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**Case studies: results and synthesis projet 7FP CLOSER  
(Connecting LOng and Short-distance networks for  
Efficient Transport) Rapport de recherche Deliverable  
5.2 project européen CLOSER.**

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Connecting LOnG and Short-distance networks for Efficient  
tRansport

## **Deliverable 5.2**

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## LIST OF ABBREVIATIONS

APT	Akershus Public Transport Terminal
BoD	Board of Directors
CCTV	Command and Control Training Vehicle
CIS	Commonwealth of Independent States
COM	Commission of The European Communities
DHL	Dalsey, Hillblom & Lynn (the express mail division of Deutsche Post)
DoW	Description of Work
Dwt	Deadweight
EC	European Commission
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration Commerce and Transport
EMS	Emerging Mobility Scheme
EMS	Environmental Management System
ERP	Enterprise Resource Planning
ERP-BI	Enterprise Resource Planning and Business Intelligence
EU	European Union
FP	Framework Programme
FP7	Seventh Framework Programme
FYROM	Former Yugoslavian Republic of Macedonia
GDR	German Democratic Republic
GmbH	Gesellschaft mit Beschränkter Haftung (limited liability company)
Ha	Hectare
ICT	Information and Communication Technology
ILC	International Logistics Centre
IMO	International Maritime Organisation
ISPS	International Ship and Port Security
IT	Information Technology
Km	Kilometres
LMCU	Lille Métropole Communauté Urbaine
LNG	Liquefied Natural Gas
LPS	Logistics Service Provider
MOC	Municipal-Owned Company
MTI	Ministry of Transports and Infrastructure
NCMPA	National Company Maritime Ports Administration SA Constantza
Nm	Nautical miles
NOK	Norwegian Kroner
NRA	Norwegian Rail Administration
NSB	Norges Statsbaner (State-owned monopolist rail passenger company in Norway)
OCR	Optical Character Recognition

OSE	Organismós Sidirodromon Elládos (Hellenic railways organisation)
P.A.Th.E.	Patra – Athens – Thessaloniki – Evzoni (highway network)
PAG	Policy Advisory Group
PDU	Local transport plan
PPP	Public Private Partnership
RFF	Réseau Ferré de France
RFID	Radio Frequency Identification
RNA	Romanian Naval Authority
RTD	Research and Technological Development
SMWA	Saxon State Ministry for Economic Affairs, Labour and Transportation
SNCF	Société Nationale des Chemins de fer Français (French National Railways)
SRIT	Regional transport plan
TEN-T	Trans European Transport Network
TEU	Twenty-foot Equivalent Unit
ThITA	Thessaloniki's Integrated Transport Authority
ThPA	Thessaloniki Port Authority
TOS	Terminal Operating System
US	United States
VAT	Value Added Tax
WP	Work Package
XML	Extensible Markup Language

## Abstract

The CLOSER project has been set to analyse the interfaces and interconnections between long distance transport networks and local/regional transport networks of all modes. The project is funded within the Seventh Framework Programme of the European Commission, under the topic TPT-2008.0.0.13 “New mobility/organisational schemes: interconnection between short and long-distance transport networks”.

The objective of WP5 of CLOSER is to accomplish in-depth case studies to deepen and validate the understanding of results obtained in Work packages 2, 3 and 4. This will be achieved by:

- Developing a joint assessment and evaluation framework for the case studies, incorporating knowledge that has been obtained in WP 2, WP 3 and WP 4
- Carrying out the case studies
- Synthesising the results of the case studies in order to give inputs for the development of recommendations in WP 6.

The deliverable at hand summarises the seven case studies that have been conducted in the CLOSER project:

- Leipzig-Halle airport (Germany)
- Armentières station (France)
- Oslo bus terminal Vaterland (Norway)
- Port of Helsinki (Finland)
- Thessaloniki port (Greece)
- Constantza port (Romania)
- Vilnius Airport (Lithuania)

The cases have been used to validate earlier developments of the CLOSER project, in particular the following aspects of interconnections between long and short-distance transport:

- Emerging mobility schemes
- Gaps identified
- Indicators for the assessment of most crucial issues
- Recommendations from the members of the Policy Advisory Group

There are significant differences between passenger and freight transport, in particular in the involvement of the public sector and the financing of transport interchanges.

Several conclusions and recommendations are common for freight and passenger transport, for instance the need for master plans for operations and development for terminals and interchanges, and also that forums should be established for proper dialogue between all relevant stakeholders.

Standardisation is also relevant in both passenger and freight transport, but at different levels. Due to the global dimension of freight flows, there is a need for standardisation across countries and regions, for instance in terms of information systems. The European Union and other pan-national organisations and structures have a particular role in this respect as such issues cannot be handled at country level. In passenger transport, there is a need for standardisation and integration of information systems across modes of transport, typically linking local with regional transport systems. These problems need integration at local/regional level, but it is also a stated policy goal of the European Commission to establish the framework for a European multimodal transport information, management and payment system by 2020.

The results from the case studies feed into WP 6 *Recommendations*. The objective of WP 6 is to give guidance and recommendations for establishing new mobility schemes and related organisational patterns at the interface and interconnection between long distance transport networks and local/regional transport networks. WP 6 will produce three separate guidebooks, one for passenger transport, one for freight transport, and the third one for decision-makers. The guidebooks will be major outputs from the CLOSER project.

# 1 Introduction and background

## 1.1 Background and aim of document

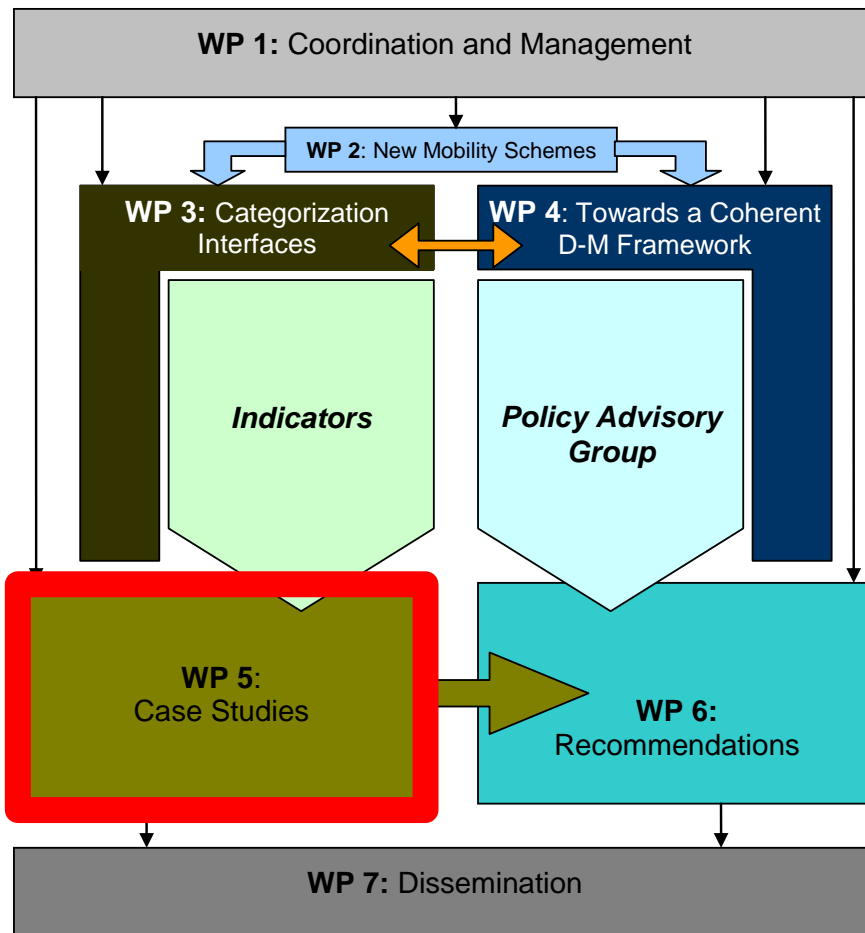
The CLOSER project has been set to analyse the interfaces and interconnections between long distance transport networks and local/regional transport networks of all modes. The project is funded within the Seventh Framework Programme of the European Commission, under the topic TPT-2008.0.0.13 “New mobility/organisational schemes: interconnection between short and long-distance transport networks”. The project covers both passenger and freight transport, and lasts from 2010 to 2012.

The purpose of CLOSER is to build upon existing research and practice, developing innovative tools for the analysis of interfaces between long and short-distance transport networks, check these tools in a number of case studies, and make specific recommendations to stakeholders in order to get:

- A more systematic approach to the concept of interfaces between long and short-distance transport (from planning to design and operation).
- Specific guidelines for decision makers in order to cope with the challenges of a particular project, and to get the most out of the opportunities that each project offers in the areas of transport, spatial, and economic development.
- A friendlier regulatory environment; fostering cooperation and supporting better integrated interfaces.
- Improved mechanisms for funding those concepts with a higher degree of integration (including EU funding schemes).
- In-depth involvement of stakeholders, particularly transport operators.

The workflow of the CLOSER project is shown in Figure 1.





**Figure 1. Workflow in the CLOSER project.**

Until now, work packages 2, 3 and 4 have explored emerging mobility schemes, categorisation of long/short-distance interfaces including indicators, and decision-making frameworks, respectively. The next step is to use case studies for further analyses in WP 5, in order to give inputs for recommendations in WP 6. This will be achieved by:

- Developing a joint assessment and evaluation framework for the case studies, incorporating knowledge that has been obtained in WP 2, WP 3 and WP 4.
- Carrying out the case studies.
- Synthesising the results of the case studies in order to give inputs for the development of recommendations in WP 6.

The objective of the deliverable at hand, as well as documenting the case studies, is to analyse and synthesise the derived results. This includes an assessment of how the results may:

- Assist in identification of the most crucial issues of interest for the interconnection between short and long-distance transport networks and modes.
- Aid in improved decision-making processes and coordination between levels

connected to infrastructure and/or operations in the interconnections of transport networks of different scales and modes.

- Establish good practices and explore key issues.
- Contribute to proposals for future development, requirements and actions to be taken regarding interfaces and interconnections between long distance and local/regional transport networks.
- Contribute to quantification of the core indicators established in WP 3.
- Validate results established in WP 2, WP 3 and WP 4, and assess whether these developments are more suitable for some modes and segments than others.

The CLOSER consortium has had an internal process with discussions of the orientation of the case studies. In addition, the members of the expert panel Policy Advisory Group have been invited to give inputs to the case selection.

The cases must be analyzed from the fact that the planning systems and responsibilities are different on national, regional and local levels. This also comprise the private involvement in planning, construction and ownership is a function of the current political systems in studied countries and the results will vary according to the policy of the ruling political parties. The planning systems will be different over time and between countries.

## 1.2 Policy context

CLOSER Deliverable 3.1 (Andersen et al., 2010) reviewed EC policy documents related to interfaces between short and long-distance transport networks. These documents were:

- The Transport White Paper European transport policy for 2010: time to decide (European Commission, 2001), which set out an ambitious action programme comprising 60 or so objectives for the transport policy until 2010.
- The mid-term review (European Commission, 2006) of the Transport White paper, which confirmed that the objective of the European transport policy is to ensure sustainable mobility in Europe. It was stated that all modes must become more environmentally friendly, safe and energy efficient. Co-modality, i.e. the efficient use of different modes on their own and in combination, will result in an optimal and sustainable utilisation of resources.
- The “Freight Transport Logistics Action Plan” (Commission of The European Communities, 2007 (COM(2007) 607 final).
- The Green Paper Towards a new culture for urban mobility (European Commission, 2007), which highlighted the importance of the urban dimension of freight transport, and the need for efficient interfaces between long and short-distance freight transport.
- The Action Plan on Urban Mobility (Commission of The European Communities,

2009 (COM(2009) 490 final).

Since then, The European Commission has launched a new white paper on transport *Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system* (Commission of the European Communities, 2011). The new white paper set out ten ambitious goals for a competitive and resource-efficient transport system, grouped into three categories<sup>1</sup>:

#### **Developing and deploying new and sustainable fuels and propulsion systems**

1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO<sub>2</sub>-free city logistics in major urban centres by 2030
2. Low-carbon sustainable fuels in aviation to reach 40 % by 2050 and reduce EU CO<sub>2</sub> emissions from maritime bunker fuels by 40 % (if feasible 50 %).

#### **Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes**

3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050.
4. A complete European high-speed rail network by 2050, tripling the length of the existing high-speed rail network by 2030.
5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.
6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.

#### **Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives**

7. Deployment of the modernised air traffic management infrastructure in Europe by 2020 and completion of the European common aviation area. Deployment of equivalent land and waterborne transport management systems and deployment of the European global navigation satellite system (Galileo).
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.

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<sup>1</sup> The text is extracted from an illustrated brochure that comprises the text of (Commission of the European Communities, 2011)

9. Move close to zero fatalities in road transport by 2050. In line with this goal, the EU aims at halving road casualties by 2020. Make sure that the EU is a world leader in safety and security of transport in all modes of transport.

10. Move towards full application of ‘user pays’ and ‘polluter pays’ principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.

Among the ten goals, there are several points related to the interfaces between long and short-distance interfaces (which we refer to as *long/short-distance interfaces*).

### 1.3 Document organisation

The rest of this document is organised as follows: Chapter 2 discusses the use of case studies as methodology and the role of case studies in CLOSER. In addition, the concepts of emerging mobility schemes, core indicators and decision-making processes are briefly presented. Chapter 2 also briefly describes the selection of actual case studies in CLOSER, covering both criteria for selection as well as an indication of how the selected case studies match the criteria. A more thorough description of the case selection can be found in CLOSER Deliverable 5.1 (Andersen et al., 2012).

Chapters three to nine summarize the individual cases. These chapters are organised as follows: (1) *introduction*, a short description of the terminal’s history, its location and the surrounding area and specific characteristics of that particular terminal; (2) *general description*, which includes passenger/freight profile, geographical coverage of the terminal, planning, financing, ownership, organisation, outputs and level of service of the terminal; (3) *analysis of gaps, mobility schemes and future changes*; and (4) *concluding remarks*, which includes main conclusions, good practices, lessons learned and suggested improvements. Full case reports are included as Annexes to this report.

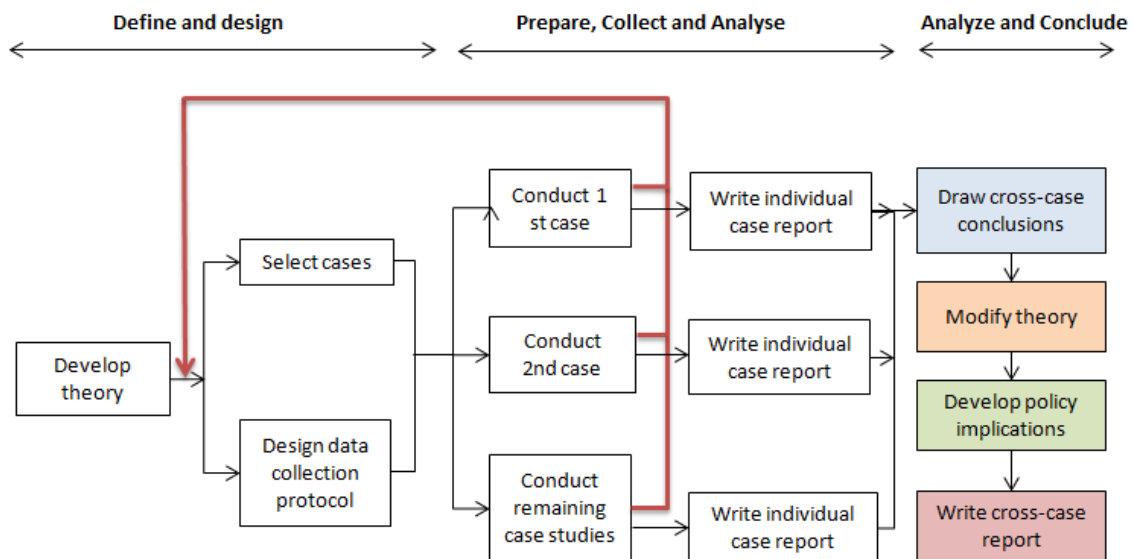
Chapter ten constitutes the cross-case analysis. Each sub-chapter presents different ways of comparing the terminals, of which most are outlined in previous work packages. These are, amongst others, emerging mobility schemes, CLOSER core indicators, PAG recommendations and fulfilment of EC policy recommendations. Chapter ten will analyse the terminals based on these indicator values, as well as validate the indicators based on relevance and usefulness for the particular terminals. Chapter eleven builds directly upon chapter ten, and presents final recommendations from the case study analysis.

## 2 Theory and approach

### 2.1 Case studies as a tool

A case study can be defined as an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2009). Gerring (2007:20) has a similar view. Case study is “the intensive study of a single case where the purpose of that study is – at least in part – to shed light on a larger class of cases” (ibid).

As can be seen from Figure 1, we can define three phases within the case study research process. First, there is the definition and design phase, where the theoretical background is made, including selection of cases and the design of data collection protocols. The next phase covers preparation, collection and analyses, in this phase the individual cases are conducted and individual case reports are written. In the third and final phase, final analysis and conclusions are made, including cross-case conclusions and development of (policy) implications of the results.



**Figure 2. Methodological approach for case study analyses.**

In other words, epistemologically, case studies (i) seek to develop logically consistent models, (ii) receive observable implications from the model, (iii) test implications against empirical observations and (iv) use the results to improve the model (George and Bennett 2004:6). The aim of case studies is partly, by in depth studies of a case, to make generalisations to a larger set of cases and develop hypotheses which can be tested empirically.

In order to deepen and validate the understanding of results obtained in Work packages 2, 3 and 4 it is necessary to emphasise the careful selection of cases (Lijphart 1971). Our point of departure has been to select cases that are comparable along specific elements, but which also secure diversity within various case studies (Ragin et al. 1996). Yin (2009) points out that substantial analytical benefit arise from using comparative studies and thus are more powerful. Eckstein (1975) emphasised that selection of crucial case studies could provide for maximum analytical leverage. A least likely and most likely approach can thereby make it possible to find robust support for theories and hypotheses. A least likely approach selects cases which are at the limits of the theory's boundaries, while a most likely approach could make good reasons for refusing a theory since it's selected from the heart of the defined theoretically scope. Such analysis is, however, difficult to create in an exact way.

Institutional approaches, on the other hand, sets out to find variations between independent variables (Gerring 2007). A main point is to examine whether cases and variables can produce different outcomes. In such a perspective case studies revise and develop current theories (Bratberg 2011). By using a broad set of case studies we can provide an analytical scheme that combine elements of each approach. Causality is also an important potential in case studies, and especially connected to mechanisms and process (Gerring 2007).

By using case studies we can also identify other variables and topics which have not been yet elaborated in other WPs. One advantage of employing case studies is precisely that the method can handle a large set of complex relations which are context dependent (George and Bennett 2005) and explain intricate and stabile patterns which demands comprehensive, exact and systematic accounts. Moreover, case studies can be used in order to explain a phenomenon and analyse the results in a larger context in which templates are used to compare the empirical results. We aim to locate indications of important regular aspects by comparing best and worst practices which can be beneficial regarding the aim of the project.

The argument for case studies is especially valid in the CLOSER project. Statistical analysis can run the risk of analysing simple correlations and not tracing important elements vital for the aim of the project (Gerring 2007). This is particularly important since we investigate complex organisational entities. Moreover, processes are complex and it will be difficult to statistically isolate various factors. The number of cases is also too low to carry out statistic studies.

In the end, it will be possible to extract several explanatory variables that are important to the project's aim, which can be important for further development and research (George and Bennett 2005).

## 2.2 Emerging mobility schemes

CLOSER Deliverable 2.2 (Nagel et al., 2011) outlined various mobility and transport schemes and trends that are identified for European freight and passenger transport analysis. The deliverable included an analysis of the impacts on last mile transport from the identified mobility schemes and trends.

In the case studies some of the most interesting emerging mobility schemes and trends from Nagel et al. (2011) are selected. Then their influences and impacts in the specific long/short-distance interfaces that are studied in the CLOSER case studies are mapped. A list of the selected emerging mobility schemes for passenger and freight transport respectively is found in the table below. The term “mobility scheme” refers both to mobility schemes in passenger transport and transport schemes in freight transport.

**Table 1. Emerging mobility schemes analysed in the case studies.**

Passenger transport	
EMS description:	Impact on interchange terminal and last mile:
Enhanced bicycle usage	More bicycle stands at terminals
	Safer bicycle stands
	Possibility to take bicycles into vehicles
Simplifying the payment	Computer equipment for payment services
	Hardware for registration in terminals
	Ticket control mechanisms for eTickets
Real time information	Information boards in terminals
	Scheduling of routes on base of real time data
Cooperation of transport operators	Shared terminals
	Coordination of schedules
Individual Access and Egress	Sufficient, safe and affordable parking areas/stands for private vehicles
	Appropriate equipment in terminal area
	Release of barriers for private access/egress

Electro mobility	Possibility to charge batteries in the parking area
<b>Freight transport</b>	
EMS description:	Impact on freight terminal and last mile:
International logistics centres	Direct access of an ILC to global transport networks enabling the direct transshipment of goods without the need of using an intermediate location
	Increase of sustainability if and when the ILC is connected and cooperates with other centres
Eco-efficient terminals	Adjustment of terminal equipment and transfer vehicles taking into account energy consumption
	Improvement of the sustainability of logistics and operations with port and hinterland terminals
Integration of an e-logistics platform	Creation of interfaces with transport/logistics partners
	Decrease of lead times-costs-environmental impact
Green corridors	Adjustment of terminal technology and equipment in order to connect to green corridors
Public-private partnerships	Funding opportunities for establishment of new terminals or modernisation of existing ones
Rail interoperability	Modernization of existing rail terminals
	“Greener” rail terminals
	Energy consumption at rail terminals
Short sea shipping	Increase of investments and increase of short-distance maritime lines in ports in order to provide a competitive alternative to road transport
Deep sea shipping	Further development of infrastructure and logistics of ports

### 2.3 Use of CLOSER core indicators

CLOSER Deliverable 3.2 (Andersen and Eidhammer, 2011) defined core indicators for long/short-distance interfaces, and these are replicated in Table 1.



For each indicator, ID is presented in the first column of Table 1 (the indicators are numbered from C1-C30, where C stands for Core). Then there are columns for indicator name and description, respectively. We also define which segments of transport each indicator applies to. Some indicators are related to all segments, meaning all long/short-distance interfaces in passenger and freight transport. Other indicators apply to either passenger or freight transport, while there also are indicators that are applicable for specific interchange types (e.g. passenger transport airports). In the last two columns, we indicate by “x” if the indicator is applicable at interchange level (for specific terminals/interchanges), at more aggregated level (typically for a city, region or country), or both. Each indicator was further discussed by CLOSER Deliverable 3.2 (Andersen and Eidhammer, 2011).

**Table 2. Suggested core indicators for long/short-distance interfaces.**

ID	Indicator name	Description and unit of measurement	Segment	Interchange level	Aggregated level
<b>Policy</b>					
C1	Multimodality rate	Percentage of multimodal versus unimodal shipments or itineraries	All		x
C2	Modal split in access/egress	Percentage of trips by road, rail, bus, taxi, slow modes (cycling and walking)	Passenger	x	x
C3	GHG emissions	GHG emissions, grams per passenger km and grams per tonne km	All		x
<b>Organisational and institutional structure</b>					
C4	Independence of terminal/interchange management	Independence from transport operators and local actors	All	x	
C5	Fair and equal access	Whether all companies have access to a terminal/interchange on equal conditions (yes/no/partial)	All	x	x
C6	Institutional complexity	Number of institutional levels involved in a) interchange planning b) interchange investments	All	x	

ID	Indicator name	Description and unit of measurement	Segment	Interchange level	Aggregated level
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### Supply side performance

C7	Employee productivity	Ratio between flows and inputs, TEU transhipped per employee and year and passengers per employee and year	All	x	
C8	Equipment productivity	TEU lifted per year and per crane	Freight	x	
C9	Flows	Number of TEUs or number of passengers per year, respectively	All	x	
C10	Energy productivity	Interchange/terminal energy use per year and TEU transhipped or passenger (kWh)	All	x	

### Terminal properties

C11	Saturation ratio	Ratio between actual volumes and maximum capacity (daily average, %)	All	x	
C12	Expandability	Potential for expandability of interchange/terminal (% increase compared to today's transhipment capacity)	All	x	
C13	Distance from city centre	Number of kilometres from city centre to interchange/terminal	All	x	x
C14	Distance from nearest highway	Number of kilometres from interchange/terminal to nearest highway	All	x	
C15	Platform access distance	Average walking distance from entrance to platform/gate	Passenger	x	
C16	Airport transfer distance	Average walking distance from arrivals hall to main public transport modes (bus, rail and metro)	Passenger airports	x	
C17	Access/egress cost ratio	Ratio between access/egress cost by car vs public transport (%)	Passenger airports	x	x
C18	Access/egress time ratio	Ratio between access/egress time by car vs public transport (%)	Passenger airports	x	x
C19	Clarity of ways	Clarity of ways within interchange/terminal	Passenger	x	

ID	Indicator name	Description and unit of measurement	Segment	Interchange level	Aggregated level
<b>Level of service</b>					
C20	Handling cost	Average price paid per TEU transhipped through the terminal (Euro)	Freight	x	
C21	Overall quality	Needs to be defined as an index in passenger transport with components of physical effort needed, personal comfort, information, perceived safety/security and facilities	Passenger	x	
C22	Ticket integration	Availability of integrated tickets between long and short-distance modes (Yes/No/partial)	Passenger	x	x
C23	Information integration	Common information for long and short-distance modes (Yes/No/partial)	Passenger	x	x
C24	Average interchange time	Average time for transfer between modes (minutes)	Passenger	x	
C25	Variability of interchange time	Standard deviation of transfer time between modes (minutes)	Passenger	x	
C26	Punctuality	Percentage of departures within defined tolerance for delay	All	x	x
C27	Non-movement factor	Non-movement time as share of total origin-destination shipment or travel time	All		x
C28	Origin-destination speed	Average speed from origin to destination	Freight		x
C29	Interchange injuries	Number of persons killed or seriously injured in interchange/terminal per year by category (staff, passengers, and other)	Passenger	x	x
C30	Loss and damage	Percentage of shipments with loss or damage at interchange/terminal including loading and unloading	Freight	x	

The core indicators that are suitable are taken into account for each case studied in the deliverable at hand. The results should therefore be traceable to the quantified

indicators. To base the analyses on comparable indicators will make the cross-case analysis of relatively heterogeneous cases clearer.

## 2.4 Decision-making processes

CLOSER WP 4 has explored decision-making, planning and financing of the different facets of long/short-distance interfaces. During this process, four important aspects of decision-making related to long/short-distance transport were identified:

1. Planning and policy
2. Infrastructure
3. The demand-side (transport users)
4. Operations

CLOSER Deliverable 4.1 (Nathanail and Adamos, 2011) identified a set of lessons that could be learnt from the analysis of decision-making processes related to long/short-distance interfaces:

- Establishment of a well documented cooperation framework where multiple stakeholders are involved, especially in the case of operators, who should provide complementary services of high quality in order to attract passengers (in case of passenger terminals) and customers (in case of freight terminals). Public sector can play the mediator role.
- It could be argued that roles should be well separated between ownership and management of land and infrastructure, and operation; the infrastructure manager should be an independent entity without connection to carriers, and ensure equal access to all.
- Following the previous, Public Private Partnership (PPP) model supports efficient organisational structure and ensures synergy and commercial cooperation, solving at the same time complex local and regional problems and financing issues.
- Creation of a strategic plan concerning the terrestrial development at international (e.g. European), national, regional and local level, in accordance with existing land use development plans, in order for the different initiatives and projects to be synchronised, so as to avoid competition and rivalries and to promote the balanced development and integration of wider areas.
- Setting of objectives, including, amongst others the rationalisation of the transportation system taking into account the European transport policy directives (e.g. elimination of negative impacts, such as road traffic increase, unbalanced development of specific businesses) and some environmental issues, the regional and territorial evolution and the business development, ensuring the acceptance of the above by the relevant companies. Also, the intermodality should be considered as the most important factor for the integration of the freight centres. As a result, the existence of an embodied intermodal terminal in each freight centre should become a condition and an indicator for its integration.
- Thorough discussion and in depth analysis of every initiative or project and

objective evaluation, without distinctions, by the responsible bodies, through a fixed process, based on certain criteria (proximity to commercial centres or areas, major industrial zones, transport and transshipment companies, connections of the freight centre to major transportation networks, sufficiency of infrastructure, level of service etc).

