 560 million tons of freight, equivalent to 95% of British foreign trade. The numbers employed in the port sector amount to 130,000, while total volumes have remained constant over the last decades, with the exception of the container and Ro-Ro sectors, which have grown by approx. 2% on average each year.

The sixteen main ports represent over 80% of the total freight handled. A great number of the larger ports are owned by private companies, such as the cases of Liverpool, Felixstowe, Tees & Hartlepool and Forth Ports or *Associated British Ports* (ABP), which own 21 ports, including Southampton. Some of these ports have been developed privately, while others were originally *trust ports*, a legal set-up typical of the United Kingdom and likened to a semi-public company, which were then privatized in the early 1990s. The government does not intervene in these ports in any way, and the ports must independently provide funding for the infrastructures. Together the private ports represent overall around two thirds of the total freight handled.

The majority of small ports and some of the medium sized ones are still *trust ports*, such as Dover, London and Tyne. These ports are managed by an independent authority without shareholders, and in some cases with a control body appointed by the Ministry. The revenue from port operations and the supply of services is entirely re-invested in the port. In all, these ports represent around one quarter of the total volumes handled. Lastly, some of the smaller ports are owned by local authorities, as in the case of Portsmouth and a number of oil terminals in the Orkney and Shetland Isles.

Intermodal transport and the Southampton – West Midlands corridor

Most freight traffic in the United Kingdom is by road. However, in the container sector there has been an increase in rail traffic, rising from 18% to 30% between 2002 and 2012, despite a reduction in traffic over recent years due to the international crisis. Container traffic is mainly involved in *short sea shipping* or transoceanic shipping routes. Although some ports are dedicated to both types of traffic, the growth in container traffic is mainly down to specific rail corridors related to the main two container ports of the country, Felixstowe and Southampton, which alone represent 77% of the transoceanic container traffic. These corridors link the ports with the three logistics and industrial areas of the Midlands, Yorkshire and the North West, while an

increase in traffic has also been noted in the last decade from Tilbury and Thamesport. In 2011, 83% of the intermodal departures were from Felixstowe or Southampton and 88% of the trains were destined for the three above logistics areas (Woodburn, 2012)

The dependence of intermodal traffic on certain corridors has given rise to the importance of upgrading the infrastructures on these routes. In particular, the case of the Southampton-West Midlands corridor offers the opportunity of evaluating the impact of improvements to infrastructures on the overall traffic. Since 2007 the corridor has been upgraded, with improvements to the clearance gauges, an assessment of the possibility of using 30-wagon trains over an overall length of 640 meters and the purchase of new loading cranes in the terminal managed by *Freightliner*, the main British intermodal operator in Southampton. Improvements to the line have resulted in an increase in the volume of containers transported on rail, with a growth in modal distribution from 30% to 36% according to DP World Southampton. Even though the overall impact is probably lower (Woodburn 2013) the increased load capacity on the line has undoubtedly improved competitiveness of the railways.

Railway incentives for sustainability in the United Kingdom

The United Kingdom has a strong tradition of using the railways, but during the 1970s the share of rail traffic was reduced considerably. Despite the process of deregulation and privatization that was to feature in the system over the following decade, rail traffic was unable to keep pace with developments in logistics systems. These developments were however detrimental to the environmental benefits linked to rail transport. For this reason, since as far back as 1974, the British government has developed a system of incentives for freight transport by rail, known as the *Freight Facilities Grant* (FFG), which offers guarantees and access to funding sources for the development of rail infrastructures dedicated to freight transport, where it can be demonstrated that environmental benefits are achievable through modal shift from road to rail. Although the system of incentives is still active in Scotland, funding in England has now been suspended, and in part replaced by the *Mode Shift Revenue Support* (MSRS).

The FFG enables us to measure the benefits deriving from the use of rail on the basis of the reduction in *sensitive lorry miles* (SLM). Various funds are allocated on the basis of the type of road that incorporates environmental impact parameters. The total value of the SLMs avoided thanks to rail transport enables a calculation of the total funds to allocate to the railways, with a direct evaluation of the benefits attainable with the system of incentives. Ports and freight villages have received these types of funding to favor competitiveness of the rail sector in connection with the hinterland of the port (Acciaro & McKinnon, 2013).

This system of benefits was integrated with a new scheme, the *Rail Environmental Benefit Procurement Scheme* (REPS) in 2007 aimed at aiding container transport over distances greater than 250 miles to and from the ports. REPS also provide a form of operating incentives —while the FFG offers simply incentives for investment—. The incentives offered by the REPS are based on measurable environmental benefits, and are available only when these benefits are not attainable because rail transport is more

expensive than road transport. Rail operators can apply for various funding schemes, but the deriving environmental benefits cannot be combined. REPS were in part replaced by the MSRS (for bulk transport), which is based on a division of zones in the United Kingdom.

1.4 Hamburg and Bremen: the main European rail ports

The situation of the German ports

The German port system, together with the other ports in the Hanseatic area, has always guaranteed the role as a gateway for industry of the entire region. It is undeniable that the industrial areas of Germany are at a significant advantage thanks to the international outlet provided mainly by the ports of Hamburg and Bremen, but also Rotterdam and Antwerp.

Until a short time ago, the main German ports were owned by the municipal authorities and did not constitute legally and economically independent bodies. However over the last decade the port authorities have emerged as major management authorities similar to those of other European countries. Despite the change of regulations in some *Bundesländer*, which envisaged the birth of port authorities, the role of the regional public authorities is still important.

The German ports are therefore managed directly or indirectly by:

1) a *Bundesland* as in the cases of the ports of Emden and Cuxhaven;
2) a *Bundesland* and a municipality such as the case of Hamburg and Bremen, where *Bundesland* and municipality coincide;
3) a municipality as in the case of Lübeck and Kiel;
4) a *Bundesland* and in part by a municipality as in the case of Wilhelmshaven.

The Federal government is responsible for the control and direct funding of works that ensure the entry and exit of vessels and freight, breakwaters and dams, defense barriers, dredging of artificial canals and rivers, and the rail network. All the remaining works and port infrastructures remain the exclusive responsibility of the regional public authorities or the port authorities, which are in receipt of the total revenue deriving from port dues.

The port operators, required to take responsibility for port equipment and machinery, work on the basis of a concession and under supervision of the competent regional authority, usually the port authority.

The main German ports: Hamburg and Bremen

The ports of Hamburg and Bremen (Bremerhaven) are the two most important ports in Germany. The particular administrative set-up under the control of the municipality-*land* has meant that both have been able to significantly increase their traffic.

After the virtually total destruction of the city in the Second World War, the port of Hamburg was quick to regain its importance as one of the main ports of Germany. Every year, the Hamburg state-controlled port authority invests around 84 million euro for the maintenance and modernization of infrastructure, and with 170 kilometers of public roads and 340 km of rail lines within the port represents a clear example of

intermodal hub. Over the last five years, the annual average of merchant ships in the port amounted to approximately 12,000 vessels, which in 2013 transported around 140 million tons of freight, including 9.25 million containers. The main tasks of the port authority (HPA), created in 2005, include that of developing and maintaining the infrastructures in the port.

The port of Bremerhaven, some 40 km downstream on the Weser river from the city of Bremen, represents one of the most important activities of the entire State. The constitution of Bremen clearly declares the port vocation of the region. Since 2002, the Senate of Bremen has officially transferred the responsibility for management, construction and maintenance of the port area to a private company entirely owned by the municipality, *Bremenhafen GmbH*, while the responsibility for safety and all general activities related to the maritime authority (police and nautical services) have remained with the Hafenmeister and the *Hansestadt Bremisches Hafenamt*, a department of the Bremen municipal authority.

The port of Bremen, though located at 32 nautical miles from the coast, is also a port of considerable importance. The *Wilhelm Kaiser Container Terminal* in particular is alone able to handle over 3 million containers per year, amounting to over 5 million TEUs. The port is also fitted with over 200 km of rail tracks.

Rail transport in the ports of Germany

The role of rail transport in Germany is the result of a long series of logistic planning interventions. A clear example of this is the development of an interport concept, dating as far back as the Sixties, when the first containers started to arrive in the country. The first authentic *freight village* in Germany dates back to 1985 near Bremen, and their number has now increased to 31. The advantage of this network of interports lies in the access to rail and road networks, the supply of specialized logistics services, the reduction in congestion of urban areas and environment-related benefits.

The development of this network of *freight villages* is one of the essential success factors of Germany's rail transport. The largest *freight village* in Germany can be found in the area of Grossbeeren, south of Berlin, covering an area of 150 hectares, where over 55 companies operate with over 3,700 employees. The logistics centre of Grossberen represents one of the preferential access routes for the railways, with three weekly trains for Moscow and beyond, reaching as far as Kazakhstan.

In the case of northern Germany freight villages offer one of the best examples of integration between port and rail. The port of Hamburg is one of the most important rail hubs in Germany. Hamburger Hafenbahn manages the rail network within the port, which is responsible for the maintenance, development and expansion of the infrastructures. The port authority of Hamburg, which as previously explained is controlled directly by the Hamburg *Land*, is responsible for maintaining the efficiency of the rail network within the port.

Hamburger Hafenbahn directly controls three stations and over 375 km of tracks within the confines of the port, where over 90 rail operators work, with more than 200 national and international connections per day. Trains depart daily from Hamburg, headed for Denmark, Poland, the Czech Republic, Slovakia, Hungary, Switzerland and

Italy. The operators are mainly independent private companies or subsidiaries of major terminal groups operating in the port, such as HHLA or Eurogate, operators specializing in intermodal traffic such as Rail Cargo Operator, or on specific corridors such as Polzug, towards Poland or Metrans towards the Czech Republic.

The success of rail transport in Germany is not only the result of a far-sighted management of the port infrastructures, but also the constant planning of rail transport throughout the country with the objective of reducing bottlenecks and maintaining competitiveness of the system (Reis, *et al.* 2103).

