Master Thesis

Hinterland Port Development in the Metropolitan Region of Barcelona

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HINTERLAND PORT DEVELOPMENT IN THE METROPOLITAN REGION OF BARCELONA

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Front Image: Plan with the proposed terminal conversion. Own elaboration.
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List of Abbreviations

ADIF: “Spanish Rail Infrastructure Administrator” entity (in Spanish).


ATM: “Metropolitan Transport Authority” consortium (in Catalan). Founded in 1997 the company is responsible for planning and coordinating the public transport in the metropolitan region of Barcelona.

BCL: “Barcelona Logistic Centre” (in Catalan). It is a private driven institution based in Barcelona, which strives to promote Barcelona and Catalonia as the main South European Logistic hub in the Mediterranean region.

bn. : “Billion”.

CIMALSA: Catalan public entity responsible for logistic platform planning and managing. Nowadays they have 6 centres operating and 4 under planning.

CO₂: Carbon Dioxide.

EC: “European Commission”.


EU: “European Union”.

EUR: ISO-Code for the Euro Currency

EUROSTAT: Statistical Office of the European Communities.

e.g. : From the Latin exempli gratia, abbreviation used to provide an example

ft: “Feet” (1 ft = 0.3048 m).

GDP: “Growth Domestic Product”.

h: “Hour”.

IB: “Iberian” rail gauge (1.668 m). Further details can be found in Appendix A 1.

IMF: “International Monetary Fund”.

i.e. : From the Latin id est, abbreviation meaning “that is to say”.

in: “Inch” (0.0254 m).

inh.: “Inhabitants”.

kg: “Kilogram”.

kv: “Kilo Volts”. 25 kV are the standard electric tension used in the European rail system and the one fostered for interoperability measures among member states.

m: “Meter”.

m: “Meter”.
mio.: “Million”.

MIX: Mix rail track with third rail combining both UIC- and IB gauge services. Further details can be found in Appendix A 1.

mov.: “Movements”.

RMB: “Metropolitan Region of Barcelona”. This region was defined among six others (from 2001, seven), in the General Territorial Plan of Catalonia in 1995 as a planning region in the Catalan territory.


PE: “Special Plan” (in Spanish). Planning tool, which allows introducing modifications in specific aspects of already approved plans.


PGE: “Spanish General State Budget” (in Spanish).


POUM: “Municipal Ordering Plan” (In Catalan). Planning tool at municipal level where both the classification and qualification of land is defined.

PP: “Priority Project” by the European Commission in the TEN-T Program.

PPP: “Purchase Power Parity”.


RENFE: “Spanish National Rail Network” (in Spanish). This is the public entity subjected to the Ministry of Public Works and responsible for operating passenger trains within the Spanish network. RENFE also provides freight transport through its branch Pecovasa. With 80 % market share in the freight sector, the public company is often regarded as a monopoly.
t: “Tone” (1 t = 1’000 kg).

**TEN-T**: “Trans-European Transport Network”.

**TEU**: “Twenty-foot Equivalent Units”. This is the widely used freight container due to its standardized dimension. It measures 20 ft x 8 ft x 8 ft 6 in, with 38.5 m$^3$ of volume capacity and was first introduced by Malcolm McLean in 1956.

**TGV**: “High-speed train” (in French). This is the French high-speed brand subjected to the national society of French railways SNCF.

**UIC**: International Union of Railways. Name also applied to the most widely used international standard rail gauge (1.435 m). Further details can be found in Appendix A 1.

**UN**: “United Nations”.

**USA**: “United States of America”.

**ZAL**: “Logistic Activities Zone” (in Spanish). These are high concentrated logistic centers in the Spanish territory, which are mostly located nearby high intensive industrial and logistic hubs such as ports or airports. The first such center developed was the ZAL Barcelona next to the Port of Barcelona in 1991.
Glossary

**Department of Territory and Sustainability:** Regional council in Catalonia (equivalent to the national ministry) responsible for: the preparation of territorial- and urban planning policies, land policies, housing promotion, heritage management, policies for re-use of buildings in historic centres, public infrastructures (including highways, railways, ports and airports), environmental policies, watershed management and the promotion of renewable energies.

**High-Speed:** In the European Union, high-speed lines are those, which meet the requisites of Directives 96/48 of 23 July 1996 on the interoperability of the trans-European high-speed rail system.

**Hinterland and Foreland:** Hinterland is the name commonly given to a port’s land area of influence that is the area of land used by the port for the entry and exit of its products and as the centre of its maritime activities. Foreland is the area of maritime and foreign influence whose trade with the nation or country is channelled through that port.

**Ministry of Public Works:** Government ministry in Spain responsible for preparation and implementation of government policy on land transport infrastructure, air and maritime jurisdiction of state and control, management and regulation of administrative services transport, management and direction of all postal and telegraph services, the momentum and direction of state services related to astronomy, geodesy, geophysics and mapping and planning and programming of investments related to the services mentioned above.

**Mixed traffic (rail lines):** A term applied to high-speed lines designed to channel passenger and goods traffic. Mixed traffic lines are subject to more demanding geometric parameters than those for exclusive traffic, related essentially to the smaller gradients permitted. This represents an additional investment over-cost, compensated by the line's enhanced functionality. Lines designed for mixed traffic may also operate with exclusively passenger traffic if the demand requires.

**Modal Split:** Share of each mode of transport (i.e. maritime, rail, road, air), in absolute figures or as a percentage of total demand for passenger or goods transport.

**NUTS:** Acronym for “Nomenclature of statistical territorial units” (in French). It is a geocode standard developed and regulated by the European Union, with the aim of referencing the subdivisions of countries for statistical purposes. There are three levels of NUTS (NUTS-1, NUTS-2, NUTS-3), which differ by the territorial subdivision degree. Further details can be found in section 2.3.2.

**Logistic:** In business terms, logistics are all the activities (storage, transport, stock control, preparation of orders, etc.) which facilitate the flow of materials, from suppliers (in raw material state) to the end consumer (as finished products ready for consumption), as well as information flows, aimed at an adequate level of service to the client at the responsible price. It is a system for the organisation and control of the flow of raw materials and semi- or fully-elaborated products, enabling demand to be met according to the amounts required, at the right time, where necessary and at minimum cost. Transport is one of logistic main activities, given what it represents in terms of costs (more than 50% of the logistic cost) and its implications for the quality of the service to the customer.

**Rail gauge:** Distance between the insides of railway tracks. The most widespread gauge is the so-called international gauge or UIC (1.435 m); some countries such as Spain and Portugal (1.676 m) or Russia and Finland (1.524 m) have broader gauges. Where the gauge is 1 m (e.g. Peloponnese, Greece) or less, it is called “narrow gauge”. A visual overview can be found in Appendix A 1.
**Urban Land**: Classification of land, which is integrated in the urban tissue and is connected to the basic urban services (road, drinkable water, sanitation, electricity supply). It accounts with 8.3 % of the total territory in Catalonia.

**Urbanizable Land**: Classification of land, which is retained as necessaries in the Municipal Ordering Plans as to cope with the future demographic and economic growth. It accounts with 3.8 % of the total territory in Catalonia.

**Non-Urban Land**: Classification of land excluded from the urban processes. It accounts with the highest proportion, reaching 93.4 % in Catalonia.
Hinterland Port Development in the Metropolitan Region of Barcelona

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Abstract

Port hinterland development is a concept based on supporting the infrastructures which ensure the efficient logistics supply chain between the port and its land area of influence. The main purpose of the research is to find strategies to improve the hinterland infrastructures of South European ports as to balance and decentralize the freight entrance in Europe. This premise is deployed in the metropolitan region of Barcelona where the conversion of an existing automobile terminal into one capable of receiving container traffic is analysed in depth. For this purpose both the stakeholder- and the institutional analysis are revealed as key methods to define the most feasible intervention. The findings show that the terminal conversion is only possible if collaboration among administrations throughout the planning process is ensured. Indeed, both regional and central administrations have to compromise in several planning procedures in order to reach mutual agreements. From the management perspective, the concession at own risk to a private operator is the most appropriate scheme to guarantee the feasibility of the project. Lastly, a considerable improve in the Spanish economy is also needed for the project viability.

Keywords

logistics, hinterland ports, freight railway terminal, intermodal transport, stakeholders

Preferred Citation Style

1 Outline

The here presented Master Thesis project is the result of a four-month research conducted between September 22nd 2014 and January 20th 2015 in the Chair of Spatial Planning and as the final step of the MSc Spatial Development and Infrastructure Systems, ETH Zurich.

The primary research goal aims at identifying the strategies and ways to improve the hinterland infrastructures of the Mediterranean logistic ports. The background thought for this choice is the fact that the South European ports need infrastructure upgrade in order to compete with the North European hubs. More precisely, the potential of the ports in South Europe relies on its geostrategic location within the global context, its hinterland market, the current infrastructure condition and the funds availability. Moreover, a balance in the current inequalities between the European North- and the South European freight traffic can be achieved. Hence, strategies and instruments for boosting the southern ports’ potential are deeply elaborated.

Methodologically, the project follows a deductive, i.e. broad to detailed, approach in terms of both territorial coverage and research goals. In other words, the research scope is divided into three levels: 1) international/European level, i.e. overview of both global and European tendencies in the field of maritime logistics, 2) regional level, i.e. structured analysis of the North Mediterranean ports, and 3) local level, i.e. identification of potential for hinterland port development in the metropolitan region of Barcelona.

First, the international level of maritime logistics is analysed in depth. More specifically, the correlation between trade/economy and demographic development is central as it is assumed that those parameters affect each other. For this, figures such as GDP growth rates in different global regions are analysed and evaluated. As for the demographic development, the population growth rates in different global regions are studied as to identify where the biggest potentials for future consumption rely. This is followed by the overview of European (both northern and southern) ports in terms of main challenges and opportunities for balanced development of European market. For this purpose the Trans-European Transport Network (TEN-T) programme lead by the European Commission (EC) is presented as a support tool for the hinterland development of key infrastructures. Finally, an extent hinterland market analysis (based on seven indicators, such as: Population, Population Density, Unemployment, Regional GDP, GDP in PPP and Household income) of both North- and South European ports is conducted as to quantify the market inequalities between both regions.
Second, the broader research scope refers to the Mediterranean North coast, i.e. its nine ports – Algeciras, Valencia, Barcelona, Marseille, Genoa, Gioia Tauro, Trieste, Piraeus and Thessaloniki. Such choice is made according to the general research hypothesis, i.e. the hinterland development in the North Mediterranean ports contributes both to a competitive increase in the South ports as well as to balance the European market. A detailed overview of the selected ports (based on eight indicators, such as: Throughput, Dry Bulk traffic, Liquid Bulk traffic, TEU traffic, Vehicles traffic, Passenger traffic, Import-Export & Transit share in total TEU traffic and Modal split in Import-Export traffic) in terms of freight traffic and hinterland market is given and some conclusions are stated.

Third, the research scope in narrow terms is devoted to the examination of potential for hinterland port development in the hinterland of the Port of Barcelona. This part of the research is deeply elaborated at two sub-levels. Namely, after brief introductory overview of the current state/conditions in Barcelona hinterland, the so-called macro level, i.e. institutional framework of spatial development both in Spain and Catalonia is given. This provides a solid background for the analysis on the so-called micro level, i.e. analysis of stakeholders (their interest, values, beliefs, etc.) involved in the development process of Barcelona hinterland port (El Vallés Intermodal Terminal). Methodological approach used at macro level consists of: overview of institutional structure of spatial development (both in Spain and Catalonia) and content analysis of the most relevant spatial planning documents. The result of such analysis is to see how collaborative is the planning process in a national and regional level, i.e. existence of collaboration between public entities, ministries, civil society when some specific plans are formulated. At micro level, the main method for data collection is examination by the technique of semi-structured interview, conducted in the period between September-December 2014 among 10 representatives of the Port of Barcelona, logistic agencies, transport operators or political representatives, i.e. the most relevant interviewees from both public and private sector for the topic of El Vallés Intermodal Terminal. In this case, the goal is to weight the different interest of the stakeholders involved as to identify the best proposal for the mentioned terminal.

The results in the international level show an uncertain future for the Mediterranean region both in economic as demographic terms. Economic growth is expected to growth below 3.5 in the next years whereas demographic development will shrink by 21% in the next 35 years. These changes will impact the trade and sea logistics, as these activities are related both to the economic performance and population consumption. Findings in the regional level reveal an expected unbalanced in the economic performance of the North and South ports hinterlands. The hinterlands of the North ports perform overall 15.9% better than the figure in the South. Moreover and within the South ports, a correlation between the ports location and the eco-
nomic performance is noticed. The ports closer to the North (i.e. Marseille, Genoa, and Trieste) perform 10 to 20 % stronger as the South average. On the contrary, the performance on rest of the nine ports ranges from -14 to -50 % from the average. On the basis of several criteria, the case study of an Intermodal terminal in the hinterland of the Port of Barcelona was chosen. Many stakeholders’ conversations on behalf of La Llagosta terminal were conducted in order to analyse and weight the interest of each. The final proposal foresees a much conservative terminal development than the one being planned. In it, a 3 ha intermodal area for container traffic along a rail track adaptation in international gauge will be provided. The management model for the terminal follows the public private partnership scheme with a concession at own risk and responsibility awarded to a private logistic operator. The costs of the project will be shared between the infrastructure administrator and the logistic operator.

The conducted research aims at contributing in future projects involving a great variety of interests and stakeholders. The thorough analysis to identify the weaknesses and potentials along with the stakeholder- and institutional analysis shows a possible procedure on how to approach complex territorial projects.
2 Overview: Maritime Logistic

2.1 Introduction

In the past decades, the level of performance of the infrastructures available within a port was the most important indicator on which to base the competitiveness of a given harbour. Centres with an efficient machinery, deep water drafts, long dockland were the most competitive. Nowadays, and as a consequence of technological development, the efficient infrastructures within a port are more widely available than before. In fact, the attention has shifted from the ports infrastructures to the hinterland infrastructure of centres. As a consequence, experts predict that the hinterland condition will be the main factor for ports to care on (Bassols, 2014). Other European actors as FERRMED (2011: 1) state that, "gateway ports, intercontinental hub ports and airports, connecting the EU with the outside world and the most important industrial areas, inland ports and intermodal freight terminals have to be linked through the […] Core network". This is how the non-profit organization starts its Manifesto presented in Brussels back in 2011. It was founded by the private sector initiative in 2004 in Belgium. Its principal aim is to enhance the European competitiveness by promoting the hinterland development of key infrastructures together with the consolidation of the Scandinavian-Rhine-Rhone-Western-Mediterranean corridors.

It is precisely the relation between the hinterland infrastructures performance and trade that will be the main focus point. And since around 90 % (International Maritime Organization, 2014) of the global trade occurs on the sea, maritime logistics will play a crucial role in this project. In fact, globalization and transport revolution, logistics integration and the consequent expansion of the maritime industry have redefined the functional role of shipping and ports in global logistics and supply chains and have generated a new pattern of freight distribution. The rapid increase in world trade in the past decade has restructured the global maritime industry bringing about new developments, deregulation, liberalization and increased competition. As Song and Panayides (2012: 4) remind: "There have been dramatic changes in the mode of world trade and cargo transportation, characterized by the prevalence of business-to-business and integrated supply chains". These changes have been embodied by the increasing demand for value-added logistics services and the integration of various transportation modes such as intermodal transport systems. As a consequence, the business stability and sustainability of the industry is largely subject to how well it adapts to such a dynamic environment (Song & Panayides, 2012). Therefore, the high quality of logistic services and the effective
and efficient integration of transport systems offered by a maritime operator have become an important issue.

Maritime logistics are directly linked to the hinterland market of the region, which is being supplied. It is therefore arguable that one of the main drivers for the ports competitive advantage is its hinterland infrastructure performance (Garcia-Milà, 2014a; Bassols, 2014). These infrastructures are the key aspect to analyse in the present report. Before this, and in a global perspective, the economic and demographic forecasts are analysed.

### 2.2 International maritime trade and logistics

The strong correlation existing between economic development, trade and logistic activity has been widely studied in the past few decades. As Yercan and Yıldız (2012: 26) argue: “Maritime transport services are directly driven by the global economic growth and the need to carry goods within international trade, and remain subject to developments in the global economy”. For this reason, global economic development and demographic prospects in different regions are analysed, due to the fact that trade and logistic are a direct consequence of economic performance and demographic development.

#### 2.2.1 Economic prospects

Data for the economic prospects are extracted from the “Global Economic Prospects” (The World Bank, 2014), regarding the period from 2012 to 2016 and from the “World Economic Outlook” (IMF, 2014) for the period from 2006 to 2019. As Error! Reference source not found. states, and assuming 2014 as the current state, the 2008 economic crises had an overall negative impact in all global economies, as all Growth Domestic Product (GDP) figures dropped. Experiencing the lowest values around 2012, the world economy started to recover from 2013 on. Currently, East Asia & Pacific and China is experiencing the highest GDP growth, ranging from 7 to 7.8 %, respectively. The European Union (EU) recovered from the crises times shifting from recessive figures in 2012 (-0.6 %) to positive growth in 2014 at 1 %. Middle East & North Africa are also from decisive relevance to the future of the Mediterranean logistic and trade due to its geographical vicinity and its emerging character. These regions experienced the highest GDP growth displayed, 290% from 2013 to 2014 (from -0.1 % to 2.8 %) and will grow at a rate of 3.6 % in 2016 according to the World Bank.
As visible in Figure 2, Middle East & North Africa (together with Latin America & Caribbean) is again one of the strongest regions with respect to percentile change from 2014 to 2016, experiencing 80 % GDP growth in the coming years. In this regard, remains South Asia with the highest prospected growth, with a predictable figure of 100 %. The EU, USA, Europe & Central Asia and Sub-Saharan Africa will remain at a modest positive GDP growth ranging between 20 to 40 %. On the contrary, Japan, East Asia & Pacific and China will see its economic performance shrink from –10 to –20 %.

Source: Own elaboration based on “Global Economic Prospects” (The World Bank, 2014)
Zooming into the site perimeter the effects of the economic crisis are much clearer to appreciate. The IMF predicts in the period 2015 to 2019 an average growth of 46% in the national GDP of European countries.
Figure 3  European economic development from 2006 to 2019

Source: Own elaboration based on “World Economic Outlook” (IMF, 2014)

Based on the predictions from the IMF (from 2015 to 2019), several scenarios for the period from 2019 to 2025 have been outlined for the case of Spain. The goal is to determine when pre-crisis economic growth (2007, 3.5 %) is reached again. The results can be seen in Figure 4:
Figure 4  Economic scenarios for Spain

Source: Own elaboration based on “World Economic Outlook” (IMF, 2014)

- High: Produced with the GDP growth rate from 2015-2019 (30 %). Pre-crisis figures expected to be reached in 2021.
- Medium: Produced with the GDP growth rate from 2017-2019 (20 %). Pre-crisis figures expected to be reached in 2022.
- Low: Produced with the GDP growth rate from 2015-2019 (10 %). Pre-crisis figures expected to be reached in 2025.