- Analyse need for permanent participation of the public sector and of the E.U. as a necessity to guarantee the financial assurance.
- Requirement from the private investment to play a supplementary role to the public subsidies in order to increase the financing of innovating, pioneer projects which introduce modernistic ideas and methods of knowing how and result an increase in the share of intermodal transport and the implementation of modal split, so as to achieve further integration in the freight transport sector.
- Inclusion in the development bodies of both public and private companies, together with European organisations and institutions if possible, coordinated by representative consortiums, promoting the synergies such as the PPP.
- Promotion of networking. In other words, the need to provide national, balanced (distribution of freight centres according to the magnitude and the shape of the territory covered by them) coverage of the area of interest should be fulfilled.
- Ensuring equal access to all interested bodies, 'healthy' competition, reinforcing supplementarity and to avoiding the rivalries between companies, freight centres and regions.
- "Clear" assignment of duties to stakeholders. The management and the administration (technical administration, economical and marketing department) should be explicitly defined in the establishment framework of the freight center.

These and other aspects are validated in the case studies that are presented in this report.

## 2.5 Overview of cases

The selections of cases were done through a thorough process based on selection criteria developed and described in Deliverable 5.1 (Andersen et al., 2012). Criteria for selection of case studies are mainly connected to heterogeneity in different ways. First of all, case studies should represent as many different countries as possible, in particular because the legislation is different between different countries. However, there are also other differences between the countries with respect to organisation of the transport sector, number of decision levels involved in planning and financing of transport infrastructure and operations, etc.

Secondly, a balance in terms of modes as well as between passenger and freight transport had to be ensured. As the long/short-distance interchanges usually involve multiple modes, balance in terms of significant long-distance modes (for airports this is air transport, for ports maritime transport, and for rail stations rail transport) is important.

Thirdly, ownership is also one important aspect in the CLOSER project. It is therefore advantageous to study cases that have different ownership structures.

Another criterion is to complement the case studies of the “sister projects” of CLOSER; HERMES and INTERCONNECT. These sister projects were focused on passenger transport only, and therefore we tried to prioritise freight transport to a greater extent than passenger transport in CLOSER.

Finally, it is useful to cover different classes in the CLOSER typologies that were defined in Deliverable 3.2 (Andersen and Eidhammer, 2011). These classes are national hub, national city terminal and other city or local terminal for passenger transport and special logistic area, industrial and logistic park, freight village, city terminal and rural terminal for freight transport. Covering different kinds of interchange points means that different roles in the transport system, differences in terms of importance for economy, etc are also covered. However, as the number of case studies is limited to seven, there could not be cases for each of the different categories. The case studies can nonetheless shed light on possible differences and similarities between the different categories.

From a set of candidate terminals, the process of choosing the seven cases were based on the selection criteria above. The cases chosen along with the ownership structure of each case are summarised in Table 3.

**Table 3. Ownership structure for the CLOSER case studies.**

Case	Description of ownership
Leipzig-Halle	Holding company, several local and regional governments are shareholders
Armentières station	Réseau Ferré de France (RFF) (French Railway Network) (State owned company)
Oslo bus terminal	Publicly owned company with shared ownership between Akershus county and municipality of Oslo
Port of Helsinki	Public utility enterprise owned by the City of Helsinki
Thessaloniki port	Public limited company
Constantza port	Joint stock company assigned by the Ministry of Transport to develop activities of national public interest in its capacity of port administration.
Vilnius Airport	Subsidiary of The Ministry of Transport and Communication

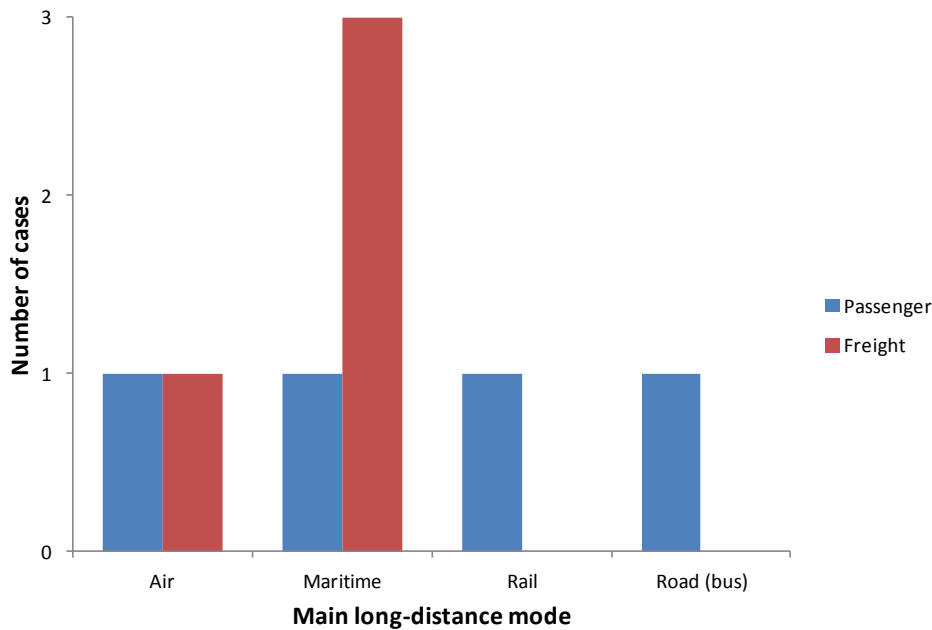
Figure 3 shows the geographical distribution of the CLOSER case studies.



**Figure 3. Geographical distribution of case studies.**

This figure shows that the case studies cover all parts of Europe, and they also cover together seven different countries.

Figure 4 displays the balance between freight and passenger transport, as well as the modal balance. Concerning mode, the main long-distance mode is selected (meaning air transport for airports, maritime transport for ports, rail for rail stations and terminals, and bus for bus stations). Thessaloniki port has been indicated as both passenger and freight transport. For other terminals where freight or passenger transport is dominant, we only include the dominant segment.



**Figure 4. Distribution on modes combined with indication of passenger and freight transport.**

The figure shows that both in terms of modes and passenger/freight transport, the selected case studies form a heterogeneous set of studies. Within passenger transport, there are several modes covered. In freight transport there is a strong emphasis on maritime transport, but keeping in mind that ports also involve other modes of transport such as rail freight, truck and in some cases also inland waterways. A stronger emphasis could have been placed on freight transport. That would however imply that we would be able to cover fewer modes in passenger transport.

The allocation of case studies to the passenger and freight transport typologies is presented in Table 4 and Table 5, respectively. Due to the limited number of cases, it will not be possible to cover all categories equally well.

**Table 4. Passenger transport case studies related to CLOSER typology.**

	National hub: Airports and passenger/ferry ports	National city terminal	Other city or local terminals
Armentières station		X	X
Oslo bus terminal		X	X
Thessaloniki port	X		
Vilnius Airport	X		



Table 4 shows that it is difficult to allocate each case study to just one category of the typology. The reason for this is that a terminal may have several roles, for instance Oslo bus terminal serves as international and national city terminal for interurban bus transport, but it is also a part of the urban transport system of Oslo with local bus lines as well as other urban transport modes.

**Table 5. Freight transport case studies related to CLOSER typology.**

	Special logistic area	Industrial and logistic park	Freight village	City terminal	Rural terminal
Leipzig-Halle	X				
Port of Helsinki	X				
Thessaloniki port	X	X			
Constantza port	X	X			

From Table 5 we see that the case studies are focused towards “Special logistic area” as well as “Industrial and logistic park”. However the selected case studies also cover functions of freight villages and city terminals in different ways.

## 2.6 Method and approach

The case studies were based on a template developed in the project. The template was slightly adapted to each of the seven cases to capture modal differences, etc, yet still maintaining as many similarities as possible. The partners responsible for the individual case studies then used the template as basis for the case reporting. The full case study reports that are included as Annexes are based on these templates.

The templates were circulated with a questionnaire serving as a tool for information collection for each case and form the basis for interviews with local stakeholders. This questionnaire was included as an Annex to Deliverable 5.1.

In addition to thorough interviews, some of the information sources utilised were annual reports; information from web pages; databases; articles; data from statistical offices; geopolitical data and operational characteristics; information from media related to topics relevant for the terminals; presentations and brochures. The interviewed stakeholders are listed below.

- Ms Emilia Horovei, head of Public Relations and Protocol Department (Port of Constantza)
- Mr Jukka Kallio, Port Manager, Vuosaari Harbour (Port of Helsinki)

- Mr Arto Satuli, Terminal Manager, PSO, Vuosaari Harbour (Port of Helsinki)
- Finnish Customs (Port of Helsinki)
- Mr Dierk Näther, Managing Director of Flughafen Leipzig/Halle GmbH
- Mr Jan Oberländer, Netzwerk Logistik Leipzig-Halle
- Mr Robert Hesse, Head of Corporate Communications, Mitteldeutsche Airport Holding (in relation to Airport Leipzig/Halle)
- Ms Katrin Weller, Marketing and Sales, LBBW, GVZ Entwicklungsgesellschaft Leipzig mbH) Dr. Dimitrios Makris, sea transport and port operations specialist (in relation to Port of Thessaloniki)
- Head of the Strategic Planning, Marketing and Sales department of Thessaloniki Port Authority SA
- Commerce director of SE Vilnius Airport
- Head of operations and research division of ME Communication services (local public transport authority in Vilnius)
- Deputy Director of passenger transportation directorate of JSC Lithuanian Railways (in relation to Vilnius Airport)
- Marketing director of the bus operator company KAUTRA Ltd. (in relation to Vilnius Airport)
- Mr Loïc Lemencel from the Regional Trains service from the Regional Council Nord-Pas-de-Calais (in relation to Armentières terminal)
- Ms Anne-Sophie Legendre from the FEDER management funds from the Regional Council Nord-Pas-de-Calais (in relation to Armentières terminal)
- Ms Céline Depiere from the Mobility service at the Lille-Métropole Communauté Urbaine (in relation to Armentières terminal)
- Mr Nicolas Augrain from the urbanism service of municipality of Armentières
- Ms Nathalie Elie exchange poles project leader from the Transport service at the Lille-Métropole Communauté Urbaine (in relation to Armentières terminal)
- Mr Knut Bergersen, Akershus Public Transport Terminals (in relation to Vaterland bus terminal)
- Mr Tom Granquist, Akershus county (in relation to Vaterland bus terminal)
- Mr Lars Erik Nybø, Norwegian Rail Administration (in relation to Vaterland bus terminal)
- Mr Halvor Jutulstad from the public transport company Ruter (in relation to Vaterland bus terminal)
- Mr Tor Saghaug from ROM Eiendom (in relation to Vaterland bus terminal)

Based on the information from interviews and other sources, each partner with responsibility for a case study completed the individual case reports.

The individual case reports were then gathered, synthesised and compiled by TOI. The result of that process is described in this deliverable, D5.2, which includes a cross-case analysis with conclusions/recommendations as well as descriptions of the individual cases.

The next chapters (three to nine) present one case each. These chapters are organised as follows: (1) *introduction*, a short description of the terminal's history, its location and the surrounding area and specific characteristics of that particular terminal; (2) *general description*, which includes passenger/freight profile, geographical coverage of the terminal, planning, financing, ownership, organisation, outputs and level of service of the terminal; (3) *analysis of gaps, mobility schemes and future changes*; and (4) *concluding remarks*, which includes main conclusions, good practices, lessons learned and suggested improvements. These chapters are based on more detailed case reports, which are included as annexes. The detailed case reports can be considered as working documents that have been used as inputs for the final case analysis in the main text. In some cases, additional material has been collected through stakeholder contact and follow-up questions.

## 3 Flughafen Leipzig-Halle

### 3.1 Introduction

#### 3.1.1 Background and history

The airport Leipzig/Halle was opened 1927, April 16<sup>th</sup> as Flugplatz Schkeuditz. At the opening date the airport was merely an airfield, a hangar and an administration building. The first runway (length 400 m) was built in 1928. That year it was also renamed to Flughafen Leipzig/Halle, its current name.

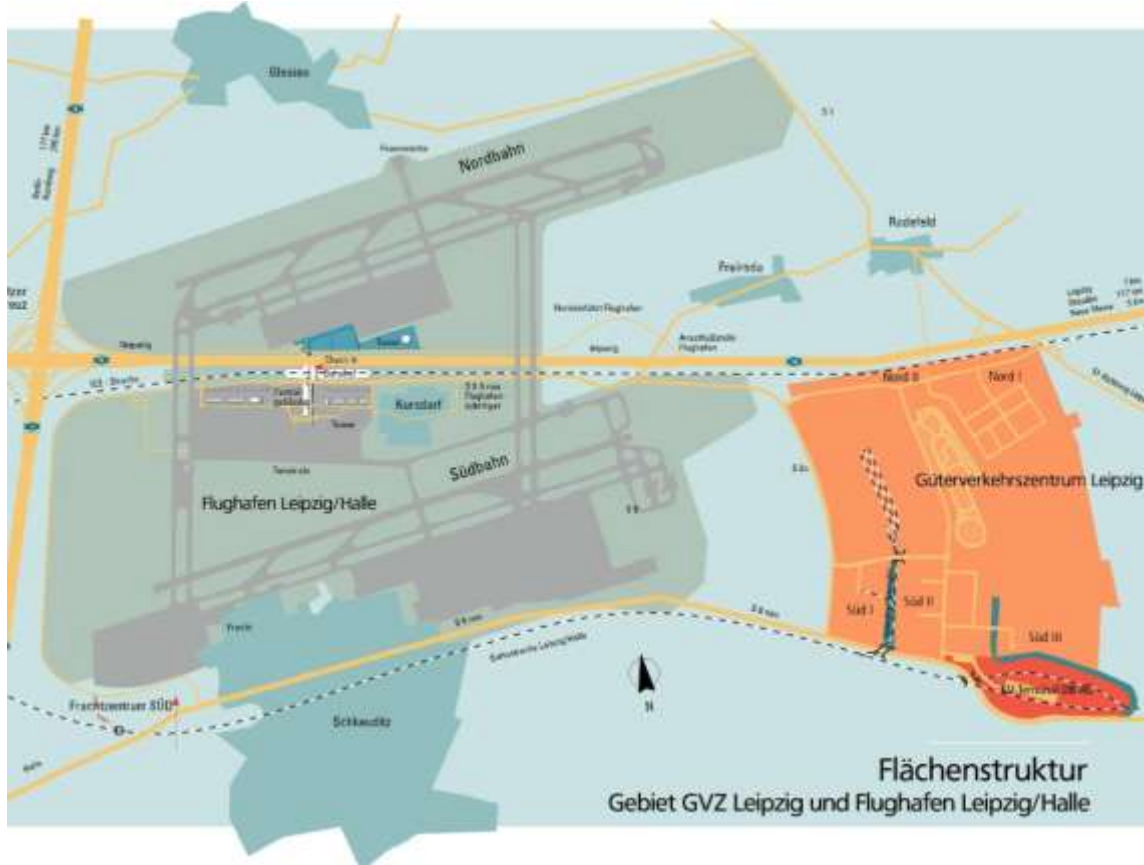
In the war, only the military used the airport. In 1947, it started to be used as an in-plant airport for the aircraft industry of the GDR (German Democratic Republic). In 1955, a runway of 2,500 m was built, but rarely used. The airport was extended step by step, and on May 19<sup>th</sup> in 1972 it opened as an all-year commercial airport. The number of passengers increased from 16,000 in 1927 to about 550,000 in 1988.

After the German reunion and after the adaption to the new economic situation, a period of modernisation and construction began. The number of passengers grew, new facilities were allocated. The link to infrastructure (road and rail) was improved significantly. A second runway (3,600 m) was built in 1998, and the old runway was rebuilt in 2005 to a new runway (length 3,600 m, width 60 m).

The enhancements carried out were supply driven; the airport was developed to be prepared for future demands. The excellent facilities combined with a low utilisation and a court decision permitting night flights for express freight without restrictions enabled the resettlement of DHL, who chose the airport in 2008 as their European hub. Since then Leipzig/Halle has mainly been used as a freight airbase, even though it is also open for passengers and for military purposes. The various applications do not hinder each other. Passengers prefer day hours for flights while most of the freight is transported during the night.

#### 3.1.2 Location and area

The airport Leipzig/Halle is located in the eastern part of Germany in Saxony, 16 km from the city of Leipzig and 22 km from the city of Halle. Both are middle sized cities with about 520,000 and 230,000 inhabitants, respectively. The airport is very well connected to the road and rail network. Two main highways, one from Munich to Berlin and one from Dresden to the Baltic Sea, directly pass the airport. The railway station located within the airport is prepared but currently not used for high-speed trains. The freight village (Güterverkehrszentrum Leipzig) is located in direct neighbourhood.



**Figure 5: Airport Leipzig/Halle and GVZ Leipzig**  
Source: LBBW GVZ Entwicklungsgesellschaft Leipzig mbH

### 3.1.3 Specific characteristics and terminal properties

First of all, this is, unlike most of the case studies, not a terminal that is suffering from being too small; the airport is, on the other hand, not fully used. The overall saturation ratio combined for passengers and cargo is only about 30-35% in average. The utilisation of the runways is less than 30%. One reason for this is low demand in the vicinity. There is also a lot of space for expansion available partly as prepared area, partly as farm land. The area used could be tripled if necessary.

Secondly, the airport has had an advantage during recent construction processes due to the Infrastructure Acceleration Act, induced to fasten the progress in the eastern part of Germany after the reunion by reducing some contestation rights and shortening the chain of commands for suits to only one level of jurisdiction.

## 3.2 General description

### 3.2.1 Freight profile and geographical coverage

The airport Leipzig/Halle is operating as a regional passenger airport and an international freight airport, mainly for express and parcel freight. For this case study

only the freight profile is analysed. The biggest stakeholder involved is DHL, which in 2008 shifted the European hub from Brussels to Leipzig/Halle. As a consequence, the total airport volume increased from 101,285 tonnes to 442,453 tonnes that year. Since then, the airport volume has increased with a steady rate at about 15 %, and in 2011 the total freight volume handled was 760,355 tonnes.

The modal mix for the logistic area Leipzig-Halle is less road-oriented than it is for Germany as a whole. But looking at the airport in isolation, the situation is different. Logically, there is a larger amount of air traffic. Most of the goods are just transhipped from one aircraft to another. The rest of the freight arrives by truck or is delivered by truck from or to destinations in Europe. Transport by rail is rarely used at the airport. Conventionally, air cargo is mostly light, expensive and time critical, while rail (or waterway) cargo is often heavy, large-volume and dirty.

About 90 to 94% of the air freight volume at the airport Leipzig/Halle is due to DHL. That means the airport is specialised in international express and parcel freight. Most of this freight arrives by plane and is submitted by plane. Source and destination are often far away, e.g. China or the US, but Europe is also served by Leipzig/Halle.

### **3.2.2 Planning, finance, ownership and organisation**

#### *3.2.2.1 Ownership structure*

The airport Leipzig/Halle is owned by Mitteldeutsche Airport Holding, founded in 2000, which also manages an airport in Dresden. Shareholders in the company are the two neighbourhood states Saxony and Saxony-Anhalt and the three involved cities: Leipzig, Halle and Dresden. The organisation was founded to appropriately represent all involved authorities on local and regional level. On one hand, the intention was to have a central body responsible for both airports in Saxony to profit from synergies and to avoid an unnecessary competitors' fight. On the other hand, there was a necessity to involve two German Bundesländer (Saxony and Saxony-Anhalt), because the airport is located in Saxony, very close to the border, and was always intended to serve the whole area of Leipzig and Halle. The Mitteldeutsche Airport Holding is a public owned company which is organised as a joint stock company (Mitteldeutsche Flughafen AG). Mitteldeutsche Airport Holding is the leading entity of the three subsidiaries (1) Flughafen Leipzig Halle GmbH (airport operator of airport Leipzig/Halle); (2) Flughafen Dresden GmbH (airport operator of airport Dresden); and (3) PortGround GmbH (handling agent at both airports).

All relevant decisions concerning the subsidiaries are taken by the holding. Most of the overarching tasks are taken by the holding, including tasks of a legal nature, taxes, strategic personal planning and recruitment, corporate communication, marketing and procurement.

Flughafen Leipzig/Halle GmbH is organised as a limited liability company, a stock cooperation with shareholders. This is a typical private sector structure, but in this case all shareholders are public authorities. Of course there are also private companies in

the airport area, e.g. carriers and producers. But they are separated companies, renting (or using or buying) space from the airport or the freight village. The road and rail infrastructure is operated by stakeholders as Deutsche Bahn or the motorway authorities.

Nevertheless, the ownership of all relevant subjects as terminal, services, and airport internal infrastructure is combined in one hand. Even most of the land ready for development or resettlement is owned by the Mitteldeutsche Airport Holding or the airport itself. There are only small areas belonging to the cities or the state. Areas for resettlement of logistic companies are normally rented, and only sold in exceptional cases.

### *3.2.2.2 Regulatory framework*

Within the wider airport area, ownership and management of land and airport infrastructure are not separated. The airport owner/operator offers all services from one source. This allows very fast decisions and planning, which was seen as a great advantage by all interviewees, even the representative of the logistic companies. There is a pre-selection of companies preferred at the airport. These are companies with a direct relation to air transport, preferably generating air freight. But nevertheless, all indicators show a fair access to the offers of the airport. There was no conflict identified related to undue favouritism.

Supported by Netzwerk Logistik Leipzig-Halle there is a co-operation between carriers, logistic related companies and service companies (for example labour or real estate brokers). This network also serves as a mediator between the airport, the authorities and the private companies. The office of the network representatives is located in an airport terminal next door to the administration building. The headquarters of the airport company and the holding are both located in the administration building of the airport. Everything is close together, and this seems to improve the coordination processes.

In 1993, the Act of Acceleration of Traffic Infrastructure Planning was induced to fasten the progress in the eastern part of Germany after the reunion. This law and the deriving subsequent regulations have had direct impact on Leipzig/Halle, by reducing some contestation rights and shortening the chain of commands for suits to only one level of jurisdiction. But some of these rules are going to expire and future planning at the airport will probably take longer.

### *3.2.2.3 Organisation and planning/construction processes*

Planning, ensuring of financing and construction could be carried out very fast. The main reasons for that were:

- Political will, especially of the regional authorities.
- Very good co-operation of all concerned.
- Legislation targeted to fast progress in the eastern part of Germany after the reunion.

The residents were involved in the planning which led to a very high acceptance and few public protests. The main conflicts identified come from the framework for infrastructure support defined by the EC. Since the airport is a privately organised stake company public funding is not authorised by the commission. Thereby it doesn't seem to make any difference that 100 % of the shareholders are public authorities. The situation is legally examined at the moment, but causes anxiety. A more subsidiarity principle-oriented view of the EC in relation to regional infrastructure funding would be preferred by the airport and holding. From their point of view this is relevant for many locations with large infrastructure facilities all over Europe.

There are some other conflicts related to infrastructure, but mainly from the carriers' point of view. The logistic area is connected to the high-speed rail network, but no high-speed train is available. The inland waterway transport is not really usable, even though the port of Halle is prepared. The port was developed but there was not enough money or willingness to ensure that the river is deep enough for cargo ships.

#### *3.2.2.4 Sharing of information*

There is a lot of information sharing between the terminal operator and local/regional authorities, because authorities are shareholders and involved in the Supervisory Boards. The information exchange between logistic companies and authorities is part of the network's tasks. The network collects information available to members and authorities. Public authorities, for example the Saxon State Ministry for Economic Affairs, Labour and Transportation (SMWA), provide available data to the network, which ensures distribution to the members.

Since the network is independent and operates as a moderator and broker, the competition does not impede the flow of information to the members. But of course, there is a competitive situation between members, which might obstruct the cooperation. The network supports cooperation between partners willing to cooperate, but cannot overcome personal affinities or business barriers if this is not desired by the partners.

#### *3.2.2.5 Finance*

Connected to the changeable German history, the history of the airport shows ups and downs. This is also true for financing in the past, coming from different sources with various intentions. The first investment was well planned and successful; the airport was used as a substitute for airports in Leipzig and Halle. But other projects and the assigned budgets seemed to be inadequate. Between 1957 and 1960 a 2500 m long and 60 m wide runway was built by the GDR government. It was planned for the expected aircraft development, which was stopped shortly after the completion of the runway.

After the German reunion the airport did not have to start from the scratch, but a lot of reconstruction and improvement was necessary. This was financed by the contribution of the shareholders which are all public authorities. This strongly reduces the possibility to receive further subsidies for example from European funds.



Even though the area of Leipzig/Halle is the most dynamic German region related to logistics today, the airport is not able to cover the costs. In 2010 there was a financing gap of about 62 million euro with sales of 92 million euro. The reason is partly the 47 million euro depreciation for new buildings, but there is still a gap left.

Concerning passengers, the airport is oversized. It was planned for 6 million passengers and (expendably) constructed for 4.5 million, but there are handled only about 2.5 Million passengers per year. The shopping mall does not attract customers and the station is not used for high-speed trains.

Leipzig/Halle is in the list of the worlds' 20 biggest freight airports (second biggest in Germany) but this does not lead to economic success. On the contrary, the gap in financing was much smaller in 2008, before DHL implemented the hub (about 38 million euro, less than half of the sales). The logistic companies, including DHL, settled in the area because of good conditions, namely the night rating, availability of labour supply on less salary, availability of space for the settlement and expansion, political support and low costs (e.g. landing charges). For example DHL is virtually autarchic and therefore contributes less than expectable to the airport profit.

There is in addition the on-going legal fight with the EC. The conflict issue is funding for infrastructure; 400 million euro is granted from the state (Bundesland). This aid is considered impermissible by the commission. The worst case scenarios analysed in the planning process were exceeded by this decision. Nevertheless, this situation is not rated as "lesson learned". The situation has to be clarified legally to establish a legal security for infrastructure projects in Europe.

### **3.2.3 Outputs and level of service**

Most of the freight (more than 90%) comes from DHL and is handled by DHL, and a large portion of this freight is only related to long-distance transport (air-air). That means the portion of freight charges using the airport as an interconnection between short- and long-distance traffic is relatively small. But there is a part of cargo transhipped from plane to truck or vice versa. The freight belongs to DHL but more and more other shippers are involved. The situation is quite different for the whole logistic area, especially for the GVZ, where rail and road is connected and the airport is directly accessible.

The productivity of employees handling cargo is hard to measure at the airport. Thus, the bare figures can only give a rough estimation of the airport's productivity concerning freight and passenger. In total there are working more than 8000 people for various companies at the airports of Leipzig/Halle and Dresden. About 1000 of those belong to Mitteldeutsche Airport Holding or the subsidiaries. About 200 employees are directly related to the airport of Dresden and can therefore be taken off the number. PortGround employs about 370 people.

Punctuality is one of the strengths of Leipzig/Halle. There are nearly no delays caused by the airport and its services. The airport is available 24 hours each day. Partly delays resulting from problems at other airports can even be compensated. But this great

punctuality is due to the low utilisation rate of the airport. There are no problems to find empty slots for landings and take-offs.

From the airport's point of view there exist no loss and very few damages (in the magnitude of 0.0001 %). Processes are optimised. The staffs are well trained and sensitised, due to the high requirements of DHL. It can be assumed that also DHL itself has a very good ratio, but there are no numbers available.

### 3.3 Analysis of gaps, mobility schemes and future changes

#### 3.3.1 Gaps

Below, gaps important for Leipzig/Halle airport are identified and analysed.

**Table 6. Leipzig/Halle: Gaps analysed.**

Lack of standardisation	Since most of the freight is directly connected to DHL, standardisation is currently not really a topic in Leipzig/Halle. However, the airport strives for a stronger connection to Eastern European markets. This might lead to more dependency on standardisation.
Lack of inappropriate infrastructure	Concerning rail, the infrastructure is available but not really used. The network and terminal/station is ready for high-speed trains, but there are no high-speed train moving to and from the airport.
	Concerning waterways, there is a lack. The closest port (Halle) is ready as an interconnection terminal between road, rail and inland waterway, but the river passing (Saale) is not deep enough for cargo ships of appropriate size.
Dependency of mode choice to economy and legislation	The cargo handled at the airport is not suitable for rail or waterway transport in many cases. Therefore freight is transhipped to or from trucks, if it is not air to air.
Lack of customers	The region Leipzig/Halle is in the eastern part of Germany, where there is still a lack of industry and production. That means the airport is not naturally located close to potential customers. The same is true for passengers. In the catchment area there are few inhabitants. The area is developing, some key players settled there already, but this is still not enough for an appropriate workload.

#### 3.3.2 Emerging mobility schemes

In the table below, the emerging mobility schemes most important for the airport are listed.

**Table 7. Leipzig/Halle: Emerging mobility schemes.**

International logistics centre	The airport is connected via air and road (highways). The airport is also connected to the rail network, but no high-speed train is available
Eco-efficient terminals	The airport and the related companies are working on sustainability. Gas driven and electric vehicles are tested and used. There is an electric vehicle charging station at the airport. There is a rain water recycling facility at the airport. DHL uses a solar plant and combined heat and power. The airport is also involved in research projects to gather information and new ideas and to further improve the situation.
Integration of an e-logistic platform	Most of the freight is derived by DHL, who uses modern technology for information exchange.
Green corridors	The connection to the high-speed network (with running high-speed trains) is prepared, but waiting for more customers willing to use it. Currently the critical mass is missing, but if a first big application can be obtained, the operation can be started immediately.