In 2008 the German government developed a project as part of the master plan for logistics and transport, to then be completed over the following years with a transport planning document that envisaged the implementation of thirty-five interventions aimed at improving the efficiency of the freight transport network by rail (Zitz & Matopoulos, 2014). The main source of inspiration for this plan was the sustainable development of the sector, with the following, in order of priority:

- development of the infrastructures;
- improvement of the efficiency in use of the transport infrastructures;
- rationalization of infrastructure use;
- improved working conditions for the sector employees;
- improvement in the quality of life through environmental and climate protection policies.

This set of policies on a Federal level, in the case of Bremen and Hamburg came together with a policy directly related to the port, aimed at encouraging the use of rail transport. For example, the port plan of Hamburg, launched in 2005 and then revised in 2013, already envisaged an increase in rail transport. In 2008 the rail master plan, in collaboration with the German railways (Deutsche Bahn, or DB), was launched, followed in 2009 and 2010 respectively by the master plans for the waterways and roads. One of the salient features of these initiatives was the recognized importance of collaboration between operators and public authorities. An example of such collaboration was the Logistik-Initiative Hamburg (LIHH) founded by the city government in 2005 with the aim of aiding logistic development in the State of Hamburg.

The collaboration between HPA and LIHH is, among others, focused on the rationalization of the port areas. Indeed, Hamburg, as a river port bordering with the city of Hamburg has limited options for expansion of the port areas, which are contested for commercial, industrial, logistic and urban use. Nevertheless, the results of various studies promoted by LIHH and HPA have enabled the mobilization of 150 hectares of commercial land to be allocated for logistics (mainly on the southern banks of the river Elbe). Use of the rail network in the port envisages a tariff system based on the duration of rail occupation, in order to improve efficiency in the use of infrastructure. There is also an incentive system for operators using low-emission locomotives.

Important factors in the development of the railways do not only include the infrastructures and incentive policies but also the specialized operators. The main rail operator within the ports is DB, in particular through DB Schenker Rail. However there

are many other operators involved in each port. In Hamburg, the total number of registered operators with access to the port railway amount to over one hundred.

One of the largest operators in rail freight transport is Kombiverkehr, the largest supplier of integrated road and rail services in Europe. Kombiverkehr handled over 21.8 million tons of freight in 2013, equivalent to 940,000 articulated trucks. The company, set up in Frankfurt in 1969 is now a collaboration of over 230 logistics operators and DB Intermodal Logistics, one of the companies in the DB group. The strength of Kombiverkehr lies in favoring the consolidation of cargoes, thereby enabling the use of rail transport and guaranteeing frequent departures. The company can now offer over 560 shuttle services weekly, to 830 destinations across Europe.

In 2002 Kombiverkehr, DB and one of the major terminal operator groups of the port of Hamburg, EUROGATE, created the intermodal terminal EUROKOMBI, which operates as a public terminal alongside the maritime terminal of EUROGATE. Since 2009 the terminal has been equipped with eleven tracks each able to serve an entire freight train, with eight bridge cranes. Meanwhile outside the port area we find the terminal run by DUSS (Deutsche Umschlaggesellschaft Schiene-Straße), which operates as an intermodal hub for the entire region. This terminal acts as a dry port, aimed at improving efficiency of transport to the hinterland (Cullinane, *et al.* 2012).

In the case of Bremen and Bremerhaven, the role of the railways is even more important, with over 47% of container traffic departing from or arriving at the port via freight train. Bremen and Bremerhaven play dominant roles in the transport of vehicles and containers. The railways inside the port are the responsibility of *Bremische Hafeneisenbahn*, which acts as manager of the infrastructures on behalf of the municipality of Bremen.

The case of Lübeck

The port of Lübeck, on the Baltic Sea, is an interesting case of a medium sized port that has managed to develop and maintain special competencies in intermodal traffic, thanks to an innovative approach that has enabled the transfer of most of the traffic onto rail. Every year, the port of Lübeck (Lübecker Hafen-Gesellschaft mbH) handles a little under 24 million tons of freight and specializes in Ro-Ro traffic, with a dominant position in the transport of timber and its by-products. Although the geographical position, to the extreme south east of the Baltic Sea, ensured a geographical advantage over the traffic between Sweden, Finland, the Baltic States and Eastern Europe, the port still faces high competition by Kiel and Rostock.

The port authority is controlled by the municipality of Lübeck (62.5%) and by an investment fund (RREEF) linked to the Deutsche Bank for the remaining 37.5%. The port authority is the majority shareholder or sole shareholder of seven controlled companies dealing with logistics and operating in the main four terminals of the port. These include some transport companies, such as Nordic Rail GmbH and Baltic Rail GmbH (50% shareholding), and European Cargo Logistics GmbH (ECL) which is not only a transport operator but also a logistics company. Lübeck offers 96 weekly departures for the main ports of the Baltic, with over 360,000 passengers and 700,000 trucks and trailers transported each year.

ECL acts as an intermediary on behalf of the port of Lübeck, organizing intermodal transport for over 40 trains per week, as well as acting as an agent for 400 trucks per day. It coordinates the transport of approximately two million tons of timber and related by-products. ECL is also an intermediary for large timber groups, such as Storaenso and UPM, as well as shipping agents, among others.

As regards rail transport, unlike Kombiverkehr, ECL is specialized in the development of shuttle trains to and from Lübeck, thus maximizing integration with the maritime transport system and limiting freight traffic to single destinations. ECL clients can directly calculate the duration of transport from the main ports of the Baltic via Lübeck to reach one of the destinations served by ECL. It is important to note that ECL does not run trains directly, but makes use of other operators, and in this sense acts as a 3PL or 4PL. For example, in the case of the connection service with Ludwigshafen (the *Rhein-Neckar shuttle*), ECL acts as an intermediary in cooperation with DHL, and deals with sourcing cargo amounting to half of the available volumes. This shuttle service, one of the first offered by ECL, was developed also due to the interest of Daimler AG, which following a contract with Valmet Automotive instigated production of the Mercedes Class A in the facilities of Uusikaupunki in Finland. Valmet also produces other components for Daimler, as well as other vehicles.

The ECL shuttle connection network

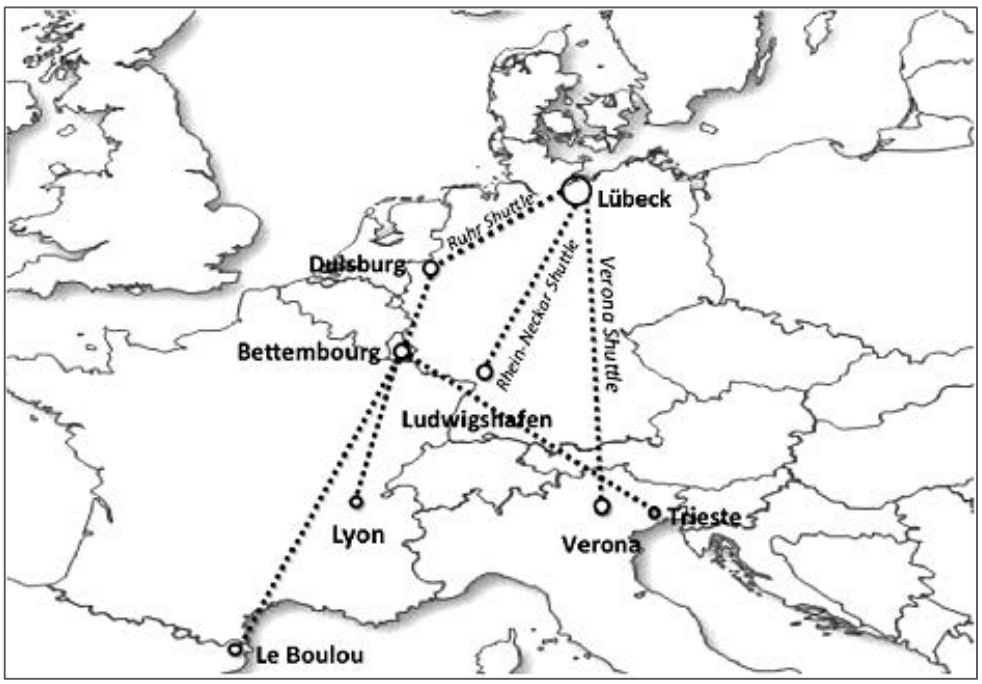

FIGURE 3 - Source: European Cargo Logistics

This agreement between Valmet and Daimler created the possibility of generating a constant flow of freight (approx. 240 semi-trailers per week) between Finland and

Ludwigshafen, to then be managed via Lübeck by ECL with daily departures. The trains take 15 hours from the arrival of the ferry from Finland to cross approximately 700 km between Lübeck and Ludwigshafen and enable a container to be transported from Finland to the south of Germany in around 60 hours.

The reliability of the rail and maritime service enables freight, for example, to depart on a Sunday at 10 pm from Trelleborg in the south of Sweden and reach Verona on Tuesday at midday, or to depart at 8.30 pm on Wednesday from Duisburg in Germany, to reach Malmö at 7 pm the next day, with no road transport involved.

7. Conclusions

The success stories of the ports in Northern Europe are certainly down to their ability to generate logistic value, and also through the reduction of inefficiencies in transport and upgrades to communication routes. European countries have developed various strategies to boost modal shift in favor of transport modes able to offer advantages in terms of costs or environmental benefits.

On the basis of the cases presented, a number of general conclusions can be advanced. The conditions for the use of rail transport are at least in part the result of historical developments and the geographical features of freight transport. In the northern European states substantial differences can be found in the degree of development of rail transport involving ports.

However it is still possible to identify strategies in the various cases aimed at modal shift from road to rail. In the cases studied, the success of rail transport is facilitated by the following factors:

- the development of dedicated rail lines;
- the upgrading of the main connection corridors between the industrial logistics areas by the modernization of existing infrastructures (clearance gauges, track gauges);
- a targeted program of incentives, both for investment (in the case of the UK) and operation;
- coordination between public and private entities;
- the creation of joint ventures between operators, public authorities and shippers;
- the consolidation of loads;
- collaboration between port authorities and logistics and terminal operators;
- the reduction of bureaucratic restrictions;
- a policy of logistics planning focused on the improvement of transport efficiencies.