These scenarios will be used in the proposal to determine the most feasible start for the project realization.

2.2.2  Demographic prospects

A further key aspect regarding trade development is demographic evolution as trade and consumption is directly induced by the living population. Prospects for this regard are extracted from the “World Population Prospects: The 2012 Revision” (UN, 2013) regarding the period from 1950 to 2050. The analysis splits in two different levels. The first focuses on a global level. The second zooms into the broader research scope, showing the countries adjacent to the Mediterranean region.
Starting by the global level, UN (United Nations) figures predicts a 40 % world population increase in the next 35 years, meaning that the world population will grow from current 7‘250 mio. to 10‘200 mio. The highest demographic growth will be experienced in Africa, with a 148 % increase, passing from current 1‘300 mio. to 2‘830 mio. in only 35 years. In fact, and as indicated in Figure 5, the African continent is the region with the strongest demographic growth. Asia, Latin America & Caribbean and Oceania will grow at 26.8 %, 37.7 % and 32.9 % respectively. Europe is the only continent showing negative demographic prospects, shrinking by 21 % in the next 35 years.

Figure 5  Global Demographic Change from 2014 to 2050

As also seen in the economic prospects, will developing countries will play a preeminent role in the future trade and demographic global state. Figure 6 compares the population share in developing and developed economies. While developed and industrialized economies (here Europe and North America) experience a constant decline in total population share from 1950 (28.5 %) to 2050 (9.3 %), developing economies (here Africa, Asia, Latin America & Caribbean) are counterbalancing the trend by increasing their total share from 71 % to 90.2 % in 2050. Currently (2014) the balance is equal to 15 % - 84.5 % in favour of developing economies.
The negative demographic prospects for European countries accentuates by zooming into the Mediterranean region. Figure 7 illustrates the development along the Mediterranean Coast. The considerable contrast between the future prospects in North Africa and in European countries can be noticed.
In fact, this trend is visible by analysing the growth rate of both coasts. While all European countries involved in the later port analysis (Spain, France, Italy, Greece) are foreseen to shrink by 16.8 % on average in the next decades, North Africa, including Algeria, Egypt, Libya, Morocco, Sudan, Tunisia and Western Sahara will boom by 74 % until 2050 (refer to Figure 8).
2.2.3 Transportation prospects: TEU traffic

Although all kind of commodities have been analysed in this research, special attention is paid to TEU\(^1\) (Twenty foot equivalent units) or container traffic due to its growing importance in the intermodal transport history. Historically, and in words of Hayashi and Nemoto (2012: 49): "[...] intermodal transport using liner ships started as a bypass route using land transport before the opening to traffic of the Suez Canal in 1896 and the Panama Canal in 1914". Embarking on a modern intermodal transport system needed devices that comply with international standards. Although various transport devices were already developed, the pioneer who introduced the container connected with today’s internationally standardized containers was Malcolm McLean in 1956, who replaced the traditional break bulk method of handling dry goods with the metal shipping container. The most important benefit of containerization is the reduction of the terminal cost (Hayashi & Nemoto, 2012). Furthermore, machine loading and unloading by gantry crane and straddle carriers have become possible by standardizing the size of the container. Manpower was greatly reduced and loading and unloading was converted from a labour-intensive to a capital-intensive one. As a consequence, dockworkers were deeply affected by unemployment.

\(^1\) “Twenty-Foot equivalent unit” is the widely used freight container due to its standardized dimension. It measures 20 ft x 8 ft x 8 ft 6 in with 38.5 m\(^3\) of volume capacity.
Figure 9 gives a global outlook of the TEU traffic situation. Data were extracted from the “Review of maritime transport” (UNCTAD, 2013) for the year 2012. For this sake, container traffic was subdivided into the most intensive relations ignoring the minor trade routes. It can be noticed that the highest intercontinental relation accounts for the Asia to Europe exchange with 13.7 mio. TEU units. However, the highest TEU exchange above all is Intra-Asia trade, equalling to 52.7 mio. TEU in the year 2012 (Drewry, 2012).

TEU traffic development (1995 - 2012) is also an important data source where economic influences can be correlated. Transpacific and Euro-Asia are clearly the strongest trade routes accounting with over 50 % of global TEU traffic. From 2007 on, both global routes have been almost at an equal traffic rate. The 2008 financial crises left also a negative balance in TEU trade. As a consequence, traffic decreased by an average of 12.9 % from 2008 to 2009.
Figure 10  TEU Traffic Development in 1995 - 2012

![TEU Traffic Development in 1995 - 2012](image)

*Source: Own elaboration based on “Review of maritime transport” (UNCTAD, 2013)*

Figure 11 summarizes the percentile change in TEU trade between 1995 and 2012. Only the Euro-Asia trade relation grew stronger than the global average (208%), around 400 % in 17 years. Both the Transpacific and Transatlantic TEU traffic grew below the average at a path rate of 100 and 152 %, respectively.
Ducruet and Notteboom (2012: 89) give a brief hint into the TEU traffic prospects for the next 40 years. The results can be seen in Figure 12. The authors defined regions (Latin America, Oceania, Middle East, South Europe, North Europe, South & East Asia, North America and Africa) and set for each of the relations a certain growth rate ranging from “below 100 %” to “over 500 %” (Ducruet & Notteboom, 2012: 89). The pre-eminence of emerging markets are also reflected here as the study confirms the faster growth of South-South linkages versus North-North and North-South exchanges. Latin America and East Asia can be regarded as the most prominent potential markets for the Mediterranean Sea. Before thorough examination of the challenges and potential for development of Mediterranean ports, some features of European maritime transportation (observed from the point of various indicators) are subjects in the next subchapter.
2.3 European ports and their hinterland

2.3.1 EC TEN-T program: support to maritime transportation

As mentioned earlier in this paper, in order for the southern ports to increase their competitive advantage, funding support regarding infrastructure upgrades is needed. In this framework the Trans-European Transport Network (TEN-T) program offers an opportunity to improve the hinterland situation in the South.

The Trans-European Transport Network (TEN-T) involves a number of road, rail, air and water transport networks in Europe. This program is part of a wider system of TENs, including telecommunications (eTEN) and energy network (TEN-E). The decision of implementing a transport network was taken by the European Parliament in July 1996 (EC, 2014a). The TEN-T projects aim at providing the infrastructure needed for a smooth functioning of the European internal market, ensuring economic, social and territorial cohesion and improvement the
accessibility across the entire European Union territory. From the start, the focus has been on cross-border projects, with a strong emphasis on high-speed rail. The key benefits of such initiatives are in words of the EC (2014c: 1) the following: "A more competitive economy will produce higher employment. Enhanced multimodality on a better rail, inland waterways and maritime infrastructure within the multimodal TEN-T, as well as innovative technologies in the field of transport, will induce modal shift, reduce congestion on roads, cut emissions and boost transport safety and security".

The new legal policy for the development of the TEN-T, adopted in December 2013, marks the beginning of a new era in Europe transport infrastructure policy. The main innovation lies in the definition of an integrated, multimodal core network, which shall be developed until 2030 by Member States and relevant stakeholders (EC, 2014b). This network will form the backbone for European transport linking major nodes through key rail, road, inland waterways, maritime and air transport connections. It provides a strong integrated policy framework, overcoming the current patchwork of infrastructure projects. Its implementation will be pushed ahead by the setting up of 9 major transport corridors that will tighten cities across the continent. These corridors are based on three pillars: enhancing cross-border connections and removing bottlenecks; integrating different transport modes; promoting technical interoperability (EC, 2014b). The corridors, which pass through the analysed ports, are described in Figure 13:
Corridor 1 | BALTIC – ADRIATIC: Extends from the Polish ports Gdansk and Gdynia and from Szczecin and Swinoujscie via Czech Republic or Slovakia and through Eastern Austria to the Slovenian port of Koper and Trieste in Italy. Key projects are Semmering base tunnel and multimodal platforms in the ports of Trieste, Venice, Ravenna and Koper.

Corridor 3 | MEDITERRANEAN: Links the Iberian ports of Algeciras, Valencia and Barcelona through southern France, with link to Marseille, and Lyon to Northern Italy, Slovenia and a branch via Croatia to Hungary and the Ukrainian border. Key projects are UIC standard gauge railway lines in Spain, the Lyon-Turin railway tunnel and the Karst crossing Trieste/Koper – Ljubljana.

Corridor 4 | ORIENT/EAST-MED: Connects the German ports of Bremen, Hamburg via Czech Republic and Slovakia, with a branch through Austria, further via Hungary to the Romanian Port of Constanza, the Bulgarian Port of Burgas, with a link
to Turkey, to the Greek ports of Thessaloniki and Piraeus and a “Motorway of the Sea” link to Cyprus

- **Corridor 5 | SCANDINAVIAN – MEDITERRANEAN:** Extends from the Finnish-Russian border and the Finnish Port of HaminaKotka, Helsinki via “Motorway of the Sea” to Stockholm and with a branch from Oslo, through southern Sweden, Denmark, Germany connecting the ports of Bremen and Hamburg among others, Western Austria to the Italian Port of Gioia Tauro and “Motorway of the Sea” link to Malta. Key projects are the Fehmarnbelt fixed link and Brenner base tunnel.

- **Corridor 6 | RHINE – ALPINE:** Connects the North Sea port of Antwerp, Rotterdam and Amsterdam along the Rhine valley via Basel to Milan and the Italian Port of Genoa. Key project are the Alpine base tunnels Gotthard and Lötschberg and their access lines.

- **Corridor 7 | ATLANTIC:** Links the Spanish and Portuguese ports of Algeciras, Sines, Lisbon, Porto and Bilbao through Western France and, with a link from Le Havre to Paris and further East to Mannheim and Rotterdam. Main objective is to enhance railway interoperability by gauge change to UIC standard on the Iberian territory.

- **Corridor 8 | NORTH SEA – MEDITERRANEAN:** Stretches from Belfast and the Irish ports of Cork and Dublin through Belgium, with a branch from Amsterdam and Rotterdam, via Luxembourg and Basel to the Port of Marseille. Key project is the Seine-Escaut inland waterway.

The TEN-T corridors are of central importance for both the development and balance of European trade. From the nine corridors defined by the EC, seven connect the here analysed South ports. From these, all besides Corridor 3 run North-South aiming to strength North – South exchange relation.

The new policy, launched on January 1st 2014, triples EU financing to 26 bn. EUR (Gleave, 2011). As stated in the “Mid-term evaluation of the TEN-T Program (2007-2013)” (Gleave, 2011) not only the TEN-T program is contributing financially to the projects. The Cohesion fund and the Structural funds contribute to the network as well. These funds are financial tools that aim at reducing regional disparities in terms of income, wealth and opportunities. Figure 14 shows the priority projects fund (2007-2009) in the countries as a point of interest.
for this research (Spain, France, Italy and Greece). In this analysis Italy becomes 42% of the total fund whereas Greece becomes less than 1%. For the sake of simplicity, the priority projects (PP) involving rail development were isolated. Spain, France, Italy and Greece account with 4, 4, 3 and 2 PP, respectively. Compared to the fund assignment in the North of Europe, Germany received almost 1’800 times more financial means for 6 PP in the same period (Gleave, 2011). Before thorough overview of the most important ports in the region of North Mediterranean, the disparities between northern and southern countries within Europe are highlighted.

Figure 14  Priority Project Fund in 2007 - 2009

Source: Own elaboration based on “Mid-term evaluation of the TEN-T Program (2007-2013)” (Gleave, 2011)

2.3.2  Hinterland market analysis

In this chapter, a closer look into the hinterland market of the ports is given. For this purpose, the hinterland of the North- and the South ports were compared and evaluated.
The data used for the evaluation was collected from the “Regional Statistics Illustrated” online system (EUROSTAT, 2013) provided by the EUROSTAT\(^2\) Department and regard to the year 2011. Within this system, data from NUTS\(^3\) regions where used for the analysis. Specifically, the NUTS-2 level was chosen as to make a trade-off between the detailed level of NUTS-1 and the broad NUTS-3. Since it is difficult to define the real hinterland of each port, a default 600 km\(^4\) distance from each harbour centre was set as representative for its market range. Thus, all the NUTS-2 level regions included in the 600 km coverage area evaluated based on 7 different indicators\(^5\):

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>mio.inh.</td>
<td>Total population living in the port hinterland. The more people living, the more consumption induced (depending also on the economic situation)</td>
</tr>
<tr>
<td>Population Density</td>
<td>inh./km(^2)</td>
<td>Average population density in the hinterland region. It is assumed that the higher the density, the stronger the economic activity.</td>
</tr>
<tr>
<td>Unemployment</td>
<td>%</td>
<td>Average unemployment rate in the hinterland area. The higher the unemployment, the lower the people’s economic situation and consumption power.</td>
</tr>
<tr>
<td>Regional GDP</td>
<td>mio. EUR</td>
<td>Average hinterland Gross Domestic Product (GDP). A high average GDP rate is positive rated, as consumption and trade will benefit from it.</td>
</tr>
</tbody>
</table>

---

2 Statistical department subjected to the European Commission. Its main responsibilities are to provide statistical information to the institutions of the European Union and to promote the harmonization of statistical methods across its member states and EFTA countries.

3 The NUTS, “Nomenclature of statistical territorial units” (in French), is a geocode standard developed and regulated by the European Union, with the aim of referencing the subdivisions of countries for statistical purposes. There are three levels of NUTS (NUTS-1, NUTS-2, NUTS-3). These levels differentiate in their administrative subdivision of member states (EUROSTAT, 2013). The comparison between Germany and Spain is in the following. NUTS-1 is the broadest subdivision defining States (Bundesländer in Germany and groups of autonomous regions in Spain.) The NUTS-2 level goes further analysing government regions (Regierungsbezirke in Germany and 17 autonomous regions or Comunidades Autónomas in Spain). NUTS-3 is the most detailed level reaching to districts (Kreise in Germany and provinces in Spain).

4 The 600 km distance radius varies depending on the region since the form and size of the NUTS-2 regions does not always match with the predefined radius of action.

5 Data for many regions were lacking in EUROSTAT database as Regional GDP in many North European (mainly Germany and Netherlands), and East Europe regions (mainly Balkans).
GDP in PPP EUR/inh. Comparable citizen power consumption taking into account the relative costs and the inflation rated of the countries. High citizen power consumption is regarded as positive for the hinterland performance.

Household income EUR Average household income in the hinterland region. The higher the income, the more consumption will be induced.

GDP growth rate % Average GDP growth in the region. The higher the growth rate, the better trade prospects for the region.

Figure 15  Hinterland market North vs. South

Source: Own elaboration based on “Regional Statistics Illustrated” (EUROSTAT, 2013)
Figure 15 summarizes the comparison between the North and the South ports hinterland. Although the North hinterland indicators beat the South indicators in all economic figures, the differences are smaller than expected. There are several reasons for such discrepancies:

- Ports as Marseille, Genoa and Trieste include in their hinterland many North European regions visible in the dark overlapping area. Hence, strong economic regions are included in the evaluation of South European hinterland ports, consequently increasing the average performance of the region.

- The number of NUTS-2 regions, which were analysed for the North, is smaller than for the South (128 vs. 96). Probably this stems from the ports geographical dispersion. Whereas the South ports stretch 18° in longitude and 9° in latitude coordinates, the North ports are much more concentrated stretching only 9° in longitude and 4° in latitude coordinates.

It can be concluded that the North hinterland performs on average 15.9% stronger than the South region. The strongest difference among the indicators is to be found in GDP growth rate, being almost one third higher in the North (2.17 % vs. 1.47 %).

The disparities between the North and the South are also clear when visualizing the performance of each individual southern port hinterland. Figure 16 shows weather each South ports hinterland is performing above or below the South hinterland average. Again there is a strong interrelation between geographical position of the port and its hinterland economic performance. North ports as Marseille, Genoa and Trieste perform 10 to 20 % above the average. On the contrary, the South port locations have a weaker performance, reaching its maximum in the Greek ports where performance stands around 45 % lower than the average. Excel calculations show a correlation degree of 0.7646, also visible in the lower right side of Figure 16.

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6 Based on Google Earth.
The transit share correlates at the same time with the port location. The more south the port is, the higher is its transit share, as they are closer to the main intercontinental shipping line service (discussed at the beginning of section 0) and thus much able to provide an intermediate hub service. Excel calculations show a correlation degree of 0.9145 between the latitude and the transit share, again visible in the lower right part of the above Figure 16. The profound overview of the current conditions (strengths, weaknesses, opportunities, threats) of the North Mediterranean ports is indicated in the next subchapter.

### 2.4 Mediterranean ports: Development potential

Having set a brief outlook at global tendencies, the research shifts towards its broader scope - the Mediterranean Sea. This region is located in a global perspective between the East and West continents. This privileged location has permitted the Mediterranean Sea to become a
crossroad of cultures throughout history. For instance, there are several liner services (Ducruet & Notteboom, 2012), which use the Mediterranean Sea as transfer hub:

- **The Line bundling service**, running between China and North Europe. As seen in the previous TEU traffic state, this relation is one of the strongest in TEU traffic figures. During this service, intercontinental vessels (with over 13’000 TEU) travel through the Mediterranean Sea using it mainly as a transhipment hub. This means that big vessels transfer freight to small vessels in transit ports (such as Malta, Gioia Tauro or Algeciras) as to distribute the freight regionally with feeder vessels. However 75 % of the freight diverts to the North European ports such as Rotterdam, Hamburg or Antwerp (Garcia-Milà, 2014b).

- **The Round-the-world service** is an "extreme form of bundling service" as Ducruet and Noteboom (2012: 79) state. In this service, main logistic operators travel through main ports of call\(^7\) as Shanghai, Singapore, Algeciras or Colon. Also during this service, high traffic volume passes through the Mediterranean Sea as it is the most direct link between the Far East and Europe-America. The Far East - America route through Suez Canal is around 38 to 58 % shorter depending on origin and destination (Garcia-Milà, 2014b).

In this research project, the Line bundling service is of primary relevance. The idea of big shipping vessels transferring their freight in Mediterranean ports instead of diverting to the North ports is one of the central focuses of this thesis. For the efficient transferring, several requirements are needed. Among them, a good port infrastructure able to accommodate the biggest vessels such as the Maersk Triple-E with 400m long, 18’000 TEU and a minimum of 16 m draft needed (Maersk, 2014). A further requirement is an efficient hinterland infrastructure allowing sending the freight from the port to the hinterland market. This aspect is actually a research subject.