### 3.3.3 Future changes

The airport is perfectly prepared for increasing e-commerce and expresses parcel services. The facilities are available and the conditions at the airport are distinctly good (location in Central Europe, no night flight ban, expandability, qualified workforce, etc.). The airport is also in a good position connecting Eastern Europe to West and Central Europe and serves as a Central European gateway to the eastern part of the world.

## 3.4 Concluding remarks

### 3.4.1 Main conclusions

The freight volume of the airport Leipzig/Halle is growing fast. The Leipzig/Halle is the second or third biggest cargo airport in Germany (after Frankfurt and in competition with Cologne/Bonn airport). Planning procedures are very fast. All services are provided from one source. There is, in addition, a lot of space for expansion and settlement of logistic companies and no problems with slots for landings and take-offs. But this convenient situation occurs because the airport is only partly utilised. The airport is far away from a balanced budget.

The holding and its subsidiaries are owned by public institutions, solely. There are no private partners involved, and all persons interviewed are happy with this situation. They think it is a very good structure and don't want to change it. But there are also risks.

According to the EC, funding from public institutions for public infrastructural objects is not a problem. However, the infrastructure is not owned by one single public institution, but organised as a stock cooperation with public shareholders only. This is a typical private sector structure, and objects owned by such a private structure are not allowed to be funded by public institutions as a Bundesland. It doesn't matter that this is a private sector structure with all public sector shareholders. If the airport would be owned only by the state of Saxony, the problem would not be there. At the moment there is no common understanding of how to handle an infrastructure object owned by a privately organised company with solely public shareholders. It is expected that this can be legally clarified.

Another risk is visible by the economic situation. The airport Leipzig was chosen as a development project to upgrade the region (East Germany). The holding was founded because the interests of different public organisations had to be taken into account, for example the interests of two Bundesländer, two middle-sized cities and the small city at the location. On one hand this model works well, supports co-operation and fair access and avoids too much competition between the airports in Leipzig and Dresden. But on the other hand, there are no strong regulatory mechanisms preventing the airport from going deeper and deeper into debt. In 1994, the former prime minister of Saxony, responsible for the expansion of the airport after the re-union, expected 6 million passengers per year in the near future. But the airport is far away from reaching this number. Now some partners (especially local municipalities) reduce their stock options. There are discussions on this topic even in Leipzig, initiated for example by The Greens.

### **3.4.2 Good practices**

- The airport is led by a holding responsible for all subsidiaries and for both airports in Saxony. Therefore, the competition could be reduced and the co-operation encouraged. The holding and all subsidiaries are in public ownership and strongly connected to the authorities involved.
- Due to this and due to a special legislation framework intending to develop the Eastern part of Germany as fast as possible, planning processes were passed very fast during the period after the German reunion (1990). The framework shortened up the planning process and reduced the chain of commands for suits to only one level of jurisdiction. But this situation might change in the near future, when the special law ends.
- The co-operation between all participants was, and is, very good. There is a political will to develop the airport and the whole region. This led to an establishment of some big companies in the area and the region.
- The connection to logistic-related companies and the connection between those companies are supported by a logistic network founded on the initiative of regional logistic actors. Synergies can be used, planning and construction are supported, and the collaboration between different actors is strengthened.

### 3.4.3 Lessons learned

- The planning for the airport was too optimistic. The airport is oversized and losing money. It also might be conceivable that the conditions are too good, attracting companies to settle in the area and use the airport, but straining on the economic condition of the airport.
- Besides, there exist different opinions between the local/regional authorities and the European Commission concerning the financing of infrastructure, which now have to be clarified by a court.
- The connection to the rail network is not as well as desirable. This is mostly a topic for passenger transportation and maybe a topic for the GVZ, because goods transported by air are normally not appropriate for rail (or even waterway) transport.

### 3.4.4 Suggested improvements

The airport will try to connect more closely to the market, especially the market in Eastern Europe. This seems to be a good idea, since there are not enough potential customers in the region. It will be hard to attract more passengers and passenger airlines because there is a new airport in Berlin opening soon and probably providing a large offer for passengers. This is why Leipzig is focussing on cargo and will continue. The logistic region is dynamic and there is a chance to get more airport customers to settle in the area.

## 4 Armentières station

### 4.1 Introduction

#### 4.1.1 Background and history

Armentières is a railway station that opened to service in 1849 on the line between Lille and the littoral cities of Dunkerque. In the first PDU (Local Transport Plan) of the Lille Urban Community, Armentières station was identified as one of the exchange poles to be developed by reinforcing the bus system, including the station and the city core of Armentières. This bus development was included in the first set of objectives defined in the PDU in the year 2000.

At the same period the Region, as the Authority for regional train, had set up a policy of development of exchange poles around the railway system as stated in the SRIT (Regional Transport Plan) of 2004. This document included Armentières railway station as an exchange pole to be developed. The initiative of the development of Armentières as an exchange pole can be credited to Lille Urban Community (Lille Métropole Communauté Urbaine - LMCU). Works have been conducted in 2006-2008 and the site has been functional in its new characteristics since in 2008.

#### 4.1.2 Location and area

Armentières railway station is located in Lille Urban Community within Région Nord-Pas-de-Calais. Armentières belongs to the Département of Nord. The municipality of Armentières is located 14 km to the North-West of Lille and at 20 km from the Airport of Lille Lesquin. It counts 25,000 inhabitants, with a density of 4,000 inhabitants per km<sup>2</sup>. The Urban Community of Lille counts 1.1 million inhabitants. The municipality is close to the Belgian border.

The railway station is located at 800 meters from the city core, in an area subject to urban renewal policies. It is located on the regional railway network on the line to Dunkerque which is the third branch of the regional network mainly centred on Lille. It constitutes an entry point in the LMCU territory and a gateway between the regional and metropolitan spaces.



**Figure 6: General view of the Armentières exchange pole (source PDU 2010)**

### 4.1.3 Specific characteristics and terminal properties

The first point to have in mind regarding Armentières when comparing it with other terminals is that it is relatively small, with only 4,600 passengers per day. This makes walking distances short, and it also makes it easy to get an overview of the terminal, consequently reducing information problems. Secondly, Armentières is an urban terminal located only 800 meters away from the city core. This will e.g. increase the importance of the planning phase and preparation for future development if the terminal ever experiences capacity problems. Thirdly, the French principle of “delegation of public service”, which can be read about in section 4.2.2.2, makes it impossible to separate the transport operator from the platform operator. Armentières must be analysed in the context of these characteristics.

## 4.2 General description

### 4.2.1 Passenger profile and geographical coverage

The traffic at the railway station of Armentières has increased from 3,300 passengers per day (in and out of train) in 2005 to the level of 4,600 in 2010.

Today, Armentières is the second regional railway station of LMCU territory after the central station of Lille-Flandres which in 2010 had 50,000 regional passengers per day. At the regional scale Armentières is ranked 10<sup>th</sup>.

In the regional network the lines 8, 8 bis and 12 are linking Lille to Dunkerque and Calais. Two secondary lines serve the freight railway to the stations of Don-Sainghin and Berguette. Armentières is also served by the motorway A26 to Dunkerque and is surrounded by a peri-urban territory.

## 4.2.2 Planning, financing, ownership and organisation

### 4.2.2.1 Ownership structure

Most of the terminal has been established on former railway related land. The property of land is partly belonging to LMCU. French National Railways (SNCF) possesses land for the station building and the building itself. The railway infrastructure is property of the national railway network, Réseau Ferré de France (RFF). The bus terminal and the bicycle parking is property of the urban transport operator Transpole. The car parking is property of LMCU.

The transport operations are run by several companies; SNCF for trains and Transpole and some other companies for buses. The ICT system and the services remains the property of the various transport operators.

The integration of the long- and short-distance transport in terms of property is mainly due to the action of Lille Métropole Communauté Urbaine. In the domain of property, the cooperation between the stakeholders is good.

### 4.2.2.2 Regulatory framework

There is no cooperation and procedural framework for the project apart from the general laws and rules defined by the state. It is important to add that all the stakeholders are independent one to another.

There is no separation of ownership and management of land. Apart from the special case of rail where RFF is proprietary and SNCF operates the services, there is no separation of ownership and management for infrastructure.

The principle of the “delegation of public service” in the French context of urban transport states that one single company is chosen for operating one complete transport network on the territory of the transport authority. Therefore, the hypothesis of having an operator of the metropolitan platform distinct from the metropolitan transport operator is not possible. The fact that different bus transport operators get access to the platform operated by Transpole seems to pose no problem because the companies are not in concurrence.

In addition, the hypothesis of having an operator of the interface that would be independent of the transport operator has not been proposed by the interviewees. Therefore, this hypothesis does not seem relevant in the case of Armentières.

### 4.2.2.3 Planning and operation/construction processes

Regarding the process of building the terminal, one noticeable delay occurred; it took 2 years for SNCF to give an estimate of work to be realised before selling the land for the project. The railway system needs essential communication and energy networks for its functioning. Before changing any piece of railway land, a study must be completed to determine if a piece of these networks could be touched. When a wire or a technical building has to be moved, the costs can be extremely high. The long time to produce



this information can be considered exaggerated; nevertheless, this phase is crucial because its impact on the project can be very high, to such extent that the design of the project can be modified to avoid moving the networks.

Through interviews some differences in the perspective of the leading roles have been observed; the metropolitan authority perceives its role as the real leader in the project, while the regional authority perceives its role as being at the initiative and then accompanying the projects lead by the intercommunalities. This difference, however, does not pose a problem in the project. In the contrary these different perspective valorises the roles of each actor and is a factor of a deeper involvement of each stakeholder.

In the case of Armentières, there have been no substantial modifications in the project between what was initially foreseen and what has been implemented. The back-casting analysis of the project revealed that the key element that could have led to a substantial modification of the project is the eventual presence of an element of railway related communication or energy networks on the land foreseen to implement the project.

#### *4.2.2.4 Sharing of information*

The operators are linked to the authorities through bidding contracts. On the site of Armentières three transport authorities are present: the region, the metropolis and the Département. The Region, as the transport authority, has asked the SNCF to develop the train services in Armentières in order to support its role of exchange pole. As a result, some adaptation of the bus timetables to the train schedules occurred. The Département has decided a modification of the interurban bus timetables.

All the transport authorities involved have invested in the exchange pole. They are all working for this exchange pole to be functional in order to valorise their investment. This explains why they have started some negotiations with the transport operators to coordinate the schedules.

This investment has pushed them to be willing to make it function properly, including the coordination of timetables, which is a key issue for an exchange pole. The involvement of all the transport authorities in the project can be seen as a key element in the success of the interface, both in the realisation of the interface and in its long term functioning.

#### *4.2.2.5 Financing*

In terms of financing the main partner is the Metropolis authority (LMCU) with nearly half of the funds. The next partner is the Regional Council followed by the Département. It must be noticed that SNCF, the railway operator, is represented in the financing partners but in a different way: it contributed not in money but by providing the land used to build the car park and the bus stop. Below is a table which describes the contributions of the different partners.

**Table 8. Armentières: Contributions of partners to elements of the project.**

	Studies:	Land:	Decommissioning:	Public spaces:		Bus station:	Car Parking:		Bicycle parking:
				Parvis:	Streets:		Building:	Surface:	
Lille metropolis	x	x	x	x	x	x	x	x	x
Regional council	x	x	x	x				x	
Conseil général:	x	x		x	x	x			
INTERREG 3 B	x		x	x	x			x	x
FEDER						x	x		
SNCF		x*							

As a company the SNCF has for goal to make some profit at the national level. At the regional level SNCF is the regional transport operator for the Regional Council. The company receives a subvention from the Region and has some objectives of correct operations of the railway network, with indicators of regularity. But it has no objectives of increasing the traffic of passengers. In addition the operations are heavily subsidised: on the price of a ticket, around 75 % comes from subsidies and the passengers contribute to only 25 %. In consequence, the SNCF has not built a regional strategy for the development of exchange poles. When selling its land, the SNCF is confronted to an arbitrage between an immediate profit from urban development projects and a hypothetical future benefit through increase patronage by developing exchange poles. At the regional level, the SNCF considers the land under its property around stations more as potential source of income than as a strategic asset for the development of exchange poles.

The SNCF is willing to profit from the selling of its land for construction projects. The Armentières project was to be built on a piece of land belonging to SNCF, but no budget was foreseen by local and regional actors for buying the land. Up to the beginning of works SNCF was not willing to make its land available for the project. Only a high level agreement, made possible by political interventions, has been able to unblock the situation. The SNCF has currently no concurrence in the bidding for operating the regional railway services but this situation may evolve in the future. It is probable that this argument has played a role in convincing the company to accept to contribute to the project by giving away land.

### 4.2.3 Outputs and level of service

Regarding interface and interconnection, ticket integration is currently ongoing; a “smart card” for metropolitan and regional travellers is to be introduced autumn 2012. This card, called “pass-pass”, should represent a very strong benefit for users by smoothing the travel experience and for transport operators by allowing for a better monitoring of the users.

Information regarding interconnection is provided to passengers through various forms:

- Human presence at the railway station desk;
- Paper timetables on the wall of the bus terminal and train station;
- Leaflet paper timetables for buses and trains available in the train station;
- Real-time information for buses and trains;
- Multimodal route planner machine available at the train station.

The innovative information supports are constituted of the multimodal route planner machine and the real-time bus information system located in the parvis area. The interconnection between short and long distance is mainly achieved through the legibility of space and functions of the terminal area.

Below, some indicators used to describe level of service are included:

- Terminal opening hours: 5:45 to 20:30 (surveillance 04:45 to 00:30);
- Distance from city centre: 800 m;
- Average distance from station entrance to vehicle at platform: 60 m
- Ratio between access/egress transport time and long-distance transport time (calculated based on most frequent used destination for long-distance and trip from ultimate origin for access/agress): 1.0 to 3.5; usual long distance destinations are Lille (17 min), Dunkerque (60 min) and Calais (70 min); egress/access times by bus takes maximum 60 minutes. This indicator is, however, not very relevant, because the longest bus trip is not realistic for intermodal trips;
- Ratio between access/egress transport cost and long-distance transport cost (calculated based on the most frequent used destination for long-distance and trip from ultimate origin for access/agress): 1 inside Lille Metropolis territory (same prices); 0.13 outside Lille Metropolis territory (1.5 € for Département bus ticket divided by 11.30 € for train to Dunkerque).

## 4.3 Analysis of gaps, mobility schemes and future changes

### 4.3.1 Gaps

No gaps were found relating to “wasted time”; the physical link between transport modes is of high quality, the distances are short and the sign system is of high quality. In addition, the project has been organised to deal with these issues through a very

high legibility of space and functions around the “parvis”. However, gaps were found relating to “poor information” and “poor quality”.

**Table 9. Armentières: Analysis of gaps.**

Poor information	The main gap is the missing real-time bus information inside the railway station, which obliges train users to move out of the station and into the bus area to obtain real-time information about buses.
	There is ticket integration but it is not complete. Monthly tickets can be used for train or urban transport, but there is no intermodal single-journey ticket. There is an ongoing project of “smart card” for users of all transport modes (regional train and urban transport) but not in operation at the date of the report (May 2012).
	There is a very good legibility of space when getting out of the railway station: buses are directly visible on the right of the stations. But there is poor information about buses inside the stations (paper timetables for buses available and intermodal journey planner). The train ticket desk does not sell urban tickets and does not provide accurate information.
Poor quality	In the railway station there is a convenience shop (tobacco, newspapers, sandwiches, etc.). There is a lack of shops around the station. The area is under revitalisation, one can expect some installation of shops in the future.
	There is an absence of multilingual information.
	The level of delays is reasonable.

#### 4.3.2 Emerging mobility schemes

In the table below, the emerging mobility schemes most important for Armentières are discussed.

**Table 10. Armentières: Emerging mobility schemes.**

Enhanced bicycle usage	The exchange pole is equipped with a parking area for bikes. One open parking of 50 slots and one closed with about 30 slots with human security.
	Trains can accommodate bicycles. The stairs for access to the platform are equipped with devices for bikes on the side of the stairs.
Simplifying the payment	The railway station is equipped with computer service for tickets: three machines for regional tickets and one machine for national tickets. There is no machine in the bus terminal; tickets have to be purchased from the bus drivers.

	No ticket control for e-tickets running for the time being. The station is equipped with terminals that are foreseen to be functional in a few months time.
Real time information	There is no scheduling of route based on real-time data. The route planner present in the railway station only uses theoretical schedules.
	<p>Regarding real-time information the systems are running in parallel without real interconnection. There is real-time information for trains inside the railway station, on the railway platforms and on the parvis outside the station. And there is a real-time information system in the bus terminal. But they are:</p> <ul style="list-style-type: none"> <li>• Physically separated: about 50 meters between the real-time info system on the parvis and the one inside the railway station, and the spaces are different, in and out of the station; in addition a traveller located inside the station cannot see the bus information system and vice versa, he or she needs to get out of the station to access the information; there is some information about buses inside the station but not real-time, under the form of leaflets of timetables.</li> <li>• Not sharing information: each system displays information of its own network and not the other networks.</li> </ul>
Cooperation of transport operators	The Armentières bus station is a shared terminal because it is operated by one single transport operator and is served by several transport operators. The buses timetables are adapted to better fit train schedules. The involvement of the transport authorities in the terminal project has incited the interviewees to negotiate adapted schedules with their respective transport operators.
Individual access and egress	A fence has been installed on the first platform of the railway station to prevent users to walk on the tracks and to force them to use the underground tunnel.
	There are reasonable quality bicycle lanes for access to the station.
	The urban modernisation of public spaces around the station is noticeable and particularly between the station and the city core.
Electro mobility	There are neither any electro mobility systems nor any projects of electro-mobility for private cars at the exchange pole for the time being.

### 4.3.3 Future changes

The 450 slots car parking is full on weekdays. A survey from May 2012 showed that the car park is full at 90 %, which constitutes, for the metropolis authority, an indicator of the success of the exchange pole. To such extent that drivers have to park on the

surroundings and particularly on a free land beyond the car park. A project has started, aimed to expand the car park on this piece of land that belongs to the metropolis. For the time being the car park is free. There is a project by LMCU to change the car park to charged parking. The management of the car park could be given to a private operator.

A gap still exists concerning availability of bus tickets inside the railway station. A perspective could be to make it possible to buy a bus ticket at the railway station desk, which is not the case today.

## 4.4 Concluding remarks

### 4.4.1 Main conclusions

Armentières is an urban terminal located only 800 meters away from the city core. This will e.g. increase the importance of the planning phase and preparation for future development if the terminal ever experiences capacity problems. Armentières is also a relatively small terminal. There are only 4,600 passengers per day. This makes walking distances short, and it is easy to get an overview of the terminal.

There are some negotiations with the transport operators to coordinate schedules. This is partly explained by the fact that all transport authorities involved have invested in the terminal. Thus, they are all working for making the terminal to be functional in order to valorise their investment.

There were some challenges connected to make SNCF sell its land for construction projects. The Armentières project was to be built on a piece of land belonging to SNCF, but no budget was foreseen by local and regional actors for buying the land. SNCF was not initially willing to make its land available. Only a high level agreement, made possible by political interventions, has been able to unblock the situation. The SNCF has currently no concurrence in the bidding for operating the regional railway services but this situation may evolve in the future. It is probable that this argument has played a role in convincing the company to accept to contribute to the project by giving away land.

The main gaps were related to “poor information” and “poor quality”. E.g. the ticket integration is not complete and there is missing information about buses inside the train station.

### 4.4.2 Good practices

- Armentières is a true multimodal interface with the co-presence of rail, buses, bicycles and private cars; the surroundings are designed and implemented with coherent approach.
- Legibility of space and functions is very good. Urban and multimodal signalling is very successful. The ground materials are particularly adapted. The whole

interface is a piece of urban public space, around the pedestrianised parvis, well articulated with the city.

- For the metropolis authority, the project of the exchange pole is concomitant with the realisation of the whole station area and of the rehabilitation and restructuring of the centre town of Armentières. The whole project was designed and discussed with inhabitants and local partners.
- In terms of planning, there is a positive dynamic of the two main stakeholders, the region and the metropolis, creating a synergy around this interface.
- The coordination of timetables can be seen as a consequence of the fact that all the transport authorities have been involved in the project. This initial investment has fed a willing to make it a success by adapting schedules through negotiations with the transport operators.

#### **4.4.3 Lessons learned**

- A gap is the missing real-time information on buses inside the railway station.
- There is a lack of indicators to assess the success of the interchange, particularly in terms of intermodal behaviour. Nevertheless the new PDU (Local Transport Plan) foresees the setting up of a mobility observatory aimed at assessing the efficiency of the measures.

#### **4.4.4 Suggested improvements**

Armentières was foreseen in the PDU (Local Transport Plan) of 2000. It has represented a new type of project for the metropolitan authority. At the end of the project they realised that there was no guidance in the planning documents to judge if the project was a success or not. In consequence the LMCU decided to introduce a set of assessment indicators for its future projects in the following PDU set up in 2011.

A main indicator of the functioning of the exchange pole is the “percentage of intermodal versus unimodal chains door-to-door”. Nevertheless, such an indicator is missing due to the lack of intermodal surveys at the station site. The next PDU will hopefully cover this shortcoming through the setting up of an observatory of the mobility on the territory of the LMCU.

A major improvement of the current situation would be to fully adapt the terminal for disabled passengers. It would involve building elevators and enlarging the underground passage. The current situation implies that the disabled persons call the station the day before their travel to get personnel assistance.

## 5 Oslo bus terminal Vaterland

### 5.1 Introduction

#### 5.1.1 Background and history

Vaterland bus terminal opened in 1989 and is the largest bus terminal in Norway. The designers of the terminal wanted to construct a building which functioned both as a bus terminal and as a building for shopping and business. Today, Akershus County council is located adjacent to. There are few shopping facilities.

The main aim was to regulate and operate regional traffic, and, if there were enough capacity, include also coaches and airport express. In 2012, both coaches and airport express buses constitute a considerable proportion of traffic in the terminal. Moreover, the terminal aimed to provide good conditions for travellers, and offer drivers improved facilities.

The terminal was originally planned for 450 daily departures and accommodate up to 6,000 passengers each day. However, increased demand made it necessary to accommodate twice as much. In 2011, about 1,100 buses departure daily and about 27,000 travellers pass the terminal on an average day. Total number of passengers and buses has consequently increased between 240 and 400 %. This was possible due to e.g. shorter slots for buses and pre-payment of tickets which facilitated shorter slot times. There have also been investments of 100 MNOK to get tangential bus-bays. The capacity is, however, about to be reached, and there is little room for further expansion in daily departures or passengers without new infrastructure. This is due to location of some tangential bus bays in the adjacent street near door to the terminal. In 2010, according to Vaterland annual report, the terminal had 9,818,500 passengers.

#### 5.1.2 Location and area

The bus terminal is located in the centre of Oslo with close connection to rail, tram, metro, local buses and taxis. There are short distances to other transport modes, which facilitates easy transfer for e.g. commuters. There is also walking distance to the main shopping and cultural district in Oslo, and some businesses are located nearby. A large new housing and business district is planned adjacent to the new opera building, which is only a short walking distance away from the bus terminal.





**Figure 7. Overview of Vaterland bus terminal**

### 5.1.3 Specific characteristics and terminal properties

Location and accessibility are essential aspects for describing the terminal's profile. Distances from highway network and distance from city centres illustrate important characteristics affecting the attractiveness and performance of transport chains. At large, there are only a couple of minutes of transfer for any transport mode. The terminal building itself is only about 100 meters in length.

Another important characteristic of this terminal is the capacity problem it faces. There is little room for further capacity without investments in new infrastructure. In addition the Oslo region faces a large increase in population which will put extra pressure on public transport. The terminal needs about 45 platforms. Currently, there are about 29 platforms. There is an ongoing discussion whether expanding the terminal or re-locating it above the railway tracks in Oslo central station, but there are no agreed solutions to this question. Since this debate directly touches the long-short interface issue, it will be thoroughly investigated below, in chapter 5.2.2.3 which regards planning and construction processes.

## 5.2 General description

### 5.2.1 Passenger profile and geographical coverage

Vaterland bus terminal is a major transport junction for local, regional and long-distance domestic and international transport. 60 % of total traffic is from areas that can be characterised as the greater Oslo region and embraces the major surrounding commuting areas into Oslo. National coaches amount to about 30 %, while international coaches and airport express make 10 % of total traffic (Ruter report 2010).

There are some variations in traffic over the week days and during the day. It is usually Fridays that have the most departures and it is most busy between 15.30 and 1630 (ibid).

Measured in number of passengers, this adds up to about 27,000 daily travellers. However, it is necessary to study this number in relation to other transport modes in order to understand its relative position to short and long distances transport. In 2005, about 63,000 travellers travelled daily to/from Oslo central rail station. A large proportion of these are long-distance journeys outside Oslo and Akershus. 56,000 travelled to the metro station (Civitas 2006). In addition, there are local buses and trams which transported about 50,000 passengers daily. Metro, local buses and tram carry mostly short-distance trips. In other words, bus transport is of major importance for travellers for both within and outside of the Oslo region, and the traffic has grown substantially since 2000. This is partly due to changes in the Norwegian coach regulations for long distances. The industry has grown rapidly following the deregulation around 2003 (Aarhaug et al 2011), which in turn reflects increased demand on the Vaterland terminal. In 2028, it is expected that the number of travellers will expand to about 35,000-40,000 for the bus terminal.

An important part of the terminal's performance is linked to the intermodality and the modal share of transport. According to a travel survey carried out in 2003 (Scandiaconsult 2003), about 32 % walked to the terminal, 3 % drove car and 2 % were car passengers. About 61 % came to the terminal by public transport. For environmental purposes the share of people driving by car should be as low as possible and car trips are only marginally used as feed transport. There are mainly two explanations behind the low car share to the station. Firstly, many commute to the region. Secondly, the public transport system is of good quality and the facilities for parking and driving are low.

The modes of transport chosen illustrates the terminal's close connection with public transport and reveals its role as an interchange terminal and its close connection to rail, metro, local buses and tram. Almost half of the passengers were commuting and about 46 % use the terminal regularly (ibid). Regarding the end destination for people travelling from Vaterland, about 47 % were travelling to Akershus and 12 % to Oslo. Consequently 41 % had a destination outside Oslo and Akershus. International trips have a marginal position with only 5 % of the passengers (ibid). This may have changed due to an increase in the coach market since 2003.

It should be noted that the population in Oslo and Akershus is expected to increase by 30-40 % during the next 20-30 years.

## 5.2.2 Planning, financing, ownership and organisation

### 5.2.2.1 Ownership structure

Vaterland bus terminal AS was established in 1986 with the purpose of owning and managing the bus terminal, as well as other linked activities. Akershus County financed the infrastructure, while Oslo municipality contributed with the terminal site. As the two only shareholders, Akershus County now owns 78.5 % of the shares, while Oslo municipality owns 21.5 %. Oslo municipality has no other responsibilities as far as finance or operation of the terminal. The infrastructure investments for the terminal amounted to 110 million NOK.

The terminal has an administrative board consisting of three members from Akershus County and two from Oslo municipality. The board is among others responsible for developing each year's budget. The terminal operations are privatized at Vaterland bus terminal and the same is the case for all other bus terminals in Akershus County. Vaterland bus terminal has no employees since the administration and management of the terminal is outsourced after tender to Akershus public transport terminal (APT). This is a fully owned enterprise by Akershus County. Their purpose is to manage, operate and maintain the county's bus terminals and park-and-ride facilities. Akershus County has therefore the responsibility for management, through APT. The managing director of APT is a secretary for Vaterland bus terminal and ensures the daily administration and management of the terminal.

According to the management directors of Vaterland, the current model is well-functioning, at least from a pragmatic viewpoint. One main advantage is that multiple owners reduce economic risk. Thus, there can be some positive effects of having multiple owners from an economic perspective. The interviews draw a somewhat different picture when it comes to administration and management. It is easier to have control with only one owner and it is more difficult to harvest large-scale advantages.

Another important point was also highlighted. It is necessary that regional public authorities own the terminal in order to secure effective and accountable competition. Transferring ownership to a private company can have negative effects. The current system is open and transparent, which foster trust among actors. One example is when it comes to allocating licenses for buses trafficking into the terminal. This is awarded by the national transport department. Vaterland bus terminal then gives a statement and recommendation to the authorities. For instance they can report that there are no free slots between 16:00-17:00 hours and, consequently, do not recommend any new departures during that time frame. Current practise has shown that authorities listen to the terminals statement and gives no licenses during hours which already are full and set requirements that bus lines have to operate on hours which have free capacity.

### 5.2.2.2 Regulatory framework

The number of actors involved in development of the largest transport terminals can be large. Road, rail, public transport operators, infrastructure managers, municipalities, counties and national authorities are examples of some of the instances involved. In

addition, there might be commuters, neighbours or interest groups which participate in the decision making process.