CHAPTER VIII
THE NORTH WESTERN MEDITERRANEAN: POLICIES AND MARKET[1]

1. Foreword

The aim of this chapter is to deepen, through analysis of benchmarks and best practices, the role of public policy in supporting intermodal rail to and from the ports aimed at raising their competitiveness and at mitigating the environmental externalities that affect the relationship between the port and the city, in Green port logic.

The work is introduced by a summary of the EU policies that encourage modal shift from road to rail and by some reflections on the role of ports within sustainable logistics systems and on the institutional modes of governance that may or may not enhance this aspect. EU policies, particularly those relating to the trans-European network (TEN-T), the Marco Polo program to promote pilot projects for modal shift and the guidelines for state aid to railway companies are the main regulatory framework for policies at a national and local scale. The core of this work is focused on the cases of leading ports in order to identify the organizational and trade aspects of direct investment promoted by the public sector and aimed at promoting intermodal rail transportation to and from the ports within the North Western Mediterranean. The policies analyzed here are those carried out by Port Authorities, local and national administrations and by public-private partnerships and they are related to the leading import-export ports in the Northern Mediterranean between Valencia and Koper whose market of reference is Southern Europe.

The study is structured to address the issue from the methodological point of view, taking account of the technological and organizational evolutions of ports caused by the significant growth rate of unitized traffic (container and Ro/Ro). A further aim of the study is to address the operational and management issues, which are different from the ones related to the railway system. The work concludes with some food for thought and policy indications.

2. Expectations of Community policy in terms of modal shift to and from the ports

The possibility of combining different modes of transport in a flexible way and to be able to implement the concept of "sustainable mobility" represents an utmost priority for European transportation policies in general and for the development of ports in particular (Haralambides, H., & Acciaro, M., 2013). The European Commission has promoted and carried out many programs, such as the ones of the Trans-European Network (TEN-T) and the pilot projects for modal shift (Marco Polo) aimed at encouraging investments

[1] This work was written by Oliviero Baccelli, Director of CERTeT Centre for Research on Regional Economics, Transport and Tourism, Bocconi University, Milan.

and at supporting the implementation of an integrated services and networks system which will empower all modes of transport.

The main general European planning document that contains specific proposals to be adopted in favor of modal shift is the White Paper, whose last draft dates back to March 2011. The centrality of modal shift in Europe is due to the fact that 31,8% of primary energy is consumed by the transport sector which is also responsible for 23,7% of total CO2 emissions and 19.7% of greenhouse gas emissions[2]. It is road transport that gives the uppermost contribution to this value and it corresponds to 25% of all the EU emissions. More and more effective laws have been passed in order to reduce this figure. The White Paper "Roadmap to a single European transport area – towards a competitive and resource-efficient transport system" points out the need to develop the transport sector and outlines future challenges and political initiatives to be carried out in order to face these tests. One of the key aspects – defined as "crucial" – of the Commission's political stance is to reduce European dependence on oil. Its availability will be reduced and the sources of supply less secure in the next decades as it is also well known that its price will tend to rise if consumption is not reduced. The increase in fuel prices will not only have a strong impact on transport but it will also influence inflation and the balance of trade. If the development route of the mobility system does not change, in 2050 the dependence of transport on oil will probably still be slightly less than 90% and the renewable energy sources will only marginally exceed the goal of 10% fixed for 2020. The reduction of greenhouse gas emissions is another important goal and the European Union has set itself the objective to reduce it by 80-90% before 2050 (compared to 1990 levels). The White Paper will undergo a mid-term review process, which includes a stakeholders' consultancy aimed at pointing out the need to develop policies that are consistent with the general goals outlined in 2011. This will make it possible to empower the tools needed to give transport policies the chance to positively influence economic development.

These policy choices involve multimodal solutions based on transport by inland waterways and rail. Especially for flows to and from the ports where the economies of scale and specialization to be activated are relevant and where policies of modal shift are among the main instruments available for the mitigation of environmental impact aimed at achieving the goals set by the Green Port policies (Mc Kinnon, 2013). These aspects must ensure low congestion and low administrative/operative costs at the same time. In relation to the carriage of goods by rail, the White Paper points out the need for dedicated corridors optimized in terms of energy use, emissions and environmental impact. These should be attractive due to the reliability of transport, the low congestion and the low operative and administrative costs. However, the attractiveness of rail transport has to deal with the current poor quality and inefficiency of the service, which is the cause of its inability to adequately compete with the other modalities and especially with the road one.

The White Paper identifies a number of specific objectives for a transport system to and from the ports that could be competitive and efficient in terms of resources:

[2] Source: Eu Transport Statistical Pocketbook 2014, data referring to 2012.

1. Optimizing multimodal logistics chains by shifting 50% of road freight over 300 km to other modes such as rail or waterborne transport. Objective to be achieved by 2050 through an adjustment of infrastructure.
2. Making a multimodal TEN-T "core network" operational by 2030 and completing a high quality and capacity network with a corresponding set of information services by 2050.
3. Guaranteeing better connections between the core seaports and the rail freight by 2050.
4. Establishing a common European framework for multimodal transport information, management and payment system.
5. Moving towards full application of 'user pays' and 'polluter pays' principles.

With regards to the policies of modern infrastructure development, smart pricing and financing the EU policy has been focusing on cross-border aspects (TEN-T networks) which will make it possible to reduce times and costs of people and goods interchanges between EU countries. This is surely one of the most ambitious and complex policies carried out by the European Union (Baccelli, 2001 and Baccelli *et al.*, 2013). The notion of trans-European networks was born in 1992 with the signing of the Maastricht Treaty. The articles 154, 155 and 156 of Title XV established that the European Communities would contribute to the development of trans-European networks in the sectors of transport, telecommunications and energy as key elements in the creation and consolidation of the internal market while identifying common interest projects, undertaking the actions needed to pursue the harmonization and interoperability of the networks and contributing to fund them[3].

We are talking about transportation corridors whose aim is to bring down the barriers that prevent the free movement of goods and people within the EU's member states. The implementation of these projects is mainly comprised of the construction of infrastructure that will help us to get rid of bottlenecks along European lines of communication. For the transport sector the EU has identified the so-called "core network" which provides a clear definition of TEN-T corridors on which to concentrate investments by 2030. In order to further boost the development of the network the Commission has established European coordinators who will make it possible to get the main stakeholders involved under a single leadership. This will give them the chance to focus on the completion of the cross-border sections and on the development of intermodality and interoperability.

The upgrade and evolution of the policies aimed at developing the TEN-T networks have been constant over time and at the end of 2013 the EU approved a revision of the priorities and tools available. This brought to an end a political debate that lasted almost two years and was aimed at clarifying and strengthening the role of the EU in this field. The complexity and high cost of most of the TEN-T corridors has forced the various parties involved (European Commission, INEA, Central Government Agencies, Local Authorities and the companies created for the realization of the project) to

[3] In the Consolidated Version of the Treaty on European Union and of the Treaty on the Functioning of the European Union the articles 155, 156, 157 have been respectively named 170, 171, 172.

imagine innovative financing tools both for the infrastructure and for the specific policies of modal shift that will secure the future use of the works planned.

As far as the infrastructural aspect is concerned, the most recent financial supports established by the European Commission to ease the realization of the trans-European network are ruled by the European program "Connecting Europe Facility" (Regulation No. 1316 of December 2013) which lays down the general principles for the granting of a financial contribution of the Community in the field of trans-European transport and energy. The European Union has a role as a co-financier of TEN projects and it mainly uses 4 tools: funds linked to the TEN program, the European Regional Development Fund (ERDF) and loans from the European Investment Bank (EIB). The Regulations provide that Community funding cannot exceed 50% of the eligible costs for studies and 20% of the eligible cost for the work, with up to 30% in the case of cross-border sections and 40% for cross-border sections in particularly sensitive areas from the environmental point of view (such as the Alps).

The new TEN-T are comprised of two network levels: the core network and the comprehensive network. The former being the entire network for the whole of Europe and the latter being the selection of its main parts to be completed by 2030. The core network consists of 10 fundamental corridors and will group 85 economical centers with their airports, 138 sea and inland ports and 28 border crossing points with third countries. The INEA Agency provides funding and promotion for the projects within the new network. Funding is provided through annual calls.

Another program directly funded by the European Union is the Marco Polo program and it is aimed at granting community financial assistance to improve the environmental performances of the freight transport system. The regulation (EC) No. 1692/2006 of the European Parliament and of the Council of 24th October 2006 establishes the second Marco Polo program which incorporates the objectives of the first (EC Regulation no. 1382/2003): reducing congestion on the roads and improving the environmental performance of intermodal freight transport to achieve an efficient and sustainable mobility system that adds value to the European Union, while promoting the economic, social or territorial cohesion. During the period 2003-2012 the Marco Polo program has provided more than € 430 million for 200 new transport services and new proposals to support the modal shift, which have involved more than 720 European companies. The goal is to shift part of the international road freight traffic (measured in tonnes/km) to short sea shipping, rail and inland waterway or to a combination of modes of transport, which will help minimize the use of road journeys.

The program aims at:

- Overcoming barriers and obstacles which prevent the correct functioning of the European freight market, the competitiveness of rail, inland waterways, short sea shipping, the efficiency of the transport chain and the modification or creation of accessory infrastructure.
- Shifting road freight to short range waterborne transport, to rail and inland waterways transport or to a combination of modes in which road journeys are as short as possible.

- Minimizing road freight without compromising global productivity or employment rate.
- Improving cooperation to reach high levels in methods and procedures within the goods transport chain according to logistics needs.