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\(^7\) Port of call is any harbor (except its home port) being visited by a ship, especially to load or unload cargo or passengers or to take on supplies.
According to various sources, the South European ports have many advantages towards the northern ports, which should be enhanced. Some of them are listed below:

- Shorter sailing time. Vessels transferring in the Mediterranean Sea cut the sailing time in 4 to 5 days (Ports.com, 2014).

- Fuel savings. Shorter sailing times translate into a considerable fuel savings.

- By reducing the fuel amount, CO₂ emissions are also decreased. A system developed by the Port of Barcelona predicts a 25 % CO₂ emissions decrease in the logistic chain with origin in Port Said and destination in Lyon if transferring freight in Barcelona (Port of Barcelona, 2014a). A graphical example of the system can be found in Appendix A 2.

- Decentralization of the European freight entrance. The northern ports are currently reaching their capacity, especially regarding the hinterland distribution (Garcia-Milà,
2014a). By using the southern ports as European gateway, the system would both de-
congest the North and decentralize the freight distribution in Europe.

### 2.4.1 North Mediterranean ports: Challenges and opportunities

The following section is devoted to the analysis of the North Mediterranean ports. It will be
done based on 9 indicators related to the traffic figures and modal split proportion. The har-
bours chosen to be part of the research study are the following⁸:

- Algeciras, Spain
- Valencia, Spain
- Barcelona, Spain
- Marseille, France
- Genoa, Italy
- Gioia Tauro, Italy
- Trieste, Italy
- Piraeus, Greece
- Thessaloniki, Greece

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⁸ More precisely the cities, in which the ports are located, are listed.
The mentioned ports are selected based on two parameters:

- **Located on the Mediterranean North Coast**: One of the thesis requirements is to improve the hinterland infrastructures of a port with the aim of having a positive European contribution. Hence, ports along the south coast (such as Algiers, Tanger) or too peripheral to the European core market (Istanbul) were excluded.

- **Significance of the port both in national and international level**: The preference is set on the top ranked ports within the four countries involved (Spain, France, Italy and Greece). More precisely, ports with high volumes of traffic and of strategic position are more likely to become funding from national and international entities and thus will have more option in developing its hinterland. Moreover, top ports tend to have a much more developed online infrastructure, which in turn facilitates the data acquisition for analysis purpose.
For the purpose of the analysis, the most relevant indicators in ports logistic were chosen and applied to the nine harbours:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughput</td>
<td>t/year</td>
<td>Total tonnage freight handled in a year.</td>
</tr>
<tr>
<td>Dry Bulk</td>
<td>t/year</td>
<td>Commodity cargo that is transported unpackaged in large quantities such as iron, cement, coal or grains.</td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td>t/year</td>
<td>Commodity cargo that is transported unpackaged in large quantities such as chemicals, petroleum, gasoline or liquid natural gas (LNG).</td>
</tr>
<tr>
<td>TEU</td>
<td>units/year</td>
<td>“Twenty-Foot equivalent unit” standardized container measuring 20 ft x 8 ft x 8 ft 6 in with 38.5 m³ of volume capacity.</td>
</tr>
<tr>
<td>Vehicles</td>
<td>units/year</td>
<td>Brand new vehicles for trade purpose. Passenger vehicles are excluded.</td>
</tr>
<tr>
<td>Passenger</td>
<td>units/year</td>
<td>Passenger both on cruise and ferry traffic.</td>
</tr>
<tr>
<td>Import-Export &amp; Transit share in total TEU traffic</td>
<td>%</td>
<td>Import-Export trade regards to freight using the hinterland infrastructure of a port. Transit trade uses only the port infrastructure as to inter-change freight from different vessel categories (Bassols, 2014).</td>
</tr>
<tr>
<td>Modal split in Total Import-Export traffic</td>
<td>%</td>
<td>Share of rail, road and other modes (e.g. pipes) in the total Import-Export traffic of a Port.</td>
</tr>
</tbody>
</table>

Figure 19 shows a graphical summary of the overview on behalf of TEU and Throughput traffic. The rest of the traffic analysis is available in Appendix A 3. Data for the conduction of this study are based on different sources, mainly official annual reports from the ports and e-mail exchange⁹. The data processed regard to 2012 and 2013. Due to difficulties in data finding,

some figures regarding TEU share (refer to Figure 20) and Modal split (refer to Figure 21) are lacking.
Figure 19   Analyzed ports

Source: Own elaboration based on different sources
With more than 4.3 mio. TEU and over 85 mio. t handled in 2013, is Algeciras the biggest TEU and Throughput port in the Mediterranean Sea. However and as noticed in Error! Reference source not found., these figures are mainly due to its geographical position. The Port of Algeciras has more than 90 % transit share in TEU traffic (refer to Figure 20) meaning that the vast majority of the freight does not actually reach its hinterland. As it will be argued in the next chapter, this fact has a direct relation to its hinterland consumption market. The South Spanish port together with Gioia Tauro, Tanger Med or Malta is a so-called intermediate hub (Bassols, 2014). These ports have a range of common characteristics in terms of nautical accessibility, transit share, proximity to main shipping lines (in this case, Far East–North Europe) and ownership, in whole or in part, by carriers or multinational terminal operators (Bassols, 2014). Most of these intermediate hubs are located along the global beltway or equatorial round-the-world route, as Algeciras and Gioia Tauro. As Song and Panayides (2012: 79) highlight: "These nodes multiply shipping options and improve connectivity within the network through their pivotal role in regional hub-and-spoke networks". In fact, and regarding the southern ports location in the Mediterranean Sea, there is a clear correlation between the port latitude and its transit share. The southern the infrastructure, the higher its transit share in total TEU traffic. Excel calculations show a correlation degree equal to 0.956\(^1\).

Contrary to Algeciras or Gioia Tauro is Barcelona mainly an import-export port accounting with the highest Import-Export share in Spain (66 %) and the third from the analysed ports behind Thessaloniki (71 %) and Genoa (93 %).

For the purposes of this research project, the Import-Export indicator is of central importance, since the final goal of the project is to focus and improve the infrastructures in the hinterland of the port. The higher the Import-Export share is, the more justified will be an upgrade in the hinterland accessibility.

\(^1\) For the sake of providing a quantitative proof, a correlation analysis among the nine ports was elaborated. In it, the percentage of transit share and the ports latitude degree were correlated. The result shows a clear dependency among both parameters.
The ports of Marseille, Trieste, Thessaloniki and Piraeus have a low TEU share in the total Throughput, visible in Marseille and Trieste are indeed, the ports accounting with the highest liquid bulk traffic in the study (over 49- and 41 mio. t, respectively) (refer to Appendix A 3). This means a liquid bulk share of 62- and 74 % of the total Throughput tonnage, respectively. Piraeus on the contrary, is the port with the highest number of passenger traffic with 17.6 mio. in 2013, from which 98 % are ferry passenger and the rest cruise traffic. On the contrary, accounts the Port of Barcelona with the highest cruise passenger traffic with over 3.5 mio. in 2013.

Available data regarding the modal split distribution were only found for the ports of Algeciras, Valencia, Barcelona and Marseille (refer to Figure 21). According to the data found, has the Catalan harbour the highest rail share from the study, handling over 10 % of the freight by rail and 75 % by road. However, and as stated by Santiago Garcia-Milà, Deputy Manager of Strategy and Business in the Port of Barcelona, the hub aims to increase the rail share from 10.7 % (2013) to 23 % in 2020 (García-Milà, 2014b). Algeciras on the other side, being a transit hub, has a modest 0.4 % of rail. 89 % is transported by pipe to the hinterland, ranking as the third liquid bulk port in the research (over 24 mio. t).
Traffic in the Mediterranean ports is still very limited compared to North European figures. In this research, the ports of Le Havre, Rotterdam, Antwerp, and Hamburg were selected as representative for the North ports. When comparing traffic figures and relating back to Figure 19 again, it can be concluded that 64% of the analysed TEU traffic was handled in the North. Similarly, 66% of the total Throughput tonnage was also managed in North Europe. In fact, accounts the Port of Rotterdam with 7 times more TEU traffic and 11 times more Throughput tonnage than the Port of Barcelona in 2013.

Also, the rail hinterland infrastructure is much more developed and integrated in North European ports. In fact, handles currently the Port of Hamburg 30% of the freight by rail (Garcia-Milà, 2014b), meaning 7 times more than the South ports average (4%).

These disparities between South- and North Europe have their roots in the economic performance of the hinterland market. Consumers are the final contributors for the induced trade in ports around the world. Hence, an extensive analysis on the hinterland market in the North and the South will be presented in the next chapter.
Having presented the overview at global, European and regional level, the next chapter deals with the situation assessment of the region, as well as the choice focus. In other words, main arguments for defining both the research hypothesis and narrow research scope (i.e. specific case study) stems from the extensive data overview and analysis conducted so far.
3 Results: Situation assessment and choice focus

The first part of this chapter presents the argumentation base. To make such a fundament, three different aspects of situation assessment are identified: 1) Macro Trends, 2) Sea Routes and 3) Port In the second subchapter, the choice focus, i.e. hinterland logistic terminal in Barcelona metropolitan region is elaborated.

3.1 Situation assessment

Aspect 1 - Macro Trends:

- Europe will experience on average a 1.3 % GDP growth in the next years (2014-2016). On the contrary, North Africa will double European economic development, growing at a rate of 3.3 % (2014-2016) (The World Bank, 2014).

- South Europe countries will decrease in demographic lines by 22 % until 2050, while North Europe (Channel Islands, Denmark, Estonia, Faeroe Islands, Finland, Iceland, Ireland, Isle of Man, Latvia, Lithuania, Norway, Sweden and UK) will decrease by -5.9 %. On the contrary, the countries involved in the analysis (Spain, France, Italy and Greece) will stagnate on average by -16.8 %. Again, the emerging North African region (Algeria, Egypt, Libya, Morocco, Sudan, Tunisia and Western Sahara) will counterbalance this stagnation by experiencing a demographic boom of 74.2 % in the next 35 years (UN, 2013).

- Currently is the Asia–Euro route the biggest intercontinental relation in TEU traffic, accounting with 13.7 mio. TEU in 2012 (UNCTAD, 2013). Regarding the TEU prospects for the next decades seems that Latin America and South East Asia will play a predominant role for the Mediterranean Sea, as these markets will keep growing. Both Latin America–South Europe and South East Asia–South Europe should grow over 250 % until 2050 (Song & Panayides, 2012).

- Hypothesis 1: The future for the North Mediterranean Region in terms of economic and demographic development is uncertain. The above mentioned figures reveal a poor economic growth as well as a demographic stagnation in the next years. In order
to counterbalance the trend, major synergies with North African regions should be strived. In any case, a decrease in trade is expected in the coming decades.

Aspect 2 - Sea Routes:

- The Mediterranean Sea will remain a transit hub in the future. As previously mentioned, the TEU intercontinental relation Asia–Euro is foreseen to grow over 250% until 2050. Moreover and due to North African emerging character, the main Mediterranean transit ports (e.g. Gioia Tauro, Malta, Algeciras, Tanger Med) will still be pivotal as to distribute freight both in African and Mediterranean countries.

- Arctic Route is an alternative but not a threat in the next 20 years. The distance between Japanese/Korean ports and North European ports is 60% shorter through the Arctic than through Suez Canal. However, the distance between Chinese ports (especially South from Ningbo) to the Mediterranean ports is 47% shorter through Suez Canal (Garcia-Milà, 2014b). Moreover, in spite of the climate change, many sailing difficulties through the Arctic Route still remain such as short opening period, collision resistant ships, icebreaker costs, emergency evacuation and rescue capabilities. Finally, the overall Arctic sailing risk is about 14% higher than the average worldwide risk (DNV-GL, 2014).

- The current Panama Canal expansion will not disrupt traffic passing through the Mediterranean Sea. On the one hand, is the Euro–Asia liner service the highest in the world. Furthermore is this route up to 50% shorter through the Suez Canal than through Panama. Finally, the Suez route allows a 26 to 58% CO₂ emission decrease depending on origin and destination (Garcia-Milà, 2014b).

➤ **Hypothesis 2:** Future sea traffic will be still available in the Mediterranean Sea although the economic and demographic contraction. The emerging character of both North Africa and Middle East regions will guarantee it.

Aspect 3 - Ports:

- From a geographic and environmental point of view, the South ports have potential to act as intermodal hubs between Asia and North Europe, transferring the freight
through railway. Also there is a considerable CO\textsubscript{2} emissions reduction if transferring in the Mediterranean Sea and not in North Europe (Port of Barcelona, 2014a).

- The Import-Export share in TEU traffic is the most important indicator for hinterland development, as ports with a higher Import-Export share will use their hinterland more intensively than transit hubs. Genoa (93 %), Thessaloniki (72 %) and Barcelona (64 %) are the harbours with the highest rate.

- Correlation between the ports location and its hinterland performance is clearly visible. The northern ports enjoy a 15.9 % stronger hinterland market compared to the South. Also within the southern ports, the correlation between geographical settlement and hinterland performance is present. The ports with the highest latitude (Marseille, Genoa and Trieste) perform on average 13.7 % better than the South hinterland average (refer to Figure 16). Moreover there is a clear correlation between the transit share and the port location as mentioned at the end of section 2.3.2. The more South the location of the infrastructure, the higher its transit shares.

- Railway share in freight transport remains very low in the ports modal split. Ignoring the lack of data, this share ranges between 0.5 and 10%. On the contrary, Hamburg harbour handles 30 % of the freight by rail (Garcia-Milà, 2014b), meaning 7 times more than the South ports average (4 %).

- This low share is a consequence of the poor railway development existing in the South compared to the North. Besides the lack in rail infrastructures there are some countries as Spain and Portugal, where different rail gauges cause interoperability problems in cross-border rail trade (ADIF, 2014a; REFER, 2012).

- Inland logistic terminals derive as one of the most relevant supports for harbours in their hinterland (Bassols, 2014). Together with the EU transport infrastructure policy aiming to reduce CO\textsubscript{2} emission by increasing the rail share, this terminals support the intermodal character of logistic supply chains contributing to a better environmental outcome (Song & Panayides, 2012).

- **Hypothesis 3:** Infrastructure upgrades in the hinterland of key ports are necessary as to increase the competitiveness of South ports towards North transport hubs. The infrastructure upgrade is more urgent in ports with a high Import-Export share.
This conclusions will form the base upon which the choice focus will rely on. The focus is intended as the concept on which the rest of the thesis will be based. The next section will present it along with the reasons and requirements regarding the choice made.

3.2 Choice focus: Inland terminal

This subchapter presents the “Inland Terminal” as choice focus of the research. It is selected based on the overview and assessment conducted previously. The logistic terminal refers and is based on: 1) the hinterland and port analysis for the nine Mediterranean ports and 2) the Spanish port system, which competitiveness is seriously conditioned by the rail and infrastructure condition (Ministry of Public Works, Spain, 2013a).

As Roso and Rosa (2012: 179) state: "The main problems seaport face today, as a result of growing containerized transport, are a lack of space at seaport terminals and growing congestion on access routes." (Roso & Rosa, 2012).

Dry, hinterland ports, or inland logistic terminals, are infrastructures located in the inland geography of a port as a means to increase the port throughput by relying on intermodal transport. According to Roso, Johan and Kenth (2008: 4) “A dry port is an inland intermodal terminal directly connected to seaport(s) with high capacity transport mean(s), where customers can leave/pick up their standardised units as if directly to a seaport.” (Roso, Johan, & Kenth, 2008). In this research, the concept of dry port is extended to the one of inland logistic terminal. Ideally the port support role will be combined with an intermodal support for freight coming and going to different areas of the region. Three different inland terminals are considered (Roso et al., 2008): 1) Distant (over 500 km), i.e. most widely used as the distance and the size of the flow make rail viable from a strict cost perspective, 2) Midrange (from 100 km to 400 km), i.e. situated within a distance from the port generally covered by road carriers. This type serves as a consolidation point for different rail services and 3) Close (under 80 km), i.e. consolidates road transport offering a rail shuttle service to the port relieving the city streets and the port gates. Further details on the impacts generated by the three types of terminal can be found in Appendix A 5.

The reasons behind choosing such a research focus are the following:

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11 Depending on the country, different terms can be used to describe a freight terminal. However, seven different facilities can be differentiated. Details can be found in Appendix A 4.
• Decongestion of the seaport infrastructure and hence increase of the port capacity by extending its natural storage area to the inland. This fact permits to expand the ports hinterland market as goods and freight get closer to the end consumers.

• Intermodal support in the logistic supply chain as a means to reduce road traffic, especially in the ports surroundings. According to Parola and Sciomachen (2004), the modal imbalance results in increased road traffic congestion, since a growth in maritime flow implies an almost proportional increase in the road flow. Past efforts by the EU on the internationalization of external costs of heavy goods vehicles open the possibility of slowing the decline in rail’s share of traffic (CER, 2009).

• The terminal can serve multiple roles and uses, i.e. from port support, to intermodal centre for regional distribution regarding traffics with different origin/destinations. This diversification can minimize the operational risk and decrease the initial investment by serving more operations. Therefore, an inland terminal has the potential to become a new distribution cluster where logistic operators settled down adding value to the surrounding regional economy (Song & Panayides, 2012).

For an inland terminal to be efficient and high performing, several requirements are needed:

• Need of a direct rail link with UIC standard rail gauge (i.e. 1.435 m). Ideally, the rail link will be freight exclusive as to decrease possible slot conflicts with passenger trains. UIC gauge is essential as to permit direct trade exchange between European countries. As previously mentioned, this is especially important in South countries such as Spain and Portugal where different rail gauges coexist among the national rail network (ADIF, 2014a; REFER, 2012).

• The inland terminal should be located along one of the Core network Corridors set by the European Commission back in 2014 (Gleave, 2011) and presented in the section 2.3.1.

• The logistic terminal should have at least 750 m long tracks as to comply with European freight standards (EC, 2014b). This measure is of great relevance since it permits to decrease the unit costs of train operations making the service much more competitive (Bassols, 2014).
• Depending on the strategy to follow, there needs to be available land for the implementation of such an infrastructure. An appropriate land use qualification of the site perimeter at the planning moment is not negligible since administration procedures can considerable increase the cost and time of completion. (Carreras, 2014)

The terminal concept dealt in this chapter is to be deployed in a specific port hinterland. The next chapter presents the selected port from the nine previously analysed and justifies the choice.
4 Case study: Barcelona hinterland port

In this chapter the case study of the research is presented. In it, the before mentioned “Choice focus”, i.e. the “Inland Terminal” is deployed based on a thorough analysis of the Barcelona hinterland. The next subchapter provides a brief analysis of the Catalan logistic system. Next, the specific proposal in the case study, i.e. El Vallés intermodal terminal, is presented and elaborate in depth. In it, the current situation is described. Both the institutional- as well as the stakeholder analysis provided in the subchapter form the backbone of this research as the future proposals rely on them. Finally, and based on the thorough analysis conducted so far, the possible proposals for the new terminal are presented and evaluated in terms of planning requirements. A final recommendation is given at the end of the chapter.