It is necessary that actors have an overall perspective of the development of a transport junction. Some of the participants may delay, counter or veto a certain development. Even when there is agreement, the number of actors and perspectives call for a complicated process (Pressman and Wildavsky 1973). This highlights the importance of promoting coordination and productive interaction between participants. Vaterland bus terminal is dependent on a range of other actors which directly or indirectly affect its performance. However, there are no regulatory requirements for cooperation. State regulations could arrange for formalised cooperation which makes it mandatory to participate and which function as an arena for early discussions.

Such processes can facilitate progress by exploring and take advantage of opportunities (Kasa et al 2011), promote improved understanding between actors, share information, practices, etc. This can be an effective strategy to manage complex developments.

### 5.2.2.3 Planning and operation/construction processes

Long and short distance transportation performance is closely connected to the planning and construction process. Oslo region expects increased demand on public transport of up to 50 % the next 20 years, and in such a long term perspective it is necessary to expand or build a new bus terminal. Consequently, there has been published several reports which investigate these matters and there has been political discussions for development of a new terminal. A majority of the actors wants to build a new terminal above the rail tracks at Oslo rail station and, thus, foster shorter distances and better coordination between short and long transport. To shed light on what determines connections between long and short transport, it is beneficial to look further into the various interests of the actors involved.

**Table 11. Vaterland: Interests of stakeholders regarding the planning and construction of a new bus terminal.**

Actor:	Role and interests:
ROM Eiendom AS	Established in 2001 as a wholly owned subsidiary of NSB AS (the state-owned monopolist rail passenger company in Norway), Rom is one of the larger property companies in Norway. Their core activities are interchange and hub development, property development, railway station development and property ownership, management, operation and maintenance. In other words they have a mandate which is divided between commercial development and developing interchanges for increased use of public transport. ROM is in favour of relocating the terminal above the rail tracks, and their active role in the planning process indicates that it has been a clear congruent interest between commercial development and development of transport junctions.
Ruter	Ruter is a publically owned company that is responsible for planning of

Actor:	Role and interests:
	<p>public transport in Oslo and the surrounding Akershus county. Ruter is also strongly in favour of relocating a new terminal above the rail tracks. They have an active and leading role in the process by being responsible for developing several of the reports on the subject. If the authorities approve a new bus terminal, Ruter might apply for developing a zoning plan. In such a process they will invite the Norwegian Rail Administration (NRA) to participate. NRA then has the possibility to object the zoning plan and the plan is send to the Ministry of Environment which decides to affirm or not affirm the zoning plan. This signalises that the outcome is still highly uncertain and that the governmental interests in the end are important. Ruter will not have any costs connected to the development of a terminal.</p>
<p>Vaterland bus terminal</p>	<p>Vaterland bus terminal seems more expectant for developing a new bus terminal. The terminal capacity might be sufficient for the next 5-10 years. However, they have in a public hearing stated that a new bus terminal could be located above the rail tracks. They acknowledge that the authorities have to find a solution for the rail through the city centre system first. Intercity improvement could strengthen the railway's market position due to new railway tunnel and, consequently, reduce the demand for regional buses trafficking to Oslo. Buses could in this perspective operate in areas which is not located close to the train stations. Meanwhile, they have upgraded the terminal. Vaterland emphasise the importance of not allowing any building in areas which can block future development of the central rail station and the bus terminal.</p>
<p>NRA</p>	<p>The Norwegian Rail Administration has a more reluctant view for combining a new bus terminal at Oslo central station. Firstly, they highlight that NRA has a different time frame than the other actors. Rail has a 10- 40 years perspective. This is a longer perspective compared to other actors, which have a relatively shorter time frame.</p> <p>Secondly, and related to the first point, NRA is reluctant to be involved in a development which might reduce their flexibility and block further investments for use of rail. It is for instance needed to build a new tunnel for trains through Oslo in order to accommodate the increased demand for train in the region. The rail administration argues that there are several possibilities for the design of a new tunnel which also affect e.g. the track structure at the station. The various solutions have implications for the development of the whole central station and NRA states that they have not concluded on how the design of the tunnel shall be. Consequently, it is difficult to decide on future development of a possible new bus terminal since they have not concluded on important future solutions. However, some of the other actors state that the design of a new terminal is quite evident and that it still is possible to build a bus terminal.</p>

Actor:	Role and interests:
	<p>Thirdly, NRA demands clear solutions for functionality at the terminal. They are uncertain on how pillars at the platforms affect accessibility and occupies space. Moreover, the platform use is insufficient at the current situation. It is only possible to access the terminals from one entrance. This leads to sub-optimal use of capacity at the platforms. Consequently, the rail authority wants to have the flexibility to develop and improve the central station further.</p>
	<p>Fourthly, new developments should not lead to increased risks for accidents or terror, and it is possible that a new development might increase such risks.</p>
	<p>The last point is related to the competition between short and long distance transport, and especially between coaches which compete with train passengers. NRA does not necessarily perceive that the best use of the land is to increase competition. The priority should be to make the most attractive terminal for train passengers. Such a view can be linked to NRAs view of questioning the need for a central bus terminal. Another possibility could be to develop a more fine-distributed system for buses, which involve that bus does not need to travel to one central point in the city.</p>

These views illustrate some of the challenges connected to planning and construction processes. Both Oslo municipality, Ruter and Vaterland has been positive to a new terminal, but the rail authorities has been more negative. Thus, the area around Oslo central station has multiple owners and there are various interests for the development of a new transport junction. There are also challenges connected to rail capacity and further investments in rail infrastructure. National authorities want to strengthen the regional rail infrastructure by building double rail tracks to the closest regional centres. Moreover, it is, in a longer time frame, necessary to invest in new tunnels for rail in Oslo. These rail projects could have important consequences for development of the area as a whole and connected to passenger demand and operations at Vaterland bus terminal.

#### 5.2.2.4 Sharing of information

Passengers arriving at the terminal have to visit the ticket counter, travel directly to other modes or search for departures on the web by means of their own. In addition, Vaterland bus terminal does not have any internet site for its customers, but instead passengers have to search directly at the operator's web-pages for travel information.

The information system at the terminal only present time tables connected to buses departing from the terminal. There has been a project aimed at establishing a multimodal information system, but it has halted due to lack of interest from operators. Operators have little interest in providing information about other transport modes and,

consequently, there are separate information systems for train, coaches at the terminal and local public transport for buses, metro and tram. This can be directly linked to competition between modes of transport. Some of the interviews indicate that the rail sector is most reluctant of providing information, even though they are a national actor and therefore could have an integrated view on short and long public transport.

Travel information for some public transport is available at internet and at applications for mobiles through “Ruter”. However, the information is limited to the greater Oslo area and does not cover all modes of transport. The system is commercial, which means that operators have to pay for being included in the system. Especially the coach market argues that it is too costly to participate and therefore the system lacks transport modes and operators. In addition, the travel information is limited to the larger Oslo region and does not include other parts of the country.

Another way of organising travel information could be to have a public organisation which is not commercial. Financing could come e.g. from national authorities or co-financed by regional authorities. Such a system can secure that all travel modes are included and that the system covers the whole country.

National authorities currently have a project which intends to establish a national travel database. Involving state authorities might be necessary in order to secure a travel system which includes the whole country and not just restricted to some regions. A national system needs to be based on commercial interest, and an important question is related to financing of the management.

#### *5.2.2.5 Financing*

Originally the terminal was financed through loans, and there are still about 30 million NOK<sup>2</sup> before the payment is finished. Vaterland has also made investments in order to upgrade and improve facilities at the terminal.

Vaterland gets its financing from various sources. Operating incomes come from terminal charges and departure charges which are based on slot-times (e.g. longer slot times mean higher charges). Another source of income is rents of buildings. Akershus County also make contributions, and Vaterland gets financing through Oslo package 3. Oslo package 3 is the master plan for development and financing of roads and public transport in Oslo and Akershus, and parts of the revenues from the toll ring around Oslo has been used for operations in public transport services. In addition, the terminal has changed its organisation from being a private public limited company to a county owned company in order to reduce VAT expenses. They have also engaged a consulting company which shall try to find possible fiscal changes.

Vaterland bus terminal points out that it is important to have an organisation and a board which is fully committed to financing issues. In addition they have considerable

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<sup>2</sup> Approximately 4 million Euros.

less commercial interest compared to a private company. Their goal is to balance the budget and they don't have to spread profits to shareholders. Such a financing model does not, however, imply that Vaterland or the authorities is ignorant about cost-effectiveness. Currently there are discussions about reorganising management of infrastructure for Oslo municipality and Akershus county and collect all management bodies under the same umbrella. This is an ongoing discussion.

### 5.2.3 Outputs and level of service

Vaterland only offers information on buses and local transport departing at or close to the terminal. There is also a lack of information for passengers arriving at the rail station and transfer to buses at the bus terminal. One main reason for this development is the lack of interest of providing such service between transport operators. Information provision could be a major improvement for these passengers. Especially disruption information would be helpful, e.g. in situations when one of the transport modes is delayed or not operative. The rail services in the Oslo region have experienced challenges connected to delays. Information provision could be facilitated by national authorities taking a stronger role.

Productivity and effectiveness is related to the number of passengers and departures. The terminal was originally planned for 450 daily departures and accommodate up to 6,000 passengers. In 2001 they accommodated around 1,100 departures and about 27,000 passengers. Total number of passengers and departures has thus increased between 240 and 400 %. This is partly due to shorter time slots for buses and pre-payment of tickets. In total there are about 9.8 million passengers trafficking at Vaterland bus terminal each year.

Vaterland bus terminal has not conducted many studies which seek to gather information about passengers experience about the terminal. The last survey was carried out in 2003. The results might not be representative for the current situation due to upgrades, but indicate that passengers are overall quite satisfied with the terminal. Location, signs within terminal and travel information have the highest scores. Not many people use the parking facilities, deposit boxes or platform trolleys. The passengers were also given the opportunity to suggest measures which would improve the use of the terminal. 18 % answered better signs and information. This was mainly connected to improving travel information, information about incoming buses, information about delays and better capacity at the customer service.

There is partial integration of tickets between long and short distance modes. There is a common fare system for travels within Oslo and Akershus. There is not any integration for longer travels. This is mainly a national responsibility and the government has been working on the matter for some years.

Regarding punctuality, the bus terminal operates with an incentive system which punishes buses which exceeds their slot time, and this can lead to better punctuality at the terminal. However, it has not been possible to extract data on this.



In 2010, according to Vaterland annual report, the terminal had 9,818,500 passengers. In a 20-years perspective, 100 million passengers per year are expected. According to Akershus Public Terminals there were about 19.1 man year working at the terminal. In other words there are 514,057 passengers per employee. However, it is necessary to point out that some services are tendered and that the passenger flow is calculated. Thus, it is important to be cautious when interpreting the results.

### 5.3 Analysis of gaps, mobility schemes and future changes

#### 5.3.1 Gaps

Gaps identified at Vaterland terminal relating to wasted time, poor information and foreigners and inexperienced passengers are presented in the table below.

**Table 12. Vaterland: Analysis of gaps.**

Wasted time	Poor links between transport modes (long walking distances) is an important factor. The longest walking distance is between the bus and rail station (200-300 metres). A possible new terminal above the rail tracks can decrease walking distances and improve links between transport modes. However, there are few gaps related to wasted time for Vaterland.
Poor information	There are more challenges connected to providing information. Some operators are unwilling to provide travel information between modes of transport. However, there are national projects aiming at developing a national system for travel information, travel planners and eTicketing (also including mobile phones). It is for instance possible to buy train tickets by mobile phones. The system is operated by NSB and it has just included local public transport trips within Oslo and Akershus. Ruter is also developing their own application for mobile ticketing. It should also be noted that there is no information available in English.
Foreigners and inexperienced passengers	Foreigners and inexperienced passengers may meet the problems described previously; the poor information provision at Vaterland between long distance buses and the local transportation network is the main problem. This information should also be in English.

#### 5.3.2 Emerging mobility schemes

Some of the most emerging mobility schemes are discussed in the table below, relating to bicycle usage, simplified payment, real time information, cooperation, access/egress and electro mobility.

**Table 13. Vaterland: Emerging mobility schemes.**

Enhanced bicycle usage	About 4 % of all journeys in Oslo urban area are done by cycling and at a general level there are insufficient parking facilities for cycling at terminals. TOI has mapped cycling facilities related to rail stations in some parts of Norway and there is a great potential for improvement when it comes to more and safe bicycle stands.
Simplifying the payment	Simplifying the payment by offering computer equipment for payment services, hardware for registration in terminal and ticket control mechanisms for eTickets are aspects which are not yet sufficiently developed at the terminal. However, for travels within Oslo and Akershus a system for computer payment services, hardware for registration and ticket control mechanisms have been developed.
Real time information	Real time information boards in terminals and scheduling of routes on base of real time data is limited to the busses trafficking in the terminal. This excludes the local buses, trams and subways covering the Oslo area; real time information on these routes are available either via the internet or via the Ruter application for mobile phones.
Cooperation of transport operators	Cooperation of transport operators relate to shared terminals and coordination of schedules. According to our knowledge there is little coordination of schedules between transport modes. Tram, metro and local buses have such a high frequency that it is not that necessary to coordinate schedules with regional travel modes.
Individual access and egress	Individual access and egress are linked to sufficient, safe and affordable parking areas and release of barriers for private access/egress. Parking facilities include a car park which costs 240 NOK each day or 30 NOK <sup>3</sup> per hour.
Electro mobility	There is already a charging station for electric cars at the bus terminal's parking house, as well as a number of other charging stations both in close proximity and in the whole Oslo area.

### 5.3.3 Future changes

There will indeed be a lot of future changes, but they are highly uncertain. The bus terminal will have to be moved due to soon-to-come capacity problems. The new location is suggested to be above the Oslo railway station, but the parties have not come to an agreement yet. Read more about this in section 5.2.2.3.

<sup>3</sup> Approximately 4 Euros.

## 5.4 Concluding remarks

### 5.4.1 Main conclusions

Vaterland is a pretty well-functioning terminal when it comes to operation and finance. It is a public owned company and does not need to share profit with stakeholders. The terminal has been running in profit and there have been several investments for improving facilities at the terminal. In 2010 a project which aimed at upgrading worn-down installations, improvement of logistics and establishing new entrances at the terminal was finished.

Operation and management of the terminal is characterised by low levels of conflicts and good cooperation between actors. Pre-payment of tickets and shorter slots for buses has been important measures to enhance efficiency. The capacity might be sufficient for the next 10-15 years, but there is a need for expanding or relocating the terminal. The process has been challenging and there is not yet any decision on future development. The largest gap is the lack of travel information between short and long transport.

### 5.4.2 Good practices

- Vaterland bus terminal is located in the centre of Oslo with short transfer to rail, metro, tram, bus and taxi. This is an important structural factor facilitating easy transfers between short and long transport. Location was also the highlighted as the most favorable factor by passengers travelling to the terminal.
- The terminal is well-functioning when it comes to finance and operation. The terminal runs with profit, upgrades have improved logistics and there has been an efficient use of the terminal. Even though the last survey among passengers was conducted in 2003, the conclusion was that overall passengers were quite satisfied with the use of the terminal.
- Vaterland is a public company, and ownership of the terminal is separated from operation. This can be important to establish trust among actors and secure a fair and equal access to the terminal for operators. Vaterland bus terminal emphasise their good relationship with authorities. Moreover, their recommendations have up till now always been taken into account.
- For environmental purposes, the car share for travels to the terminal should be as low as possible. Vaterland has a low car share, and it is likely that it is linked to high charges for parking and good connection to public transport modes.
- In Oslo and Akershus there have been several improvements for public transport. In 2011, a common fare system for travels within Oslo and Akershus was established. In addition, the zone system for ticketing was reduced from 88 zones to twelve. It is also possible to buy tickets electronically and by mobile phones.

### 5.4.3 Lessons learned

- Lack of travel information between transport modes might be the most important barrier for good interconnection between short and long distance transport. There has been a project aiming at offering travel information between modes, but it has been terminated due to lack of interest from operators; consequently, there are separate information systems for train, coaches, and local public transport. Some of the interviews indicate that, despite being a national actor, the rail sector is especially reluctant about providing information.
- Travel information for some public transport is available at internet and through different applications. A main problem is that the system is geographically limited, mainly to Oslo and Akershus. In addition, it does not include all public transport. One main reason can be the commercial nature of the system which excludes operators which does not pay for participating. Especially some of the coaches argue that it is too expensive to participate. National authorities have projects which aim at establishing national travel data systems. An important question is to settle financing of management.
- Lack of one responsible actor for developing and integrating transport junctions and public transport might be an important barrier. There is a great potential for better coordination and earlier discussions of adjoining problems. At least to some extent the system is fragmented, meaning that actors only have responsibilities for part of the process and have not an interest of developing a public transport system which integrates and coordinates short and long public transport. There are examples of unclear responsibilities and lack of leadership in processes.
- Another bad practice is related to lack of consensus on goals. Cooperation and implementation can go easier if the participants agree about the direction and goal of a project. It has been especially difficult to foster cooperation in building a new terminal since the actors do not share a vision for integration of various transport modes. It could be a state responsibility to secure that state actors promotes a broader perspective on public transport and not just limited to one form for public transport.
- Different time frames between actors and unclear national strategy plans can make it challenging to promote cooperation and planning among transport modes. The Norwegian Rail Administration especially points out that unpredictability and the lack of political commitment in the National Transport Plan creates uncertainties in future planning.
- A last point is connected to the nature of politics. Akershus and Oslo is divided into two counties and several municipalities. This creates a political game in which the various political actors are struggling over recourses and projects. Professional advice concerning public transport often falls short of being a priority when other political goals are taken into account.

#### 5.4.4 Suggested improvements

Introducing economic principles for allocating slots during rush hours can be a measure used for regulating departures. One could expect that the low fare coaches would choose less popular departure times, and by doing so reduce competition between train and long-distance bus.

Regarding lack of integrated travel information (most likely due to the commercial nature of the system which excludes operators which does not pay for participating) it is recommended to establish a public system where counties are responsible for financing.

Some of the interviews point to the direction that rail authorities should have a broader mandate which is not limited to only rail. An integrated view on short and long transport could improve incentives/responsibilities for e.g. providing information between modes.

Regarding cooperation and integration, a suggested improvement can be to establish strategies which bridge sectors in a coordinated manner. It might be particularly important to assign a leading actor that can initiate and govern processes. Regional authorities (counties) are perhaps the most suited actors as they possess competence and legitimacy, as well as having a coherent perspective for integration of short and long public transport. A challenge is to take into account that rail often is cross-regional, and to secure a development coinciding with national interests. Such a strategy can improve coordination and facilitate progress and implementation of measures.

It is important to bring up adjoining problems at an early stage. Having one responsible actor in charge of transport junctions can alter this challenge. Moreover, having a steering group or a forum consisting of members from relevant actors can create an arena for discussions, bring about planning and analysing and achieve development in a more coherent view.

## 6 Port of Helsinki – Vuosaari

### 6.1 Introduction

#### 6.1.1 Background and history

Previously, the Port of Helsinki served unitised cargo in West Harbour and South Harbour, which are located in the city centre of Helsinki. The central location caused challenges in logistics, such as congestions and lack of space. It was therefore a logical choice to move the freight operations to another location further from the city centre.

There were two potential locations for the harbour: Vuosaari in Eastern Helsinki and Pikkala in Kirkkonummi, which locates over 30 km from Helsinki to the west. It was mainly a political choice to build the new harbour in Vuosaari; in order to maintain the harbour in the municipality of Helsinki and not to lose tax revenues to another municipality. Vuosaari is also logistically better located, due to the shorter distance to the main national highways and the main airport of Finland.

There was no harbour at all in Vuosaari previously, thus it was a green field project. The Port of Helsinki was responsible for the project management. The planning of Vuosaari Harbour started the year 2001 and the construction in the beginning of 2003. Vuosaari Harbour was opened almost six years later in November 2008. The mobilisation was fast. Only a week after opening, traffic was flowing, and by the end of the year, all operations and systems were in full flow without delays.

#### 6.1.2 Location and area

Vuosaari Harbour has an important role and a central location in Finnish trade and logistics. Vuosaari is located 15 kilometres east from the city centre of Helsinki, which is the capital of Finland. The capital region is the biggest centre of business activity in the country and almost 30 per cent of inhabitants live in Uusimaa region, which constitutes only 3 per cent of Finland's surface area. As around 80 per cent of Finnish international trade is transported by sea, ports have a crucial role in the Finnish logistics system. The densest network of logistics centres in Finland is located along the ring road from the airport area in Vantaa towards Vuosaari Harbour and between the two main highways to the north. The main domestic material flows are from south to north.

Vuosaari is a modern and efficient harbour with several ship owners, stevedoring companies and other logistics service providers operating in open competition. In the harbour area, there are service areas, a logistics area and a gate zone next to the ISPS area.

The service areas are mainly for drivers, and for the maintenance and repair of heavy equipment on wheels. The logistics area next to the Vuosaari Harbour area is meant

for incoming and outgoing cargo loading and unloading, containerisation and recontainerisation, short-term storage and other similar logistics operations. The close location of logistics service providers enables flexible and fast movement of goods. In the gate zone, there are parking areas for short and long term parking. Also port security and area surveillance, and Customs services are located in the gate zone. Customs perform traffic control, cargo x-ray and vehicle inspections. Inside the ISPS area there are depot, storage, stevedoring and cargo handling services.

Access to Vuosaari Harbour area is efficient by sea, road and rail. A highway level road leads directly to the port, and automatic access gates for vehicles makes the entrance smooth. Rail tracks reach the loading/ unloading areas in the quays. The fairway is easily navigable and pilotage is needed around 15 km in the costal island area. Ice breaking services are available in winter time.

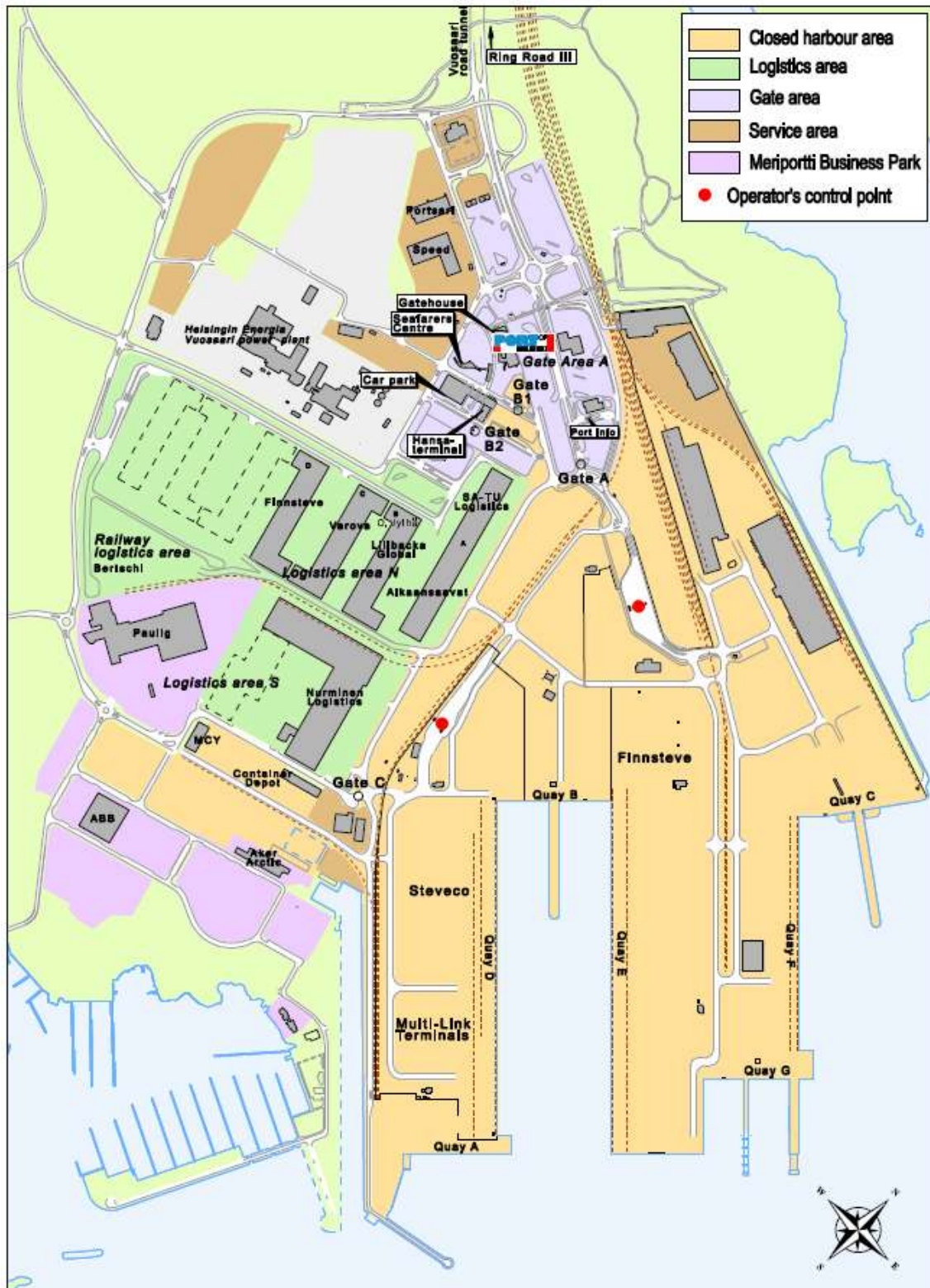


Figure 7. The layout of Vuosaari Harbour Centre (Port of Helsinki 2012)



### 6.1.3 Specific characteristics and terminal properties

The Port of Helsinki is the main hub for global trade in Finland. It also serves small-scale transit traffic from and to Russia and other CIS countries. Vuosaari Harbour is the main freight harbour of the Port of Helsinki. It is specialised in unitised cargo services, i.e. containers, trucks and trailers. The Port of Helsinki also serves Ro-Ro traffic from West Harbour and South Harbour to Tallinn and Stockholm on passenger ships. General cargo and special transportations are also served in Vuosaari.

Vuosaari Harbour has a surface area of 150 hectares of which 122 hectares constitute the terminal area. Container terminals provide inspection, storage and handling services for containers, trucks and trailers. There are ten container cranes in Vuosaari and they are owned, like other cargo handling equipment, by port operators: Finnsteve Oy Ab, Multi-Link terminals Ltd and Stevedco Oy. The lifting capacity of container cranes varies and it is up to 90 tonnes with an outreach of 46 metres. Terminal handling equipment includes also straddle carriers, reach stackers, forklifts and terminal tractors.

There are seven quays where the depth of water is 10.5 or 12.5 metres. The total length of container quays is 1460 metres and there are 17 Ro-Ro berths in Vuosaari. The potential of expandability is around 20 per cent of today's capacity, but there is no need for expansion in the near future as only half of the current maximum capacity is in use.

## 6.2 General description

### 6.2.1 Freight profile and geographical coverage

Vuosaari Harbour has good transport connections of all modes. It has the most frequent scheduled departures to all major Western, Central and Northern European ports from Finland. The harbour is located in the Eastern part of Helsinki where Ring III starts, which is part of highway E18. Ring III has connections to other main highways in Finland (E75, E12), connecting Vuosaari directly to the entire Finnish road network. A 19 km long rail track built for the harbour connects it to the main rail network of Finland. In addition, Vuosaari Harbour is located close (18 km) to the main airport of Finland. This is important for combining the material flows of consumer goods using different transport modes.

The year 2011 the unitised cargo traffic of the Port of Helsinki was 10.2 million tonnes with an increase of 4 per cent from the previous year. 393,619 TEUs of containers (3.2 million tonnes) passed through Vuosaari Harbour. The number of trucks and trailers totalled 520 000 (6,5 million tonnes), of which 54% of vehicles (59% in tonnes) was served in Vuosaari harbour and 46% (41% in tonnes) in West and South Harbours on passenger ships. 38 per cent of the unitised cargo of the Port of Helsinki departs from or arrives to Germany. Estonia (Tallinn) has a share of 29 per cent.

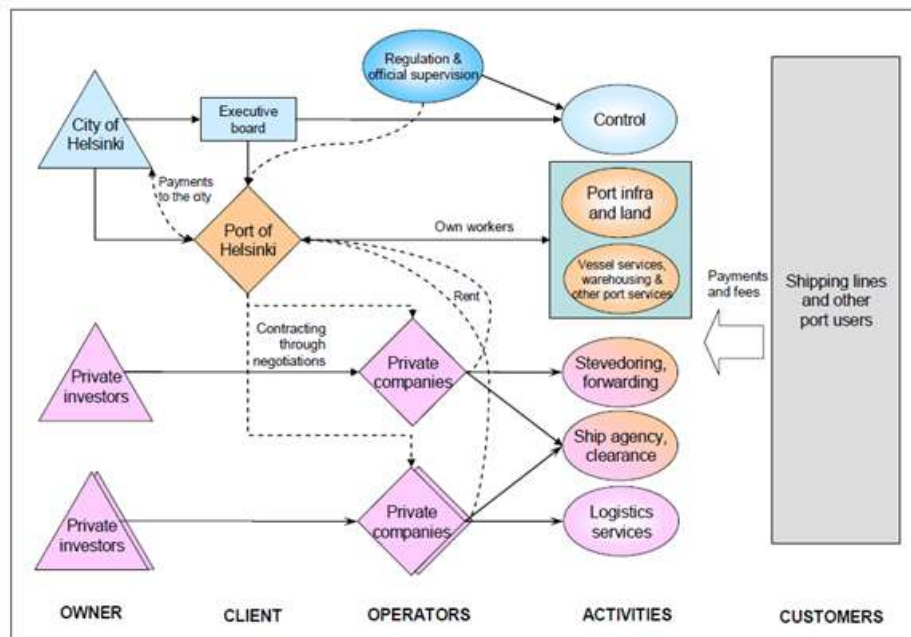
The import traffic of the Port of Helsinki mainly consists of consumer goods (65 %). Raw materials and production inputs account for 25 per cent and investment goods for 10 per cent. Machines and equipment, and forest industry have both a share of 30 per cent in export traffic. Also metal and metal group industry (20 %), foodstuff, chemicals and other industry (15 %) and electronics and electrical goods industry (5 %) are exported from the Port of Helsinki. The cargo traffic at the Port of Helsinki represents approximately 11 per cent (the year 2011) of the Finnish foreign trade transported by sea in tonnes, but approximately two-fifths in value.