There are six types of actions eligible for funding:

- Catalyst actions aimed at overcoming the obstacles of the goods transport market. The main goal of these actions is to maximize the use of existing infrastructure (including motorways of the sea) to improve synergy between rail freight, inland navigation and short sea shipping.
- Actions of intermodal shifting aimed at shifting road freight to other modes or at combining the different modes to minimize road journeys. These actions are funded for a maximum of six months after which they must be completed autonomously.
- Common actions of awareness aimed at improving cooperation and structurally optimizing the methods and procedures of work in the goods transport chain according to logistics needs. These projects are funded for a maximum of 24 months.
- Actions for the motorways of the sea whose main aim is to shift road freight to the other modes. The motorways of the sea were introduced by the 2001 White Paper on European transport policy. The projects can be funded for a maximum of 60 months.
- Actions for the reduction of traffic aimed at studying new solutions to make transport more sustainable without compromising competitiveness and the communities' wealth. The projects can be funded for a maximum of 60 months.

The contribution paid by the EU is based either on the number of tonnes per kilometer shifted from road to other modes of transport or on the number of vehicles per kilometer shifted from road. The aim of this criterion is to reward high quality projects. The program is particularly attentive to sensitive areas and to high urban density areas. For the latter the European Commission evaluates the actions presented by taking into account their positive impact on the congestion of the road system but it also considers very highly their advantages for the environment and their sustainability.

The 2014 program is managed by INEA that also manages the TEN-T program. In order to be awarded a grant the projects need to have some specific characteristics:

- Proven non profitability of the projects without grants in the start-up phase.
- The amount of goods shifted from road to other more sustainable modes must not be inferior to: 60 million ton/km for the intermodal actions (13 million ton/km if they are concerned with projects for waterborne transport), 30 million ton/km for catalyst actions, 200 million ton/km for the motorways of the sea and 80 million ton/km for the actions that are concerned with the reduction of traffic.
- The grant cannot be higher than € 2.00 per 500 ton/km or, in case of actions concerned with the reduction of traffic, € 2.00 every 25 vehicles/km.

Among the projects funded in 2014 within the Marco Polo program which concern the rail interconnections market to and from the ports we can find: the project Kamel

presented by Hannibal S.p.A. of Eurogate Group aimed at developing a new train between Melzo (Milan) and Karlsruhe to revamp the container traffic to and from Liguria ports and other destinations/origins such as Padova, Frosinone, Prato and Pescara; the project LogoPort promoted by the Agency for promotion and development of the German inland port of Duisburg to support railway connections to the Belgian ports of Antwerp and Zeebrugge.

The Marco Polo program used all the funds available and became an example for similar projects on the national and regional scale as in Emilia Romagna[4] and Friuli Venezia Giulia[5]. The Marco Polo program has been radically revised to further strengthen the development of technological innovations and economic coordination which are specifically funded within the wider *Connecting Europe Facility Programme*.

3. Sectorial policies for modal shift

The EU guidelines on state aid for railway companies (2008/C 184/07) were published in 2008 and move on from the fact that rail transport in Europe is not attractive. The Commission observes that from the '60s to the end of the 20th century the sector had been in constant decline. Not only did the traffic of goods and people on railway decrease in relative terms compared to all other modes of transport but it also decreased in absolute terms because the volumes transported had been higher in 1970 than in 2000. The commission also points out how traditional railway companies hadn't been able to meet the levels of reliability and punctuality required by customers and how this resulted in a shift of traffic from railways to other forms of transport, above all road.

According to the commission the relative decline of the European Railway sector is mainly due to the organization of the transport offer which has always been characterized by national and monopoly models that have some important consequences:

- Because of the lack of competition on national railways companies haven't been pushed to lower functioning costs and to develop new services. Their activity hasn't produced sufficient incomes to cover the overall costs and the expenses for necessary investments. Sometimes important investments haven't been carried out and sometimes the states have forced the national companies to make the investment even when they did not have sufficient resources to finance them. This resulted in heavy indebtedness for railway companies and prevented them from developing.
- The lack of normalization and interoperability in the networks of other sectors (maritime and air transport above all) has produced a mosaic of national railways characterized by different gauges, railway signaling and safety measures that make them incompatible preventing the railway companies from taking advantage of the

[4] Regional Act n° 15/2009, updated by the Regional Act n° 10/2014.
[5] Regional Act n° 15/2004, updated and reviewed many times.

economies of scale. These could arise from an infrastructure and from a rolling stock designed for a great and unique market instead of 26 small national markets[6].

To revamp the use of railways the EU is carrying out a policy based on three main routes:

a) gradually creating the necessary conditions for competition to become an important part of the railway services market
b) promoting technical normalization and harmonization on European railways aimed at developing full interoperability on a European scale
c) granting financial contributions at the EU level through the CEF program and structural funds

With regard to public intervention in favor of the railway sector, the Commission considers this type of support justified in some cases, given the high costs of adjustment that the sector requires. It is therefore widely recognized that the injection of public funds in the rail transport sector has always been conspicuous. In light of these considerations, the Commission states that aid to the railway industry can be authorized when they contribute to the realization of an integrated European market, open to competition and interoperable and to Community objectives of sustainable mobility. In this context it is necessary to determine whether the financial aid paid by public authorities causes distortions of competition contrary to the common interest.

The guidelines regard the public financing of railway companies in the following sections:

- Public aid to railway companies through financing of infrastructures.
- Aid for purchase and refurbishment of rolling stock.
- Forgiveness of debts carried out by states with the aim of rebalancing the railway companies.
- Aid for reorganization of railway companies in the goods branch.
- Aid for coordination of transport.
- Granting of state guarantees to railway companies.

With regards to "coordination" the Commission points out that article 73 of the treaty states that aid demanded for coordination needs must be compatible with the treaty itself. This granting is based on three main elements:

- Transport activities produce relevant external diseconomies which cannot be taken into account due to the inherent difficulties of including external costs (as well as direct usage costs) in the pricing of access to transport infrastructure. This situation may produce disparities between the different modes of transport, which ought to be corrected by public authority support to those modes of transport that generate lower external costs.
- The transport sector may have to face problems of coordination in the economic sense of the term. This is the case when it becomes necessary to adopt a common

[6] Cyprus and the Republic of Malta have no railways.

interoperability standard for the railways or when it becomes necessary to connect different transport networks.

- Railway companies may find themselves in a situation where they are unable to get all the benefits they had expected because of the efforts made in research, development and innovation. This constitutes a market failure.

With regards to the railway sector, aid given to satisfy the needs of the coordination of transport may take different shapes:

1. Aid for use of infrastructure: they are given to the companies that bear the expense of the infrastructure they use. Companies that provide transport services through other modes do not bear such expense.
2. Aid for reduction of external costs: they are aimed at encouraging modal shift to railway because this modality usually produces lower external costs compared to other modes, such as road.
3. Aid for interoperability and, according to coordination needs, aid aimed at enforcing safety, eliminating technical obstacles and reducing noise pollution.
4. Aid for research and development in response to the needs of transport coordination.

Analyzing individual cases is beyond the scope of this work. But it is rather necessary to carry out an analysis of funding for "the reduction of external costs", i.e. for all measures designed to produce a modal shift from road to rail transport. The Commission details the criteria for aid for rail infrastructure use, to reduce external costs and for interoperability:

With regards to aid for the reduction of external costs the expenses eligible are represented by the fraction of external costs that rail transport permits to avoid in comparison with those of other modes. Article 10 of directive law 2001/14/CE gives member States the possibility to establish a compensation system for: environmental costs, costs linked to accidents and infrastructure costs not covered in other competitor modes – if it is proven that there is no coverage of these costs and only if they exceed the equivalent specific costs of rail transport.

The Commission assumes that aid is necessary and proportionate when its intensity remains below 30% of the total cost of rail transport, in the limits of 50% of eligible costs. If these limits are exceeded Member States must demonstrate the necessity and proportionality of the aid measures. Aid must be strictly limited to a compensation of the higher cost-opportunity of rail transport in comparison to other more polluting modes. When the recipient of the aid is a railway company it must be proved that the aid has a real effect of encouraging the modal shift to rail. Theoretically this means that the aid must be reflected in the price paid by the passenger or charger, since these are the people who must make a choice between rail and more polluting transport modes such as road. Finally, there must be realistic prospects that the traffic transferred to rail will be maintained, so as to ensure that modal shift is permanent.

The limits to aid established by the guidelines are applicable both when the aid is financed entirely from public resources and when it is funded in whole or in part by Community resources. Authorized aid may not be combined with other State aid or with other forms of Community financing if such combination produces a level of aid

higher than the one provided in these guidelines. In addition, all aid must be notified to the Commission and obtain a decision of compatibility and must be limited to a maximum period of five years, in order to allow the Commission to reconsider the aid in the light of the results obtained and, if necessary, authorize its renewal.

4. The promotion of intermodality and logistics as a strategic opportunity for the development of port activities: the cases of Spain, France and Slovenia

Port Authorities, Regions and European Union countries have promoted various initiatives both inside and outside of the walled ports with the aim of promoting intermodality and the development of new logistics services increasingly necessary to compete globally today (Notteboom 2008, Song 2003, Heaver, Meersman and van de Voorde 2001). For the growth of a modern port it is crucial to build an adequate rail connection network that will make it possible to shift goods to the logistics plants in dry port and to the target territory. The promotion of intermodal transport sets itself a series of specific aims in terms of economic benefits:

- Reduced costs of transport due to the use of the most suitable mode for each journey to be made (co-modality principle).
- Increased productivity and efficiency in response to the growing need for flexibility for port services arising from the phenomenon of gigantic ships.
- Reduced congestion on road infrastructure.
- Better return on public and private infrastructure investment in the sector of ports.
- Reduced energy consumption and contribution to improved air and environment quality.

In this context, the analysis will be mainly devoted to the policy promoted by various public sector actors (Port Authorities, local administrations, public-private companies promoted for this specific aim) to encourage modal shift of port traffic from road to rail in the main North Western Mediterranean hubs. These interventions are mainly aimed at mitigating the effects of market failures arising from the need to reduce environmental externalities, to encourage economic coordination between the various public and private actors involved in the maritime logistics chain and to enhance direct and indirect external positive effects arising from higher competition between ports which is achieved through expanded contestable lots for port services. The subject is of a strategic importance for the development of the port from the point of view of operativeness, in particular for container and RO/RO traffics. This is due to:

a. Commercial reasons: offering intermodal services is crucial to expand the commercial basin of reference of the ports for middle and long haul and to reduce monopolistic or oligopolistic contexts.
b. Optimized organization of port areas due to the fact that intermodality promotes a cycle of production based on continuous production (24 hours a day all week as is the case for activities in support of the cycle of the ship), which makes it possible to optimize the time and the space available. A situation that is very different from the

one of road transport, which concentrates traffic in the first part of the day and suffers from many restrictions to movement throughout the year.