4.1 Introduction

The Port of Barcelona is located at 41°22’17.11’’ N, 2°10’53.08’’O coordinates\textsuperscript{12}, South-West from the city centre of the Catalan metropolis. Barcelona is in turn the capital of Catalonia, one of the seventeen autonomous regions\textsuperscript{13} in Spain. As for 2013, the region accounts with 16% of the Spanish population (7.48 mio. inh.) and 19% of the total national GDP, 203’615 mio. EUR. (National Institute of Statistic, 2014; Catalan Institute of Statistic, 2014).

\textsuperscript{12} Based on Google Earth. The coordinates indicate the liquid bulk terminal.

\textsuperscript{13} The Spanish State is subdivided into 17 regions with different levels of autonomy in terms of competences. For further details, refer to Article 148.1 of the Spanish Constitution in which the territorial organization of the State is analyzed in depth.
The reasons behind choosing this case study are following:

- The Port of Barcelona accounts with 66 % the highest Import-Export share in the Spanish port system. From the analysed ports, it ranks third after the Port of Genoa (93 %) and the Port of Thessaloniki (71 %). As stated in section 3.1, this indicator is the most relevant if willing to upgrade the hinterland infrastructures. Although both the Greek and Italian hubs having a greater Import-Export share, these centres were discarded for three reasons: 1) only the rail share for the Port of Barcelona is known, 2) both language and data availability difficult the research if focusing in the Greek port, 3) Genoa’s hinterland is already experiencing heavy research with the CODE 24 project (CODE24, 2010). Hence, a research contribution in a less focused port, where data availability is guaranteed, is prioritized.

- Although having a low railway share (10.7 %) for import-exports compared to the North ports (Hamburg: 30%), it is considerable higher than the South ports average (4 %). Moreover, the port authorities set as goal to raise the rail share up to 23 % until
2020 (Garcia-Milà, 2014b). Furthermore, the works for the new access in MIX gauge railway leading to the new BEST terminal\textsuperscript{14} started in December 2014 (Ministry of Public Works, Spain, 2014a). This fact supports the improvement of the hinterland infrastructures with a special outlook into the rail system. Moreover it states the priority character the Port of Barcelona has for the Spanish Central Government.

- The Catalan seaport received in November 2014 the “Third most productive port in Europe” award by the Journal of Commerce (Port of Barcelona, 2014b). The productivity index (calculated in terms of containers moved per vessel/h, while the ship is docked at the wharf) indicates an increase from 41 mov/h (2012) to 78 mov/h (2014). Being the first time a South European port ranks among the top three (behind Bremerhaven and Rotterdam), the Port of Barcelona consolidates its position as the most productive South European gateway to North Europe.

- The infrastructure is position along the TEN-T core network, specifically Corridor 3 (Mediterranean) running from Algeciras through Barcelona and South of France to Hungary. Moreover in the national level, Barcelona pivots along the Interior Iberian Corridor, running from Catalonia to Zaragoza (hosting the largest logistic platform in Europe\textsuperscript{15}) and splitting there towards Madrid and North Spain (Port of Barcelona, 2013).

- Within Spain, it is the northeast top port. This is relevant, as the future presented intervention should have a positive impact in the international trade with North Europe. The norther the port is located; the easier will be the synergies between the infrastructure and the North European regions.

- The Spanish Ministry of Public Works has announced investments\textsuperscript{16} in the national logistic and rail sector for the period 2010-2020. From a total of 7’112 mio. EUR, 34.9 % will be assigned to rail infrastructures and 35.4% to inland terminals. Regarding the

\textsuperscript{14} Barcelona Europe South Terminal (BEST) is the new semi-automated terminal in the Hutchinson Port Holding group and the most technologically advanced port development project in Spain. With 8-MIX track railway, it is the biggest on-dock railway terminal in the Mediterranean Sea. Currently it accounts with 45’000 TEU on 60 ha storage capacity.

\textsuperscript{15} PLAZA S.A. is with 1’311 ha the largest logistic platform in Europe. It promotes intermodal supply chains being connected to the highway- and rail system as well as located next to Zaragoza airport.

\textsuperscript{16} These investments were presented within the “Strategic Plan for the Rail Freight Promotion in Spain 2010-2020”. However, the actual assignment of the funds depends on the economic situation and on the political stability of the country. Therefore, the mentioned plan has no binding character and serves only as an indication/proposal for future development.
last, it is estimated that 60% of the investments proceeds from the private sector. (Ministry of Public Works, Spain, 2010).

- Prioritization by the Spanish Ministry of Public Works of Corridor 3 (Mediterranean) against Corridor 7 (Atlantic) for freight traffic (Ministry of Public Works, Spain, 2010). Moreover, the Spanish Government defined 4 inland terminals in Catalonia as priority to develop in the next 10 years (Ministry of Public Works, Spain, 2013b).

- Personal preference for the hinterland of the Port of Barcelona as case study. The personal knowledge about the current infrastructure situation in Spain along with the ease of data and available contacts in the sector has contributed for this choice.

4.2 The Catalan hinterland: A logistic perspective

In this section, the hinterland logistic system of Barcelona is analysed. After giving a brief hint in the general system, different transport infrastructures are looked more closely.

General

During 2013, the Catalan logistic system managed a total of 319 mio. t, representing a 9.5% decrease compared to 2012. The internal traffic has been the most affected, falling for 43% over the last 6 years. However, the rail freight share keeps growing at a path of 3.3% during 2012-2013. Currently it accounts for a 3.5% share of the modal split proportion. The trend is visible in Figure 23 where international freight rail transport is experiencing the highest growth.
Different freight commodities have used the Catalan rail system in 2013. Figure 24 shows the rail freight services per week in the territory. The Port of Barcelona rail terminals, Can Tunis and Morrot, received on average 28 trains per week. Half from them were TEU, mainly directed to the maritime terminal of Zaragoza\(^{17}\) (TMZ). 6 TEU services run between the port and France. The second largest cargo group is vehicles, with 5 services per week (mainly to the private SEAT factory in Martorell and the rest of Spain\(^{18}\)). La Llagosta terminal\(^{19}\) received 4 trains with vehicle cargo, one of them were coming from France.

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\(^{17}\) One of the inland terminals where the Port of Barcelona has a 20 % share hold. It is located along the Barcelona – Madrid – Lisbon rail axis and accounts with the highest TEU traffic from the 5 inland terminals the port uses. 92'284 TEU were handled in 2013, 22% more than the previous year (Martinez, 2014).

\(^{18}\) From now on, “Rest of Spain” intended as origin/destinations further South from the Port of Barcelona.

\(^{19}\) One of the priority logistic terminals for the Spanish Government. Currently used as automobile storage terminal with 12.4 ha and 5'400 car spots capacity. Further details in section 4.3.
Railway

The map shown in the next page gives an overview on the current infrastructures along the segment from Barcelona to Perpignan. As already mentioned, different rail gauge systems co-exist in Spain, which enforce difficulty between the international exchanges. In the map, only the freight lines are shown. From Barcelona towards France freight trains use two routes. Either through Port Bou having to change gauge system (from IB to UIC) or through Le Perthus tunnel avoiding any gauge change (UIC). Port Bou requires the usage of cranes as to change trains between gauge systems. Besides being costly, this procedure is time consuming. If using the international UIC line through Le Perthus tunnel, the gauge change is avoided but high tariffs are set by TP Ferro\(^{20}\). The international route hosts regular passengers (TGV) and

\(^{20}\)This company is the concessionaire of the high-speed line segment between Spain and France until 2056. It built, manages and maintains a 44.4 km line segment from Llers (Spain) to Le Soler (France) including the
freight services with 750 m long trains permitted. Thus, it stands as the first interoperable connection between the Iberian Peninsula and the rest of Europe becoming a major breakthrough for TEN-T. This segment is connected to ADIF\textsuperscript{21} Spanish railway network at its South end and to the RFF French railway network at its North end. One of the main responsible for the high cost is the topographic slope. However, further operational constraints increase the rail freight cost between Spain and France. Appendix A 6 shows the current lack of harmonisation in terms of signalling (3 systems), electric power (3 tensions) and some constraints in gradients along the section (Secchi, 2012). In fact, 1.8 % gradient slope close to the border require freight trains to use 2 locomotives (unlike in Port Bou with 1.5 % slope) as to guarantee enough traction (TP Ferro, 2014). All these factors make rail freight transport less competitive towards the road. According to the Head of COMSA Rail Transport, Miquel Llevat: "the problem of rail freight in Spain is not about infrastructure supply but management and operational procedures. Rail freight will only be competitive when it is able to provide a cheaper cost than the road and create benefit for the companies operating the service." (Llevat, 2014). A much more detailed map of the border region is available in Appendix A 7.

Closer to the Metropolitan Area of Barcelona, freight trains use different rail segments both in UIC and Iberian gauge as the colours from the map indicate. Several key infrastructures are allocated along the corridor.

\textsuperscript{8.25 km long Le Perthus tunnel. The line has been built full according to the technical specifications for European rail interoperability (TS.I.), 350 km/h max speed, 25 kV electrification and ERTMS Level 2 signalling system. As for the tariffs, TP Ferro charges 59 EUR for a single capacity allocation in the freight segment. If it is an urgent service, the cost raises up to 282 EUR. Additional initial charges increase the total cost in 589.57 EUR for a wagon freight train (TP Ferro, 2014).

\textsuperscript{21} Public entity with non-financial character subjected to the Spanish Ministry of Public Works. It is responsible for the building, managing and maintaining of the national railway system.
Figure 25  Infrastructures along Corridor 3

Source: Own elaboration based on different sources
Airports

Airports are an example. Airfreight cargo is a segment with a high potential growth in the future. It is the only transport mode, together with rail, experiencing growth in freight volume transported from 2012 to 2013 (+3.2 %) (CIMALSA, 2014). Only airports which are part of AENA\textsuperscript{22}, the national airport management agency, were considered. Barcelona El Prat Airport managed 100’000 t, ranking as the second airfreight hub behind Madrid Barajas (AENA, 2014). The two most intensive destinations are Europe (53% of total traffic) and the Middle East (24 % of total traffic), the last having grown by 70% in the period 2012-2013 (CIMALSA, 2014). Girona airport managed only 45 t. In France, Perpignan-Rivesaltes Airport has a negligible airfreight volume of fresh products (Beans from Burkina-Faso, artichokes from Egypt or Litchis from Madagascar). The cargo terminal of the French airport is currently under development (Saint Charles International, 2014).

Ports

Some seaports are also placed along the corridor between Barcelona and Perpignan. In the French part the Port Vendres supplies mainly fresh and vegetable products, proceeding from the Mahgreb, to Saint Charles International terminal\textsuperscript{23}.

As seen in section 2.4.1, the Port of Barcelona handled 1.7 mio. TEU and over 41.3 mio. t in 2013. This figure follows the declined trend experienced since the past 4 years (CIMALSA, 2014). However data records show an increase in 8 % of the total tonnage handled in the Port of Barcelona during the first 5 month of 2014 compared to the same period in 2013. This could imply a start of a change in the trend observed during the recent years.

The Catalan port has also increase its hinterland market in the past year. In fact the recent data for the TEU destinations show that the highest growth (2012-2013) were experienced towards Algeciras (+134 %) and Perpignan (+125 %). Figure 26 also provides facts on the declining importance of the route Barcelona-Port Bou, against the high-speed line through Le Perthus. Indeed, the traffic through Port Bou experienced a decline of 46 % in the period 2012-2013.

\textsuperscript{22} Public entity subjected to the Spanish Ministry of Public Works that owns and operates the majority of Spanish airports besides Ciudad Real and Lleida. It is responsible for the air traffic control.

\textsuperscript{23} The European leading terminal for fresh and vegetable products located in Perpignan, France (Ifreight MED, 2013). It handled 1’500’000 t in 2013 (Saint Charles International, 2014).
The importance of TEU traffic in the current sea freight logistic sector, already highlighted in section 2.2.3, is also reflected in the rail freight type development in the Port of Barcelona. Figure 27 shows TEU traffic growth as the highest among the main cargo types. Furthermore, this commodity has been much more resilient to the economic crisis in contrast to Bulk or Vehicle cargo.

Source: “The Logistics Observatory. Indicators of competitiveness for the Catalan Logistics system (9th edition)” (CIMALSA, 2014)
TEU export shares rose considerable as to counterbalance the weakened Spanish internal market during crisis years, (refer to Figure 28). Furthermore, the difference between the volume of goods imported and exported reducing and thus consolidating the growth trend of exports managed by the port logistic system. Indeed, during the last 8 years, full-containerised exports have gone from being 25 % less than imports to being 50 % more than imports.

Figure 28   TEU Exports vs. Imports

![TEU Exports vs. Imports](image)

Source: “The Logistics Observatory. Indicators of competitiveness for the Catalan Logistics system (9th edition)” (CIMALSA, 2014)

Inland Terminals

Last but not least, the inland logistic platforms are looked at more closely as they represent they represent the choice focus of the research. Back to Error! Reference source not found. three logistic platforms have been highlighted in red. These platforms are among the 52 defined by the Ministry of Public Works on a national level to be developed with priority character in the next 10 years (Ministry of Public Works, Spain, 2013b). Further details can be found in Appendix A 8:

- **Far Empordá**: Located in the municipality of “El Far d’Empordá” 30 km from the French border, this terminal is under planning by the TIE S.L, the Empordá Intermod-
al Terminal, with the participation of the Port of Barcelona (48 %) and CIMALSA (52 %). The terminal will be located next to the existing Empordá International Industrial Complex, 5 km South from Figueres municipality. Expert information reveals that the terminal is being planned exclusively for the private automobile sector (Batlle, 2014). Thus, freight being handled in the future terminal will not proceed from the Port of Barcelona but from private factories located in the Iberian Peninsula (Torrent, 2014). The automobile sector will use this platform as an intermediate stop to export towards North Europe. Furthermore is the consumer market in the area very week compared to the Metropolitan Region of Barcelona (refer to Figure 29). Thereby has the Port of Barcelona little interest in using this platform as an inland terminal. A weak consumer markets in the surroundings difficult the intermodal process to allow freight distribution in the region (Abengochea, 2014). Currently and as a response to the economic contraction of the last years, the project is being phased. The total budget is set to 113.6 mio. EUR (Department of Territory and Sustainability, Catalonia, 2014c).

• **El Vallés:** El Vallés terminal is a priority project for the Central Government to convert the current La Llagosta terminal into an intermodal platform. It is located in the Metropolitan Region of Barcelona, 40 km away from the Port of Barcelona. The consumer market in the area is very strong due to the vicinity to the Catalan capital. 25 mio. EUR are calculated to be necessary for the terminal conversion (Department of Territory and Sustainability, Catalonia, 2014c). Although currently being called “La Llagosta”, the here presented project will refer to this terminal as “El Vallés” as this is the administrative name given by the Ministry of Public Works in the planning documents for the future intermodal platform (Ministry of Public Works, Spain, 2010).

• **El Llobregat:** El Llobregat terminal is the new multipurpose platform planned on the old riverbank of El Llobregat River. As a consequence of the new BEST container terminal, the Port of Barcelona and the Ministry of Public Works are planning a Rolling Highway terminal which in the future can be extended as container hub. From the three mentioned platforms, it is the most viable to be realized in the short term as the UIC rail access project has been started in December 2014 (Ministry of Public Works, Spain, 2014a). The budget is set to reach 235 mio. EUR (Department of Territory and Sustainability, Catalonia, 2014c).

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24 Public owned company subjected to the Government of Catalonia, responsible for planning and managing logistic platforms in the Catalan territory. Nowadays there are 6 centers operating and 4 under planning.

25 The river was diverted in 2008 to allow a further port expansion towards South.
The three terminals are pointed with a black dot on Figure 29. Regarding the consumer market and the infrastructure layout, several facts can be outlined:

- The three terminals have rail access being located along the main rail corridor. However El Llobregat terminal is slightly offset from the main freight flows between Spain and Europe as trains have to do a 20 km dead end rail segment. Moreover only El Llobregat terminal accounts with (temporary) MIX rail connection. The other two have only IB tracks.

- Both Population density and GDP/inh. is higher in the terminals located closer to Barcelona. Density and GDP/inh. is 82 % and 9 % higher than in Far Empordá terminal, respectively.

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26 Network configuration in which the entrance and exit movements occur at the same place.
On the basis of these considerations and aiming to choose one of the terminals for the future proposal, several conclusions have been extracted:

- Far Empordá terminal is discarded. As already indicated, this terminal will serve the private automobile sector from the Iberian Peninsula. Due to the weak consumer market from the region, the Port of Barcelona is not interested in using the platform as an inland terminal as regional distribution is not guaranteed.

- El Llobregat terminal is also discarded since it is in a very advanced planning stage (Llevat, 2014). Moreover, the Port of Barcelona is reticent to facilitate information about the current project as they claim confidentiality is a key to guarantee a successful outcome (Roman, 2014).

- El Vallés terminal is chosen as the future proposal to be developed in this research study. Main reasons are its strategic position along the Corridor 3, the ease of data through different sources and the potential to serve not only the Port of Barcelona but also the Metropolitan Region of Barcelona. Moreover, its consumer market is strong as revealed in Figure 29. Further details are explained in the next chapter.

### 4.3 El Vallés intermodal terminal

This chapter deals with the specific proposal aiming to improve the hinterland of the Port of Barcelona. As the on-going project for this terminal is not revealed, a personal analysis will be conducted in order to determine the most feasible terminal conversion.

For this purpose and as a first step, the current situation of the terminal both in a Metropolitan- and Municipal level will be given. Second, the planning system in the different administration levels will be analysed as to identify the constraints and procedures needed to implement the project. Third, a brief stakeholder analyses will identify the main relevant actors in the future of the terminal and their interest with regards to the logistic development.