## **6.2.2 Planning, financing, ownership and organisation**

### *6.2.2.1 Ownership structure*

Port of Helsinki is a municipal enterprise fully owned by the city of Helsinki. It operates under the guidance of Board of Municipal Enterprises, which is responsible for operations and profitability of municipal enterprises. The city establishes annually revenue targets for Port of Helsinki, and requires approximately 15 % of net revenue returned to the city as income. As a municipality owned enterprise, the Port of Helsinki does not pay state taxes and has a monopoly.

Port of Helsinki has a separate budget. Its operation is based on incomes received from the port users, port operators and other customers. Port users pay fees for port usage and provided services according to the listed prices, which are verified annually. These fees include for example cargo charges based on gross weight, vessel charges based on net tonnage and storage based on TEUs and duration. The price list can be found on the Internet. The land is owned by the City of Helsinki, and the port operators, logistics companies and other enterprises providing services in the port area pay rent for the use of land area and the infrastructure. The ownership model of the Port of Helsinki is shown in Figure .



**Figure 8. Helsinki: The ownership model (Rönty et al. 2011)**

It has been speculated that the municipality law in Finland will change and drive ports to the municipal-owned company (MOC) model in the future in order to increase competition neutrality. In the corporate model, the city of Helsinki would remain the owner. If the Port of Helsinki was a public limited company, it could for example expand by buying another port.

#### 6.2.2.2 Regulatory framework

Vuosaari Harbour operates on a landlord principle. The Port of Helsinki invests on infrastructure, maintains the port area, and administers the land area and leases it to private operators. The private operators own and are responsible for the superstructure, such as cranes, terminals, machinery, cargo-handling equipment and their information systems. Shippers can buy services based on competitive bidding, independent of the Port of Helsinki.

The strength of the landlord principle is that operators have the control of the whole cargo handling process and related logistics and services. Thus, operators have more flexible opportunities for developing cargo handling which benefits customers.

As the operators own fixed container cranes, the port loses flexibility on space alternation in changing situation even though operators have agreed on flexible land use. For example, if an operator's volumes decrease, it is difficult to use the area with free capacity for other operators' purposes, because there is superstructure owned by another company.

#### 6.2.2.3 Planning and operation

The Port of Helsinki has basic contracts with all the actors in the area. Common procedures are managed in different cooperation bodies, as operator meetings

(operational level), follower (executive level) and cooperation forum. Operators were also involved in the planning stage, and their points of views were already taken into account at that stage.

There have only been minor conflicts between different stakeholders. For example, Vuosaari Harbour finds the requirements of national authorities (Customs, Border Guards) sometimes oversized. In addition, more clear rules regarding operators, e.g. related to the maintenance of the area, would clarify cooperation even though it works relatively well already. The disadvantage when operators own their fixed container cranes is that the land use alternation between different operators becomes more complicated in the harbour.

#### *6.2.2.4 Sharing of information*

Vuosaari Harbour utilised AutoID (automatic identification) technology in the gates, in loading and unloading processes and in access control system of machines. The AutoID system used in the gates is based on optical character recognition (OCR) where vehicles are recognised on the basis of their licence plates. OCR technology is also used to identify transport units (e.g. trailer, container) on the basis of their number. The OCR system's reliability is 97%.

When a vehicle approaches a gate, identification information is automatically transferred to the information system, which provides guiding information through display panels. Vehicles that cannot be identified will automatically be guided to the Port Info service point for manual identification. Vehicles leaving the port area are also identified on the gates for security reasons. As there are several actors in the port area, each of them provides an access pass for their clients. The recognition of machines is based on RFID (Radio Frequency Identification) technology.

In Vuosaari Harbour, Customs and different actors have their own IT-systems. There are interfaces enabling communication between different IT-systems. However, this causes challenges for example for the Customs who need to have several interfaces or devices in order to be able to communicate with all the actors in the area. Developing the harbour from "green field" bases has facilitated the system integration of different actors. However, due to competition all information cannot be shared openly.

Despite the large amount of cooperation, actors have their own processes and, thus, customers need to handle with different procedures. Harmonising these processes would enable more efficient operation in the harbour and remove one identification gate for vehicles.

The Port of Helsinki uses the Portnet service, which is a service network for nationwide vessel traffic in Finland maintained by Finnish Transport Agency. Ships have to provide information regarding its timetable, route, cargo, any hazardous cargo and maritime fees. It is also possible to give security announcements. The user interface for the PortNet system is internet-based, but companies can also send notices in EDIFACT or XML formats.

#### 6.2.2.5 *Financing*

The Port of Helsinki was completely responsible for financing Vuosaari Harbour and the logistics area surrounding it. The loan for building Vuosaari Harbour was taken by the city of Helsinki. Vuosaari Harbour is not and has not been subsidised at all. The construction of transport connections to the harbour, including road and rail connections and fairway, were financed equally by the Port of Helsinki and the state of Finland. The main problem related to financing is interest rates.

### 6.2.3 **Outputs and level of service**

Vuosaari Harbour measures productivity and effectiveness by some indicators. Span time indicates the time trucks spend inside the gate area. This shows if unloading and loading operations are efficient. Operators also follow the number of containers lifted by cranes per hour.

The close location of logistics operators and shipping companies is crucial for efficient terminal operation and for the level of service. Currently, logistics operators are located in the terminal, which enables flexible and fast movement of goods and good cooperation with the harbour. Shipping companies are not located in the Harbour Centre, and this complicates face-to-face communication between Vuosaari Harbour and the shippers. Shippers and logistics service providers collaborate to some extent even though they are competitors.

Apart from the services offered by logistics service providers and shippers, the most important businesses and services in Vuosaari Harbour area are operators, container depot and container repairs. Below is a list of different services available:

- Container transport services;
- Assignment and customs procedure services;
- Impartial inspections of goods and vehicles;
- Weighing functions;
- Wash and repair services;
- Express oil change service;
- Tyre services;
- Spare part and accessory services;
- Lubricant and chemical wholesale etc.;
- Restaurant, grill-kiosk, Internet café;
- WC, sauna and shower facilities;
- Library;
- Laundry room;
- Social and meeting facilities;
- Catering and event services;
- Service station, small store.

Currently, only one rail operator transports freight from Vuosaari. The lack of competition affects prices and services available. This problem relates to rail traffic in Finland in general, not only Vuosaari.

Vuosaari Harbour offers regular and frequent connections to the main European ports with a full capacity 24/7 all year round. The price level is relatively high compared to other ports in Finland, but due to the central location, Vuosaari Harbour is competitive. The pricing system in tonnes instead of units promotes the traffic of certain product categories (break bulk). There are three independent operators in the harbour, which creates competition affecting positively on the price level of terminal operations.

The delays of arrival traffic are minimal, and they are usually temporary and caused by storms and strikes. Also the loss and damage of shipments is minimal. Thus, Vuosaari Harbour provides reliable sea freight services.

As Vuosaari Harbour was built on “green field” bases, there were good basis for placing different actors close to each other with the premises and infrastructure required. Thus all the operators and other actors can easily provide high quality services and cooperate. In the landlord principle operators have the control of the whole cargo handling process and related logistics and services. Thus they have good opportunities for developing cargo handling which increases service level.

In Vuosaari the ratio between TEUs transhipped per employee and year is approximately 1,120. This is based on the terminal personnel including mainly stevedoring personnel.

As the freight volumes in Vuosaari Harbour the year 2011 was nearly 400,000 TEUs and there are ten container cranes in the harbour, the average number of TEUs lifted per year and per crane is approximately 40,000. As only half the capacity is in use in Vuosaari Harbour, TEUs lifted per year could be higher with the current equipment.

The energy consumption of Vuosaari Harbour Centre in the year 2011 was 17,265 MWh, of which operators used 68.5 per cent, Vuosaari Harbour 28.5 per cent and the remaining 3 per cent was sold. If half of the energy used by Vuosaari Harbour and operators is considered to be used for trailer and truck traffic, the energy use per TEU is 21 kWh.

## 6.3 Analysis of gaps, mobility schemes and future changes

### 6.3.1 Gaps

In Table 14, the most important terminal gaps are listed. These relates to (1) lack of standardisation, (2) lack of appropriate infrastructure and (3) dependency of mode choice to economy and legislation.

**Table 14. Vuosaari: Terminal gaps.**

Lack of standardisation	Information systems of different operators and other actors in the area could be better integrated if standardisation was agreed in common. As operators are operating in different ports and operators have their own systems, a complete integration would require cooperation of a large group of actors.
Lack of appropriate infrastructure	Vuosaari Harbour has new and well maintained infrastructure. The lack of infrastructure is related to expansion possibilities and rail freight terminal. Even though rails reach the quays, if rail transportation increases remarkably, appropriate infrastructure for large-scale efficient operation is missing.
Dependency of mode choice to economy and legislation	The sulphur regulation may decline transport volumes in the Baltic Sea which directly affects the ports in the area. There might be possibilities, such as LNG vessels, which would reduce the impact of the sulphur regulation.

### 6.3.2 Emerging mobility schemes

Table 15 presents some emerging mobility schemes especially relevant for Vuosaari Harbour and its current situation.

**Table 15. Vuosaari: Emerging mobility schemes.**

International logistics centre	Vuosaari Harbour serves only foreign trade and connects Finland by motorways of the sea to the European TEN-T network.
Eco-efficient terminals	<p>Vuosaari Harbour has taken environmental issues into account in many ways:</p> <ul style="list-style-type: none"> <li>• Sewer system that can be closed in a case of chemical leaks;</li> <li>• Separate sewing system for wash water and detrimental elements;</li> <li>• Sewage disposal;</li> <li>• Headworks to prevent leaks on the ground to reach the sea;</li> <li>• Preparedness for ground electricity;</li> <li>• The use of condensing water from a power plant to reduce the need and emissions of ice breakers in winter time;</li> <li>• Modern machines and equipment with lower emissions and noise;</li> <li>• Efficient oil spill prevention and response plan.</li> </ul>
Intergration of an e-logistic platform	In Vuosaari Harbour, the Port of Helsinki, Customs and different actors have their own IT-systems, but there are interfaces enabling communication between different IT-systems.

Green corridors	Vuosaari Harbour has a direct connection to the Finnish main rail network and for example to Bothnian Corridor, which may become part of the TEN-T network. Vuosaari Harbour has also connections to European corridors, for example to Rail Baltica.
Rail interoperability	There is no rail terminal in Vuosaari Harbour, but there are rail tracks reaching quays. If the rail traffic will increase, a rail terminal may be required.
Short sea shipping	As Finland can be considered logistically as an island, short sea shipping is the main transport solution for foreign trade.

### 6.3.3 Future perspectives

International Maritime Organisation's (IMO) intention to impose a limit of 0.1 % sulphur content of shipping fuels by the year 2015 in the Baltic Sea, the North Sea and the English Channel regions, declines competitiveness of sea transportation in these areas. The use of LNG (liquid natural gas) fuel in vessels helps to reach emission limits in sea transportation and may be a good possibility in the future. Currently there are no LNG terminals or other infrastructure needed for LNG available in Finland. The sulphur regulation may decline transport volumes in the Baltic Sea which affect directly the ports in the area. For the Port of Helsinki, the regulation may increase the share of transportation to Estonia with short distance sea transportation. The challenge is that even though there are passengers on Ro-Ro boats, Vuosaari Harbour is not built for passenger traffic and there is no capacity to build a passenger terminal. Passenger ships have a good concept with 2 km of lane and 2,000 passengers, and freight ships cannot compete with this. As the passenger terminals of the Port of Helsinki are currently in the city centre, there cannot be a massive increase in volumes. This might force logistics operators to increase the use of Ro-Ro ships in Vuosaari instead of passenger ships in the city centre.

## 6.4 Concluding remarks

### 6.4.1 Main conclusions

Port connections are crucial in Finland for the global and domestic supply network. The location of Vuosaari is excellent in the main business and logistics concentration of the country. As the material flows are thin in Finland, combining material flows of different transport modes improves efficiency. General cargo distribution from Vuosaari Harbour can be easily combined with air and road freight.

Vuosaari Harbour has rail tracks reaching quays. If the rail traffic increases a rail terminal may be required, and this may cause capacity problems in land use of the harbour. However, the main reasons hindering multimodal transport in Finland are related to transport volumes, the lack of capacity and the lack of competition. Currently



only one operator is offering rail freight services in Finland and competition could affect positively on services offered and prices. On the other hand it is difficult to get new operators as the volumes in Finland are relatively small on long distances which may make profitable operation more difficult. In addition, there are also capacity problems on the main rail network, and passenger trains having a priority, freight slots are not necessarily good enough to compete with road transport timetables.

Vuosaari Harbour is not a passenger harbour and will not be due to the lack of capacity, which may cause challenges if transport volumes to Tallinn will increase remarkably. Also because of the limited space, Vuosaari Harbour cannot expand its activities to space demanding transportation of forest industry, dry or liquid bulk, car and large-scale transit. Because of the relatively high prices due to the central location, Vuosaari Harbour is too expensive for low value transportation. The pricing systems in tonnes instead of units favours light and valuable product transportation.

The location of Vuosaari harbour was partly determined by political and financial reasons (tax revenues). Generally in Finland there is no upper level (national or regional) guidance for ports or other logistics centres, which leads to competition between municipalities. There are several reasons why municipalities want a logistics centre in their municipality. The most important ones are that logistics centres create jobs and increase tax revenue and they raise the image and profile of the municipality (Eckhardt & Rantala, 2011). The optimal locations of logistics centres, including ports, require upper level (national) guidance.

#### **6.4.2 Good practices**

- Vuosaari Harbour has a central location to Finnish main trade area. Vuosaari is easily accessible by all transport modes and infrastructure is in good condition. There was a separate project during the planning and construction phase concentrating on transport infrastructure for Vuosaari Harbour.
- The main airport locates close the Vuosaari, which promotes the chosen profile (retail). Also the pricing system in tonnes promotes the profile.
- Modern equipment and technique is used in Vuosaari Harbour. Gate systems use OCR technology and working machines are identified by RFID technology. Portnet provides traffic information of all Finnish ports and in can be used by the Internet, XML- or EDI-messages.
- Vuosaari Harbour has taken environmental issues into account in several ways regarding nature protection, energy saving and emission of pollutants.
- Many businesses and services are concentrated in the harbour area. This increases the service level of the harbour and creates better possibilities for cooperation. The Port of Helsinki has basic contracts with all the actors in the area and common procedures are managed in different cooperation bodies in operational and executive levels. Also the clear roles of landlord principle increases service level as operators have control on the whole cargo handling process.

### 6.4.3 Lessons learned

- Passenger terminal needs were not taken into account in the planning phase, which might reduce some possibilities in the future operation. Generally the lack of expandability precludes certain large-volume industry transportation. The potential increase in rail transportation could also have been anticipated better in the land use plan. With a higher level approach taking all transport modes, passenger and freight transport and future insight into account the result could be better in a long term.
- Port operators have separate gates and procedures, which complicate logistics operators' work. Superstructure owned by operators may be a good solution, but it also reduces flexibility and requires clear operational principles.

### 6.4.4 Suggested improvements

In the planning stage of a freight terminal, passenger needs should be considered, because combining passenger and freight terminals can be an efficient solution. Less bureaucracy and more straightforward operation principles would facilitate planning and construction processes.

A common gate system and integrated information system would improve efficiency of information exchange by removing the need for middleware programmes between different information systems. Integrating information systems would have a larger perspective (e.g. national) as operators are operating in other harbours too, making the integration more complex.

EU level Portnet systems would be useful and efficient to insert and receive vessel traffic information. Upper level (state) guidance and coordination could improve the situation if it would create recommendations for port related information systems that would be in line with other information systems used in logistics. This could harmonise information systems of different ports and operators operating in several ports.

In order to shift transportation from road to rail, a single logistics centre only can provide sufficient infrastructure/superstructure in the area and positive attitude towards the development of rail transportation. Other issues should be supported mainly by national level. For example sufficient capacity in the national rail network should be provided in order to enable interesting time slots for freight. Also a network of open rail terminals should be dense and efficient enough.

Information and loading technologies have an important role in efficient transfer from one mode to another. Subsidies could be used to make the transportation of rail freight more profitable in order to better compete with road transportation, especially when volumes are relatively low in Finland expect heavy industry transportation directly from industry plants to ports. Rail operators should create



efficient and innovative services and operation models to promote rail freight. This could be supported for example by national research and development projects.

## 7 Thessaloniki port

### 7.1 Introduction

#### 7.1.1 Background and history

Thessaloniki's port operations started with the establishment of Thessaloniki city in 316 b.C. The strategic location of Thessaloniki met city's capabilities for port servicing to satisfy the commercial needs of that period of time. In the recent years, milestones of port's history are the following:

- 1904: Agreement between Turkey and France for the establishment of the company 'Societe Ottomane d 'Exploitation du Port de Salonique' which undertakes the operation of the harbor;
- 1914: Establishment of the Free Zone;
- 1923: Establishment of a public entity (public law) "Guardianship of Thessaloniki's Free Zone";
- 1925: Launch of the Free Zone;
- 1930: Establishment of the Public law Entity "Harbour Fund of Thessaloniki";
- 1953: Integration of the "Guardianship of Thessaloniki's Free Zone" and "Harbour Fund of Thessaloniki" to "Free Zone and Port of Thessaloniki";
- 1970: Transformation of Harbour Fund to "Thessaloniki Port Authority" (THPA SA);
- 1999: Transformation of Thessaloniki Port Authority into a public - private company called "Thessaloniki Port Authority SA" (ThPA SA SA);
- 2001: Introduction of ThPA SA SA into Athen's Stock Exchange and a concession agreement for a period of 40 years was concluded between the national government (represented by the Ministers of Finance and Mercantile Marine) and ThPA SA SA, under which ThPA SA was granted the exclusive right to use and exploit the lands, buildings and facilities of Thessaloniki Port Land Zone owned by the Greek State (public sector).

#### 7.1.2 Location and area

The terminal is located at the central-west side of the urban agglomeration of Thessaloniki. It has fair access to the west road entrance which is part of the main road link between Thessaloniki and Athens by road. This road is called P.A.Th.E. Highway network (Patra – Athens – Thessaloniki – Evzoni). It is evident that Thessaloniki sets as a vital node in Greek road network. Also, Thessaloniki is almost in the middle of the road axis 'Egnatia – Highway' connecting East and West borders of Greece. Moreover, city's hub port facilitates freight transport to Balkans (Albania, FYROM, and Bulgaria) and southern central Europe via its direct linkage with European corridor X. Thessaloniki's port is located at the city centre, about 25 kilometres from Thessaloniki's international airport and about 3 kilometres from the Central Railway Station. Apparently, the port could provide a combination of transport means; road, rail and air transport combined with maritime.

Maritime connection with other neighbouring ports is strong because of the proximity of the port to other port terminals around Mediterranean Sea and Balkans. For instance, Piraeus port is 252 nautical miles far from Thessaloniki's port while Volos port is about 140 nm far. Other sea nodes are Constanta, Romania (529 nm from Thessaloniki's port), Limassol, Cyprus (653 nm), Istanbul, Turkey (333 nm), Burgas, Bulgaria (443 nm) and Damietta, Egypt (736 nm). Thessaloniki is also very close by road to other Balkan cities such as Beograd (609 km), Sofia (280 km) and Bucharest (608 km).

Concerning land-use, the terminal is located to pure commercial and industrial area which consists of various types of land-use such as commercial, residential and tourist places. Around the port area, a commercial district is deployed including freight, commercial and logistics companies. Many large and medium-scale operators and forwarders are very close to the port premises and take advantage of the location.



**Figure 9. Panoramic view of Thessaloniki port**

### **7.1.3 Specific characteristics and terminal properties**

The terminal area consists of a passenger terminal, a container terminal and a conventional cargo terminal. The passenger terminal has facilitations for cruise traffic as well as coastal ferry traffic. The container terminal can berth ships with a draught of 12 m, and it is linked by a double tracked railway to the national railway network. The conventional cargo terminal has a quay length of 4,000 meters, and a depth up to 12 meters. Among the handling equipment there are 47 cranes, with lifting capacities between 40 and 150 tonnes. Also, there is a space for cultural events and two restricted parking areas. Terminal provides a variety of services to its users, such as:

- Cargos: Loading, unloading, servicing and storage of all kinds of cargos (containers, bulk and general cargo) from - to: ships, trucks and rail wagons;

- Ships: Anchoring, mooring, water supplies, power - telecommunication supply, ship's garbage management;
- Passengers: Modern passenger terminal providing ships and cruise liners passengers with a plethora of services;
- Leasing of storage space for port activities in the Free Zone and the Free Port
- Usual handling with or without customs supervision.

The port area hosts the following departments: harbour master's office, customs control offices, sanitary and veterinary control station, state chemical laboratory, Hellenic Railways Organisation offices, fire brigade station, pilotage, towage and lashing/unlashing companies.

The terminal area also encompasses a Free Zone. Free Zones are restricted areas in which operating companies enjoy special advantages regarding economic and tax alleviations and logistics privileges, and are generally operating in an environment which underpins business activities. According to Customs Law, Free Zones are customs institutions towards servicing free trade and practically, cargos could not be subject to formal customs clearance. The Free Zone in the port of Thessaloniki operates in line with the EU customs code. It also facilitates international trade and 'in-transit' cargos. No import dues and taxes are paid, there are limited customs formalities upon entry of cargos and there are capabilities of unlimited storage duration.

The terminal's strategic location facilitates freight forwarding to a great extent. Its attributes depict its capability and capacity to perform and serve well-known shippers, travel agents and logistics service providers and meet their needs. Below, there are some indicators that can describe terminal properties and be associated indirectly to the level of service:

- Saturation ratio: 66 % for TEUs. This indicator is the ratio between actual volumes and maximum capacity, and represents how much of the terminal/interchange capacity that is utilised;
- Expandability: The potential for expandability of interchange/terminal, basically estimated as per cent increase in potential from today's transshipment capacity. Today, the major project carried out within port's area is the expansion and enhancement of 6th pier. This will boost transshipment capacity by 133 %;
- Distance from city centre: Thessaloniki's city centre is about 1.0 kilometre away from the terminal's central commercial gate. The passengers gate is even closer to city centre (0.5 km);
- Distance from nearest highway: Distance of port's central commercial gate to the nearest highway (which is the main North – South road axis of Greece) is about 1.5 kilometres;
- Platform access distance: implies the distance covered on foot from terminal's main entrance to platform (quay) where ships are departing, and is about 500 meters.

## 7.2 General description

### 7.2.1 Passenger and freight profile and geographical coverage

The geographical coverage of the port is international, national and regional. The port services 5 % of the national maritime passenger transport and 95 % of the national maritime freight flows.

#### 7.2.1.1 Passenger profile

The total number of access/egress passengers was 64,735 in 2011. This is a reduction of 35.7 per cent compared to 2010. This reduction is most likely caused by the financial situation of the country. Passengers departing from Thessaloniki for travelling to a regional destination (defined as a zone within a 200 km radius of the port) represent 38.2 % of the total passenger flow of the terminal. In addition, 44 % of that total flow arrives to Thessaloniki originating from a regional destination. Accurate profiles of modes used by passengers to reach or to leave the terminal have not been investigated yet, so there are not any data on this. It is, however, assumed that the majority of passengers who make use of the terminal use car as a transport mode for arriving to and getting out of the port.

#### 7.2.1.2 Freight profile

Data provided by ThPA SA show that the total amount of TEUs for 2011 is 295,870. 138,213 (46.7 %) of these represent exports from Greece to several other countries. Regarding export to Balkan countries, 36,584 of 38,576 TEUs are being transferred by trucks while 1,992 are being transferred by wagons. Also, 42.4 % reflect imports of cargo (125,360 out of 295,870) and about 10.8 % is associated with freight transit (31,681 out of 295,870).

The multimodality for import and export activities is estimated as follows:

- 94,8 % of total TEUs for road-maritime and maritime-road transport
- 5,2 % of total TEUs for rail-maritime and maritime-rail transport

Obviously, the first leg of the cargo transport is being performed by trucks, and freight is then transhipped to vessels for international maritime transport. Regarding import activities, cargo is being loaded to trucks or wagons and distributed to further inland destinations (locally, regionally or even nationally).

The TEU flow at Thessaloniki spiked in 2007 at about 450,000 TEUs. Then, a sharp drop took place in 2008, obviously because of the global economic condition. After 2008, there is a smooth increase in handled TEUs up to today's level at 295,870.

### 7.2.2 Planning, financing, ownership and organisation

#### 7.2.2.1 Ownership structure

ThPA SA was established in 1999 as a private entity (private law of public utility) with managing and operating responsibilities of port facilities. The land and infrastructure

were conceded by the national government to ThPA SA (according to concession contract signed on June 27<sup>th</sup> of 2001) for operation, management and exploitation until 2041. Currently, national government indirectly owns ThPA SA. Land and infrastructure belong to the national government too, but operations are being performed by ThPA SA as well as all other services provided. ICT-systems operation and maintenance are also subject to ThPA SA's responsibility.

Different types of stakeholders play an important role (one way or another) to the overall performance and operations of ThPA SA:

**Table 16. Thessaloniki: Roles of stakeholders in the operation of the terminal.**

Stakeholder:	Role and responsibilities:
EU	The European Union mainly carries a legislative and regulatory role.
National government	National government also plays a vital role in regulatory part which defines the framework of operations, services, management, etc. in national level. Legal initiatives concerning port operations of government should be instantly adopted by port managing entities. Also, the national government sets policy goals regarding the ports development policy. It should also be mentioned that the national government (on behalf of the public sector) is considered as the infrastructure provider.
Regional and local authorities	Regional and local authorities (Administrative authority of Central Macedonia and municipality of Thessaloniki) try to cooperate and coordinate their actions in terms of urban development initiatives. Practically, conflicts of tasks between regional level authorities and the port managing entity are rare.
Freight forwarders	These are the demand side stakeholders which make use of the port's facilities to accomplish their business objectives. Their role is crucial and they support financial viability of ThPA SA. Tight relationship between them and ThPA SA is essential.
Terminal manager and operator	ThPA SA is responsible for the management, operation and maintenance of port's premises as well as systems (equipment) operation and maintenance.
Transport operators	The transport (and logistics) operators are the cornerstone of port's economic viability. They are also part of demand-side stakeholders.
Rail operator (OSE)	Owns the rail network inside and outside port's restricted area. Also, OSE is performing rail transport of goods with the cooperation of respective logistics service providers from and to the port.



Stakeholder:	Role and responsibilities:
Travel agents	In passenger transport, travel agents provide a 5 % part of each ticket's fare to ThPA SA. Travel agents are also responsible for ticketing and travelling issues.
Dockers	Considered as employees of ThPA SA under the framework of formally so called profession 'stevedores'. They are responsible for providing mainly stevedoring services within port area.
Customs	Customs officers are employees of the national government (ministry of economy - public sector). Customs and harbor master are public authorities and they have not competing interest with the rest of the ThPA SA staff. The harbor master plays a police safeguarding role in the coastal and marine area (instead of the police).

Every month the port development council is assembled, and its main task is to exchange opinions on the port's issues. Decisions are made to tackle the problems appearing. Port development council is a non-institutionalised advisory board that consists of institutional representatives by relevant chambers and users of the port services. This advisory channel is valuable for ThPA SA because it helps the managing authority of the port to adjust and launch policies that help its customers on their business operations.

#### 7.2.2.2 Regulatory framework

May 14<sup>th</sup>, 2012 (according to legal framework 3986/2011 and 195/2011 and also the decision of the Ministerial Committee for Privatisation and Restructuring), 74.27% of the total shareholding structure (previously in the property of the national government) was transferred to Hellenic Republic Asset Development Fund SA, a fund managed by the national government. This fund is structured for privatisation of public assets. However, the national government still indirectly owns the majority of shares.

Regarding Port Development Council, there is not any institutional framework that outlines its establishment and operation. This council is a pure advisory board whose main role is to arrange priorities regarding the port's operations and management. All members of the council are internally appointed by their corresponding body and associations to represent them in the board.