The analysis of the transport policy instruments carried out in this work takes into account the different underlying economic logics. In particular, four types of intervention can be outlined:

a. market based instruments: policies based on market incentives and disincentives aimed at encouraging modal shift
b. regulation based instruments: policies regarding technical standards and restrictions arising from regulation elements, i.e. prescriptive constraints given in concessions
c. instruments based on information and telecommunication development: policies related to information for the user and operator training, linked to forms of "coordination" in the economic sense of the term
d. instruments based on the construction of infrastructure or the provision of services: policies relating to the field of public infrastructure or public services

4.1 The case of Spain: the promotion of intermodality through the construction of new infrastructure with European standards and the use of direct incentives

The policies for the development of intermodality in the transport sector are defined by the Ministerio de Fomento. The main national guidelines are included in the "Plan de Infraestructuras, Transporte y Vivienda (PITVI) 2012-2014" and in the "Estrategia Logística de España" where political priorities established by the EU are applied to the Spanish context. In these programs it is clearly stated that there is a need to rebalance land trade in favor of rail, also and especially with regard to connections with the hinterland of the port nodes[7]. The "Plan estratégico para el impulso del transporte ferroviario de mercancías en España" establishes the necessary measures to achieve modal rebalance in favor of rail. The Government aims at increasing the market share of rail from 4% in 2010 to 10% in 2020. In the scenario outlined by 2020 up to 77 million tonnes a year will have to be carried via rail. This is equivalent to 19000 heavy vehicles less every day and to savings in terms of environmental externalities equal to € 252 million a year. To achieve this ambitious goal the Ministerio de Fomento estimated that € 1.8 billion will have to be invested to get rid of the bottlenecks in the connections between ports and the national network[8].

It is in pursuit of these objectives that the Spanish government has recently announced its intention to establish an investment fund for the land accessibility to ports, which will have an estimated capacity of about € 1.5 billion and will be used to finance the investment in road and rail connections to seaports[9].

According to early rumors, the Fund will be fed by contributions from the same Iberian Port Authorities. This tool will provide grants for infrastructure work to

[7] Documents available on the website of the Ministerio de Fomento, www.fomento.es

[8] Ministerio de Fomento, "Plan Estratégico para el impulso del transporte ferroviario de mercancia en España", Madrid, 14th September 2010.

[9] The creation of this Fund was announced by press release in July 2014. See Ministerio de Fomento, Nota de prensa, Madrid, 4th July 2014.

improve the systems of terrestrial connection with ports in the form of loans. Its implementation is closely linked to the recent change in the law on state concessions to port terminals, which gave private operators in the ports the opportunity to extend the term of the concession from 35 to 50 years according to the investment programs which include funding for terrestrial connection infrastructure[10].

Along with this intervention the Ministry is also engaged in negotiating tables aimed at activating an aid instrument for intermodal transport which provides a single contribution to the operators that use rail instead of road for the traffic of goods with foreign countries. The contribution, which was calculated by taking into account similar experiences of French policies initiated more than a decade ago, was initially estimated at 21 Euro per intermodal transport unit (ITU). At the moment (March 2015), however, the measure has not entered into force yet[11].

In this context the role of Port Authorities in the rail sector is regulated by Ley 48/2003, modified by Ley 33/2010 and is mainly that of railway infrastructure administrators that determine the rules to gain access to the network and to operate within port boundary[12]. The competitive landscape of interest for Italy regarding intermodality to and from the ports is characterized by the major role of the ports of Barcelona and Valencia, important gateways for traffic to and from the continent and the Iberian Peninsula. Valencia handled 4,441,949 TEUs in 2014 and more than half of it was reshipped through transhipment to other ports, which means that Valencia has an enormous capability to attract international lines that run through the Mediterranean. On the other hand, Barcelona handled 1,893,299 TEUs of which only 312.314 TEUs through transhipment, which means that most of the goods arriving at the Catalan port are either sent to their final destinations by land or manufactured within the logistics areas of the port.

In this scenario it is clear that railway and intermodal connections between ports and inland areas are increasingly important because they determine the ability of a port to compete in the short, medium and long term. The Mediterranean corridor – one of the two TEN-T corridors that run through Spain – passes through these two ports. In this respect, it is appropriate to remind that the inclusion of an infrastructure in the TEN-T corridors determines its capability to attract investment aimed at developing it. Indeed, most of the intermodal traffic generated by the ports of Barcelona and Valencia develops on this route. At the moment, several regular services are operated to and from these two ports: Barcelona is connected through rail with 26 destinations while Valencia with 14 destinations.

In detail, the port of Barcelona is the most projected towards European markets, in particular France, Italy, Germany, Belgium and Great Britain. In the railway connections to and from the port ten companies are currently operating. The share of

[10] See: Real Decreto-ley 8/2014, de aprobación de medidas urgentes para el crecimiento, la competitividad y la eficiencia, in BOE, num. 163, 5th July 2014.

[11] The implementation of these measures was announced by press release in July 2014. See Ministerio de Fomento, Nota de prensa, Madrid, 4th July 2014.

[12] See: Ley 48/2003, de régimen económico y de prestación de servicios de los puertos de interés general, 26th November 2003, in BOE núm. 284, 27th November 2003 and Ley 33/2010, de modificación de la Ley 48/2003, 5th August 2010, in BOE num. 191, 7th August 2010.

rail has increased from 2.6% in 2006 to 12% in 2014, thanks to the adjustment to 1435 mm of the gauge of some internal lines and of the networks that provide connections with France. The Autoridad Portuaria aims at reaching a modal share of rail of 20% by 2020[13].

In the container terminal a third bundle of tracks with international gauge was built in January 2011 to help to overcome the limitations represented by the Iberian gauge[14]. In addition to that, from December 2013 the Port Authority of Barcelona, in collaboration with RENFE, the main Spanish railway company, has boosted an expanded offering in intermodal port to and from Europe through the establishment of the company TP Nova, the result of the partnership between logistics operators Transportes Portuarios and Novatrans. TP Nova, which uses rolling stock provided by RENFE Mercancias, offers 4 weekly connections with Lyon, Perpiñan, Toulouse, Burdeos, Paris (Valenton) and Lille (Dourges). TP Nova expands and enriches the offer of railway between the Catalan capital and France, also characterized by the service Barcelyon. Barcelyon has been operative since 2009 and it is the result of a partnership between the Port Authority of Barcelona, Renfe and Naviland Cargo. This strategy has made it possible to increase the number of containers handled by rail from 154,522 TEUs of 2013 to 189,593 TEUs of 2014, marking an increase of 22.6%.

The Port Authority tries to expand its growth strategies also towards the dry port through the promotion and investment in several intermodal plants called "terminales marítimas interiores"[15]. Among these: Terminal Marítima de Zaragoza (tmZ), Puertos secos de Coslada (Madrid), Azuqueca de Henares y Yunquera de Henares (Guadalajara), Terminal Marítima Centro (tmC), Terminal Intermodal de Navarra, Terminal Marítima de Toulouse (tmT), Perpignan St Charles Conteneur Terminal (PSCCT). The Authority's aim is to build and participate in the management of a series of dry port infrastructures that will help to relieve congestion in the areas of the port and to create logistics centers that will attract bigger traffic to and from the Catalan port.

As far as the port of Valencia is concerned, 4 railway companies are currently operative and they offer rail services to national destinations such as Abroñigal, Coslada, Azuqueca, Bilbao, León, Madrid, Valladolid and Zaragoza. The ability of the port of Valencia to penetrate international markets is compromised by the persistence of an Iberian gauge system on the North line. The project to upgrade and modernize the line between Valencia, Castellon and Barcelona is nearing completion and the European gauge is expected to be active by the end of 2015. This will increase the capacity of the port to attack European markets[16].

The development of rail services to and from the port has recently been boosted by the traffic of cars thanks to the completion of new rail investment in Valencia Terminal

[13] Port de Barcelona, Un puerto diversificado, Dossier de prensa, Barcellona, January 2015.

[14] See the review Vía Líbre, "Barcelona, el primer puerto español con ancho internacional", Número 544, September 2010.

[15] Port de Barcelona, Un puerto diversificado, Dossier de prensa, Barcelona, January 2015.

[16] The completion of this intervention was announced by press release in December 2014. See Ministerio de Fomento, Nota de prensa, Madrid, 15th December 2014.

Europa Grimaldi, an infrastructure dedicated to RO/RO traffic. Thanks to this investment two new bundles of rails are now available and they can simultaneously accommodate up to two trains of maximum length of 700 m. At the moment, there is a weekly connection to General Motors establishments in Zaragoza operated by Transfesa. Spanish authorities and especially the Ministerio de Fomento have also planned further investment to expand the rail catchment area of the port and among these the installation of a third electrified rail stands out because it will have international gauge and will run parallel to the ones already existing between Almussafes and Valencia. The Autoridad Portuaria approved in 2014 a 15% discount on port charges for cars loaded and unloaded by rail in the port as a further measure of support to rail traffic.

Another important initiative in support of intermodality to and from the port of Valencia is the participation of the Port Authority in the Valencia Plataforma Intermodal y Logistica, a special purpose entity dedicated to the development of logistics in a 683,000 Sq m area adjacent to the port and that will probably become the main attraction pole of high value services for the support to marine traffic to and from Southern Spain.