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27 Among others: La Llagosta City Hall, Santa Perpetua de Mogoda City Hall, ADIF, RENFE, Government of Catalonia, Port of Barcelona, Cerda Institut, SEAT, FERRMED
4.3.1 Current state

Metropolitan level

The proposed terminal is located in the municipality of La Llagosta, 17 km North from Barcelona. With a population of 13’721 inh. and an area of 3.3 km², it is one of the 166 municipalities forming the Metropolitan Region of Barcelona (RMB). This region is in turn one of the six functional ambits or planning regions (from 2001, seven\textsuperscript{28}) which were set by the approved General Territorial Plan of Catalonia back in 1995 (Department of Territory and Sustainability, 1995) and visible in Figure 30 on the bottom right side.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure30.png}
\caption{El Vallés Terminal Location within the Metropolitan Region}
\end{figure}

Source: “Metropolitan Territorial Plan of Barcelona 2010” (Department of Territory and Sustainability, Catalonia, 2010) \textit{with own modifications}

\begin{footnotesize}
\textsuperscript{28} The General Territorial Plan of Catalonia was modified through the law 24/2001 in order to recognize “Alto Pirineo” and “Aran” as a new functional ambit differentiated from the “Poniente” ambit.
\end{footnotesize}
The terminal locates itself along the rail corridor (Corridor 3) linking the Iberian Peninsula with Europe. Figure 31 indicates the rail lines currently being used by freight trains between the rest of Spain, Barcelona and Europe.

Figure 31   Infrastructures in the Metropolitan Region of Barcelona

Source: “Metropolitan Territorial Plan of Barcelona 2010” (Department of Territory and Sustainability, Catalonia, 2010) with own modifications

The terminal locates on the splitting point between the IB-, the UIC - and the MIX rail lines. The distances from the platform to several key destinations as follows:

- To the Port of Barcelona: 40 km

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29 The freight track running on the North of Barcelona was opened in 1987 as a means to avoid freight services crossing the city of Barcelona. From 2010, the MIX track was opened enabling all kinds of trains to flow from Spain to Europe (La Vanguardia, 2007).

30 Based on Google Maps, hence on road routes.
• To Madrid Coslada Terminal\(^{31}\): 600 km

• To the Port of Valencia: 360 km

• To Saint Charles International Terminal: 170 km

Several other logistic terminals operate currently in the RMB. For this purpose the two main actors for these infrastructures have been considered: ADIF and CIMALSA:

• 9 terminals owned and operated by ADIF, indicated in green: Barcelona-Can Tunis, Barcelona-Morrot, Castellbisbal, Granollers Mercaderies, Martorell SEAT, La Llagosta/El Vallés (in red), Manresa, Martorell and Montcada - Bifurcacio. All of these terminals have rail access. The first 5 are defined as “Freight Main Logistics Facilities” (ADIF, 2014a).

• 1 terminal owned and operated by CIMALSA, indicated in black: CIM Vallés. This logistic platform, 44.2 ha wide and located 3 km North from El Vallés terminal, is specialized in high-rotation logistics activity, inducing 240'000 vehicles per month in its perimeter. Although having only road access, it is the most important platform in Catalonia and especially in the Metropolitan Region of Barcelona (CIM Vallés, 2014).

Certainly, there is an expected correlation between the land use and the infrastructures deployed on the territory. The interrelation can be noticed given the industrial land provision. As shown in Figure 31, most of the industrial land (in violet) locates along the road- and rail corridor. It can be derived that the majority of industrial activity concentrates in the “first crown” of Barcelona City, from which El Vallés terminal is key part. Moreover a second industrial hub emerges in the South of the capital. This second centre overlaps with the port- and airport sites. These areas induce a high degree of industrial and logistic activity and hence become strategic both for the city and the region.

The job density in different sectors is also a reliable indicator about the activity in a given territory. Figure 32 shows the job density in the RMB regarding the service, agricultural, industry and construction sector. The area around the terminal is predominantly strong in industry sector with an average job density of 40 % from the total job supply. As expected, reaches only 20 % in the service sector. The city of Barcelona, a clear service oriented urban centre, accounts with more than 65 % job service density (Department of Territory and Sustainability, Catalonia, 2010). On behalf of the South hub is the proportion of total job in services over 65

\(^{31}\) One of Spanish most significant inland port terminals connected to the sea hubs of Barcelona, Valencia, Algeciras and Bilbao. 60'265 TEU handled in 2013 (Dry Port of Madrid, 2013).
%. The industry sector is only represented in the port area with an average of 20% of the total job offer. In fact, ports and airports areas are service oriented regions in which the logistic offer is much more represented than the industrial (Acebillo, 2014).

Figure 32  Job Density in Different Sectors

Source: “Metropolitan Territorial Plan of Barcelona 2010” (Department of Territory and Sustainability, Catalonia, 2010) with own modifications

Such a high concentration of industrial and logistic activity, together with the high density of population, provoke high levels of traffic congestion. Figure 33 illustrates the traffic flow charters in both highways and conventional roads.
It can be noticed that the road segment from the here-analysed terminal to the Port of Barcelona (road B-30, B-23, A-2) is one of the most congested. Freight trucks mix with passenger vehicles inducing an average of 80,000 vehicles/day (Data for 2005). The high congestion on this segment is highlighted by the prohibition of heavy trucks to drive through the B-10 ring-road of Barcelona City. Other arteries such as the highway AP-7 traversing the Metropolitan Region from South-West to North-East support an average congestion of 90,000 vehicles/day. (Cerda Institut, 2014a).

On the basis of these considerations, the following can be stated:

- Two main industrial and logistic poles exist in the Metropolitan Region of Barcelona. The first cluster locates along the “first crown” of the capital, following the rail Corridor 3. The second industrial concentration appears South from Barcelona, matching with the logistic-intensive activities of the port and airport.
Due to its regional and international importance, Barcelona, as a consumer market, provokes a load break from a logistic point of view. This implies a differentiation between the North and the South system (Acebillo, 2014).

The above mentioned logistic platforms have to cope with the two differentiated logistic systems: El Vallés terminal, North from Barcelona and acting as gateway support for freight between Barcelona and Europe; El Llobregat terminal, South from Barcelona in the port area and responsible for freight between Barcelona and the rest of Spain.

**Municipal level**

In a municipal level, El Vallés terminal appears as a striking 12.4 ha flat platform on the West edge of La Llagosta municipality. It is located next to an industrial complex of 33 ha. In fact only the industrial cluster and the automobile platform occupy 10 % and 3.7 % of the total municipal land, respectively\(^{32}\).

\(^{32}\) Based on “Google Maps Area Calculator Tool” (Daft Logic, 2014).
The map in the next page shows the current use of the terminal, i.e. an automobile storage. Moreover, the three zones in which the here proposed project develops are identified. For details on the land use classification, please refer to Appendix A 11.
Figure 35   El Vallés Terminal – Current state

Source: Own elaboration
• **Zone A**: 9.5 ha of land located in two municipalities. The area in Montcada i Reixac municipality is classified as “Non-Urban Land” with the qualification of “Green and Open Space System – SV” (Barcelona County Council, 2014). Private people own it. The plot on the municipality of La Llagosta is classified as “Non-Urban Land” with the qualification of “Technical and Environmental Services – ST” (Barcelona County Council, 2014). It is used as a parking area serving trailers running between Spain and France. The municipality owns it.

• **Zone B**: The current and operating La Llagosta terminal. Land is owned by ADIF and classified as “Non-Urban Land” with the qualification of “Railway System – SF” (Barcelona County Council, 2014). RENFE has the beneficial right for the terminal exploitation. At the same time it rents two areas of the terminal, to Pecovasa and Transfesa. The rail operations are done by RENFE under a self provision scheme to its branch LOGIRAIL. Totally there are 12 ha and 8'400 car spots are available. Cars arrive by rail on the East edge of Zone B on 8 IB rail-tracks connected to the MIX gauge line towards the Port of Barcelona and the rest of Spain. Further details to the rail links will be provided in the next pages.

• **Zone C**: 9 ha of unoccupied land. It is classified as “Non-Urban Land” with the qualification of “Rural - N1” and owned by the municipality of La Llagosta. On it, ADIF predicts a logistic centre as a continuation of the current automobile platform and as part of the terminal conversion. However, and based on the Catalan Agency of Water (ACA), is Zone C under flooding risk with a 50 years return probability (Catalan Agency of Water, 2013) (refer to Appendix A 12). Moreover, the PDU “Riera de Caldes South Axis” (in Catalan) foresees a logistic development between Zone C and the CIM Vallés (Department of Territory and Sustainability, Catalonia, 2014a). Both the

33 COMSA Rail Transport evaluated the possibility of building a new Rolling Highway terminal on this area (COMSA Rail Transport, 2013).


35 In the Spanish Planning System, the land qualification assigns to the territory uses and building normatives defining both the rights and duties on each. Each use is represented by a code, e.g. “Industrial - A1”, “Rural - N1” or “Railway System – SF”.

36 LOGIRAIL is a branch part of RENFE freight department. It constitutes in 2009 with the aim of providing integral logistic services on land transport in Spain with the aim of increasing the rail freight competitiveness in the logistic supply chain. Along El Vallés terminal, the company manages 3 other terminals in the Spanish Peninsula.

37 Public owned entity subjected to the Department of Territory and Sustainability of the Government of Catalonia with full competences in all the Catalan watersheds. It is responsible for the implementation of the regional policies concerning the water sector.
Government of Catalonia and the municipalities in the surrounding have an active interest in developing it (Armengol, 2014) (Macias, 2014). However, Setram Park\textsuperscript{38} owns and operates a 20 ha automobile storage classified as “Urban Land” with the qualification of “Industrial - A1” (Barcelona County Council, 2014). It is located in Santa Perpetua de Mogoda municipality and based on stakeholder conversations, none of the responsible for the above mentioned PDU contacted them in order to discuss about the land rights and the project implementation, which currently ignores the cited automobile storage platform (Gonzalez, 2014).

For purposes of accessibility, the terminal is connected by 8 tracks to the rest of the network. Figure 36 provides a detailed rail topology in the surroundings. Again, the colours indicate the rail gauge deployed. T\textsubscript{}1 – 8 in IB gauge are the lines used for load/unload automobiles. All the tracks in the shown network are electrified (ADIF, 2014b). El Vallés terminal is connected by two ways to the national rail system:

- Connected to the conventional rail network\textsuperscript{39} through R\textsubscript{}4, 5. These lines serve the regional line “R2” running from Castelldefels to Granollers and the “R2Nord” running from the Airport to Macanet. The frequency ranges from 1 h to 11 min from 05:49 to 00:22 (RENFE, 2014). Appendix A 10 shows the integrated railway network in the RMB.

- Connected to the MIX rail line R\textsubscript{}1, 2. From the terminal until Castellbisbal (refer to Appendix A 10) the lines support both passenger and freight services. In fact from Castellbisbal to the terminals surroundings both freight and regional line “R8” use the tracks. This line runs from 06:34 until 21:41 with a frequency of 6 min (RENFE, 2014). From Castellbisbal until the Port of Barcelona, freight trains run on two exclusive tracks (Department of Territory and Sustainability, Catalonia, 2014c).

\textsuperscript{38} Founded in 1988 and part of Setram Group. Setram Park owns an automobile storage site with 8’000 car spots capacity.

\textsuperscript{39} Defined by ADIF as rail lines which does not meet the technical requirements for High-Speed services, thus with IB gauge. (ADIF, 2014a).
Several freight services run through the above visible topology. Based on Figure 24 several conclusions regarding train services per week have been outlined:

- 20 freight services passing through the MIX rail R_1, 2, the IB rail R_4, 5 and the UIC HS_3, 4. Several commodities are transported as TEU, automobiles and bulk cargo.

- From the 20 services, 3 TEU trains run between the port and France using the MIX R_1, 2 and linking with the UIC line HS_1, 2, 3, 4.

- The 17 remaining services run between the rest of Spain and the North\(^\text{40}\) using also the MIX R_1, 2 but diverting to the IB R_4, 5. 4 from these 17 services have as origin/destination the El Vallés terminal, transporting automobile cargo.

\(^{40}\) From now on, “North” intended as origin/destinations further North from El Vallés terminal.
As it can be noticed, the terminal has no MIX track connection towards the rest of the railway network. The MIX track arrives until the terminal but does not reach the 8 terminal tracks. It lacks both the connection to the MIX line R_1, 2 and with the HS_1, 2 towards France. The high-speed line coming along the axis Paris – Perpignan – Barcelona – Madrid splits in the surroundings of the terminal. Lines HS_1, 2 are exclusively for passenger on the above-mentioned axis. On the contrary HS_3, _4 are only used by freight trains running between Spain and North Europe and thus merging with the MIX lines R_1, 2.

Freight trains coming from Europe use both UIC and IB line as indicated in section 4.2. If using the IB line, trains will pass through Montmeló and Mollet St. Fost on R_4. After unloading in El Vallés terminal, trains continue their path on the MIX line R_1 towards the Port of Barcelona or the rest of Spain.

Freight trains coming from Europe on the UIC line HS_1 are not able to connect to the terminal as deducted from Figure 36. HS_3, 4 only allow trains a direct link to the Port and the rest of Spain.

Besides the technical characteristics described above, also the institutional framework is key to understand the formal- and informal procedures available in the current system for a terminal conversion.

4.3.2 Institutional analysis

Here, a brief overview of the Spanish planning system is presented. Specifically the territorial- and infrastructure planning will be looked into more detail, as the future interventions will deal with both sectors. Moreover, it will be shown in which relevant planning documents is El Vallés terminal included as a project to take into consideration. Within the regional level, only the case of Catalonia will be considered. The next figure provides a graphical overview into the Spanish planning system. The entities responsible for the planning draft are the following:

- NATIONAL: Ministry of Public Works. Within it, several departments such as the “General Secretary for Infrastructures”, the “General Secretary for Transports” and the “General Direction for Architecture, Housing and Land” collaborate to develop the here presented plans (Ministry of Public Works, Spain, 2014b).

- REGIONAL: Department of Territory and Sustainability. Within it several sections such as “General Secretary for Territory and Sustainability” or the “Secretary for In-
strastructures and mobility” work together aiming to draft the here mentioned plans (Department of Territory and Sustainability, Catalonia, 2014b).

- LOCAL: Depending on the range of the plan, different entities are involved. From municipalities such as Barcelona or La Llagosta to supra-municipal organizations such as the “Metropolitan Area of Barcelona” or the “Riera de Caldes”.

Figure 37  Spanish planning system

![Spanish planning system diagram](attachment:image)

Source: Own elaboration based on “General Urban Planning” (Urba Web, 2010a)

**National level**

After the end of Franco’s dictatorship in 1975, the competences for territorial planning, urbanism and housing where fully transferred to the 17 Autonomous Communities (AACC) within the Spanish Constitution of 1978. Thus, has nowadays the Spanish Government no compe-
tences in territorial planning. The State keeps competences for developing the economic poli-
cies, which support the territorial development in a general way. However it has fully compe-
tences in the infrastructure planning of railway and highways of general interest. Regarding
the railway infrastructure, which is the one dealt in this project, is competence of ADIF,
which in turn is subjected to the Ministry of Public Works. Competences are still in State lev-
el for sectorial policies, which might have impact in the overall territory (Government of
Spain, 2003). Following, the main planning tools will be outlined:

- The highest legal text managing the land is the “Land Law” (LS), which was first
  promulgated in 1956 experiencing posterior reforms in 1975 and 2008. It defines the
  legal framework on which the land rights can be traded and handled. Legal procedures
  such as expropriations, land value evaluation or land plot definition are described in
  this text. All subsequent planning documents which will be mentioned have to respect
  the legal framework define by the LS (Ministry of Housing, 2008).

- The “Strategic Plans” (PE) are indications and proposals but have no binding charac-
ter. The “Plan for Infrastructures, Transport and Housing” (PITVI) is the main plan-
ning tool released by the Ministry of Public Works for the period from 2012 to 2024.
  Among others, the main proposals and interventions in the infrastructure and logistic
  sector are drawn. The “Logistic Strategy” (EL) is another planning document released
  by the Ministry of Public Works in 2013. It sets the main guidelines to increase the
  competitiveness of the Spanish logistic sector. As the PITVI, the plan provides only
  indications and proposals for the future (Ministry of Public Works, Spain, 2013b).

The project of El Vallés terminal is mentioned in the next planning documents:

- PITVI: The Ministry of Public Works, responsible for drafting the PITVI, has defined
  52 logistic platforms in Spain, which have to be developed with priority character in
  the next 10 years. The entity included 4 in Catalonia, being one of those El Vallés
  terminal (Ministry of Public Works, Spain, 2013b).

  The plan, besides giving priority to logistic platforms located along TEN-T corridors,
  also strives to adapt the current nodal infrastructures to comply with interoperability
  requirements such as 750 m long sidings, 22 t of load per rail axis or 25 kV for electric
  supply on rail lines (Ministry of Public Works, Spain, 2013b). These considerations,
  especially the requirement of 750 m long meter sidings tracks are relevant for the pro-
  posed interventions.
• LS: Although mentioning the PITVI plan, it also classifies the terminal as a priority project for the Government (Ministry of Public Works, Spain, 2013a). Moreover, and as in the PITVI, 750 m long sidings and UIC adaptations are advised (Ministry of Public Works, Spain, 2013a).

Collaboration at national level is present in different terms. Within the Ministry of Public Works, the before mentioned “Secretaries” work together aiming to submit plans and development strategies. At the same time, the Ministry of Public Works is coordinated with the Ministry of Economy and the Ministry of Finance as to ensure the viability of the State General Budgets.

**Regional level**

Due to the previously mentioned competence transfer from the State to the Autonomous Communities, every region\(^{41}\) has developed its own urban and territorial legislation from this date onwards. The first Autonomic Law of Territorial Planning (Catalan Government, 1983) occurred in Catalonia in 1983 releasing the first “General Territorial Plan of Catalonia” (GTPC) in 1995. Basque Land and Asturias have also developed its own. The rest of the regions, besides Castilla-Leon, La Rioja, Extremadura and Castilla-La Mancha, have an approved Territorial Planning Legislation but the “General Territorial Plan” (GTP) is still in process. The relation between different plans is made on the basis of two principles (Urban Web, 2010a):

1. The principle of hierarchy and coherence (art. 13), which implies that plans with an inferior position have to respect and adapt to the higher plans. Also “Urban Masterplans” (PDU) have to be coherent with the determinations of the PTGC, PTP and PTS.

2. The principle of competence regulates the decision making process in case of multiple public interests. All interests have to be analysed and evaluated through binding reports.

Focusing in Catalonia, the planning categories are outlined:

• The first and most relevant category is the mentioned “General Territorial Plan” (PTG). It aims to balance the territory in terms of economic growth fostering an improvement in the level of life. The specific planning document is the “General Territorial Plan of Catalonia” (PTGC) (art. 5.1, Law 1/1995). It defines the spaces and natural areas to be preserved and the space provision for future infrastructures. It also divides

\(^{41}\) The “region” as administrative level is equivalent to the before mentioned 17 AACC.
the Catalan territory into six (from 2001 on, seven) planning ambits from which the RMB is one (refer to Figure 30). This plan follows the legal framework of the 1983 approved Territorial Legislation. The 3 next categories act under the PTGC and hence have to be coherent with the territorial guidelines set by this instrument.