#### 7.2.2.3 Planning and operation

The private company's layout of ThPA SA characterises all internal processes. Strategic planning, internal operations and construction projects are processes that totally rely on ThPA SA initiatives. National government in terms of public sector have not had any involvement in such processes. The only kind of involvement that could be pinpointed is related to the legal and institutional framework of the official (national and EU) sector which urges ThPA SA to pursue it.

Other planning issues which include policy-making (apart from construction projects) require the involvement of several stakeholder groups depending on the nature of the initiative. Nevertheless, the usual process which is followed contains either the implementation of national legislations or port policies (National Port Policy determined by national government) by port managing bodies around Greece, or the assessment of initiatives proposed by ThPA SA's planning division by national government. In the latter, the idea is provided by Port Development Council and then better structured by the Strategic Planning Division of ThPA SA. BoD is the next level of decision-making, and according to the recommendation and acceptance, the project is then addressed to the national government for further authorisations or remarks.

With respect to discrepancies, a great issue to be tackled is potential delays taking place between strategic planning of an initiative and its implementation. ThPA SA has ensured the rapid arrangement of such issues by establishing a proper and efficient system which abates internal bureaucracy. This leads to no identified delays during implementation processes due to ThPA SA ineffectiveness. Usually, drawbacks occur by national government's bureaucracy. This includes delays in funding, permissions and amendments of legal framework to ease ThPA SA initiatives and policy-making.

The problem gets worse when it contains the involvement of the official sector for huge construction works. The reason is that such initiatives require (according to Concession Contract) the authorisation and funding of the national government. But this is prohibited in compliance with European Law, which considers that public subsidising to private initiatives violates the conditions of free market competition. Therefore, special authorisations and funding may be needed by EU to justify public funding activities. This could cause a significant delay in the accomplishment of the project. Therefore, the legal framework needs to be clarified and improved to facilitate funding and financing of new infrastructure.

#### *7.2.2.4 Sharing of information*

With respect to freight transport information sharing between stakeholders, ThPA SA has established an integrated platform called TOS (Terminal Operating System) which develops technological applications that optimise the existing services provided by the company while updating and improving its competitiveness. TOS assists yard and gate planning and it is open only for transactions at the container terminal, not in the conventional cargo one. This electronic platform is available to involved stakeholders (freight forwarders, ThPA SA corresponding parties, etc) for scheduling cargo loading and unloading.

For passenger transport, information can be obtained through the call centre of Thessaloniki's master Harbour, which is aware of ferry schedules (arrivals and departures) as well as other passenger related information. Besides this, travel agent offices that are located near the passenger terminal have the main responsibility for providing information on ships schedules. ThPA SA has created a 24h customer information board that allows citizens and travellers to be informed on several issues.

Complaints, clarifications and information can be easily elicited by this call board. Also, for deriving such information email services are provided.

#### 7.2.2.5 Financing

ThPA SA is a self-financed private body and all funding sources are internal. Operation and maintenance of land and infrastructure (including facilities and equipment) are subject to internal sources. In special cases the port managing entity could recourse to external bank loans for investing to costly projects. The national government is only co-funding (subsidising) in rare cases, when projects are considered of high importance to serve the country's infrastructure development.

### 7.2.3 Outputs and level of service

Infrastructure in the passenger terminal is capable of serving multimodality needs, but there is still room for improvements. The existing infrastructure encompasses two restricted parking areas very close to the passenger terminal in order for serving access/egress. The taxi station is just outside terminal for those who would like to reach or leave the terminal by taxi, and bikeway access is available. Although there is not a high level of service regarding interconnection with urban public transport, outside the terminal there is a bus stop that facilitates access to the central and eastern side of the city. The rail terminal is located close to the passenger terminal, but it is accessible only by taxi or walking. The national road network is also easily accessible, and located around a kilometer away from the central gate of the passenger terminal.

It is considered that around fifty shippers and twenty logistics service providers (LSPs) are cooperating with the managing entity of the freight terminal. Consequently, the terminal's level of service is intuitively upgraded as the last (or first) leg of transportation is performed in a very short period of time.

ThPA's SA turnover for the fiscal year of 2011 amounted to € 51,222,138 against € 49,617,466 for the correspondent fiscal year of 2010, exhibiting an increase by 3.23%, attributed to the increase of the sales of the container terminal by 6.01%, to the increase of the sales of the rest provisions of services to ships and cargoes by 5.35% and to the increase of the sales of the conventional port by 0.35%. As a result of this and a decrease of the expenses, the gross profits amounted to the sum of € 16,215,195 (against € 11,557,575 in 2010) exhibiting an increase of 40.30 %.

The level of service can also be described by different types of indicators. Some of these are summarised below:

- *Productivity indicators:*
  - The ratio between the lowest and highest monthly throughput (volume) handled by the port terminal was 65 % for 2010, and 62 % for 2009;
  - In 2011, 73,968 TEUs were lifted per crane. This number is achieved by dividing the total number of TEUs handled by the terminal by the number of cranes used that year (four cranes);

- Energy productivity per TEU for 2009 is 40.33 KWh/TEU (for a total of 270,181 TEUs);
- Energy productivity per passenger is 68.88 KWh/passenger (for a total of 158,181 passengers).
- *Handling cost:* The handling cost is about 100 €/TEU and reflects the average price paid per TEU through its handling of the terminal. It has to do with typical customer and other average values of affecting factors;
- *Overall quality:* This indicator is better mapped by empirical estimation and complies with passenger transport. According to the interviewee for Thessaloniki port, this indicator scores “good” as an average value of criteria like physical effort needed, personal comfort, information, perceived safety/security, etc;
- *Time indicators of interchange:*
  - Average time for transfer between transport modes is about five to ten minutes in passenger transport;
  - Variability of interchange time is about five minutes. This indicates that walking time from the ferries’ platform to the bus stop outside the terminal is approximately five to ten minutes.
- *Punctuality:* This is a grassroots indicator and representative for performance measurements. ThPA SA achieves satisfactory scores. This means 100 % for passenger transport (100 % of passenger ships arrive and leave within 10 minutes of scheduled time) and 70 % for freight transport (70 % of freight ships arrive and leave within 30 minutes of scheduled time);
- *Safety of people and security of goods:*
  - In a period of ten years there was only one fatality in ThPA SA personnel;
  - In loading and unloading activities people who are involved are continuously exposed to danger. Shipments involving goods damaged or corrupted or even lost represent 0.5 % out of total shipments.
- *Employee productivity:* This is measured taking into consideration employees, TEUs and passengers per year (2011). ThPA SA employs 476 employees for year 2011. Data inspection shows that each employee handles 621.6 TEUs and also corresponds to 136.1 passengers.

## 7.3 Analysis of gaps, mobility schemes and future changes

### 7.3.1 Gaps

Three types of potential gaps are analysed for freight transport; lack of standardisation (no gaps identified), lack of appropriate infrastructure and dependency of mode choice to economy and legislation. For passenger transport, the five types of potential gaps analysed are lack of appropriate infrastructure, wasted time (no gaps identified), poor information, poor quality and foreigners and inexperienced passengers. The identified gaps are presented in the tables below.

**Table 17. Thessaloniki: Gaps for freight transport.**

Lack of appropriate infrastructure	The needed interventions in terms of infrastructure improvement are limited, and regard the accomplishment of the expansion of the 6 <sup>th</sup> pier of the port, a project that is scheduled for the near future.
Dependency of mode choice to economy and legislation	At the specific case study, legislation issues do not seem to affect the mode choice.
	Regarding economy, the mode choice is dependent of the port and ship tariffs, concerning the use of the rail network or the road network through trucks. In the first case, the carriers should pay extra fees in order to use the railway, while in the second case, when using their own trucks, the companies have to assess the total cost, based on fuels' prices, packaging (in needed), etc.

**Table 18. Thessaloniki: Gaps for passenger transport.**

Lack of appropriate infrastructure	The main problem arises from the lack of financing. At the same time, legal restrictions cause problems (i.e. delays) in construction projects. The main deficiencies are indicated in the passenger terminal, which, due to the relatively low number of the travellers, has not been modernised enough.
	Interventions for the development of parking areas are indicated as catalytic for the improvement of the services provided to passengers.
	The existing infrastructure does not foresee any special facilitation of the interconnectivity of different modes of passenger transportation.
Poor information	The provision of information is limited to the port services, and does not regard any multimodal or last mile transportation options, thus, an integrated system for the provision of such information is necessary.
Poor quality	The most serious problem regarding multimodal transport of passengers at the port is not being able to purchase a public transport ticket and lack of relevant information. Also, the recruitment of staff as guides or volunteer guides for better service of passengers is not foreseen.
Foreigners and inexperienced passengers	Foreigners and inexperienced passengers may meet the problems described previously, and this is mainly the poor information provision at the port regarding the interconnection between the port and the surface transportation network.

### 7.3.2 Emerging mobility schemes

In the tables below, some of the most important emerging mobility schemes are presented and analysed, separate for freight and passenger transport.

**Table 19. Thessaloniki: Emerging mobility schemes for freight transport.**

International logistics centre	<p>The current freight volume and transport needs are fulfilled by the private logistics centers that operate around port area. The status quo is characterised by the existence of logistics service providers who have their own warehouses. There is a great potential that the international logistics centre is not initiated and could not facilitate logistics operations of service providers because each one of them is already satisfied.</p>
	<p>The case of small logistics depots could be explored to be fostered assisting small logistics providers by offering consolidated services that could mitigate costs. A great possibility is to look for a location outside port area, where ThPA SA could have an advisory (and not a funding) role.</p>
Eco-efficient terminals	<p>An aim is to integrate the environmental issues of sustainable development into the port planning and decision-making processes.</p>
	<p>Implementation of relative environmental management system (EMS) processes in order to organise the port's activities, products and services in such way that will enable the continuous improvement of the port's environment.</p>
	<p>Development of necessary procedures to comply with all relative international and national legislation, as well as contribution to achieving compliance with other relative policies and guidelines.</p>
	<p>The ThPA will make efforts to sustain natural resources and enhance nature conservation by integrating these objectives into any port development projects.</p>
	<p>Commitment to high standards of health and safety within the workplace so as to safeguard the well being of those working at, visiting or living near the operations of the port.</p>
	<p>The ThPA will make efforts to improve the energy efficiency and the resource consumption, as well as adopt technological best practices. Promotion of multimodality is a core objective by ThPA SA and actions towards this direction will be forced (wider use of rail, better interconnections in passenger transport chain, etc.)</p>

	<p>Monitoring, evaluation and review of the port's environmental performance (i.e. policy, action plans, etc.) and the environmental quality of the port area, focusing on significant environmental aspects and on the identification of appropriate performance indicators.</p>
	<p>Periodic publishing of an Environmental Report regarding ThPA commitment and progress in the improvement of the port's environmental performance.</p>
	<p>In addition, a wide range of other measures, as communication with local community, training of staff, coastal zone management and pollution prevention are implemented.</p>
<p>Integration of an e-logistic platform</p>	<p>An e-logistic platform exists at the container terminal. Its operations include entrance/exist control, loading/unloading monitoring, and storage. Arrival registration is submitted electronically by the shipping agents, and approval is issued. If a client operation is installed at the customer's system, the latter may be informed of the status of the shipment, concerning the arrival, staying and departing the port at any time.</p>
	<p>In the future, the conventional cargo terminal should be included, as well as equal and fair entrance of forwarders, logistics service providers, and rest stakeholders and professionals. Such a platform will be suitable for port operations and will not concern any activities outside the port's responsibility area.</p>
<p>Trans-European network</p>	<p>One of the objectives of ThPA in the near future is the promotion of the connection of the port with the Egnatia Motorway. Since the Egnatia motorway will include three vertical axes which constitute sections of the Transport European Network (one link to Albania and two links to Bulgaria), the perspectives of the development of the port are significantly increased.</p>
<p>Public-private partnerships</p>	<p>The private status of ThPA SA does not foster the development of public-private partnerships. Though, since the transformation of ThPA SA into a landlord status managing entity is planned, the establishment of concession agreements with other private companies is foreseen, including, for example, the concession of the container terminal.</p>
<p>Rail interoperability</p>	<p>Rail interoperability exists. Infrastructure modernisation, interventions on rail accesses around port, double track for upgrading level of service and other types of indispensable for improving the interconnection and to facilitate multimodal trips.</p>

Deep sea shipping	Deep sea shipping, truck and rail are the three different modes in the specific case study. The share of transfer between deep sea shipping and rail is 5.2% (of TEUs) and between truck and deep sea shipping 94.8% (of TEUs), respectively.
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**Table 20. Thessaloniki: Emerging mobility schemes for passenger transport.**

Enhanced bicycle usage	The bicycle way network runs along the port facilities, providing access to passengers and civilians, within the context of port openness towards the city. Bicycle network is less than 200 meters far from the passenger terminal.
	ThPA SA plans to establish cruising along with use of bicycles for cruiser passengers. The plan constitutes of a private initiative capable of hiring bikes to be used by passengers of cruise ships which stay in the city of Thessaloniki overnight. This may not be considered as an indicative kind of multimodal transport, because there is not any explicit transport leg (origin – destination), though it could be treated as combined transport that supports urban mobility.
Simplifying the payment	There is computer equipment for payment services, but no ticket control mechanisms for e-tickets. On the other hand, there are small branches of shipping agents in the wider area of the terminal that provide passenger transport services.
Real time information	Through the programme TRANSLOGNET and the use of electronic Variable Message Signs, information is provided to passengers. There is also a special electronic gate for information on passenger services that is available through the website of the port.
Cooperation of transport operators	The harbor master (Hellenic Coast Guard) provides information on passenger transport issues (by phone or in person), and the travel agents provide information on their corresponding ferry transport.
	The basic cooperation scheme among the port co-operators is the port development council. This scheme guarantees swift and frequent addressing of issues and timely fostering of development initiatives, which underpin policies such as multimodality, through the strong relationships that are developed within this framework.
Individual access and egress	The bicycle way runs along the port facilities, enabling access and egress by bicycle. Public bus stops exist in the vicinity of the port. Finally, the port provides sufficient, safe and affordable parking areas/stands for private vehicles, enabling port access by car, as well.



Electro mobility	Such a scheme is not indicated now or planned for the near future due to the limited space for maneuvering. Special attempts are, however, being made towards obtaining hybrid port equipment for 'greener' operations.
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### 7.3.3 Future perspectives

A new transportation means is under construction and regards the urban public boat transport of Thessaloniki, which foresees the connection of the centre of the Thessaloniki with the eastern areas (Municipalities of Kalamaria and Thermaikos). The project, expected to be finalised in 2013, will service 15,000 passengers daily, and approximately 5,400,000 passengers, annually. The project will be of high importance for the improvement of the level of services of the port to its passengers, since it will enable more efficient (in terms of time, cost, quality, safety) transportation of the passengers that arrive at or departing from the port.

In addition, a metro station is under construction in the area of the railway station, which will provide an alternative means of transportation to passengers. The perspective is that the reconstruction of the existing infrastructure will drive to a modernised integrated bus-railway-metro station. It will be located closely to the port and will work as an added value for the improvement of the provided services to passengers.

## 7.4 Concluding remarks

### 7.4.1 Main conclusions

The freight terminal is separated into a container terminal and a conventional cargo terminal. Both terminals achieve high scores at cargo traffic, showing a slight increase in recent years. Until 2007, the growth of freight flows was worth highlighting, and especially that year it almost approached saturation. Then, probably after the increase in port tariffs, freight flows addressed a sharp drop and since 2008 a smooth increase is taking place. In addition, passenger flow was reasonably high, but after the global and Greek economic crisis it started reducing.

Revenues by private parking areas financially support viability of ThPA SA and also act as interconnection infrastructure for passenger multimodal transport. Both parking areas include many lots.

ThPA SA is a stand-alone, self-financed entity acting totally as a private enterprise, though under the supervision of Ministry of Development, Competitiveness and Shipping. It falls upon the legal and regulatory framework of the national government, but its internal processes and operations are outlined by a non-institutionalised framework. Stakeholders are discussing issues relevant to the port together in the port development council. This operational status that does not hinder free market competition has had tangible results in recent years, leading to remarkable rise of the

profitability ratios (coupled with other successive policies) and adequate level of service achieving very well at punctuality issues and cargo handling. However, needs for privatisation of the terminal led to the transfer of all shares previously owned by national government (on behalf public sector) to Hellenic Republic Asset Development Fund.

Information provision is better in the freight terminal than in the passenger terminal, where only basic information is being provided concerning ferry scheduling and also through the usual ways of communication. Maybe this is related to low information needs of travellers that are fully met by Harbour Master call centre or by information provision of travel agents. In freight operations, the port is being identified as more organised, having already established a Terminal Operation System for information on interested containers. This platform is very specialised and difficult to handle by the variety of users. In this regard, special light should be shed on optimising this service both from the national government (adjusting regulatory framework and channelling of funding sources) and from ThPA SA (financing information provision).

#### 7.4.2 Good practices

Below, there is a list of recent initiatives for each business aspect, considered as good practices. Many of them have not been finalised yet.

1. *Institutional and Operational Modernisation of Thessaloniki Port Authority SA:*
  - Procurement processes standardisation that ensures the economic interests of the organisation and reduces wastage;
  - Spatial reorganisation of administrative services of Thessaloniki Port. All major administrative departments gathered, allowing for better organisation and operation of the Agency;
  - In collaboration with the Customs division, their operation is now expanded on weekends and evening to enhance customer satisfaction.
2. *Works of port infrastructure and superstructure:*
  - Expansion of 6th pier is in progress and will boost port's capacity in TEUs handling to 133% or 1,200,000 TEUs. This is the largest development project carried out at the port of Thessaloniki which guarantees the long-term growth;
  - Expand Free Zone Area to outer city region, helping to increase terminal capacity and improve environmental context of port operations;
3. *Environmental awareness:*
  - Compiling of Environmental Impact Study according to national standards for environmental performance surveillance while outlining environmental policies for handling of different cargo types;
  - ThPA S.A. implements a ship's waste reception and management plan;
  - Successful tackling of dust issue through the introduction of appropriate equipment;
  - Introduction of hybrid vehicles of port equipment that reduced the environmental footprint.

4. *Property development of ThPA SA:*
  - Promotion of the 1st pier facilities as places hosting events and business meetings.
5. *Expanding use of new technologies into port operations:*
  - Operation of electronic payment system and issuing electronic invoices;
  - Introduction of "Integrated Information Management System, Enterprise Resource Planning and Business Intelligence" (ERP-BI), with a view to increasing the agency's operating efficiency while reducing costs.
6. *Marketing:*
  - Invoice attractive port services to attract more cargo to the port of Thessaloniki;
  - Promotion of port of Thessaloniki as a cruise destination and provide contacts with companies and shipping agents cruise. The goal was to increase cruise traffic and impact was positive as passenger cruise faced an increase of about 20 % in 2011 compared to 2010.
7. *City-port relations:*
  - Publication of the newspaper called 'Port.Thess' bi-monthly and distributed free to inform citizens on the news of the port of Thessaloniki.
  - Publication of cartoons for children who learn about the port through painting.

#### **7.4.3 Lessons learned**

- The lack of Key Performance Indicators and in general a framework of measuring services performance. Some empirical elements may have led to estimation of performance aspects, but a sounder, European framework is needed for assessing services impacts. This will surely improve the estimation process and have as a result more precise business plans.
- Lack of Master Plan and business plan could also be a case. Its implementation in cooperation with rest stakeholders will strengthen their collaboration and make robust and homogeneous perspectives towards future plans in port operations. Moreover, it will introduce a range of targeted actions providing a future path to be seamlessly followed by whichever administration scheme may occur.
- Special focus needs to be made at passenger terminal. Due to the low volume of passenger transport, the terminal seems disorganised, offering only basic services and suffering from lack of planning. A reformulation in its layout and services could render it as attractive to travel audience. Up to now, low investments in the terminal and low level of service have led to a low transport volume.
- Sometimes, projects approved to be implemented by managing entity were obstructed by huge bureaucracy of Greek public sector. This was not exactly internal malpractice of ThPA SA, but it sabotaged the port's development process. Rapid authorisation and mitigating bureaucracy is the key to close this void from planning to implementation. Development and adjustments of legal

framework and legal assistance by European Union could alleviate the problem and make regulatory framework more flexible.

#### **7.4.4 Suggested improvements**

There are some kinds of provided services which, although the level of service may be low (i.e. information provision), shall not be treated as bad practices. Some directions for suggested improvements are outlined below:

- Force new research fields, especially focusing on adopting indicator framework for mapping port performance in several domains. Introduction of indicators will lead to safer and more accurate modelling of impacts;
- Better cooperation with EU and authorities to adjust existing framework so as to increase port management efficiency;
- Implementation of the logistics centre that will be better established in the container terminal. Integrated services, operations and cargo have proven to be a key solution for freight transport activities;
- Construction of a marine project of a capacity of 250 yachts in the first pier. Port outlook should be enhanced to attract yacht tourism and increase port's revenues;
- A severe attempt towards optimising information sharing and provision channels should be undertaken comported with national government assistance (both funding and technical). The introduction of wider integrated e-platforms (such as port community system), with easy-to-use interfaces, for scheduling and monitoring loading and unloading operations and deriving all necessary information for passengers is one of the core actions for coping with that issue. This platform could be easily (and equally) accessed by interested private sector, travel agents, shippers and final users (passengers). The study for the Bay Plan of Container Terminal could be an add-on service;
- Expansion of Free Zone for reducing customs formalities;
- Wider use of services concession to external parties by ThPA SA. i.e. establishing of sub-terminals managed by different companies (under concession framework) in conventional port according to cargo type loaded/unloaded. This will increase operations efficiency and flexibility;
- Upgrading access to the national road network and Egnatia Odos through the construction of road infrastructure for 800 m. Direct link to Egnatia Odos implies faster access to hinterland;
- Launching a car terminal will result in intrusion of ThPA SA into new market share and new income source;
- Actions towards more efficient operation of railway transport system to provide improved access to south Balkan countries;
- Urge energy efficiency initiatives by incorporating Renewable Source of Energy into supply needs of the port. Photovoltaic systems and natural gas could enhance energy autonomy of the terminal;
- Investigation and initiating of actions that enhance 'sales' of cruise terminal;

- Ameliorating level of security of cargos by establishing CCTV systems in accordance to ISPS security codes;
- Establishment of collaboration schemes with other public and private parties of Thessaloniki and deploy a port-visit strategy in order for citizens to acknowledge port facilities;
- Planning of investments to interconnectivity infrastructure for safer and faster access to passenger terminal:
  - For bikeways, an extension of the network inside the passenger terminal area could be a solution;
  - Construction of a bus stop just outside the passenger terminal that would be served by as many bus lines as possible.

## 8 Constantza port

### 8.1 Introduction

#### 8.1.1 Background and history

Constantza port was officially founded in 1909, as a harbour covering a total area of 722 hectares. Later, its total area expanded to reach the 3,926 hectares, out of which 1,312 ha is land and 2,614 ha is water. The most important events are listed below:

- On 16<sup>th</sup> of October 1896 the official launch of the construction works and modernisation of Constantza Port took place;
- Until 1909, when Constantza Port was officially inaugurated, dredge works were made, the breakwaters and the quays were built; also six basins and storage tanks had been developed for oil and the cereal silos. Having these facilities, the Port of Constantza registered in 1911 a total traffic of 1.4 million tons;
- Between the World Wars, other infrastructure facilities were added: corn drying facility, the administrative headquarters, the stock exchange and the floating dock. The traffic reached the 6.2 million tons in 1937, a figure that ranked the Port of Constantza amongst the first European ports;
- Unfortunately, Constantza and the entire country suffered damages from the two World Wars, Soviet occupation and communist dictatorship. The south extension works of the port started in 1967. An important role in the port development was played by Black Sea - Danube Canal, which was inaugurated in 1984;
- On 1<sup>st</sup> of January 2007, the Port of Constantza became a Free Zone;
- Currently, there are several projects in progress, in order to build new facilities for cargo handling and to improve the transport connections between Constantza Port and its hinterland. These projects are mainly located in the South part of the port.

#### 8.1.2 Location and area

Constantza is located at the eastern part of Romania, by the Black Sea, 250 km from the capital city of Bucharest and 85 nautical miles from Danube river mouth. It is ranked fifth in population amongst Romanian cities with 387,593 inhabitants. Constantza port is the biggest hub in the Black Sea and constitutes a major transportation gate between the sea and the hinterland. The port is both a maritime and a river port located at the crossroads of the trade routes (TEN-T Paneuropean Transport Networks), linking the markets of the landlocked European countries to Transcaucasus, Central Asia and the Far East. Facilities offered by the port allow accommodation of any type of river vessel.

The connection of the port with the Danube river is made through the Danube-Black Sea Canal, which represents one of the main strengths of Constantza Port. Due to low

costs and considerable cargo volumes that can be carried, the Danube is one of the most advantageous transportation routes, an efficient alternative to the European rail and road congested transport.



**Figure 10: The port of Constantza in Romania (aerial view)**

### **8.1.3 Specific characteristics and terminal properties**

The port complex covers an area of 3,926 hectares and consists of the old part to the north and the new part to the south. The north part is entirely operational and consists of 12 basins with water depth between 8.0 and 13.5 m, also including 15.5 km of quay and 82 berths. It has specialised terminals for ores, coal, crude oil and oil products, grain, chemical products rolled metals, containers, general cargo, platforms and warehouses.

The south part is partly operational. Completion works on the southern side have already started to host new terminals in a favoured zone with high water depths. It has 13 km of quays, 70 operational berths and handling capacity, including platforms and warehouses, for containers, ores, coal, phosphate, crude oil and oil products, rolled metals and general goods. Part of the traffic is handled as Ro-Ro and ferry cargo. The south port encompasses the entrance to the Danube-Black Sea canal, which is part of Europe's most important inland waterway, the Rhine-Maine-Danube corridor (VII corridor of TEN-T). There is also a dedicated river/maritime basin for transhipment of cargo into river barges. Important cargo quantities are carried by river, between Constantza and Central and Eastern European countries: Bulgaria, Serbia, Hungary, Austria, Slovakia and Germany. River traffic is very important for Constantza Port,

having a share of 18% of the total traffic in 2008. Below, there are some indicators that can describe terminal properties and be associated indirectly to the level of service:

- **Saturation ratio:** The saturation ratio is 19 % for the number of tons handled, and 2 % for the number of TEUs handled. This is the ratio between actual volumes and maximal capacity.
- **Expandability:** In the future, as long as the freight traffic increases, one of the main concerns will be the expansion of the container terminal, in order to boost the transshipment capacity. Additional to the 31 hectares of existing land, there are some 39 more hectares in case the expandability project is decided to be processed. That means that the container terminal has the potential to increase in size with 126 %.
- **Distance from city centre:** Neither the container terminal nor any of the access gates are located more than 2.0 kilometres away from the city centre.
- **Distance from nearest highway:** The shortest distance is the better, because it provides access to the core national road network and hence, it improves transport flexibility. The distance from the port's central commercial gate to the nearest highway is about 2.5 kilometres.
- **Platform access distance:** This means the distance covered on foot from the terminal's main entrance to the platform, and it is about 500 meters.
- **Clarity of ways:** implies the plainness in which services and facilities are explained by signage, design, etc. It is estimated empirically through a scale between 1 and 5. 1 represents less clear identification of ways and 5 implies the maximum clarity of ways identified. It is believed by the NCMPA representatives that the port of Constantza scores 5.

## 8.2 General description

### 8.2.1 Freight profile and geographical coverage

Constantza port's major throughput comes mainly from the freight operations and activities (sea and river), according to the general profile of the port. In addition, there is also a passenger port operating nearby and, even though there are no regular lines any more, a considerable amount of passengers visit the port of Constantza through cruises. However, almost the 99% of the vessels embarking and disembarking to and from the port of Constantza constitute freight ships.

Pertaining to the port's geographical coverage, the port terminal of Constantza covers local, regional, national and international transportation needs for Romania. Concerning the origination of the port, in the terminal's target area, mostly European and Asian countries are included. In particular, the origins/destinations are Germany, Austria, Slovakia, Czech Republic, Hungary, Romania, Bulgaria, Serbia, Spain, Italy, Slovenia, Greece and Albania (Albania is approached through sea and/or river itineraries).



Today's port handling capacity reaches the 100 million tons per year, as within the port there are 156 berths (140 berths operational). The total quay length reaches the 29.83 km, while the depths range between 8 and 19 meters, allowing the accommodation of tankers with capacity of 165,000 dwt and bulk carriers of 220,000 dwt.

The almost 47.564 millions of tons serviced by the terminal in the port of Constantza in 2010 are classified in the following cargo categories: liquid bulk and dry bulk, which constitutes almost 80 % of the cargo handled, and containers, Ro-Ro and general cargo. General cargo consists of imports of industrial equipment, foods, fertilisers and chemical products, clothes and electrical appliances and exports of furniture and wood products, fertilisers and chemical products, foodstuffs, textiles, glass products and cars.