4.2 The case of France: national port strategies

In March 2014, the Directorate General for transport infrastructure and for the sea of the Ministry of Ecology, Sustainable Development and Energy approved the French "Stratégie nationale portuaire", in which the guidelines for the development of the port sector are outlined[17]. Among these, the aim is to build within the ports some "architecture" of logistics solutions projected onto a European hinterland and able to improve the commercial exchange between maritime, inland waterways and rail network systems. Among the various lines of development identified by the French government, one of the most important is the impulse to the conclusion of a framework agreement between the major seaports and the manager of the national railway network Réseau Ferré de France (RFF) to improve the quality of services and define a regulatory system. Looking to the Mediterranean, the strategic objective concerning the rail and intermodal branch at the core of the joint programming between RFF and the Grand Port Maritime de Marseille (GPMM) is linked to the development of traffic between the port and the regions to the east of the Rhine, which will result in an expansion of market shares to other European countries such as Italy, Switzerland and Germany.

In this landscape, characterized by increasing attention to the development of intermodality, we need to register the approval in June 2014 by the European Commission of a program of aid for combined transport fielded by the French Government for 2013-2017[18]. This intervention follows a similar previous one for the

[17] Ministère de l'Ecologie, du Développement durable et de l'Energie, "Stratégie nationale portuaire", 21st March 2014.

[18] The information related to the decision of the European Commission are summarized in the Communication n° 4113 of 19th June 2014 and the details of this aid plan are available on the website of *Ministère de l'Ecologie, du Développement durable et de l'Energie*, www.developpement-durable.gouv.fr

period 2008-2012. The budget allocated by the French government for the five years between 2013 and 2017 is 140 million. In total, since 2003, the funds allocated by the French government for intermodality amount to over 362 million Euro. The aid takes the form of a lump sum contribution for each intermodal transport unit transported by rail in France and that was transshipped in a port and rail terminal and whose transport chain is characterized by a phase of pre- and post-haulage road. The contribution is € 18.00 for each movement.

In its plan for Southern France, RFF has given priority to strengthening the connections to and from the port of Fos Sur: the main container terminal of the French region which has been recently strengthened through the project Fos 2XL through which its capacity of handling was brought up to 1.5 million TEUs per year. RFF aims at improving technologies on the line Fos-Graveleau-Lavalduc that connects Marseille city and port and that currently does not allow to handle more than 21 trains a day. By the end of 2015, thanks to an improvement in signaling technologies and energy supply it will be possible to handle up to 60 trains per day on this line, allowing a significant development of the ability to raise sea containers by rail. The cost of this intervention (€ 8 million) is financed for 25% with resources of the GPMM.

Further work in progress is the expansion of the *gabarit* on the line Avignon-Marseille in the direction to Lyon within the TEN-T Corridor North Sea-Mediterranean, at a cost of € 24 million, with a contribution of € 8 million on behalf of GPMM, whose commissioning is scheduled for the end of 2016. Thanks to this intervention the port will be interconnected with Northern Europe and through the crux of Lyon with the Mediterranean corridor which, once completed, will be the main artery of transport on the East-West axis in Southern Europe[19].

Among the projects being implemented for the increase of intermodality to and from the port of Marseille it is important to highlight the constitution in 2014 of the Mourepiane Combined Transport Terminal Company (MTTC), a purpose entity whose main shareholders are the GPMM (29%) and the shipping company CMA CGM (15.5%). The core business of this company is to attract investments for the construction of a terminal dedicated to the combined road-rail transport within the public lands of the port of Marseille.[20] This is aimed at increasing the rail transport quota from the actual 15% to 30%. The start of construction of this infrastructure is planned for the summer of 2015 and its completion is expected in 2017. MTTC will contribute € 41.8 million to the total cost and the Port Authority will provide additional resources amounting to € 18.7 million.[21]

[19] Réseau ferré de France, "Plan d'actions 2014 en Provence-Alpes-Côte d'Azur", 2014.

[20] In addition to the Port Authority of Marseille and the CMA CGM Group other shareholders of this company are the *Chambre de Commerce et d'Industrie Marseille Provence* (9%), the company PROJENOR, branch of *Crédit Agricole* (15.5%), the *Caisse d'Epargne Provence Alpes Corse* (15.5%), the *Caisse des Dépôts et Consignations* (15.5%).

[21] ReporteR, Newsletter du Port de Marseille Fos, num. 16, January-February 2015.

4.3 The case of Slovenia: port and intermodal activities as general economic interest services managed by the public sector

Interventions in favor of intermodality in Slovenia refer mainly to the port of Koper, whose Port Authority is 51% owned by the Government of Slovenia and is actively pursuing a series of initiatives aimed at developing intermodality and logistics to and from the port. In particular, the Luka Koper Group manages most of the logistics and intermodal flows in transition in Slovenia through a series of subsidiary enterprises as well as jointly–controlled and associated companies.[22] The port is directly connected to the major national and European arteries that run through Slovenia and is also close to the Mediterranean Corridor that connects Trieste to Ljubljana.

The entire port has the status of a customs free zone, allowing operators to work the goods and perform machining and transformation operations under suspension of customs duties. The main terminals (container, grain, coal, timber, minerals, steel) are directly connected with the railway that joins the major national line in Divaça, where it is possible to reach Italy to the West and Hungary to the East.

Since 2005 Loka Koper has controlled the company Adria Transport, the main intermodal operator in the connections to and from the port that manages 6 weekly services to Graz, Austria and 2 weekly services to Slawkow, Poland. Another important shareholding is in the 100% controlled Adria Terminali, through which Luka Koper manages the Sežana terminal where semi-manufactured products are handled and stored. Adria Terminali manages the terminal and the warehouses, organizes transportation through Adria Transport and provides high value logistics services such as packaging and labeling.

Through the controlled company RAILPORT Arad, Luka Koper participates in the management of the Arad terminal located close to the border between Romania and Hungary. Through the 96% owned Logis Nova, Luka Koper manages and controls the logistics area of Prekmurje, on the border between Hungary and Slovenia.

5. The case of Italy: the heterogeneousness of interventions of Port Authorities and Local Governments

In Italy, the main players capable of promoting this kind of initiatives are Port Authorities and Local Governments. In particular, the regulations regarding the strategies of Port Authorities were modified in 1998, 2011 and 2012 to encourage investments and favor initiatives aimed at promoting intermodality. Act 84/94 regulates port activities and establishes port rail services among the services of general interest defined for Port Authorities by the D.M. 14th November 1994 and by the D.M. 4th April 1996. These services of general interest must be offered to port customers upon payment.

[22] Luka Koper, 2013 Annual Report of the Luka Koper Group and Luka Koper, d. d., Capo d'Istria, 2013.

The assignment of the service of general interest to an operator must comply with the requirements of free market access, competition and transparency through the use of public procedures.

Since 1998 (with the approval of article 6 paragraph 5 of Law 84/94 and paragraph 6 of the same Article replaced by article 8 bis of Legislative Decree 30th December 1997, No. 457, converted into Law 27th February 1998 n° 30) it is possible to "establish or participate in companies engaged in ancillary and instrumental activities with regard to the institutional tasks entrusted to the same authorities, including for the promotion and development of intermodality, logistics and the transport networks".

In recent years, the powers attributed to Port Authorities on this issue have been expanded with Article 46 of the decree "Salva Italia" on logistics systems published in the Gazzetta Ufficiale 27/12/2011 n° 300. In order to promote the execution of links between ports and dry ports, this regulation gives Port Authorities the power to create logistic systems able to intervene with the regions, provinces and municipalities involved as well as with the managers of rail infrastructures, through acts of understanding and coordination. These activities must be carried out in accordance with the provisions of the community regulations, having regard to the trans-European corridors and without causing distortion of competition between the port systems. Interventions of coordination must be aimed at adapting strategic plans of the ports and towns to the development needs of port logistics systems that, as a consequence, become priorities in the criteria for intended use of the areas. The rule also provides that in the back of port terminals, referred to by the logistics system, the customs service is carried out by the same territorial administration responsible for performing the service in the ports of reference, without new or increased burdens on public finances.

The regulatory framework has been further enriched with the Decree Law 22nd June 2012 n ° 83, whose article 14 intervenes on the issue of financial autonomy of Port Authorities and on the fund for infrastructure projects in ports and intermodal connections. This norm creates a fund for infrastructure interventions in ports fed with 1% of the revenue from VAT and excise duties levied in the ports and inter-ports (but restricted to € 70 million a year). Inside Article 19 of the same law there was also the creation of a fund for the rail and road connections with ports powered with an allocation of 5% of the State resources given to ANAS and RFI in their program contracts, thus highlighting the strategic priority of efficient relations between land and ports.

In this context, Italian Port Authorities have promoted a series of initiatives:

- Shareholding in railway companies.
- Memoranda of understanding and agreements with Trenitalia, RFI, Local Public Authorities, Ministry of Infrastructure and Transport and private companies of rail services management or logistics centers.
- Creation or shareholding of companies for the promotion of intermodality and logistics.
- Acquisition of areas allocated to logistic activities.
- Purchase of maneuver or rail traction means.

The mix of activities planned by the Port Authority of Genoa, the main Italian port for volumes handled in import - export of goods transferred by rail (excluding, therefore, liquid bulks), illustrates clearly the different instruments of infrastructure policy that can be activated at local scale. The objectives that guide the choices of the Port Authority of Genoa in the development of the "Piano del Ferro" (Plan for Iron) within the port by 2020, linked to the decision to increase the market share of the railway (which in 2012 was only 14% in containers) and the number of freight trains to and from the port (which in 2012 were on average 37 per day for a total of 130 thousand wagons moved), may be summarized as follows:

- Pole of Voltri – implementation of the internal rail system in connection with the park A/P included in the project node of Genoa that will allow the formation and management of trains with features more in line with the European module (length over 600 meters) to be concluded by 2018.
- Port basin of Sampierdarena – minimization of maneuver activities through the electrification to the root of the main railway adduction points to be concluded by 2016.
- Improving connections between the park of Campasso and the new compendium of Sanità-Bettolo (gallery Molo Nuovo-Parco Rugna and electrification) with works to be completed by 2017.
- Maximizing the capabilities of the new compendium Ronco-Canepa-Libia (length of parks and interconnections with network) as well as multipurpose terminals also through Fuorimuro park, with works to be completed by 2016.
- Introduction of new laws for the formation and testing of trains within the operational areas.
- Investments on information systems aimed at speeding up the procedures related to rail transport.