- The “Partial Territorial Plan” (PTP) is placed one level below. There are seven PTP in Catalonia, one for each of the seven planning ambits. This plan defines the goals to balance the territory and the framework in which actions have to take place. All the sectors are analysed (housing, demography, infrastructures, transports, etc.). A relevant planning document under this category is the “Metropolitan Territorial Plan of Barcelona” (PTMB). This Plan is the main instrument for setting the guidelines of urban and transport development in the RMB. It has binding character for the lower plans.

- At the same level of the PTP is the “Director Territorial Plan” (PDT), which has a lower range of action than the former. PDT act with a supra-municipal character being able to include in the same plan, municipalities from different planning ambits. There are 3 PDT approved for the area of “L’Empordá”, “Alt Penedes” and “La Garrotxa”.

- The “Sectorial Territorial Plan” (PTS) also acts at the same level as the former 2 categories. There are 10 PTS, which refer to the whole territory analysing a specific sector (i.e. mobility, ski resorts, infrastructures, ports, airports and bicycle mobility). Current plans as the “Masterplan for Mobility in the Metropolitan Region of Barcelona” (PDM), the “Plan for Transport Infrastructures in Catalonia” (PITC) and the “Masterplan for Infrastructures in the Metropolitan Region of Barcelona” (PDI) are part of this category. They analyse transport and logistic infrastructures both in the Metropolitan Area as well as in the Catalan territory. These plans have to be coherent with the guidelines set by the PTG and have binding character for Local authorities.

The project of El Vallés terminal is mentioned in the next planning documents:

- PTMB: The “Metropolitan Territorial Plan of Barcelona” foresees three new intermodal freight stations. Two of them are complying with the Spanish State definition, El Llobregat terminal in the Port of Barcelona and El Vallés terminal, North of the city (Department of Territory and Sustainability, Catalonia, 2010).

- PDM: Within this sectorial plan, the terminal of El Vallés is defined as one of the current intermodal stations, which is being planned. Again, the MIX rail adaptation is required and promoted for the rail freight transport promotion (ATM, 2013).
• PITC: In this document, the current La Llagosta terminal and El Llobregat terminal in are defined as the most strategic rail terminals in Catalonia (Department of Territory and Sustainability, Catalonia, 2006).

• PDI: Regarding the “Masterplan for Infrastructures in the Metropolitan Region of Barcelona” a direct rail connection from El Vallés terminal to the North in MIX gauge is strived (ATM, 2011) in order to improve the freight exchange with Europe.

Also at this level the different sub-sections from the Department of Territory and Sustainability are coordinated for the development of plans. Along this, the mentioned Department follows the guidelines set by the Department of Economy and Knowledge regarding the financial assignments for infrastructures and transport related projects.

**Local level**

The municipal, or local, level is the one implementing most of the physical interventions in urban context. In this case, La Llagosta is the municipality hosting the analysed freight platform.

• The “Urban Masterplan” (PDU) coordinates the urban planning development, concretizing the placement of infrastructures and preserving the non-urban land. The PDU also proposes guidelines for sustainable urban development as well as supra-municipal policies for land- and housing development, which have to be coordinated with the different municipalities involved. This plan respects the guidelines set in the PTMB and defines more in depth the interventions to take. The PTMB defines 12 PDU (Department of Territory and Sustainability, Catalonia, 2010) in the RMB, each of whom is formed by a group of municipalities. The “Riera de Caldes PDU” is the sub ambit in which La Llagosta is integrated. This sub ambit (refer to Figure 30) is formed by 11 municipalities having the highest GDP/inh. in the RMB. A further relevant document is the PDU “Riera de Caldes South Axis” in which the already cited logistic centre between the Zone C and CIM Vallés is outlined.

• The “Municipal Ordering Plan” (POUM) is a further planning instrument, which can include one or more municipalities. Each municipality has one. In it, the classification and qualification of land is outlined. Also the implementation model for urban development is defined as well as the general structure of the territory around the municipality.
• The “Special Plan” (Pesp) is a further legal instrument, which permits to act in built land and introduce modifications set by higher plans. The Pesp, as the PTP, has to respect the general territorial guidelines of the higher PTGC. However, if deployed in a specific an isolated sector, the plan is able to introduce considerable modifications in the higher plan with previous justification. This instrument is highly flexible, eligible for a wide variety of sectors (i.e. land use, urban furniture, infrastructure, heritage, natural protection, etc.). Thus, the Pesp has an almost unlimited range of action but limited in its specificity and precise motivation. Its only limitation is the impossibility of replacing the higher plans as to organize the territory in an integral way. It has been widely used throughout the years since the General Plans are usually revised every 10 to 15 years.

The project of El Vallés terminal is mentioned in the next planning documents:

• PDU “Riera de Caldes South Axis”: In it, a logistic cluster between Zone C and the CIM Vallés is strived (refer to Appendix A 11), although most of the land is classified as “Non-Urban Land” under the category “Rural - N1”. Moreover, Setram Park currently owns 20 ha of industrial land in which it operates an automobile storage site. This is located within the projected site perimeter. The PDU fosters the synergies between the proposed logistic centre and El Vallés terminal.

At the local level, collaboration among entities is also present. Municipalities coordinate with supra-municipal entities for the sake of a consistent plan elaboration. Within the municipalities, different sub sections work together. In the Barcelona City Hall, the “Management for Territorial Coordination”, the “Management for Strategic Plans” and the “Management for Economy, Company and Employment” work under coordination.

These planning tools represent the interest of key stakeholders involved in both territorial and regional planning development. El Vallés terminal is not an exception to this. Therefore, a detailed stakeholder analysis provides a hint on the most relevant actors in the here presented research.

4.3.3 Stakeholder analysis

In this section the main stakeholders involved both in the operation and management of El Vallés terminal are outlined. For this purpose, only the most relevant actors are included. A much extensive and graphical analysis of further actors can be found in Appendix A 13.
Figure 38 shows the beneficial ownership award\(^{42}\) currently being deployed in the terminal management. In it, RENFE exploits the automobile terminal through third parties contracts. From one side a self provision award\(^{43}\) for the train manoeuvres through its branch LOGI-RAIL. From the other, two lease contracts, tendered to Pecovasa and Transfesa, for the transport operations and automobile storage area.

\(^{42}\) Is a legal term where specific property rights in equity belong to a person (here RENFE) even though the legal title of the property belongs to another person (here, ADIF). This often relates where the legal title owner has implied trustees duties to the beneficial owner. (Ministry of Housing, 2008)

\(^{43}\) Contractual agreement in which the infrastructure administrator permits the rail operators to manage their own rail movements. (Abengochea, 2014)
Following, the most relevant stakeholders are described:

- **ADIF**: The Spanish Railway Manager subjected to the Ministry of Public Work owns the 12.5 ha land where the current automobile storage is placed. In this framework, and acting as infrastructure administrator, ADIF has defined several future scenarios for the possible uses of the freight platform. Although being confidential, an overview of the scenarios has been produced based on interviews and talks with different stakeholders (Cerda Institut, 2014). The results are shown in Appendix A 9.

- **RENFE**: The Spanish Railway operator, also subjected to the Ministry of Public Works, has the beneficial ownership right for the terminal exploitation. ADIF granted it in 2004 for a period of 15 years. RENFE has two further contracts in leasing tender scheme for the automobile transport with Pecovasa and Transfesa.

- **Pecovasa**: Specialized in automobile transport both at national and international level. Being RENFE with 60% stake share its main shareholder, also DB Schenker (15% stock share) and COMSA Rail Transport (15% stock share) are part of the shareholding committee. It currently leases one part of the terminal for automobile storage purpose and acts as one of the two main automobile transport operators. Under the leasing contract scheme, they are responsible for load/unloading of trains, gas supply, automobile managing, storage process as well as freight cleaning.

- **Transfesa**: Part of Transfesa Group, dedicated to carry out all the operations within the logistics chain in order to offer integrated door-to-door services, including transportation, warehousing, final delivery. It currently leases one part of the terminal for automobile storage purpose. The operations are carried out through its subsidiary Semat, from which it holds 63% of shares. Besides the here-analysed terminal, Semat operates in 5 other platforms in Spain (Semat, 2014).

- **LOGIRAIL**: The integrated logistic operator, 100% subjected to RENFE, manages the train operations in self provision scheme. Under this scheme, it is responsible for the train formation and train manoeuvres within the terminal.

- **External experts**: Represented by COMSA Rail Transport, this sector acknowledges the load break induced by the consumer market of the Catalan capital. As a consequence, a terminal in the North managing the trade between Barcelona and Europe is
positively seen as a means to consolidate – deconsolidate load. However, the poor economic development together with the huge over expenditure in infrastructures followed in the last 15 years by the Spanish State make it difficult to proceed with the complete logistic development planned until the date (Llevat, 2014).

- **Port of Barcelona:** The port is currently not involved in the freight supply to the terminal (refer to Figure 24). However, and after conversations with experts (Torrent, 2014), it is potentially interested in the allocation of an inland terminal in El Vallés if sea freight traffic grows considerably. In that case, the Port would use the new terminal as platform to increase its port capacity. Both Barcelona City Hall and the port itself are interested in stepwise dismantling Morrot terminal located in the port (refer to Figure 31) as a means to gain land for urban development. The freight being handled there can be absorbed by El Vallés terminal in the future. However, the new BEST container terminal in the Port of Barcelona is projected with a maximum capacity of 5 mio. TEU. With the current economic and trade prospects, experts affirm to reach the ports capacity not before 2035 (Bassols, 2014).

- **Ministry of Public Works:** Spanish Ministry with fully competences in planning of railway, highway and port infrastructures of general interest in Spain. As part of the Ministry, the State Secretary for Infrastructures, Transport and Housing is the specific entity, responsible for planning the above-mentioned sectors. As such, they are competent in approving any modifications deployed in infrastructures of general interest (ports, logistic terminals, national rail- and highway network, etc.). The public institution defined El Vallés intermodal terminal as a priority logistic platform to develop until 2024. Being ADIF subjected to this public institution, the Ministry will be the last one in the decision making process regarding the future of the terminal.

- **Government of Catalonia:** The regional authority is responsible for drafting several plans as the “General Territorial Plan” (PTG) or the “Partial Territorial Plan” (PTP), which among others; set the guidelines in spatial-, transport- and infrastructure development in the Catalan region. This authority will be the one competent to approve any modification in the current planning documents. The Department for Territory and Sustainability is conducting the project foreseeing the implementation of a logistic centre between Zone C and CIM Vallés (refer to Appendix A 11) and crystalized in the PDU “Riera de Caldes South Axis”.

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44 In logistics supply chain, consolidation procedures are implemented when concentrating several shipping calls in one, as to reduce transport costs. Deconsolidation occurs when de-concentrating the freight from a big shipment in order to distribute it.
• **La Llagosta City Hall:** It is the municipality hosting the terminal and as such the competent administration for the development of the PDU of La Llagosta. If willing to change the land classification within municipal limits, this local administration will need to release permission for it. The municipality together with the “Riera de Caldes” group are also striving for the logistic centre implementation between Zone C and CIM Vallès. Members of the La Llagosta City Hall argue that ADIF is only interested in creating an intermodal platform in the current infrastructure without further developing the logistic sector in the area. In their opinion, only a logistic centre will bring job positions and add value in the region (Macias, 2014; Feiner, 2014).

The here outlined institutional and stakeholder analyses show a variety of interest among stakeholder. According stakeholders conversations it can be derived that mutual collaboration is currently lacking. More precisely, ADIF (representative of the Spanish Government) rarely meets to discuss with the municipality of La Llagosta. Also the Catalan Government would like to have a much fluid relation with ADIF regarding the project implementation. The PDU “Riera de Caldes South Axis” and the “High Scenario” set by ADIF (refer to Appendix A 9) collide in Zone C.

This analysis, along with the institutional analysis, form the base on which to state the proposals following now.

### 4.4 Proposal

This subchapter presents the possible scenarios for the future terminal. The time horizon is set from 2025 onwards. This is based on the low scenario presented in 2.2.1. in which Spain is expected to reach pre-crisis GDP growth rates from 2025 on. In a first step, three main strategic roles for the terminal are described as well as terminal interventions are argued. In a second step the scenarios are outlined. In it, two scenarios for the terminal conversion are presented (Scenarios A) along with two further scenarios for the rail link connection in MIX gauge (Scenarios B).
1. **North Logistic Hub**: Stakeholder conversations have revealed the desire of concentrating the whole logistic and industrial activity of the North metropolitan area in one hub (Armengol, 2014; Abengochea, 2014). El Vallés terminal can absorb the TEU traffic from Granollers\(^\text{45}\) situated 13 km away. The infrastructure is next to the passenger rail station and thus 2.8 ha of land could be liberated for future urban development (refer to Appendix A 14). Therefore, and as mentioned before, two main logistic platforms will consolidate the RMB: El Llobregat, South from Barcelona and aiming to manage traffics between Barcelona and Spain and El Vallés, located North from the Catalan city and assuming the pivot role between Barcelona and Europe.

\(^{45}\) The ADIF owned platform, receives an average of 18’000 annual TEU coming from Ludwigshafen and Belgium (Abengochea, 2014). The main commodities are chemicals as the region hosts several companies from the chemical sector such as Novartis, BASF Construction Chemicals, Petronas Lubricants, Chemetall Group or BEHQ.
2. **Intermodal:** Act as an intermodal platform for freight running along the rail Corridor 3 to be distributed in the North part of the RMB. As seen in section 4.3.1 there are 17 train services per working day on this route. The vicinity to Barcelona, its high population density and high purchase power of its inhabitants shown in Figure 29 support the freight distribution in the region.
3. **Consolidation - Deconsolidation Centre**: The platform will serve as a pivot hub between the port and the main rail corridor running from Spain to France. As confirmed from the Logistic operators (Abengochea, 2014; Llevat, 2014), it has the potential to act as a hub for consolidation and deconsolidation load. In that way, the competitiveness of the hinterland system increases, as rail transporters will be able to avoid the 20 km detour between the port and Castellbisbal.

These roles are subjected to the economic development in the next decades. Given the current economic disruption and the poor forecasts for the next years, an increase in sea freight reaching the ports capacity is highly uncertain to happen in the short term. In fact, stakeholders agree on the good location of the terminal to act as storage place for the port (Torrent, 2014) but acknowledge that for this role to be possible, a considerable increase in sea traffic is needed. In fact the new BEST terminal has a maximum capacity of 5 mio. TEU and hence it is not expected to reach congestion before 2035 (Bassols, 2014). Therefore, is the role of “Port sup-
port” not included in the above mentioned strategic references on which to base following interventions:

- **Terminal conversion:** From the current automobile storage into an intermodal hub capable of receiving containers in order to cope with the above mentioned roles. The base for these proposals will be the stakeholder analysis conducted with different actors during the 4 month research.

- **International rail gauge:** Connection from the terminal to the rest of the rail network. In this intervention, it will be assumed the adaptation of some of the terminal tracks from 1B to MIX gauge (refer to Figure 36) as to allow all kind of trains to use it. Hence, focus will be given to the connection between the terminal tracks and the rest of the network.

In this context and acknowledging the highly volatile and uncertain future, which is expected both in the Spanish as well as in the global context, different scenarios have been developed as a means to cover the whole spectrum of stakeholder interests realized during the research.

### 4.4.1 Scenario A1: Medium Proposal

The first scenario for the conversion combines the current automobile storage with a container area within Zone B. For both activities to be located in this zone, a car park structure is proposed as to save land (currently vehicles are stored on ground).

**Zone A:**

- As trains enter from the North part of the terminal, a manoeuver zone is needed in order for them to access the intermodal platform. Hence, a 1.6 ha for train manoeuvring purpose is required. The 750 m long MIX track is electrified adopting a dead end configuration.

**Zone B:**

- Maintenance of the 8 current tracks. The rail T_4 is converted to MIX gauge linking both the R_2 and the above mentioned manoeuvring track. The rest of the 6 tracks re-
main IB gauge as a means to reduce investments and continue with the automobile transport purpose.

- 2 further MIX tracks are built adjacent to T_8 for container traffic. The tracks measure 750 m in dead end configuration. This form is forced by the two rail link scenarios presented in the next pages.

- The two new MIX tracks serve a 2.3 ha TEU plinth\textsuperscript{46} for TEU managing. The rails are not electrified as reach stackers\textsuperscript{47} manoeuvre the containers. An asphalt adaptation in this area is mandatory in order to support the container weight. Storage capacity is set at 990 TEU.

- Preservation of the automobile car spots with 12.5 ha storage capacity. Due to the new TEU area, a car park with 5.7 ha of total ground floor is included as a means to save land by storing cars vertically.

- Change of the terminal access from the current mid position to the North. The new intermodal tracks along with the future truck flow forces an internal adaptation of the road network.

\textsuperscript{46} Area covering the TEU storage site where intermodal traffic between rail-road occurs. The concrete ground characteristics need to be based on the maximum container weight. (Martinez, 2014)

\textsuperscript{47} The reach stacker is a machine that is used exclusively to move and stack up empty or loaded containers in container yards. It also loads containers onto trailers and unload containers from trailers. (Konecranes Liftrucks AB, 2012)
Figure 42  Scenario A1: Medium

Source: Own elaboration
Requirements

Zone A:

- The 1.6 ha of land for the rail track locates in Montcada i Reixac municipality and is classified as “Non-Urban Land” with the qualification of “Green and Open Space System – SV”. As it is owned by private people and used as garden spots, an expropriation from the Ministry of Public Works is needed. For this expropriation to be successful, the Ministry should first show through a technical and business plan, that the project is feasible. If accepted, the State is able to declare the intervention of “strategic importance both in a regional and national ambit”. The private owners are eligible for opposing but depending on the level and grade of interest shown by the State, the expropriation will follow (Carreras, 2014).

- As a consequence, financial compensations for the private people who own the land are mandatory. The compensation amount is defined by the productivity and use of the land in the expropriation moment. Although very rough, stakeholders estimate an average of 200 EUR/m² (Feiner, 2014).

- A “Special Plan for Infrastructures” is mandatory in order to modify the land use both in the Municipal Ordering Plan of Montcada i Reixac and in the PDU of the Metropolitan Area of Barcelona (Carreras, 2014). The modification has to recognize the land use change from “Green and Open Spaces – SV” to “Railway System – SF”.