## **8.2.2 Planning, finance, ownership and organisation**

### *8.2.2.1 Ownership structure*

The port of Constantza and its satellite ports Midia and Mangalia, also including the Tomis Marina are public-private maritime ports owned by the Romanian State. The state is responsible for their regulation and function through the tasks entrusted and discharged by the national company "Maritime Ports Administration" S.A. Constantza and Romanian Naval Authority (RNA), both of them being subordinated to the Ministry of Transports and Infrastructure. Under the Romanian ministry of transport, the National Company Maritime Ports Administration SA Constantza (NCMPA) has the role of port authority for the port of Constantza and the neighbouring ports Midia and Mangalia, including Tomis Marina, located in the adjacent area. The agglomeration of these ports formulates a big cluster, forming a major sea and river port, covering a total area of 4 km<sup>2</sup>.

NCMPA has adopted the business model of a landlord port. According to that model, the port authority builds the wharves destined for rent or leasing to a terminal operator (e.g. stevedoring companies). The operator invests in cargo-handling equipment (machinery and equipment such as forklifts, cranes, etc), hires longshore labourers to operate such lift machinery and negotiates contracts with ocean carriers (steamship services) to handle the unloading and loading of ship cargoes. From its position, it aims to provide quality and competitive services to the ports customers, to offer a developed transport infrastructure, as well as security, safety and environmental port conditions. On that base, the major pursuit of the NCMPA is the encouragement of the cargo traffic and the transformation of the Constantza port to an important transit centre - by offering the shortest transport alternative to the centre of Europe and becoming a leading regional distribution centre for its hinterland.

All authorities are in full collaboration, under the coordination of NCMPA and the supervision of the Romanian Ministry of Transports and Infrastructure (MTI). Thus, NCMPA Constantza and MTI are the two main bodies in charge of the planning, management, policy making and promotion of marketing strategies, regarding issues associated with long/short distance intermodality. Of course, there are other public

and/or private bodies and institutions involved in the decision making, such as various stakeholders, regional and local authorities or terminal operators, owners and users, or even infrastructure providers, stevedoring companies and rail operators. Nevertheless, their role and contribution is secondary, meaning that any suggestion should be authorised and approved by MTI and NCMPA. It is worth mentioning that there is satisfactory cooperation and integration amongst the two leading authorities (NCMPA and MTI) and the rest of the involved stakeholder groups and even customers, when it comes to dealing with management issues concerning the port of Constantza.

#### *8.2.2.2 Regulatory Framework*

There is an established cooperation and procedural framework according to which every involved body's role, jurisdiction and obligation is explicitly specified. Thus, any operational and business activity is characterised and co-acted by the collaboration and mutual understanding amongst all the involved bodies and stakeholder groups. As a result, there are no conflicts recorded amongst private terminal operators and NCMPA or local authorities, concerning issues on planning, financing, construction and maintenance. As long as there is a win – win situation amongst stakeholders, the authorities' role is rather supervisory and complementary; the public body is just checking the compliance of operations and activities with the national and EU maritime policy and directives.

It seems that in planning, finance, construction and operation of terminals, the cooperation amongst the involved groups of stakeholders is fundamental for any project to be accomplished, but everyone's role, responsibility and jurisdiction must be clarified and be predetermined through a legal and institutional framework. On that base, in order to come up with a holistic approach and mutual agreement concerning the development prospects of the port and its terminals, in 2001-2002 the Constantza port Master Plan was created. The Master Plan constitutes the constitutional map according to which any project or activity associated with the port operation and development is planned, routed and processed. In the context of the Master Plan, the role, jurisdiction and responsibilities of all involved parts, members and stakeholders, as well as the communication code amongst them is determined, in order to reassure uniform behaviour and justice for all, avoiding misunderstanding and conflicts. For the port of Constantza, this code is vital as there are many public authorities and bodies, as well as several private companies and stakeholders involved in the port operations.

#### *8.2.2.3 Planning and operation/construction processes*

Several undergoing and future development projects towards sustainable development are associated with the port of Constantza terminal. The most important of them are listed below:

- Upgrading of road and rail connections to national and international networks;
- Infrastructure and superstructure works on piers for special terminal development, including road/rail construction works and mooring constructions;
- Development of artificial island inside the port to build new platforms;

- Dredging works and berth extension for increased capacity;
- Shore protection, soil consolidation and management of Constanta adjacent areas;
- Upgrade lighting level in port and reduce road lighting system power supply through the replacement of old systems with new, advanced, more efficient and liable ones;
- Upgrading of port's safety system.

The total budget of the before-mentioned projects is estimated to surplus 1 billion €. Funding is to be covered by Sectorial Operational Programme, European Gateways Platform project, East Europe Trans-National Cooperation Programme, together with some national and port authority funding.

The ownership and management are partly separated in public bodies and private companies. This fact has the advantage of having better control and more rapid solving of problems, ensuring the interest from the part of the private domain as they are potential stakeholders. Nevertheless, such a model often attracts many coordination difficulties and probably involves additional costs. So, in any case, the port authority of Constantza port is in favour of the landlord port when it comes to the ownership of land and infrastructure, but for the management, a more flexible public-private partnership (PPP) scheme is the most preferable one.

On the same base, the management of land and infrastructure is separated from the operational activities of the terminal. The management is under the control of the port authority, while the operation is undertaken by private companies. The benefit is believed to be the enhancement of the provided services and their upgrading to a higher level, guaranteeing the attraction of more potential customers and wealth. Another strong point is that the operation of the port is becoming independent from the politics, meaning that any negative circumstance will not have big impact on the successful operation of the terminal. According to the Constantza port representatives, the model adopted today guarantees the separation of management from the operation, towards the fastening of the development procedures.

#### *8.2.2.4 Sharing of information*

As far as the ownership, management and operation of the information and communication systems are concerned, the NC MPA Constantza SA is no longer in charge of any of those tasks. In particular, during the last five years, there has been a full privatisation of the whole telecommunication domain. The private companies have undertaken the task of providing reliable, direct and high level information and communication services either by phone or internet and also to provide for any of the systems technological upgrading and updating, according to the demand market requirements.

As per the lessons learned, it was found out that it is important that operators and authorities are in position of sharing and exchanging information. In addition, as long as it is not confidential data, this information should be available to all stakeholders at the

same time, in order to promote further development without wasting valuable time and money. In that sense, the existing cooperation amongst operators and authorities regarding the information provision in the port of Constantza should be supported and further strengthened via e-mails, websites, specialised technology or software programs and internet tools. Nevertheless, especially in the case of the diffusion of confidential information (e.g. financial data), the fear of competition in combination with the economic recession may constitute potential barriers towards information sharing techniques.

#### *8.2.2.5 Finance*

The terminal was initially (before 1998 when it was transformed into a joint stock Company) financed by the Romanian state as it had been public property, together with the contribution of some private investors, under a public private partnership (PPP) scheme. Nevertheless, up until today, there is no public subsidy. On the contrary, it seems that the port of Constantza constitutes a bargain for private investors, providing the opportunity for stakeholders and customers to lease land, infrastructure and equipment and at the same time be in charge of their own provided services and operations.

In addition, according to the NCMPPA representatives, no significant barriers concerning communication, coordination, initiative, finance, control and legislation were mentioned or recorded associated with the integrated planning and financial process, the infrastructure phase and the cooperation amongst stakeholders and the information sharing. On the other hand, financing difficulties and delays concerning public funding or private investment, as well as legislation issues when it comes to the diffusion of confidential information are often recorded.

The total income of NCMPPA for 2010 reached the 65.4 millions €. The income is mostly produced by the provided ship services and the renting of infrastructure, superstructure and mechanical equipment. The funding resources mostly come from self owned investment schemes or sources (57.15 % of total) and budgetary allocations (19.6 % of total). The role of the European Union is important, with a total contribution of 23.25 % to the required investments and funding.

### **8.2.3 Outputs and level of service**

Some indicators related to output, level of service, productivity and effectiveness are calculated/estimated below:

- The intermodal transport chains are estimated to prevail over the unimodal ones by 90% of the total. This indicates that the port terminal constitutes an intermodal interconnectivity point of the transport chain;
- The ratio between the lowest and highest monthly throughput (volume) handled by the port terminal in Constantza equals approximately 70 %, meaning that the recorded variability of traffic was relatively low throughout the whole year;

- The daily workload of each employee, measured in TEUs handled, is calculated. Its value is produced as the mean daily number of TEUs handled per day in the terminal divided by the employees performing this task. The respective value equals to 235.24 TEUs/employee/day approximately;
- The ratio between volume and facilities, measured through the mean number of TEUs handled by a typical crane per day is calculated. The respective value equals to 4245.02 TEUs/crane/day approximately.

### 8.3 Analysis of gaps, mobility schemes and future changes

#### 8.3.1 Gaps

Important gaps regarding lack of standardisation and infrastructure, and dependency of mode choice to economy and legislation are discussed below.

**Table 21. Constanza: Identified gaps.**

Lack of standardisation	The lack of standardisation (affiliation with international standards on several processes, such as building construction, transportation and traffic regulations and barriers, safety and security codes, information sharing protocols, cleanliness etc) is identified as a fact. Nevertheless, it is not mentioned or faced as a problem by the port authorities due to the perception that the existing regulatory framework is considered sufficient to cover issues such as standards on infrastructure elements, information services, transport operation, retail and other services, even though with differentiation from the international standards applied in such situations.
Lack of appropriate infrastructure	The current infrastructure is considered as good, although for the modernisation of the port in terms of sustainability, three relevant ongoing projects will enhance this dynamics: the completion of the Northern breakwater of Constantza Port-extension by 1050m, the road bridge at km 0+540 of the Danube-Black Sea Canal and the Development of the railway capacity in the river-maritime area of the port. Currently, there is inadequate infrastructure between sea and road. However, there is sufficient connection between sea and rail.
Dependency of mode choice to economy and legislation	At the specific case study, rail is considered as a more advantageous mode than the road (trucks), as it is more economical, and more flexible, since the road network lacks the appropriate (safe, comfortable, etc.) infrastructure. In the near future, though, the improvement of the road network will probably change the terms of the competition between the two modes. Legislation issues do not affect the mode choice.

### 8.3.2 Emerging mobility schemes

The emerging mobility schemes important for Constanza Port are discussed below.

**Table 22. Constanza: Emerging mobility schemes.**

International logistic centre	The port is a special logistic area working as an international logistic centre, providing significant services, such as loading/unloading of containers and other load units, warehousing of general cargo, quality control of products, tracking of shipments, etc. In addition, the strategic location of the port enhances its dynamics as the most important interconnectivity point in the wider inland area and the Black Sea.
Eco-efficient terminals	Eco-efficient issues are taken under consideration by the port authorities (i.e. adjustment of the terminal's equipment and transfer vehicles taking into account energy consumption), but an integrated environmental policy framework is missing.
Integration of an e-logistic platform	An integrated e-logistic platform, regarding for example the sharing of information, is missing among the involved stakeholders (operators, shippers, authorities, etc.). This lack is mainly caused by the fear of competition, especially, when referring to financial data.
Green corridors	There is no perspective for this scheme
Public-private partnerships	The development of public-private partnerships is under consideration for the future development of the port, including interventions, such as the expansion of the port to the south, the building of new terminals, the completion of the road connection of the port with the national motorway network, etc.

### 8.3.3 Future changes

In order to cope with the future growth of river traffic, which is soon foreseen to register 17 million tons/year, the NCMPA SA Constantza has started a new investment for a barge terminal. Such investment will improve the sailing conditions and develop facilities for the accommodation of river vessels in the south part of the port. Because of insufficient road network, it is also planned to connect the port with the national motorway network. The development of public-private partnerships is under consideration for these processes.

## 8.4 Concluding remarks

### 8.4.1 Main conclusions

The port of Constantza operates as a special logistics area, providing services of a regional, national and international oriented freight centre. Together with the two satellite ports of Midia and Magalia north and south from the main port by the Black Sea and the Tomis marina used exclusively by boats' and yachts' owners, the port of Constantza is considered to be a port cluster. Apart from the sea port, there is a river port nearby, as well, servicing considerable volumes of cargo coming from or destined to the central European countries. The maritime and river ports are connected with each other through the "Danube – Black Sea Canal", which constitutes a very important connector and a key point for the Constantza port, providing the opportunity for important cargo volumes to be carried through the Danube river at low cost in comparison with road and rail competitive routes in East Europe.

The port may constitute an integrated special logistic area, including a logistics centre, but because of insufficient freight flows due to recession, the port must attract a bigger market share and upgrade connectors to national and international networks, promoting combined transport services.

### 8.4.2 Good practices

The collaboration amongst the different public and private stakeholders seems to be the most significant strength in the Constantza port terminal case study. In addition, the landlord model adopted for the administration and management of the port and its operations and the fact that it is open to all potential customers has proven to be a success story concerning the expandability of business and the further economic development. The master plan seems to constitute a key factor as it is utilised as a memorandum of mutual understanding and cooperation amongst partners, facing effectively any hard cases so far. Based on the master plan, a great number of new projects, such as the expandability of the port and the upgrading of infrastructure and equipment are in the phase of implementation and realisation, due to the optimised exploitation of the low budget available.

### 8.4.3 Lessons learned

One hard case worth to mention is the delay recorded concerning the completion and upgrading of the road network. The port is planned to be connected to the national high speed and capacity motorway network in the very near future, as the local network, currently in use, has proven to be insufficient to service the large volumes of freight traffic attracted in the wider area network due to the operation of the port. A key issue is therefore this non-existence of infrastructure and of respective equipment concerning the interconnection of different transportation networks inside the terminal area, as well as the provision of related supporting services, in order to make the multimodal

concept more competitive compared to the unimodal one in the fields of time and money.

Also, towards the better management of the terminal's workload, the separation of cargo to unimodal and multimodal should be supported by an integrated information exchange system, in order to provide the best possible scheduling of freight vehicles when changing of transportation modes in successive transport legs.

No further actions are taken from the part of national government and port authorities (NCMPA and MTI) towards the initiation of passenger regular lines and the increase of traffic in order for the entire wider area to be upgraded and also achieve socio-economic and business development of the region. There is also a lack of extra services for board and lodging as well as for the provision of additional services inside the port area (banks, shops, etc.), probably due to the inexistence of passenger regular lines.

#### **8.4.4 Suggested improvements**

The port customers agrees that the provided services range at a satisfactory level, however, the use of some more advanced and state of the art technological equipment, in order to make the diffusion of information more rapid, or close to real time, would be beneficial.

NCMPA are in favour of the harmonisation of the regulations on physical and information standards in long/short distance interchanges. Moreover, they acknowledge the importance and utility of the existence of a regulatory framework for the agreements amongst different administrations and authorities where every involved stakeholder's responsibilities and jurisdiction is clearly identified. Also, further improvements may be necessary on regulations associated with the physical accessibility and information services for passengers and freight customers, while some modifications may also be required concerning the better management of shops (e.g. duty free) and commercial activities. It is advised to update the master plan, taking into consideration the socio-economic recession, the new marked requirements and regulations, also focusing on the attempt to attract passenger flows from regular lines including the introduction of additional services boosting business development.



## 9 Vilnius Airport

### 9.1 Introduction

#### 9.1.1 Background and history

The terminal of Vilnius Airport was built and taken into use in 1932. The airport was used as a military airfield during the World War II, but resumed its activity as a civil airport in 1944. This building did not survive to this day. The present buildings of the airport were constructed in the year 1945 -1954, during the post-war period. The arrival terminal was built by prisoners of war. The building of Vilnius International Airport is included into the Register of Immovable Cultural Heritage of the Republic of Lithuania.

In 2007 the Departures Area was redesigned, and now it is more spacious and provides more comfort for travellers. The infrastructure of the terminal is adapted to separate the Schengen and non-Schengen passenger flows. This separation ensures more efficient servicing of the departing passengers in accordance with the security requirements applicable for the Schengen countries.

In 2010 Vilnius airport was enabled to transfer by tender the centralised infrastructure management to a private subject. This kind of regulation makes it possible to increase the Vilnius airport revenues while reducing the costs.

In year 2011 to 2012 the preparation of Master plan was carried out. The aim of the project was to prepare a Master plan of Vilnius Airport by assessing the variety of possible scenarios of further development of the airport in the perspective by one or another scenario. Several key activities can be identified from the strategic objectives:

- Cost reduction by optimising the activities: reduction of number of employees by eliminating activities and functions, which are uncharacteristic to the airport, transfer of some functions to professionals, ensuring lower cost of services and higher quality of service provision;
- Orientation to augmentation of non-aviation services;
- Attraction of new airline companies.

In the period of 2011 – 2014 the preparation of a set of territorial planning documents is planned to be completed. A set of special and detailed plans will be prepared to establish the schedule of management and use of the territory, to determine the boundaries of the sanitary protection zone and to structure an optimal territory required for the activity of the airport.

#### 9.1.2 Location and area

Vilnius International Airport is located on a plateau in South of Municipality of Vilnius city. The airport occupies an area of 326 ha. The length of the airfield perimeter is

10.54 km. Vilnius International Airport is surrounded by an industrial part of the Vilnius city.

Vilnius International Airport plays an important role in the transport system. It is the largest of the four airports in Lithuania. Other airports are in Kaunas, Palanga and Šiauliai. Vilnius and Kaunas act as a multi airport system and cover almost the entire territory of Lithuania (accessible in 2 hour trip by car). Vilnius is the main airport and Kaunas operates as a secondary airport, oriented to serve low-cost airlines. Palanga (3 hours and 30 minutes away from Vilnius by car) is also an international airport. Šiauliai is a military airport, specialised in freight, but also open for civil passenger flights. The Riga Airport (in neighbour country Latvia, 3 hours and 30 minutes away from Vilnius by car) is also an attractive alternative for people living in Northern Lithuania, as Riga airport is an international hub with a large number of direct flights to European cities.

Vilnius International Airport is only 7 kilometres away from the city centre. You can drive this distance by car in 15 minutes. Vilnius International Airport is also well accessible by public transport: inter-city bus, scheduled city bus, scheduled city taxi (vans), taxi and train. City buses number 1 and 2 provide a service to the airport from 5:28 in the morning (first bus) to 22:05 in the evening (last bus).

The airport is also well-connected to the main bus and rail station for inter-city travel. Airport Express service (Vilnius bus station – Airport) runs from 7:40 to 22:50. You can also get from Palanga through Klaipėda (the port city of Lithuania) and Kaunas directly to Vilnius Airport.

A special scheduled train runs from Vilnius Railway Station to the airport. The railway stop, stairs, and passenger lift are installed just outside the airport terminal. For the safety of passengers there is lighting and a video surveillance system. The train runs back and forth from 5:45 to 21:29. Schedules of the airport train are composed to match inter-city train schedules.

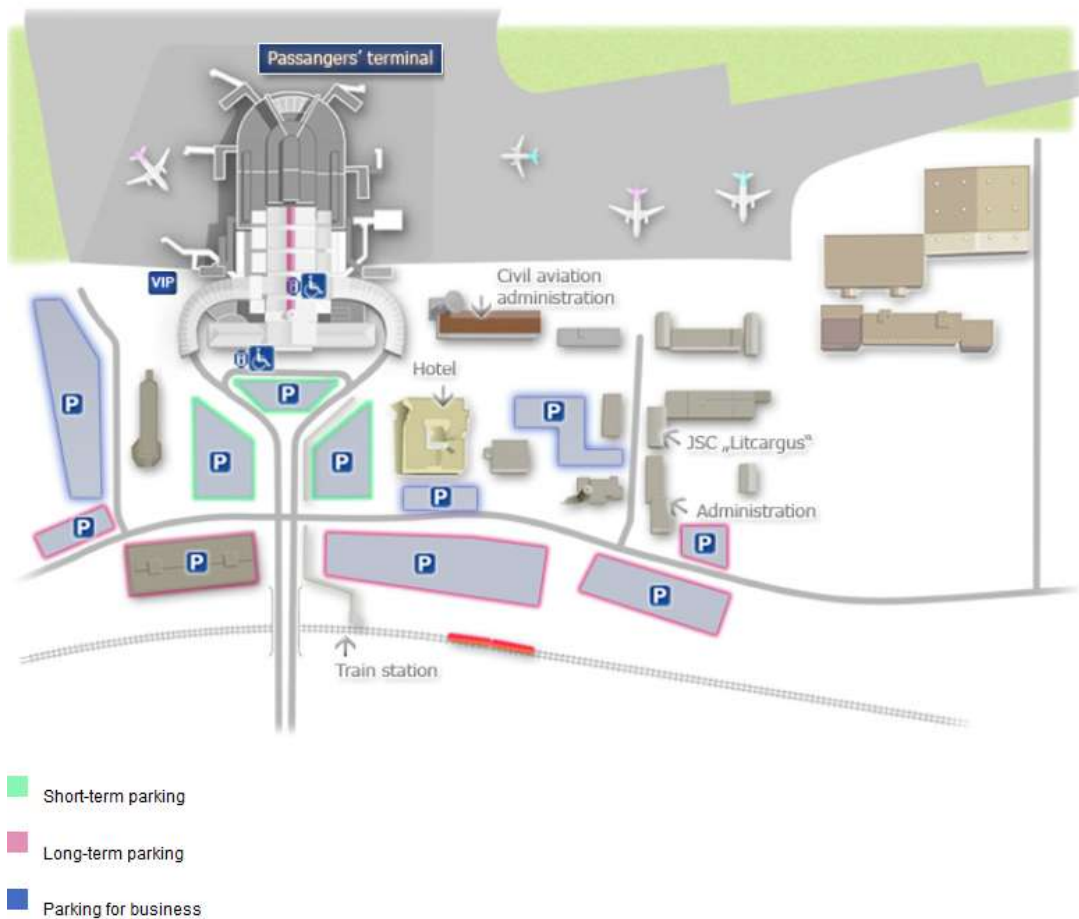


Figure 11. Airport overview. Source: <http://www.vilnius-airport.lt/en/airport/airport-plan/>

### 9.1.3 Specific characteristics and terminal properties

Firstly, key figures for understanding and analysing this terminal are calculated for (1) the average cost ratio between car and public transport – car costs are 196 % of the cost of public transport when ownership costs of car are included, and 140 % of public transport when ownership costs are not included (only fuel costs are counted), (2) the average time ratio between car and public transport – the average time from city centre by car is 75 % of the average time it takes by public transport, and (3) the saturation ratio – actual volumes are 49 % of maximum capacity of the airport.

Secondly, as described in section 9.1.2, Vilnius is an urban airport. The distance from the city centre to the terminal is only 7 kilometres and the distance to Vilnius central bus and rail station is 5 kilometres. One implication of this is that the potential for expandability of the terminal is close to zero. This is not a problem yet, because of the low saturation ratio. However, the number of passengers is steadily increasing.

Thirdly, Vilnius is a relatively small terminal. Average walking distance from the entrance to the platform/gate is about 100 metres. Average walking distance from arrivals hall to the main public transport modes is also short. Nearest bus stop is only

45 metres away from arrivals hall and nearest rail stop is 300 metres away from arrivals hall. This makes it easy to get an overview, and it also reduces problems with long walking distances. In addition, the relatively low number of passengers makes it unprofitable for public transport companies with frequent departures, and this is one of the reasons why many passengers prefer private cars.

Fourthly, the organisation and structure of Vilnius airport should be viewed in context of the Lithuanian laws and regulations. In Lithuania, state enterprises are strictly regulated and must follow complicated procedures when subcontracting services or purchasing necessary supplies. This also applies for partnerships, therefore a limited company has greater freedom to negotiate, choose suppliers and contract services. Currently, the airport is state enterprise but plans to reorganise to limited company, as it would make the airport management more flexible – it would be easier to attract public-private partnerships, hire employees and organise public procedures. This flexibility could contribute to better, quicker and more efficient (from financial point of view) decision making.<sup>4</sup>

## 9.2 General description

### 9.2.1 Passenger profile and geographical coverage

Vilnius International Airport's geographical coverage is Europe. Regular flights are operated mainly to European countries. Charter flights are operated to some touristic African countries: Morocco, Tunisia, Egypt and Israel.

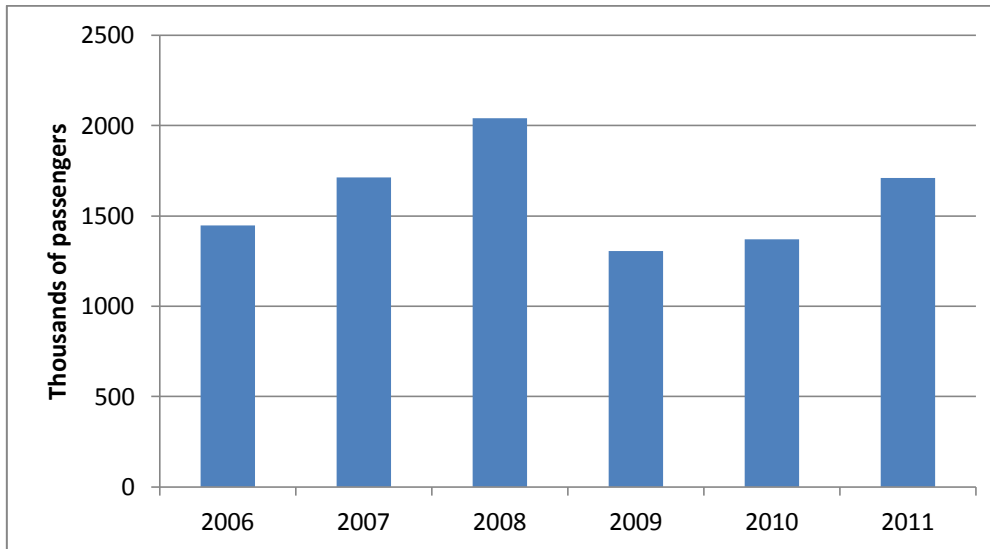
Vilnius International Airport Newsletter (2011 January) announces top 10 most popular flight directions: Riga (11.10 % of passengers), Copenhagen (10.70 %), Frankfurt (7.50 %), Antalya (7.00 %), London (6.00 %), Dublin (5.80 %), Prague (5.00 %), Helsinki (4.60 %), Warsaw (3.90 %), Hurghada (3.70 %) and other (34.70 %).

In 2009, Vilnius International Airport passenger survey showed that 44 % of travellers are travelling on job/business (38 %) or research/study (6 %) purposes. These are called the 'business' segment. 56 % of the passengers fall into the so-called "leisure" segment, which is distinguished into recreation/sightseeing purposes (31 %) and personal purposes (as the visiting friends and relatives) (21 %).

Annual number of arriving and departing passengers from 2006 to 2011 is visualised in Figure .

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<sup>4</sup> State enterprises are, however, protected from market competition to an extent and more favoured by the public (considered more transparent) but these advantages are lesser than the disadvantages in the particular case of Vilnius international airport.



**Figure 12. Vilnius: Annual number of arriving and departing passengers at Vilnius International Airport.**

Figure displays that the number of passengers in Vilnius International Airport highly increased from 2006 to 2008, during the economic rush. In 2009 this number fell sharply and in 2011 it still has not reached the level of 2008.

## 9.2.2 Planning, financing, ownership and organisation

### 9.2.2.1 Ownership structure

Land, infrastructure and ICT of Vilnius international airport are owned by the state of Lithuania. Operation and services regarding users of air transport are provided by state enterprise Vilnius international airport. SE Vilnius international airport owns 6 surrounding paid short and long term parking lots, out of which several are contracted and managed by other companies. SE Vilnius international airport also provides paid parking lots containing up to 45 taxi cabs. Specific infrastructure (such as bus and rail stops) and means of information provision (such as information boards) of passenger transport operators serving Vilnius international airport are owned by operators. Retail and catering services for passengers are provided by 41 independent businesses renting retail space in the airport passenger areas.

Responsibilities and roles of the relevant stakeholders, with special focus on long/short distance transport integration, are presented in Table 23.

**Table 23. Vilnius: Roles of stakeholders in the operation of the terminal.**

Stakeholder	Role and responsibilities
Ministry of transport and communications of Lithuania	Responsible for shaping transport policy and organising, coordinating and overseeing its implementation. The ministry can affect strategic goals and encourage long/short distance transport integration, therefore the possible influence of the ministry on planning and policy can be considered as high.