In the following paragraphs we analyze the main instruments for promoting the development of rail services to and from ports in Northern Italy, in order to carry out a comparison between the different modes of public intervention.

5.1 Policies for the development of rail service for maneuver and shuttling: the case of Savona Port Authority

The case of the port of Savona-Vado is an interesting example of proactive public policies promoted by the Port Authority in a systemic way to favor the creation of a port logistics system based on the railroad. These policies use both the levers of direct investment (acquisition of direct control of railway sidings, locomotives and interports) and the levers of business development (setting up a company dedicated to the marketing of rail services), in addition to the promotion of technological development (economic support to the project Metrocargo).

The ultimate goal is to be able to effectively manage the important developments expected in the sector of containers by 2018, both from the point of view of operations and marketing.

The Port Authority of Savona has developed an autonomous rail service for the

connection between the port and the hinterland, through selection by European call of a railway company, which has been given the exclusive management of port shunting and the ability to perform traction in line to the main inland destinations under market laws. In further support of this initiative and to reduce initial investment costs for operators, the Authority has acquired eight maneuver locomotives and six electric locomotives. In addition, the Authority has also boosted the creation of Fernet, who plays the role of Multimodal Transport Operator and manages shuttling from the docks of the port to the airport areas, commercializing rail service and maintaining business contacts with customers. The Port Authority holds an equity stake of 10%, and other private parties in the logistics sector (Autofiori, Group Orsero and Gavio Group) have also made a contribution. In 2010 for the route Port of Savona-Parco Doria and in 2015 for the route Seaport of Vado-Parco Doria, the Authority acquired control of both rail links to the port areas to handle the technological upgrading more quickly and efficiently and in order to have a greater flexibility of the service. In this way the means of maneuver can travel continuously between the two basins and, following the downgrading of the track to line of connection, it is easier and cheaper to organize the transport of coaches to form freight trains in Parco Doria.

This setting of the management of rail service makes it possible to efficiently plan the transport by rail and to optimize the rolling stock used. Through an integrated approach it is possible to take advantage of the positive aspects offered by the rail system, recovering the fixed costs considerably higher than those of the other means of transport and offering services at competitive costs compared to road transport.

In 2015, the Authority also acquired the majority of the company "Interporto di Vado Intermodal Operator Spa" (VIO) which manages the interport of Vado Ligure, a structure that spreads on over 232,000 square meters inserted in the trans-European network and eligible for EU grants up to 30% of the possible extensions. On these areas the new rail terminal will be realized by 2018. This new plant will function as an interface for both the port and industrial areas, but especially for the new multipurpose platform where a central role is played by the container terminal operated by APM Terminals Vado Ligure Maersk Group. This investment, which is currently in progress, is expected to reach standard use from 2018 and will have a containers handling capacity of up to 820.000 TEUs. In order to respect the constraints imposed in the awarding of the concession, 40% of the total terrestrial traffic must take place by rail, requiring the preparation of a daily average of 12 to 18 freight trains.

In order to develop a policy of collaborative logistics, the Authority signed memoranda of understanding with the Polo Logistico Integrato di Mortara in 2010 and with the Rivalta Terminal Europa. In 2011 it collaborated in the planning of the Integrated Logistics Platform of Mondovì, still under completion at the moment.

5.2 La Spezia Shunting Railways S.p.A, a new company for the management of rail service in the port of La Spezia and in the dry port of Santo Stefano di Magra

By analyzing the operational problems of the railway system of the port of La Spezia it has been possible to establish that their main causes are the number of subjects involved and the lack of coordination between them. In 2013 the Port

Authority of La Spezia created a management company for the port rail service extended to the dry port of Santo Stefano di Magra. The instrument for the management of the port rail service extended to the dry port follows the ideas of reform 28th January 1994 n° 84 issued at the end of 2011. This provides for the creation of port-logistics systems for the coordination of the activities of many ports and dry ports belonging to the same geographical basin or serving the same trans-European corridor, marking their starting point.

To comply with the provisions of the EU, at the end of 2013 a notice was published containing the invitation to show interest in the subscription of shares in the newly formed La Spezia Railways Shunting S.p.A. The object of the new company is to operate in the port of La Spezia, in the areas behind the port of Santo Stefano di Magra and in the territorial areas carrying out activities related to: rail transport according to the Legislative Decree no. 188/2003 directly or through authorized companies; rental of vehicles and railway equipment; technical railway consultancy; rail services and logistics. The company has a registered capital of € 1 million, represented by shares sorted by the following categories:

- Category A – the shares may be subscribed and owned only by the Port Authority of La Spezia and may not exceed the 20% of the total number of shares representing the equity capital.
- Category B – the shares may be subscribed and owned only by private holders of state maritime concessions granted pursuant to Law 28th January 1994 No. 84, Art. 18 in the port of La Spezia and by logistics operators permanently operating in the dry port areas of Santo Stefano di Magra, owners of facilities connected with the railway network. They may not exceed 40% of the total number of shares representing the equity capital.
- Category C – the shares may be subscribed and owned only by individual entrepreneurs or companies, individually or grouped together for the purpose, engaged in activities of MTO (multimodal transport operator) or of railway company licensed in accordance with Legislative Decree 8th July 2003 n° 188, art. 7, that operate stably in the port of La Spezia. They may not exceed 40% of the total number of shares representing the equity capital.

The company is open to participation and it is possible to buy shares even after the constitution, provided that the requirements for the different categories as established in the statute are met. The company adopts the system of dual governance with a supervisory board and a management board. The supervisory board is composed of three members appointed, of which the first acts as chairman and is appointed by the category-A partner while the second and the third members are appointed by the Category-B and Category-C partners. The management board is composed of five members appointed: the first acts as chairman and is appointed by the Category-A partner while two of the remaining members are appointed by the Category-B partner and two by the Category-C. On the one hand, the dual system makes it possible to maintain the Port Authority's role as guarantor of the impartiality of the company towards individual operators in categories B and C through the supervisory board; on the other, it allows to give professionals in the categories B and C the organizational

and management responsibilities while enhancing the institutional role of the Port Authority as the guarantor of market access, free competition and transparency and the role of operators in a position to transfer know-how and operational capabilities in the society by adopting an effective business management.

The management board will draw up the business plan of the company after investigating the needs in the light of the findings of the market. The corporate structure is open to new shareholders that meet the requirements set by the founders even after the conclusion of the social contract, thus meeting the EU guidelines in the field of competition, free market access, transparency and publicity in contracting services. The company will acquire the operations in successive stages by acting primarily on the streamlining of operations without any changes to the infrastructure and then, on a longer timescale, by considering the new scenario of infrastructure as provided by the Port Plan.

The society appointee of the port rail service (included primary and secondary maneuver) will operate within the remit of three stations: Marittima, Migliarina and Santo Stefano Magra. It was launched at the end of 2013 by the following founders: the Port Authority, Trenitalia S.p.A., Serfer - Servizi Ferroviari s.r.l., Terminal del Golfo S.p.a., SO.GE.MAR. Interporto S.p.A., LSCT, La Spezia Container Terminal S.p.A., Speter S.p.A., Oceanogate Italia S.p.A.; Nora S.p.A.; Contrepair Manovre Ferroviarie s.r.l..

In summary, starting from 2014 with LSSR (La Spezia Shunting Railways) the whole port rail service is managed in a unified manner with no distinction between primary and secondary operations. The result has been to streamline railway maneuvers eliminating overlaps, minimizing costs and thereby increasing the attractiveness and competitiveness of the port of La Spezia, as demonstrated by the 10% increase of rail traffic during the 2014, with approximately 118 thousand railway wagons for nearly 7 thousand trains arriving and departing and a market share of 35% in land transport, the highest value at national scale.

5.3 Regional policies: the case of the subsidies to rail transport in Emilia-Romagna

In order to avoid the decrease of rail traffic, in November 2009 Region Emilia-Romagna, after obtaining permission by the EU (State aid 483/2009 C 2009 7136), issued a law for subsidizing rail transport of goods (LR n° 15/2009), afterwards reviewed with the Legge Regionale 30th June 2014 n° 10.

This was aimed at stimulating the increase of rail transport of goods by subsidizing new traffics on routes already existing or on new routes so as to reduce the number of heavy vehicles with evident benefits for the environment, the congestion and the safety of traffic. With the Legge Regionale n° 15 of 2009 called "*Interventi per il trasporto ferroviario delle merci*" (Interventions for rail transport of goods) Region Emilia-Romagna aims at activating interventions in the sector of transport of goods consistent with the objectives indicated in the national and regional planning. The benefit expected thanks to the implementation of this law is an increase in the rail traffic of goods of about 2.3 million tonnes a year in the first three years of the subsidy, with a reduction of 246.000 28-tonnes heavy vehicles. Estimates say that when the subsidy

finishes, traffic of 1.5 million tonnes of goods will be maintained on the railway.

In 2007 the multimodal and intermodal nodes of Emilia-Romagna handled a total freight traffic, incoming and outgoing, via road and iron, amounting to 41,518,231 tons / year, of which over 60% realized in the Port of Ravenna, which is the main entry point for goods and raw materials in the Region, 11% of which is handled by rail. The economic crisis that hit Italy since 2008 led to a decrease in regional rail traffic resulting in a -24% of tonnes handled in 2007-2009. The subsidies of the region made it possible to activate new forms of service and to cover the losses resulting from the reduction in traffic. The specific objectives of the interventions are:

- Stimulating growth by encouraging additional rail traffic with respect to the previous year, and maintaining these new traffics even after the end of the subsidy.
- Encouraging short and medium range links departing from or arriving to a regional node, namely intra-regional and inter-regional links with neighboring regions.
- Privileging dry ports as strategic areas for the development of the regional nodes and able to express plenty of room for growth of rail transport, giving priority to connections with the ports that are penalized by bottlenecks or infrastructure constraints.
- Encouraging both intermodal and traditional rail traffic as they are functional to the vocations of the regional production system by taking into account the rail costs related to incidental expenses such as audit, train forming and maneuvers.
- Encouraging the traffic of complete trains as they represent a model that is more functional to the creation of a sustainable traffic.