Zone B:

- As the land is owned by ADIF with the qualification of “Railway system – SF”, the Spanish railway manager has competences to implement the changes above mentioned (Carreras, 2014). One limitation is the car park building, which cannot exceed the 20 m height. Giving the vicinity to human settlements and as chemical containers will arrive; a decree between the Ministry of Public Works and the Catalan Government regarding security and environmental measures needs to be issued.
### Pro

- Realistic proposal
- Adaptable according to development
- No plan modifications needed for Zone B

### Contra

- 1.6 ha of expropriated land
- Expropriation success not guaranteed
- Big investment

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Scenario A1 is estimated to cost\(^{48}\) between 30 and 44 mio. EUR. Further details can be found in Appendix A 15.

#### 4.4.2 Scenario A2: High

**Proposal**

This scenario foresees a much wider development, adding four intermodal tracks in Zone B. Moreover, and based on ADIF scenarios, a logistic development is included in Zone C.

**Zone A:**

- Same as in Scenario A1.

**Zone B:**

- Regarding the 8 tracks, same as in Scenario A1.
- The intermodal plinth includes 4 MIX tracks adjacent to T_8 for container and intermodal purpose. The 750 m long tracks adopt also a dead end configuration.

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\(^{48}\) The total cost calculations showed in Appendix A 15 are incomplete as not all the financial expenses for the project are included. Due to lack of information the rest of the costs are ignored.
• These four MIX tracks serve a 3.1 ha intermodal plinth for TEU managing. As in the previous case, the rails are not electrified as two gantry cranes\textsuperscript{49} manoeuvre the containers. Same considerations regarding the asphalt adaptation are valid here. Storage capacity is set at 1’650 TEU.

• As in Scenario A1, the automobile car spots are preserved. Hence, a car park with 7.2 ha of total ground floor is included in the site perimeter.

• As in Scenario A1, the access alteration to the North is also proposed.

\textbf{Zone C:}

• 9 ha of logistic development. A road connection over the river between the current terminal and the new logistic centre is deployed. Also a further access from the highway is needed as to allow trucks a direct access to the main road network. Some street branches are proposed in order to connect the different land plots. A mid access from Zone C towards the CIM Vallés is prepared foreseeing a possible connection if the logistic development promoted by the Catalan Government is successful.

\textsuperscript{49}Cranes spanning over several rail tracks and suitable for container lifting. The so called “Rail-Mounted gantry cranes” move along the rail trucks on its own rail system. (TEREX, 2014)
Figure 43  Scenario A2: High

Source: Own elaboration
Requirements

Zone A:

- Same as in Scenario A1.

Zone B:

- Same as in Scenario A1.

Zone C:

- Un-used land classified as “Non-Urban Land” with the qualification of “Rural - N1” and owned by La Llagosta City Hall. Therefore and as in Scenario A1, an expropriation of land from the Ministry of Public Works is necessary (for further details see Scenario A1). However the expropriation in this case might be much more difficult as it is done to the Municipal Administration. In fact, La Llagosta City Hall opposes any development from ADIF in this area as it goes against the PDU “Riera de Caldes South Axis” project (Macias, 2014; Feiner, 2014; Armengol, 2014) promoted by the Catalan authorities.

- If successful, financial compensations would follow to the municipality. Same estimations as in Scenario A1 regarding the expropriations cost are assumed, 200 EUR/m² (Feiner, 2014).

- Similar to Scenario A1, a “Special Plan for Reconversion” is mandatory in order to modify the land use in the Municipal Ordering Plan of La Llagosta. The plan has to recognize the land use change from “Rural - N1” to “Logistic-A3”. This means to convert 9 ha of “Non-Urban Land” into “Urban Land”.

- Having a 50 year return flooding risk (Catalan Agency of Water, 2013) an environmental impact assessment- along a feasibility study needs to be issued in order to ensure the project viability.

---

50 The plan was approved in 1987 and has not been revised since then. Seven modifications from the plan have occurred since its approval.
**Pro** | **Contra**
---|---
More TEU capacity for future growth | 13 ha of expropriated land
No plan modifications needed for Zone B | Expropriation success not guaranteed
Zone C expropriation does not affect used land | In Zone C, expropriation with municipality might be conflictive.
Possible synergies between logistic centers in Zone C and Can Pere development | Flooding risk of 50 year return in Zone C

Scenario A2 is estimated to cost between 64 and 104 mio. EUR. Further details can be found in Appendix A 15.

### 4.4.3 Scenario B1: MIX track

**Proposal**

Scenario B1 foresees the adaptation of 5.6 km from the current IB R_5 track into a MIX rail from El Vallés terminal to right after Montmeló passenger station (refer to Figure 44). After the tunnel, both the high-speed line and the conventional line run parallel on a 30 m wide corridor, fact that permits the deployment of 3 railway switches\(^{51}\) in a short distance. The intervention is carried out exclusively on land category “Railway System – SF”. Therefore the terminal is able to receive/dispatch trains coming-going to North Europe as traffic flow between the HS_1, 2 and the R_3, 4 is possible.

---

\(^{51}\) A „switch“ or „turnout“ is an arrangement of a switch, a frog and closure rails, which diverts rolling stock from one track to another. (Unitrac Railroad Materials Inc., 2012)
Figure 44  Scenario B1: MIX track

Source: Own elaboration
requirements

- for the mix rail deployment, a contractual agreement between the ministry of public works and the catalan department of territory and sustainability is mandatory. the track is both used by freight trains as well as catalan regional services. if the project is approved by both administrations, it is eligible for construction.

- capacity study to determine the slots availability and the possible conflicts between regional lines and freight services is also needed. as pointed out in section 4.2 there are 17 freight services running along the network in a weekly average.

- being the mix rail an adaptation of the current r_5, a study report on the capacity restriction during construction is strived. the frequencies of the current regional lines r2 and r nord should not be affected by the works. thus, it should be proved if frequencies can be maintained by using the ib rail siding next to the station of mollet st. fost.

- although the municipalities affected (mollet del vallés, montmeló) are not eligible for opposition (the intervention takes place in the “rail network of general interest”) a cooperation and mutual agreement on the project is desired.

<table>
<thead>
<tr>
<th>pro</th>
<th>contra</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct link to the north</td>
<td>conflicts with current regional lines r2 and r2 nord</td>
</tr>
<tr>
<td>less time consuming for rail operators</td>
<td>capacity reduction during construction</td>
</tr>
<tr>
<td>increase throughput of existing infrastructure</td>
<td>very high cost</td>
</tr>
<tr>
<td>no expropriation needed as intervened in the current rail infrastructure</td>
<td></td>
</tr>
</tbody>
</table>

scenario b1 is estimated to cost between 18 and 28 mio. EUR. Further details can be found in Appendix A 15.
4.4.4 Scenario B2: UIC track

Proposal

The last scenario regarding rail link might be the most attractive for rail operators. 2 ha of land accommodate a 530 m long UIC track from the T_4 to the HS_2, 3. The link has a 14 m height difference between the current high-speed line and the terminal. The viaduct on the HS_2, 3 runs at 60 m above sea level whereas the terminal tracks are set at 46 m above sea level. This implies a 2.8 % slope for the viaduct towards Zone B. As a consequence, container trains need a much longer brake distance towards El Vallés terminal and thus, the rail tracks located in the intermodal plinth adopt a dead end configuration (Abengochea, 2014).

This intervention is part of the so called, “Mollet Node Project”, aiming to restructure the railway infrastructures between La Llagosta, Mollet del Vallés and Santa Perpetua de Mogoda (ATM, 2011; Armengol, 2014). All rail lines have been completed besides the here mentioned connection. In fact, and in the opinion of Santiago Abengochea, the Ministry of Public Works already foresaw this scenario by starting to build the bifurcation on the HS_3 line towards the T_4. In fact, during a site visit, a 15 m long cantilever was noticed where the proposed link meets the HS_3 line.

---

52 Based on Google Earth.
Figure 45   Scenario B1: UIC track

Source: Own elaboration
Requirements

- The land needed along the viaduct construction is owned by the municipality of La Llagosta. It is classified as “Non-Urban Land” with the qualification of “Rural - N1”. Same as in other scenarios, expropriation from the Ministry of Public Works is mandatory. For this process to be successful, and as indicated in Scenario A1, the Ministry has first to show through a technical and business plan, that the project is feasible. If accepted, the State is able to declare the intervention of “strategic importance both in a regional and national ambit”. The municipality of La Llagosta can oppose the process. Depending on the level and grade of interest shown by the State, the expropriation will follow (Carreras, 2014).

- If the expropriation appears to be eligible, a financial compensation to the municipality is required. Same estimations as in Scenario A1 regarding the expropriations cost are assumed, 200 EUR/m² (Feiner, 2014).

- A “Special Plan for Infrastructures” is mandatory in order to modify the land use both in the Municipal Ordering Plan of La Llagosta. The plan needs to recognize the land use change from “Rural - N1” to “Railway System – SF”. Land classification remains “Non-Urban Land”.

- Again, the 50 year return period of flood (Catalan Agency of Water, 2013) require a technical study for the projects feasibility. In this framework also the geological composition has to be analysed as to ensure the viaduct foundations (Carreras, 2014).

---

<table>
<thead>
<tr>
<th>Pro</th>
<th>Contra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most direct link towards North</td>
<td>2 ha of expropriated land</td>
</tr>
<tr>
<td>No slots conflicts with regional trains</td>
<td>Flooding risk of 50 year return in Zone C</td>
</tr>
<tr>
<td>Less time consuming for trains</td>
<td>Big investment</td>
</tr>
<tr>
<td>No disturbance during construction</td>
<td></td>
</tr>
</tbody>
</table>
Scenario B2 is estimated to cost between 9 and 15 mio. EUR. Further details can be found in Appendix A 15.

4.4.5 Recommendation

After a thorough analysis of possible interventions, the combination of Scenario A1 and Scenario B2 is chosen. Therefore, the Medium scenario together with the UIC track to the viaduct is strived. The total amount, although not complete, is expected to range from 41 to 67 mio. EUR. The main reasons on which this decision is based are listed below:

• Contrary to the High scenario, the Medium scenario for the conversion is retained as the most realistic for the next 10 years. Stakeholder conversations reveal a poor traffic prospect in the next 10 years and hence only the transferring of Granollers activity is necessary in short- to medium term. For this to happen, two tracks with an average of 8 trains per week are enough to absorb the transfer (Abengochea, 2014). Moreover, the high volatility and uncertainty in the global economy forces a “conservative” measure, which is adaptable with time.

• The UIC direct track to the viaduct is already foresaw by both Central and Catalan authorities as it is part of the so called, “Mollet Node Project”. Moreover, construction works do not interfere with operating services.

• The logistic development in Zone C is avoided for the following reasons: 1) the flooding risk defined by the ACA makes it difficult and expensive and 2) it interferes with the PDU “Riera de Caldes South Axis”, in which a logistic development from Zone C to the CIM Vallés is foreseen.

• It is the cheapest combination among all. Due to the present economic situation and the volatile economic scenarios, the most conservative option is recommended.

Finally and on the basis of this combination, several proposals and characteristics for the planning procedure are outlined:

• The time horizon, in which the project is based, shows a dilated process. Its start depends on the economic development. As mentioned before, the low scenario, produced on the basis of IMF economic forecasts (IMF, 2014), predicts a recovery of pre-crisis economic growth from 2025 on. Hence it is assumed that in order for the project to be
possible, a considerable improvement in the Spanish economy and thus, reaches from pre-crisis GDP growth, is mandatory. In fact, high costly processes like expropriations should initiate from 2025 on. Regarding the precise planning procedure, both the viaduct and the manoeuvre track are the first requirement for the project proposal. As a consequence, all construction procedures for the terminal conversion depend weather the planning steps are successful or not. If the tender award for both the viaduct and the manoeuvre track is realized, construction phase can begin. Within it, the car park is the first thing to erect in order to permit the automobile transport operation during the intermodal plinth construction. A collaborative commission steers the whole process. The overall duration is expected to last at least 10 years starting the full operation from 2030 on.

Figure 46  Time Horizon

Source: Own elaboration
The financing is done within a Public-Private Partnership scheme. All expropriation procedures are paid by the public hand, as it is the Ministry of Public Works the competent entity for this process. The track construction from the terminal to the “General Network of Interest” is also financed by the public hand, i.e. the Infrastructure Administrator - ADIF. The rest of the track cost, i.e. the manoeuvre- and terminal tracks is carried by the private operator. Furthermore, this operator is responsible for the costs of the terminal conversion (Zone B), i.e. the intermodal plinth, street construction, the intermodal machinery, urbanizable costs\textsuperscript{53} etc. Therefore, the cost balance is set at 55 % and 45 % for the public and private hand, respectively. Further details can be found in Appendix A 15.

This implies a shift in the management model presented in section 4.3.3. The intermodal activity will be tendered in concession at own risk\textsuperscript{54} to a private operator (Abengochea, 2014). This implies for the private investor to invest in the construction of the intermodal terminal and the management for the rail operations and freight manoeuvres. At the same time, the operator will both receive the revenues and support the possible (unpredicted) costs. Parallel to this, the beneficial ownership award to RENFE is expiring in 2020-2021 (Abengochea, 2014). Therefore, the concession for the TEU terminal exploitation is combined with a leasing tender for the automobile activity. This can occur through a lease of exploitation in public tender (with the infrastructure administrator, ADIF). A further option is a lease of exploitation through concessionaire depending on the concession award specifications of the TEU terminal manager.

\textsuperscript{53} Costs of basic urban services (road, drinkable water, sanitation, electricity supply). General expressed in EUR/m\textsuperscript{2} of road.

\textsuperscript{54} Contractual agreement, in which a public administration awards an entity with the right of exploitation. The entity awarded assumes both benefits and risks in the construction and operation of the work. (Fuentaga Pastor, 2004). This management scheme is the one preferred by ADIF, as the current economic situation jeopardizes public expenditure and hence, a private investor is prioritized (Abengochea, 2014).
Although ADIF is partially able to implement the terminal conversion (both with forced expropriations and with the current legal normative), a collaborative process is desired as to find a mutual agreement within stakeholders. It is of central importance as construction phase depends on the expropriation success as seen in the time horizon. Therefore, fluid communication and mutual agreement among stakeholders is desired for the sake of a good project implementation. Based on stakeholder conversations, three commissions are proposed: one political driven, a technical based, and a citizen representation (Macias, 2014; Feiner, 2014). In them, all the relevant actors involved both in the terminal and in the regional development meet on a regular basis in order to address the main problems concerning the project. Representatives of each of
the commission meet together in the framework of a “Steering Commission” as to make proposals for the project outcome. These proposals are processed by the “Executive Committee” which will decide which of those are sent to the "Executive Commission", the one in charge of building the project.

Figure 48  Collaborative commission

Source: Own elaboration
5 Concluding remarks

The last chapter is devoted to the final considerations of the here presented research.

The deductive approach of the document has started in a global level by analysing the main tendencies in economic and demographic. Supranational organizations such as the TEN-T program have been presented as a useful tool to boost the infrastructures of the South European ports. This has been followed by a quantitative analysis of nine ports in the North Mediterranean coast and its hinterland performance. Furthermore, the next chapter identified the main problems and potentials both for the region and the ports. In it, also the choice focus on which to base the future analysis was proposed and justified. Lastly, the case study of Barcelona hinterland was introduced and studied in depth. The current state analysis of the logistic system was followed by the specific intervention in El Vallés terminal. Here, a stakeholder- and institutional analysis set the framework on which to base the future proposals. In the last subchapter, the most feasible intervention was identified and further recommendations for the planning process were proposed.

The research permits to state several conclusions. The first and most important is the importance of thorough analysis as a starting point for every complex project. The detailed overview provided in the first part of the report permits the identity of the main problems and potentials for the hinterland development. This in turn, has allowed for a sharp problem definition in which to base the consequent proposals.

Moreover, the stakeholder analysis has been revealed as a key method to define the interests of relevant actors in a given project. In this case, the analysis has stated the variety of opinion on behalf of the terminal. A poor collaborative process has been identified as one of the drawbacks for the current problems in the planning stage. In this sense, an informal process for discussing and weighting the variety of opinions is considered a good approach for this situation.

Although implementing such informal processes, the difficulty in collaboration relies on more systemic problems. From one side the interferences of politics in the public works occurring both at national and regional level is acknowledged. In fact, the current conflict between the Spanish and Catalan Government in which the regional authority fuels a secession process opposing the Spanish legal framework hinders even more of a possible agreement in the proposed project. This has been noticed on behalf of stakeholder conversations conducted with both parts and the research is aware of it.
Furthermore, the high economic volatility experienced in the past decade has implied some assumptions regarding the final proposal. First, the impossibility of forecasting the economic and traffic figures in the next 15 years. Second, the desire of not jeopardizing the research proposal by this fact. Indeed, the status quo option was discarded as a result option. On the basis of these considerations the most conservative and cheap combination has been chosen as a means to trade off both the needs and the economic situation.

The proposal aims to improve the rail freight transport in the Catalan hinterland focusing in the infrastructure discourse of an intermodal terminal. However, further and more structural interventions are required in order to promote and support the rail freight transport in Spain. Changes that are much more related to the management sector than to the infrastructure ambit. First and most important, the quasi-monopolistic market share of the public company RENFE has to be redefined. A quasi-monopoly does not incentive competition; neither encourages the entrance of private rail operators to the system in order to reduce costs. Second, the rail and road tariffs have to be adapted in order for the rail to provide a cheaper service compared to the road service. According to Miquel Llevat, rail freight share will not increase in Spain until its operation is both cheaper than the road and also profitable for companies. Third and most important, the public terminals have to become private in order to reduce operation costs. The current direct management scheme used by ADIF in its terminals difficult an efficient management of resources. A private operator, as it has been proposed in El Vallés terminal, is a key requirement to make the terminals profitable and competitive again.