The subsidies may not be given to traditional traffic and to motorways.

Recipients of the contributions are all logistics and rail companies, even in consortium or cooperative form, having their registered office and constituted in a Member State of the EU. The indirect beneficiaries are loaders and industrial companies because the direct beneficiary must mark down the fee schedule applied to end users by the amount of the contribution received. Each company must commit to not increasing the price of the services in the two years following the end of the period subsidized. The application for subsidy must be accompanied by a written description of the initiative and, in addition to the elements identified by the Regional Council, it should also include:

- The characteristics of the services and planned expenditure.
- The benefits expected thanks to the implementation of the services.
- Any other public sources, as well as regional ones, to cover the planned expenditure.

The contributions may not exceed 30% of the total cost of rail transport, including incidental expenses. The maximum annual contribution granted to each company may not exceed € 400,000 if the additional services have a duration of one year, € 500,000 if they have a term of two years and € 600,000 if they have a term of three years.

The compensation of external costs is guaranteed by a contribution of € 0.01 per ton / km, equal to the difference between rail and road defined by the Marco Polo program, reduced by 50%. The budget of the scheme was judged positively as the expected reduction in road traffic of 246,000 heavy commercial vehicles can be widely

confirmed. As reported on 31st December 2012, 25 new rail services had been provided by 17 companies selected through public notices and that carried 2,647,607 tonnes of goods more than in 2009. In the previous funding period all beneficiaries had been logistics companies rather than rail companies. The railway companies which have provided services of transportation are Trenitalia Cargo, T to, Oceanogate, NordCargo, Interporto Servizi Merci and DB.

The Regional Legislative Assembly, given the excellent results achieved, asked the Council to propose further measures for the development of rail freight and then, with regional law n° 10 of 30th June 2014, Regional Law 15/09 was repealed and the regulation "Interventi per il trasporto ferroviario e fluviomarittimo delle merci" (Interventions for rail and sea-river transportation of goods) was approved.

The new law identifies the new services eligible for contribution as follows:

a) Each train service in addition to those made in the reference period specified in the notice, having origin and/or destination at a railway junction located in Emilia-Romagna. The additional rail service must be made of at least thirty trains a year, or carry at least twenty thousand tonnes per year and must be kept active, at least to the minimum volumes, in the two years following the end of the contributions.
b) Each river or sea-river service additional to those carried out in the reference period specified in the notice having origin and/or destination at one of the ports of Boretto, Ferrara, Porto Garibaldi and Ravenna. The additional river and sea-river service must transport at least 10.000 tonnes per year.
c) Each journey related to special river or sea-river transport.

The contributions are calculated as follows:

a) For rail services, on the basis of mileage up to a maximum of 120 km, even if the journey is of a longer length. The level of support is determined in € 0.8 cents per tonne per kilometer (20% lower than the previous law). The contribution is reduced by a percentage equal to 30% if the recipient is a railway company.
b) For river or sea-river services, on the basis of the quantity of goods loaded or unloaded in the ports of Boretto, Ferrara, Ravenna and Porto Garibaldi. The amount of the contribution is established in € 1.5 per tonne and € 2,500.00 for each journey related to special transport.

The extent of the subsidy granted in the river sector is determined within the limit of the amount of the maximum general "de minimis" provided for in the EU Commission Regulation No. 1407 of 18th December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union and on "de minimis" aid, as required by the Community guidelines on state aid in the railway sector. For each additional service a contribution may be granted for the minimum duration of one year and a maximum of three years. In the allocation of contributions priority is given to three-year services. The contributions are non repayable and are calculated to produce a reduction of the costs of transport by rail and waterways equal to the higher external costs of transport on road. The maximum annual contribution that can be granted to each beneficiary company amounts to € 150.000.

The distribution of the resources available, € 800.000 per year for the period 2014

to 2016, takes place in a percentage of 90% for rail and 10% for river and sea-river transport. Any remaining resources pertaining to the list related to one of the modes of transport may be used for the promotion of services eligible for funding and incorporated in the ranking, to be made with the other modes. The modes of supply of the contributions are mainly aimed at developing rail shuttling systems to and from the port of Ravenna and the objective is to increase the market share from 15% to 25%.

Among the beneficiaries of the contributions in the early years of activation of the policy, some of the most important are the companies of combined transport road-rail belonging to the UIRR (Union International Rail-Road) such as Kombiverkehr, Hupac and CEMAT, companies of management of interports such as Ce.P.I.M. Spa of Parma, Dinazzano Po Spa or Gestione Servizi Interporto Spa of Bologna, railway companies such as Trenitalia or big carriers and maritime companies such as Spinelli Srl, Ignazio Messina & C. Spa, Gab Spedizioni Internazionali and Sogermar, as well as big industrial groups like Marcegaglia Spa.

6. Conclusions

The importance of the role of ports in complex logistics systems depends increasingly on the efficiency of the organization of the inland routes. The developments of container traffic have led, in fact, to a market increasingly characterized by a large dispersion of the origins and destinations, spread over a vast hinterland port area, with a large number of operators in both directions, with stronger competition among port logistics systems, given the easy substitution of the points of embarkation and disembarkation. This increased competition between ports has led us to develop systems of forwarding by land, often based on an enhancement of rail intermodality.

These strategies imply the purchase of rolling stock and the creation of inland terminals of reference. Apart from those directly affected by the reduction of overall costs of shipping – whose maritime route is often a minority aspect – also other logistics supply chains (Ro/Ro and dry bulks) have benefited from them thanks to the development of economies of scale and scope in the investments in infrastructure and services.

The following table summarizes and orders the main instruments of transport policy aimed at favoring rail intermodality in the main ports of the North Western Mediterranean.

The main instruments of transport policy activated by Port Authorities to favor rail intermodality

Port Authority	Market-based instruments	Regulation based instruments	Instruments of economic coordination	Instruments that provide for direct public investments in infrastructure or superstructure
Valencia	National contribution to modal shift (measure in the study) for an amount of E 21 per ITU and 15% discount on port charges for cars loaded and unloaded by the railroad in the port	Extension of the term of the terminal concessions to operators in order to achieve also the infrastructure of terrestrial connection. Promoting competition between railway companies, with four active players in the market	Coordination of the relations with terrestrial intermodal centers	National fund for terrestrial accessibility to ports, coordinated at national scale and financed by Puertos del Estado. Adjustment of the railway network to the EU standards (by the end of 2015). Participation in the investment for the Valencia Plataforma Intermodal e Logistica.
Barcelona	National contribution to modal shift (measure in the study) for an amount of E 21 per ITU	Extension of the term of the terminal concessions to operators in order to achieve also the infrastructure of terrestrial connection. Promoting competition between railway companies, with ten active players in the market	Coordination of the relations with terrestrial intermodal centers and participation in the investment through seven projects for "terminales maritimas interiores"	National fund for terrestrial accessibility to ports, coordinated at national scale and financed by Puertos del Estado.
Marseille	National contribution to modal shift (measure in the study) for an amount of E 18 per ITU		Development of the coordination with terrestrial centers thanks to the national strategy related to the Grand Port	Co-investment by GPMM for rail accessibility to the port and participation in the investment for the Mourepiane Combined Transport Terminal Company
Savona	Direct support to the promotion of a high-tech pilot project (MetroCargo)	Inclusion in the concession agreement of the article for the provision of terrestrial forwarding of 40% of traffic for the new container terminal	Creation of the commercial company of rail services (FerNet)	Acquisition by the Port Authority of direct control of railway junctions, interports and maneuver locomotives

Genoa		Development of new information systems aimed at speeding the procedures for the formation of trains	Development of the interventions of the "Piano del ferro" (plan of iron) for the extension of the modules and electrification of railroads within the ports
La Spezia		Development and minority participation in La Spezia Shunting Railways	
Ravenna	Regional contribution for the activation of new incremental rail services		
Koper	The status of customs free zone reduces the administrative burden also for intermodal activities	Direct coordination of port and intermodal activities following a logic of vertical integration of public companies	Direct investments also in dry port terminals in Slovenia and other countries

Even though existing policies at Community, national, regional and local scale – as revealed in the summary table above – are characterized by high heterogeneousness due to the differences in their contexts, they should all highlight some distinctive features that can enhance the motivations and objectives of a long-term strategy involving government grants in this area:

1. The incidence of direct and indirect operating costs of transport and logistics on the revenue of the manufacturing industry is growing also due to the continuous expansion of the international markets of reference for both imports and exports, so a reduction of these values can contribute indirectly to the maintenance of competitiveness of the production and distribution companies.
2. The need to initiate a virtuous circle to bring about a more sustainable mobility of goods in terms of economic, social and environmental impact is also evident because the transport sector is the only industry that, at a national and EU scale, does not seem to be able to reduce significantly external effects in terms of greenhouse gas emissions, air pollution, noise, accidents and congestion. Using the transport sector and the logic of smart mobility as a lever for a green economy is crucial to the mitigation of pollution, especially in very sensitive areas as most of the Italian territory.
3. Having a clear and far-sighted planning of the sector is the tool for greater involvement of private capital to improve infrastructure and superstructure to support transport and logistics such as intermodal terminals or logistics areas. This

involvement can only be realistic if the different levels of planning of the policies for services and infrastructures are able to offer a clear interpretation of the goals, which can only be the enhancement of modal integration at big intercontinental access doors: the ports.

Generally speaking, for the Italian system (the only one among those analyzed that still lacks a national port strategy) creating economies of scale and network in railway services starting from the main ports is necessary to compete with the European logistics regions. It is also important to rebalance the flows in comparison with Northern European ports and to facilitate the localization of logistics companies with high added value (for example large-scale distribution centers or headquarters for Southern Europe of international shipping companies).

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For its scientific project, the Maritime Economy Observatory
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