Finally, this thesis is a broad analysis of a wide range of topics related to hinterland infrastructure development. Haven outlined the complexity of factors related to a logistic terminal conversion and having analysed the different stakeholders interests involved in it, this research aims at providing hints and guidelines for more collaborative procedures in territorial planning projects.
6 Bibliography


ADIF. (2011). Rail topology from the Port of Barcelona to France. (unpublished information)


Macias, A. (2014). [personal communication]. 18 December


7 Appendix

A 1 Rail gauges

Source: Own elaboration based on “Network Statement 2014” (ADIF, 2014a)
A 2 CO₂ emissions in the transport chain

Source: “Ecocalculator” (Port of Barcelona, 2014a)
A 3  Ports overview

Source: Own elaboration based on different sources
### A 4 Terms used in relation to inland terminal facilities

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inland Container Depot</td>
<td>A common-use inland facility with public authority status, equipped with fixed installations, and offering services for handling and temporary storage of any kind of goods (including containers) carried under customs control.</td>
<td>UN ECE (1998)</td>
</tr>
<tr>
<td>Inland Clearance Depot</td>
<td>A common-use inland facility with public authority status, equipped with fixed installations, and offering services for handling and temporary storage of import and export containers. Connects inland facilities to seaports.</td>
<td>UN ECE (1998)</td>
</tr>
<tr>
<td>Intermodal Freight Centre</td>
<td>A concentration of economically independent companies working in freight transport and complementing port services. A designated area where a change of transport units between traffic modes can take place.</td>
<td>UN ECE (2001)</td>
</tr>
<tr>
<td>Logistic Centre</td>
<td>A concentration of independent companies and facilities that are dealing with freight transport in a freight Forwarding, carriage, and transportation service (logistics); handling and storage of goods for outward and inward transit.</td>
<td>Harrison et al. (2002)</td>
</tr>
<tr>
<td>Inland Freight Terminal</td>
<td>Located inland, generally far from seaports, supplies the region with an intermodal terminal offering warehousing, storage, and transport services for different traffic modes involved in distributing merchandise that comes from ports.</td>
<td>UN ECE (2001)</td>
</tr>
<tr>
<td>Dry Port</td>
<td>An inland terminal which is directly linked to a maritime port.</td>
<td>UN ECE (2001)</td>
</tr>
</tbody>
</table>

*Source: Roso and Rosa (2012:187) (Roso & Rosa, Dry port in concept and practice, 2012) with own modifications*
**A 5  Impacts generated by inland terminal facilities**

<table>
<thead>
<tr>
<th>Distant</th>
<th>Close</th>
<th>Midrange</th>
<th>Seaports</th>
<th>Seaport cities</th>
<th>Rail operators</th>
<th>Shippers</th>
<th>Society</th>
<th>Midrange</th>
<th>Seaports</th>
<th>Seaport cities</th>
<th>Rail operators</th>
<th>Shippers</th>
<th>Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded hinterland interface</td>
<td>Increased capacity</td>
<td>Dedicated trains</td>
<td>Efficient hinterland</td>
<td>Interface with hinterland</td>
<td>Land use opportunities</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td></td>
</tr>
<tr>
<td>Decreased traffic</td>
<td>Reduced congestion</td>
<td>Increased capacity</td>
<td>Efficient hinterland</td>
<td>Interface with hinterland</td>
<td>Land use opportunities</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
<td>Efficient hinterland</td>
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<td>Improved access</td>
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<td>Improved capacity</td>
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*Source: Roso and Rosa (2012:187) (Roso & Rosa, Dry port in concept and practice, 2012) with own modifications*
## A 6 Technical parameters along rail line Spain - France

<table>
<thead>
<tr>
<th>Section</th>
<th>Electric power</th>
<th>Signalling</th>
<th>Description / gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le Solder</td>
<td>New HS line: 25 kV AC</td>
<td>KVB: 2014-2020</td>
<td>UIC gauge</td>
</tr>
<tr>
<td>Perpignan-Le Soler</td>
<td>New HS line: 25 kV AC</td>
<td>ERTMS</td>
<td>UIC gauge</td>
</tr>
<tr>
<td>Reccord, Figueres-Girona</td>
<td>New HS line: Conventional line - Port Bou (2015): 1.5 kV, 3 kV DC</td>
<td>ERTMS</td>
<td>UIC gauge</td>
</tr>
<tr>
<td>Mollet-Barcelona Sants</td>
<td>New HS line: Conventional line - Port Bou (2015): 3 kV DC</td>
<td>ERTMS</td>
<td>UIC gauge</td>
</tr>
<tr>
<td>Mollet-Mollet</td>
<td>New HS line: Conventional line - Port Bou (2015): 3 kV DC</td>
<td>ERTMS</td>
<td>UIC gauge</td>
</tr>
<tr>
<td>Girona-Mollet</td>
<td>New HS line: ASFA + ERTMS</td>
<td>ASFA + ERTMS</td>
<td>UIC gauge</td>
</tr>
</tbody>
</table>
A 7  Border region

Source: Own elaboration based on “Rail circulations Barcelona - French border (weekly average)” (ADIF, 2013)
### A 8 Analysis of the priority terminals in Catalonia

<table>
<thead>
<tr>
<th>Priority</th>
<th>Terminal</th>
<th>Land owner</th>
<th>Project Management Authority</th>
<th>Authorities approving</th>
<th>Expropriations</th>
<th>TEN-T Network</th>
<th>TEN-T Support</th>
<th>Maximum track length</th>
<th>Rail Access</th>
<th>Slots conflicts towards North</th>
<th>Logistics Development</th>
<th>Connectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 TIE</td>
<td>GEN (part assigned to CIMALSA, rest to be expropriated)</td>
<td>TIE-CIMALSA</td>
<td>GEN, ADF</td>
<td>Yes, but only for the study management</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>750m in the terminal development</td>
<td>IB to Vilafranca terminal</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2 El Vallés</td>
<td>ADF</td>
<td>ADF</td>
<td>ADF</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Access of two tracks to be built (scheduled 2019)</td>
<td>Access between Mollet and Figueres (mainway)</td>
<td>Possible between Mollet and Figueres (mainway)</td>
<td>Yes</td>
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<tr>
<td>3 El Llobregat</td>
<td>Barcelona Port</td>
<td>Barcelona Port</td>
<td>Barcelona Port, ADF</td>
<td>Need of Special Plan to change terrain classification</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>75km</td>
<td>Possible between Mollet and Figueres (mainway)</td>
<td>Rail Access projects will start in one month</td>
<td>Part of the terrain is in flood risk (50 years), not suitable for logistic activity</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: Own elaboration based on “Alternatives for the placement of a Ro-Ro terminal in Catalonia” (COMSA Rail Transport, 2013)
### Hinterland Port Development in the Metropolitan Region of Barcelona

**January 2015**

#### Investment (orientative) (mill. EUR)

<table>
<thead>
<tr>
<th></th>
<th>MEDIUM</th>
<th>HIGH</th>
<th>According to Interviews</th>
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<tbody>
<tr>
<td>Surface (ha)</td>
<td>22.4</td>
<td>44.3</td>
<td>22.4</td>
</tr>
<tr>
<td>Ro-Ro terminal surface (ha)</td>
<td>8.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface for intermodal services</td>
<td>15.4</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>Surface for logistic development (m²)</td>
<td>19.6</td>
<td></td>
<td></td>
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</tbody>
</table>

#### Details other interior spaces

- Turn-over parking for 250 trucks
- Locomotive area for maintenance purpose
- Turn-over parking for 250 trucks

#### Rail gauge

<table>
<thead>
<tr>
<th>Type</th>
<th>Length (m)</th>
<th>Amount of Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB + UIC</td>
<td>750</td>
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#### Management of Container and Ro-Ro trains

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####进一步的服务

- Parking for trucks and freight storage areas
- Locomotive maintenance
- Parking for trucks and freight storage areas

#### Job positions

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Source: Own elaboration based on “Study on the economic impact of the new intermodal freight terminal in La Llagosta” (Cerda Institut, 2014b)
A 10 Integrated railway network in the RMB

Source: “Integrated railway network” (ATM, 2014)
A 11 Land use

Source: “System for Municipal and Territorial Information” (Barcelona County Council, 2014) with own modifications
A 12  Flooding risk

Source: “Flooding risk” (Catalan Agency of Water, 2013) with own modifications
A 13 Stakeholders El Vallés terminal

Source: Own elaboration
A 14  Granollers terminal

Source: Google Earth with own modifications
### Summary of proposals

**Scenario A1: Medium**

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**TOTAL COST BALANCE**

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**COST SOURCES**

- **Source: Own elaboration**
- **Source: Baumgartner**
- **Source: Baumgartner**
- **Source: Roger Senserrich**
- **Source: Baumgartner**
- **Source: Asin Pinyeiro, TMZ**
- **Source: Online forum**
- **Source: ETH lecture script**
- **Source: Information System and Analysis for Urbanizable Costs**
- **Source: Albert Roure, Setram Group**
- **Source: Carles Feiner, Santa Perpetua de Mogoda City Hall**

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**COST ESTIMATION**

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**Summary of proposals**

The total costs are in complete.
A 16  Interview Jose Luis Rodriguez

Seafreight Director, Kühne + Nagel Spain

Juny 23rd 2014, 10:00, Kühne + Nagel, Barcelona

Questions:

What are the main trade relations from this company in the Port of Barcelona?

What are the expected impacts of an opening of the Arctic Route in the future for the Mediterranean Sea? Does Kühne+ Nagel have concerns about it?

How would sea freight flows distribute between Suez and Arctic Route?

Is the rail transport a competitor for the Arctic?

How would you rate the disruption caused by this opening for the Mediterranean ports?

What potentials do you see in terms of trade synergies with Africa? Does Kühne+ Nagel have business in Africa?

What are the main reasons for Chinese holdings to invest in port terminals in the Mediterranean Sea?

What alternatives do you see for Europe regarding energy supply coming from Russia? Is the US shale gas a feasible option?

What are the most important strategic guidelines of the Port of Barcelona nowadays?

How do you rate the transport infrastructure in the Catalan context?

What are the most priority infrastructure upgrades for freight and trade?

Do you have any contacts I could use for further requests?
A 17 Interview Santiago Bassols

Head, Barcelona Logistic Centre (BCL)

September 28th 2014, 09:30, Inter-oceanic Corridor of Guatemala, Barcelona

Questions:

What is the role of BCL in the Catalan and Mediterranean context?

What is the current strategic positioning of the Port of Barcelona? Is BCL playing an active role in promoting the ports development?

What are the main projects for the Port of Barcelona in a mid- to long term future?

How do you rate the transport infrastructure in the Catalan context?

How are freight trains moving in Catalonia? Is the high-speed and the freight traffic compatible?

From BCL, which interventions are you striving with priority character for an improvement in the hinterland infrastructures?

How do you rate the interventions on the Corridor 3 (Mediterranean)? What should still be done?

Which criteria would you use in order to choose the key port to analyse?

What are the most direct competitors of the Port of Barcelona in the Mediterranean Sea?

What potentials do you see in terms of trade synergies with Africa? Can Spain play a major role in the gas supply between Africa and Europe as to minimize the Russia dependency? Is the US shale gas a feasible option for European demand?

What are the expected impacts of an opening of the Arctic Route in the future for the Mediterranean Sea? Did BCL made any study on it?

Do you have any contacts I could use for further requests?
A 18 Interview Santiago Garcia-Milà

Deputy Manager Strategy and Business, Port of Barcelona

September 29th 2014, 12:30, Port of Barcelona, Barcelona

Questions:

(Presentation done by Maite Roman on the ports situation and its priorities)

What is the port doing in order to reduce the inequalities in traffic between the North ports and the South ports? How is the relation with the North ports?

What are the arguments the port gives in order to receive EU funds?

What kind of incentives does the port offer for foreign investment?

How are the land rights functioning in the port? Who owns and manages it?

What proportion of profit proceeds from the passenger traffic?

What kind of synergies exist between the port and the nearby airport? Only in passenger traffic or also in freight? Is it an incentive for logistic operators to have an airport nearby?

What are the main priorities for the port in the hinterland context?

Which are the most important inland terminals for the port in its hinterland?

What potentials do you see in terms of trade synergies between the port and Africa?

What are the most direct competitors of the Port of Barcelona in the Mediterranean Sea?

Regarding the Far Empordá terminal, what is the Ports interest in it? Is the hinterland development a priority for the port?

Do you have any contacts in the Far Empordá Committee that I could use for further requests?
A 19  Interview Miquel Llevat

President, COMSA Rail Transport

October 24th 2014, 16:30, COMSA EMTE, Barcelona

Questions:

As a private freight transporter, how do you rate the rail freight situation in Spain? What are the main problems?

What are the measures needed, in order for the rail transport to increase its share towards the road?

How many private companies are operating in Spain? Is it competitive enough compared to other European countries? And if not, why?

How far is the Spanish rail system compromising the rail freight share?

What opinion do you have about freight trains running on a mix rail through Port Bou? Do you see problems in the compatibility of passenger and freight trains on the high-speed line through Le Perthus?

From the four priority terminals in Catalonia, which one is the one having more chances to be completed?

Do you have any contact in RENFE or ADIF in order to request data for the train flow in the border region?
A 20 Interview Simon Batlle

Head Planning & Intermodality, CIMALSA

October 24th 2014, 10:00, CIMALSA, Barcelona

Questions:

How is the institutional organisation of CIMALSA structured?

How many logistic centre has CIMALSA in Catalonia? What are its main roles?

Regarding the Far Empordá terminal, what is the current planning stage?

Having a 48 % of the shares, what interests does the Port of Barcelona have in this terminal?

How are the rail connection working between the terminal and the French border? What rail links are priority for CIMALSA?

How much financial support did CIMALSA receive from the TEN-T program for the terminal? And from the Spanish Government?

In terms of management structure, how similar is the Far Empordá terminal and other inland terminals as TMZ in Zaragoza or Azuqueca in Madrid?

What are the land use and land rights in the surroundings of the terminals? Who owns the land? Which are the main stakeholders involved in the project?

What are the different variants for the rail connection in the project? Who supports those interests?

What opinion do you have about freight trains running on a mix rail through Port Bou? Do you see problems in the compatibility of passenger and freight trains on the high-speed line through Le Perthus?

Which inland terminal from the four strategic ones do you think is more important for the Port of Barcelona?

Do you have data regarding the rail freight services in Catalonia?
A 21 Interview Santiago Abengochea

Subdirector Logistic Services Northeast Spain, ADIF

December 18th 2014, 09:30, Can Tunis terminal, Barcelona

Questions:

Why is La Llagosta terminal chosen as a strategic centre for freight traffic? What is its strategic role within Catalonia?

What is the rail network topology in the surroundings of the terminal? How do freight trains run?

What are the land use and land rights in the surroundings of the terminals? Who owns the land? Which are the main stakeholders involved in the project?

Which management system does La Llagosta use? Would it change if converting the terminal for container traffic? Why does ADIF prefer a concession scheme?

What are the basic requirements for the terminal conversion to be feasible? What should be adapted in it if wanting to introduce a container activity?

What do you think about my personal proposals both for the terminal conversion and the rail link? Which proposals do you see more feasible?

What is ADIF's position regarding the PDU "Riera de Caldes South Axis" in which a logistic development next to the terminal is projected?

Are plan modifications required if ADIF wants to restructure the terminal in Zone B? What about the direct link to the high-speed line?

Who owns the land in Zone A and Zone C?

How are the relations between ADIF and the other stakeholders such as the municipalities of the area or the Catalan Government?

Do you think the current political problem between the central and regional government jeopardizes the project of the terminal?

What is the total cost of the scenarios outlined by ADIF?

Could you provide any topologic map of the rail network around the terminal?
A 22  Interview Adelino Macias and Carles Feiner

Head Business Promotion, La Llagosta- and Santa Perpetua de Mogoda City Hall, respectively

December 18th 2014, 14:30, City Hall, La Llagosta

Questions:

What is the importance of La Llagosta terminal in the regional context?

What are the interests of both La Llagosta and Santa Perpetua municipalities in the terminal project?
What is your position regarding the PDU “Riera de Caldes South Axis”?

What are the land use and land rights in the surroundings of the terminals? Who owns the land?
Which are the main stakeholders involved in the project?

Is ADIF able to reconvert the terminal without doing any plan modifications? Can the municipality oppose the development?

What would be the position of La Llagosta if ADIF wants to expropriate land in Zone C?

What measures could La Llagosta take as to stop the expropriate process?

What kind of relation do you have with ADIF and the Catalan Government? What are in your opinion the biggest drawbacks?

Being La Llagosta and Santa Perpetua de Mogoda part of a regional association called “Riera de Caldes” do you feel valued by the central authorities regarding your concerns and requests?

Regarding my personal proposals, which are the plan modifications needed? Which of those proposals do you think is more feasible from the point of view of the planning procedure?

Are there informal processes taking place? Are citizens involved in these projects? Are you promoting some kind of collaborative process with the main actors? And with the citizens?

Do you think the current political problem between the central and regional government jeopardizes the project of the terminal?
A 23  Interview Carles Carreras

Professor Geography, University of Barcelona

December 19th 2014, 11:00, Faculty of Geography and History, Barcelona

Questions:

How does the planning system in Spain work? What competences has the State and what competences are transferred to the Regions?

In Catalonia, which are the most important plans and in which administration are they deployed?

How does the binding character work between plan? Is it hierarchical? Does it always work properly? Have the State plans binding character to the lowers?

What is the first thing to analyse when confronting a complex planning project?

What do you think about collaborative processes in planning procedures? Are informal processes usual in Spain and Catalonia?

Regarding my personal proposals, which are the plan modifications needed? Which of those proposals do you think is more feasible from the point of view of the planning procedure?

Do you have cost estimations for expropriating land?
A 24 Interview Josep Armengol

Subdirector Territorial and Landscape Planning, Catalan Government

December 22nd 2014, 10:00, Department of Territory and Sustainability, Barcelona

Questions:

What is the interest of the Catalan Government in La Llagosta terminal? What is the strategic role of this terminal in the Catalan context?

How does the PDU “Riera de Caldes South axis” with the terminal complement each other? What is the planning stage of the PDU?

The current PDU ignores the automobile storage of Setram Park, Did the authorities inform them about the plans?

What are the conflicts between the state ADIF and the Catalan Government concerning Zone C? Would it be easy for ADIF to expropriate land in Zone C for the viaduct?

What are the land use and land rights in the surroundings of the terminals? Who owns the land? Which are the main stakeholders involved in the project?

Within the “Mollet Node Project”, which rail proposals need to be completed?

Who has competences over the rail infrastructures in the area? The State or the Catalan Government?

What do you think about my personal proposals both for the terminal conversion and the rail link? Which proposals do you see more feasible?

Does the Catalan Government have a fluid relation with ADIF? Where are the main conflicts?

Do you think the current political problem between the central and regional government jeopardizes the project of the terminal?

What do you think about collaborative processes in planning procedures? Are citizens involved in the PDU “Riera de Caldes South Axis”?

Is there enough demand from logistic operators for the proposed project?
A 25  Interview Silvia Martinez and Miguel Asin Piñeiro

Manager Inland Northeast Spain, Port of Barcelona

December 23rd 2014, 11:00, TMZ terminal, Zaragoza

Questions:

How is the TMZ terminal being managed? Which are the actors involved?

What are the interests of each stakeholder?

How is the relation between the terminal and the public rail actors ADIF and RENFE?

What is in your opinion the most successful management scheme for an intermodal terminal? Is the concession a good model?

Who owns the land in the terminal?

What are the main rail connections from the TMZ?

Do you have expansion projects in mind?

Are there existing synergies between the TMZ and PLAZA terminal?

Could you provide some cost estimations for the intermodal plinth?