Stakeholder	Role and responsibilities
	<p>The ministry does not have direct responsibility or legal right to provide, coordinate or otherwise interfere with integration of long/short distance transport services in Vilnius international airport, therefore responsibilities on management of long/short distance transport integration are low.</p>
<p>SE Vilnius international airport</p>	<p>This is the operator and manager of Vilnius international airport. The institution is not responsible for planning, management or policy development of long/short distance transport integration; however, it provides information on plane schedules for better coordination of passenger transport schedules. The institution has a more significant role on promotion and marketing: SE Vilnius international airport cooperates with passenger transport operators to provide information for passengers on available transport services.</p>
<p>SC Lithuanian railways</p>	<p>The only railway operators in Lithuania providing both passenger and freight transport services. Operates a route dedicated to transport passengers to/from the airport to/from the train station, which is also located next to the bus station and Vilnius city public transport routes. The institution mostly plans, manages and forms policy for railway transport and manages own promotion and marketing, however, if there are requests from the public or other transport operators to slightly adjust schedules or exchange information (e.g. hanging information boards on public transport from the train station to the city) the institution cooperates.</p>
<p>ME Communication services</p>	<p>Responsible for the organisation of the public transport in Vilnius city. In case of Vilnius airport, they are responsible for schedules and planning of Vilnius city public transport routes to the airport.</p> <p>The institution is not responsible for planning, management and policy forming of long/short distance transport integration. It is, however, responsible for coordinating and displaying information on city busses going to the airport and the infrastructure of the bus stop. It cooperates with other operators on level of information exchange, e.g. coordination of schedules to optimise bus time tables in accordance with inter-city busses and trains as well as flights. It also cooperates on information provision, e.g. displaying schemes and schedules of city public transport in railway station and inter-city bus station.</p>
<p>KAUTRA, JSC and TOKS, JSC</p>	<p>Operators of the largest private companies providing passenger transport services by buses. These institutions do not influence planning management or policy formation of long/short distance transport integration. However, they cooperate with other operators</p>

Stakeholder	Role and responsibilities
	to provide information on other transport services if requested and if that information is not increasing competition for their own business.
Other operators (operators of minibus services)	These operators provide small scale passenger service. They have no influence on long/short distance transport integration at all as they are small, highly flexible businesses without the need to adapt to anyone. These institutions are supposed to provide transport on different routes than city transport in order not to compete with city busses; therefore they fill some transport gaps.
Taxi operators	All the taxi operators serving Vilnius city also transport passengers to the airport. Several companies have purchased rights to park in the dedicated taxi parking lot at the exit of arrival terminal of the airport. Influence of these companies on planning, management and policy long/short distance transport integration is indirect: taxi is the second most popular way to arrive to the airport; therefore other operators compete for passenger flows and adapt their strategies to attract passengers using taxis. Taxi companies do not cooperate with other operators; however, they cooperate with Vilnius international airport. This includes initiatives on safe and fair taxi services, information on available operators, taxi service vouchers, etc.

Cooperation between the different operators can be evaluated as very weak – the only examples of cooperation are exchange of information or information provision on non-competitive transport services. As there is no cooperation, level of integration is also very low. Stakeholders mostly agreed that tighter cooperation is achievable by putting into practice joint initiatives closely coordinated by some type of external organisation with influence over all stakeholders involved, such as governmental institutions. After successful encouraged and supported activities, voluntary cooperation might follow if all the stakeholders are convinced about benefits of collaboration.

### 9.2.2.2 Regulatory framework

The current regulatory framework is not oriented to standardise the transport system as a whole, but dedicated to standardise specific modes of transport. Standards for different modes are not coordinated between each other, which leads to complicated and expensive integration of transport modes.

Influence of transport operators on the overall integrated intermodal long/short distance transport service is low and influence of transport policy makers is high. This may seem like a viable system; however, it does not work in reality as transport policy is not obligatory. Therefore, even if there is a trend of transport service integration, this policy is not implemented by transport service providers or the interchange owner/manager. Some of the reason for this situation is that there is no cooperation and procedural

framework for integration of short/long distance transport services. Any initiatives to coordinate schedules and improve passenger services are independent initiatives of passenger transport operators.

Interviewees agreed that regulatory framework regarding coordination of services and information provision is necessary and would improve the overall transport services. Regulation on physical standards were not considered as very important in this case, as passengers are mobile and can transfer between transport modes quite easily.

#### *9.2.2.3 Planning and operation/construction processes*

Main conflicts regarding operation and construction processes are between the state, which is owner and manager of the airport, and inhabitants of surrounding areas, which actively resist most of development projects, resulting in delays or even termination of development projects. There are no significant conflicts between airport and transport operators regarding operation and construction.

Vilnius airport expansion is always very sensitive topic, as the airport is located within limits of Vilnius city. Because the surrounding area is populated by several thousand people, any development becomes complicated both because of impact local community and surrounding land use issues. A cooperation framework would have positive impact on collaboration of different stakeholders involved in operation and development of the airport. Collaboration framework could be encouraged by a dedicated institution with power to involve representatives of the stakeholders for round table discussions and actual initiatives.

#### *9.2.2.4 Sharing of information*

Sharing of information between transport operators and/or the terminal is completely voluntary process. There is no legal framework to regulate sharing of information between operators, however all operators provide data on passenger numbers and some other indicators to the Statistics department of Lithuania. Other information is shared between operators under individual agreements (mostly on schedules or passenger flows for better coordination). Main barriers for information sharing are commercial and strategic secrets of companies or financial issues, if gathering specific information requires additional funding.

#### *9.2.2.5 Financing*

The terminal and surrounding land is owned by state, and the operator of the terminal is a state entity, therefore no additional charges for rent occur and losses are subsidised by the national authorities. EU structural funds have co-funded some of the development projects. Each of the transport operators funds their infrastructure and ICT systems by themselves. This model has advantages as there are no issues with sharing costs or project delays if one of the partners fails to provide funding, however, projects of larger scale are difficult to fund.

From year 2010 Vilnius International Airport was supposed to conduct financial accounting by International accounting standards. Previously, national business



accounting standards were used. There are still a lot of improvements to be done to switch to international accounting standards, so this process is not yet completed.

Passenger transport services provided are limited by actual cost and profits of specific trips, e.g. during late hours there might be only 5 passengers per bus, making the trip a huge loss for the operator. Due to low use of public transport and limited subsidies for unprofitable trips, operators cut down number of trips available and working hours of public transport. Retailers are limited by actual profit received from business in the airport and corresponding decisions are made if operating a business is not profitable.

Developing and installing information systems is pricey and single operators face difficulties with such projects, therefore, systems of limited functionality are used or printed schedules are handed.

### 9.2.3 Outputs and level of service

Interface of the interconnection in Vilnius international airport is rather simple as Vilnius is a small airport and all transport modes are within a few minutes' walk from the terminal. Additional services are not necessary for most of passenger without special needs, however, increased information service would contribute to better travel experience. Real time information on transport is not available at the airport, and operators agree that this is one of the major issues decreasing passenger experience, as passengers feel insecure if the bus is late. Operators did express a need for a joint system, but there is no leader to put the idea into life. This lack of initiative leads to the current state of information provision and poor results of public transport use.

Vilnius International Airport passenger survey, carried out in 2009, has shown that exactly half of all passengers to Vilnius airport are coming or leaving by car with friends or family members. This method is especially popular among the locals and charter flyers. 26 % of travellers access/egress the airport by taxi. Among the foreigners, the most popular arrival and departure way is taxi – used by 49 % of foreign respondents, and friends bring 26 % of foreign passengers.

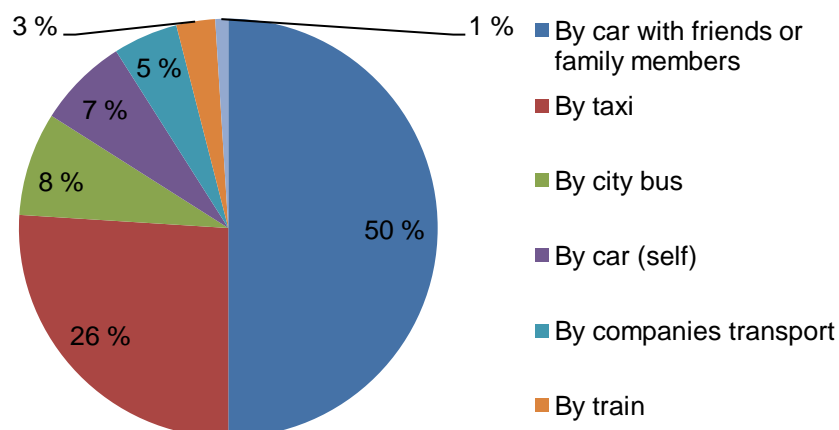


Figure 5. Vilnius: Airport access/egress modes.

Passengers living abroad or in Vilnius city or district use the taxi service more frequently than others. Only a small percentage of passengers who reside outside Vilnius use a taxi. 11 % of residents of Vilnius arrive at Vilnius airport by city bus while among people living not in Vilnius this rate is only 4%. Arrival at the airport by train is quite popular among the Lithuanian, whose residence is not in Vilnius – 7%, while only 1% of the residents of Vilnius arrive by train.

A number of different services are available at the airport for passengers to use. The following table provides an overview of available services.

**Table 24. Vilnius: Services available at the terminal.**

Service	Yes	No	Not relevant
Specific information to smart phones improving information about interchange terminals and public transportation		x	
Information boards in terminals	x		
Information about personal navigating systems in terminal	x		
Scheduling of routes on base of real time data		x	
Ticket control mechanisms for eTickets		x	
Computer equipment for payment services	x		
Coordination of schedules between transport operators	x		
Bicycle stands at terminals	x		
Sufficient, safe and affordable parking areas	x		
Possibility to charge batteries for electric vehicles in the parking area <sup>5</sup>		x	
Recruitment of staff as guides		x	
Recruitment of staff as volunteer guides	x		

No information on scheduling of routes based on real time data is available, as no public transport vehicles are equipped with such system, nor are there ICT for it in Vilnius city.

There are general complaints on the public transport system in Vilnius that apply to the routes serving the airport as well. No complaints are received about safety of the terminal; however, the following issues are raised by passengers:

- Train stop is within uncomfortable walking distance if you carry heavy luggage and if the weather is bad. The path is well lighted and a security camera is installed, but passengers are not satisfied.
- Information services are available at a special stand inside the arrivals terminal, but not during the late and early hours. Free Wi-Fi internet services are

<sup>5</sup> Electric cars are not yet popular enough in Lithuania to install a charging station (there is a total of 4 electric vehicles in Lithuania).

available, but these measures might not be sufficient for late foreign passengers not familiar with the airport and city.

- No integrated tickets are available and the ticketing system of public transport might be confusing for users not familiar with it;
- Delays of busses might occur during the rush hours.

There are generally few complaints about passenger transport service to and from the airport as most of the passengers use private cars or taxis.

Employee productivity has significantly increased from 2009 to 2011. In 2009 this number was 2,830 passengers per employee per year and in 2011 this number is almost doubled and has reached 5,550 passengers. This change is caused by optimisation of costs in Vilnius International Airport, which is implemented by reducing the number of employees and other actions.

### 9.3 Analysis of gaps, mobility schemes and future changes

#### 9.3.1 Gaps

Three types of gaps are analysed; wasted time, poor information and poor quality of services. The most important gaps are listed in Table 25.

**Table 25. Vilnius: Terminal gaps.**

Wasted time	Train stop is considered to be too far away (roughly 300 meters), but the directions are clearly indicated.
	No public transport is available for very early flights (leaving before 6 a.m.) and late flights (after 11 p.m.). Additional bus service is considered, but it is doubted to be beneficial, as public transport only runs until half past 11 p.m. and from 5 a.m. in the morning, therefore change of schedule for single bus is not an option.
Poor information	Currently operators only exchange information on schedules. Information to increase collaboration is exchanged vaguely.
	All operators use their own ticketing systems. Electronic tickets are slowly spreading in the country; however, there are no close future plans to use same electronic tickets for different modes of transport.
	Missing information about local tickets for the last mile during the late and early hours, when information service stand is not working.
	Information of fares for travel services is available on the airport website for the public transport. Taxi fares depend whether you take taxi waiting in the airport or call you own cab from the city. This information is not provided.

	Information boards with routes of other transport modes are available, but information services should be more detailed.
Poor quality	Customer survey (2011) reported that more additional services are required. The airport is currently working on attracting new retail and food services.
	Very few of the airport's staff are available late at night and early in the mornings; however, no complaints were received on lack of assistance.
	Public transport frequency is quite low, but higher frequency is highly unprofitable for transport operators. There are currently discussions on the issue, but due to limited funding solutions are still limited.
	Delays happen during rush hours. Expansion of connecting roads is planned in the future, but the traffic problems in the city itself, also affecting transport to the airport, are still to be solved.
	In the rush hours some congestion might occur, but it is not significant.

### 9.3.2 Emerging mobility schemes

Table 26 presents some emerging mobility schemes especially relevant for Vilnius Airport and the current situation.

**Table 26. Vilnius: Emerging mobility schemes.**

Simplifying the payment	Computer equipment is available for payment services inside the airport terminal. One may also pay by card in taxi.
	Hardware for registration in terminals or ticket control mechanisms for eTickets is not available. There are no close future plans to install this equipment from the side of the terminal operator.
Real time information	Real time information is provided on information boards for air traffic. Information on city bus traffic is not real time; information boards display schedules, relevant information and estimated time until arrival of next bus. Plans to install a real time information system are being prepared, and have been for several years, but there is no clear vision of a funding scheme and the project is delayed again and again.
Cooperation of transport operators	Operators provide transport services from the airport, so technically, they use the same terminal. However, stops are located in different places nearby the terminal.
	Operators of public transport cooperate to adjust their schedules to air traffic schedules and to schedules of intercity busses and trains leaving

	from the main station, as several transport routes take passengers directly to main station of Vilnius (same place for busses and trains, as well as city transport).
Individual access and egress	Individual access is very well developed. Long term, medium term and short term (5-15 minutes) parking zones are available at the airport. Most of the parking lots have security control. Quantity of parking spots is sufficient. Terminal access by car is declared most comfortable way to arrive to the airport by the travellers (data of survey carried out in 2011). Bicycle is a very unpopular way to reach the airport and investing in bike lanes would be unfeasible.
Electro mobility	Means of electricity powered transport are not yet offered at the airport, nor are charging stations or other similar commodities. Electro mobile perspectives are being researched, and electro mobile charging station in the terminal is also planned in near future.

### 9.3.3 Future changes

Currently, strategic planning is oriented to promote the use of public transport instead of arriving by private car, and these tendencies will affect habits of terminal users as well.

## 9.4 Concluding remarks

### 9.4.1 Main conclusions

Vilnius international airport is a rather interesting object for a case study: the terminal is close to the city and well connected with different means of transport, however passengers arrive and leave by private cars or taxis in 9 cases out of 10. The terminal offers satisfactory public transport services, but such level is not sufficient to attract passengers used to the comfort of private cars. Situation of the terminal reflects overall situation of public transport on a smaller scale: chaotic planning through the years led to rapid auto mobilisation and dramatic decrease in use of public transport. Public transport services are considered to be slow, difficult to use and with poor access to desired destination. State or municipality public transport operators providing unfeasible services are not used to competing in the market and private passenger transport operators cannot offer adequate coverage, as they seek to serve profitable routes. Collaboration between the two is a rare happening, and lack of good practice in the field further discourages operators from trying to collaborate and achieve significant improvements. This is the point where transport policy and regulations could have positive impact: interviewed stakeholders agreed, that independent governmental body responsible for passenger transport development and integration would encourage them to collaborate through or be guided by the mentioned governmental body. Main conclusion of the interviewees and researchers who contributed to this case study is

that a strong leader is required to inspire or even force change to achieve sufficient results and visible change in the public transport system.

### 9.4.2 Good practices

Passenger transport operators serving the airport as well as the airport operator react well to complaints of passengers: operators collaborate to adjust time tables with each other if the passengers express any need for changes. Passengers are the driving force to improve service. Bottom-up initiatives should keep being welcomed. Operators are also familiar with transport policy, understand the importance of achieving both national and EU level goals and are willing to adopt new practices.

### 9.4.3 Lessons learned

Interviewed operators were highly sceptical about other operators, considering them either competitors or impossible to collaborate with. Sometimes such points of view were based on previous experiences of joint initiatives, but in a number of cases the concern is not based on experiences but rather reluctance to try unknown and possibly risky initiatives without clear understanding of possible results. Stakeholders agreed that if transport policy regarding integration would be mandatory, better results would be achieved. This indicates a lack of willingness to improve quality of service and change status quo without strong external influence.

### 9.4.4 Suggested improvements

Based on interviews carried out and other research, the following suggestions were made:

**Table 27. Vilnius: Suggested improvements.**

Planning:	Interviews revealed that a common framework for planning involving all stakeholders is missing. Stakeholders agreed that round-table discussions would have positive impact on planning of public transport development in the area of the airport. This discussion should be mandatory (regulated by legal acts) in order to achieve any results.
Finance:	Currently, public transport initiatives are mostly funded by operators. Joint initiatives could be used to implement a joint information system or other similar development projects. This would reduce costs of operators and would also contribute to a single, more informative system for passengers.
Construction:	Construction projects of large scale should also be discussed with other stakeholders in order to evaluate impacts before the projects' implementation. Adjustments are easier to make in the planning stage to ensure better integration of transport modes or better solutions of existing problems.
Operation:	Public transport operators should find a compromise to adjust working hours to the working hours of the terminal to cover early and late

	flights, which are impossible to make with the present public transport (except for the taxi service).
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Encouragement from the government could have a positive impact on collaboration of operators: setting up several initiatives would familiarise operators with collaboration procedures and a best practice cooperation framework could be established for projects of greater scale.

## 10 Cross-case analysis

This chapter presents different comparative analyses of all the seven cases described in the previous chapters. Although it is beneficial to identify trends and emerging schemes and see how they manifest themselves at particular terminals on a case-to-case basis, it is important to realise that seven cases are too few for establishing solid, general conclusions on a European level. The confidence of the comparative results are further obstructed by the heterogeneity of the chosen cases; half of them are freight and the other half are passenger transport, and the type of terminals cover airports, ports, a bus terminal and a train terminal. However, trying to shed light on different causes of the identified terminal properties can nonetheless be fruitful, in particular for evaluating (1) emerging mobility schemes, (2) gaps that were identified in WP 2 of CLOSER, (3) recommendations from PAG members, (4) CLOSER core indicators and (5) terminals' fulfilment of EC policy goals. The heterogeneity of the different cases will help covering as many aspects of these as possible. It is also possible to analyse the potential for transfer of practice and solutions across contexts. This chapter will discuss the before-mentioned issues (one to five) one by one, in relation to the case study terminals. Section 10.6 summarises a set of good practices identified in the case studies, while some conclusions related to the case studies are presented in Section 10.7. Finally, Section 10.8 describes how feedback from the Policy Advisory Group members has been taken into account.

### 10.1 Emerging mobility schemes

CLOSER Deliverable 2.2 (Nagel et al., 2011) outlined various mobility schemes and trends that are identified for European freight and passenger transport. In the case studies some of the most interesting emerging mobility schemes and trends from Nagel et al. (2011) are selected. Their influences and impacts in the specific long/short-distance interfaces that are studied in the CLOSER case studies are then mapped. An analysis of these mobility schemes based on the cases where each particular scheme is relevant is presented below. For each scheme, the relevant cases are presented in a table. It is, however, necessary to point out that the emerging mobility schemes are not automatically a factor which is desirable or a goal for each terminal. There are substantial variations between the terminals and some of the emerging mobility schemes are not suitable or are not a part of the terminals responsibility. This section will focus on a descriptive study of the relevant mobility schemes and map their existence at the various terminals.



### 10.1.1 Passenger transport

#### 10.1.1.1 Enhanced bicycle usage

**Table 28. Enhanced bicycle usage.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
	X	X		X		

Armentières is the only terminal which is sufficiently adapted for bicycle usage. In urban areas, it will not help adapting the terminal for bicycle usage unless the rest of the cityscape also supports it; this reduces the relevance for this emerging mobility scheme e.g. in cities where it is not possible to upgrade the streets with a bicycle lane. A problem identified in the Oslo case is connected to security; the bicycle parking areas need to be guarded to secure the bicycles from theft when people go away for longer time periods. Finally, to show the relevance of this emerging mobility scheme, for passengers of cruise ships which stay in the city of Thessaloniki overnight, the terminal plans to arrange for the possibility of hiring bicycles. Bicycles will be stored and parked in a depot suitable for accommodating light vehicles. This may not be considered as an indicative kind of multimodal transport, because there is not any explicit transport leg (origin – destination). However, it could be treated as combined transport that supports urban mobility.

#### 10.1.1.2 Simplifying the payment

**Table 29. Simplifying the payment.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
	X	X		X		X

None of the analysed terminals had e-tickets available which integrated both short and long distance transport. However, more and more cities use e-tickets for local transport; Oslo have used it for some time and Armentières have implemented an e-ticket system which is planned to function in a few months. All four terminals, however, are equipped with computer systems for payment services, although these services provide either unimodal long distance tickets, tickets for one short distance leg or for short distance multimodal transport.

#### 10.1.1.3 Real time information

**Table 30. Real time information.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
	X	X		X		X

All four terminals display real time information for the long distance transport leg. In Armentières, real time information for busses (in addition to trains) is displayed. However, these systems do not share information and they are physically separated to

such an extent that one has to go in and out of the building to see both systems. In Oslo, real time information for short distance transport (local buses, trams, subways) is displayed at the respective stations, which are located 50-100 meters away from the bus terminal. In addition, real time multimodal information for regional transport is available on the internet and through an application for mobile phones developed by Ruter, a publically owned company that is responsible for public transport planning in Oslo and the surrounding Akershus county. This application works quite well; however, it is considered too costly by many transport operators, and therefore it mainly displays Ruter’s own routes, which are restricted to the wider Oslo area. Both Thessaloniki and Vilnius lack real time information for last mile distribution; no clear vision of a funding scheme is identified as the main cause. These four cases indicate that lack of cooperation is an essential factor; however, real time information is clearly an emerging subject because of the security and service level it provides for users.

10.1.1.4 Cooperation of transport operators

**Table 31. Cooperation of transport operators.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
	X	X		X		X

Cooperation of transport operators exist to some extent. For Armentières and Vilnius, cooperation exists in terms of adjusting timetables for buses to fit the train or airplane schedules. At Thessaloniki Port, the degree of cooperation is somewhat lower. The harbour master (Hellenic Coast Guard) provides information on passenger transport issues (by phone or in person), and the travel agents provide information on their corresponding ferry transport, respectively. In Oslo, cooperation of transport operators relate to shared terminals and coordination of schedules. There is little coordination of schedules between transport modes. This is because the terminal is located in the centre of the largest city of Norway, and therefore tram, metro and local buses have such a high frequency that it is not necessary to coordinate schedules for more regional travels. The analysed cases show that cooperation seems to pose no problem in win-win cases (like coordination of schedules); however, for the emerging mobility schemes “simplifying the payment” and “real time information”, lack of cooperation between operators seems to be the main obstacle. It seems therefore that for achieving socio-economic optimality, public intervention could in some cases be imposed. One intervention that could be useful is a publicly managed multimodal real time information system which would be able to capture all relevant transport operators and integrate long and short distance transport legs.

10.1.1.5 Individual access and egress

**Table 32. Individual access and egress.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
	X	X		X		X

For the studied cases, individual access and egress is linked to bicycle and car accessibility as well as sufficient parking areas. Armentières is the terminal most accessible by bicycle; as well as the properties mentioned in section 10.1.1.1 Armentières have reasonable quality bicycle lanes for access to the station. The whole area covering the station is built favouring slow modes and public transport. The car park, however, is full 90 % of the time. There is currently free parking, but the terminal are planning to introduce parking fees, as well as building more parking areas. In Oslo, few are using bicycles for access and egress due to lack of security at bicycle parking areas. The parking facilities include a car park which is rarely full. This could be due to the price (240 NOK per day) or the good public transport connection relative to car accessibility. In Thessaloniki, the terminal's facilities for efficient interconnection could be considered as adequate, since passenger volumes can easily be served by the existing infrastructure. The bike lanes runs along the port facilities, enabling access and egress by bicycle. Public bus stops exist in the vicinity of the port. Finally, the port provides sufficient, safe and affordable parking areas/stands for private vehicles, enabling port access by car. Bicycle is rarely used to access Vilnius airport and investing in bike lanes would be unfeasible. However, long term, medium term and short term (5-15 minutes) parking zones are available at the airport. Most of the parking lots have security and theft guards and the quantity of parking spots is sufficient. Terminal access by car is declared the most comfortable way to arrive to the airport by the travellers.

#### 10.1.1.6 *Electro mobility*

**Table 33. Electro mobility.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
	X	X		X		X

The emerging mobility scheme “electro mobility” will be a key element for obtaining results in line with EC’s green profile when it comes to transport. However, because of the current performance gap between electric cars and conventionally fuelled cars, especially when it comes to long distance transport, the state of the art technology must be improved before users will drastically increase their purchase of electric cars. Nonetheless, it is at the last mile/urban element this performance gap is least, and adapting terminals to support electric cars can therefore be beneficial. At the car park at Vaterland Bus Terminal in Oslo, there are charging devices for electric cars. The whole city is in fact under the influence of initiatives for obtaining increased electro mobility and Oslo is one of the European cities with a highest number of electric vehicles per capita. This is not the case for Armentières terminal, Thessaloniki port or Vilnius airport, where no such charging devices exist. The reason for this is partly identified as low number of electric cars in the respective countries, but having facilities in terminals is surely one means of increasing the attractiveness of electromobility.

## 10.1.2 Freight

### 10.1.2.1 *International logistics centres*

**Table 34. International logistics centres.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
X			X	X	X	

Direct access of an international logistics centre (ILC) to global transport networks will enable direct transshipment of goods without the need of using an intermediate location. All four case study freight terminals act as international logistics centres. Indicators of success for international logistics centres seem to be (1) location of the terminal, (2) hinterland connections and geographical coverage of the terminal and (3) the number of services offered at the terminal, such as loading/unloading of containers and other load carrying units, warehousing of general cargo, quality control of products, tracking of shipments, etc.

### 10.1.2.2 *Eco-efficient terminals*

**Table 35. Eco-efficient terminals.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
X			X	X	X	

In context of the global warming, eco-efficiency at terminals is an important emerging mobility scheme. The case study terminals have all directed various measures towards this goal, of which some are focused on global issues such as carbon emissions and energy consumption, while others are focused towards local pollutions. Some of the stakeholders at case terminals report the lack of an integrated environmental policy framework. Because of the technological progress in this area, it is important to have a dynamic attitude towards eco-efficiency. However, without an integrated policy framework there is a concern that some terminals may focus too much on the commercial/promotional aspects of eco-efficiency without having to take the necessary global responsibility. There is, however, an increased focus on this issue with e.g. the forthcoming CEN standard EN 16258 for emissions (CEN, 2012) and EC projects such as COFRET<sup>6</sup>, which focuses especially on standardisation of calculation methodologies, comparability and consistency of emission figures.

<sup>6</sup> COFRET is an ongoing EC project of which the main output will be a consistent methodology for standardised calculation of energy consumption/CO<sub>2</sub>-e emissions from transport, taking into account the whole supply chain including terminals and warehouses (<http://www.cofret-project.eu/>).

### 10.1.2.3 Integration of an e-logistics platform

**Table 36. Integration of an e-logistics platform.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
X			X	X	X	

At Constantza, an integrated e-logistics platform is missing. This is also the case for Helsinki; however, at this port interfaces enabling communication between different IT systems exist. At Leipzig-Halle, most of the freight is derived by DHL, who uses their own modern technology for information exchange. Finally, at Thessaloniki, an e-logistics platform exists at the container terminal, but it has not yet reached the desired level of integration. All terminals acknowledge the advantages of a sufficiently integrated e-logistics platform. However, lack of cooperation between operators, caused by the fear of competition, especially regarding financial data is reported as a main problem for achieving this.

### 10.1.2.4 Green corridors

**Table 37. Green corridors.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
X			X	X	X	

For Constantza and Thessaloniki, connections to green corridors are missing. Vuosaari Harbour in Helsinki has a direct connection to the Finnish main rail network and for example to Bothnian Corridor, which may become part of TEN-T network. Vuosaari Harbour has also connections to European corridors, for example to Rail Baltica. For Leipzig-Halle, the connection to the high-speed network (with running high-speed trains) is prepared, but waiting for more customers willing to use it. Currently the critical mass is missing, but if a sufficient demand would be available, the operation can be started immediately.

### 10.1.2.5 Public-private partnerships

**Table 38. Public-private partnerships.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
X				X	X	

Regarding Constantza, the development of public-private partnerships is under consideration for the (near) future, including interventions, such as the expansion of the port to the south, the building of new terminals, the completion of the road connection of the port with the national motorway network, etc. For Thessaloniki, the private status does not foster the development of public-private partnerships. However, since the transformation of ThPA SA into a landlord status, managing entity is planned and the establishment of concession agreements with other private companies is foreseen, including, for example, the concession of the container terminal.

### 10.1.2.6 Rail interoperability

**Table 39. Rail interoperability.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
X			X	X		

Rail provides environmentally friendly and usually cheap movement of goods. Intermodal transport with the possibility for rail freight will perhaps stabilise or hopefully reduce the amount of road transport. At specific piers of the port of Thessaloniki, the trains arrive directly from the point of origin without any further interventions ready for transshipment. To this extent, rail interoperability for freight exists. Train is also available at the port of Constantza, but both at Constantza and Thessaloniki rail only constitute a minor part of the inland transport. Constantza has the potential of being a major transfer point for sea-to rail transfer for goods destined for Central Europe, but lack of interoperability of different countries railway systems constitute a barrier to such solutions. At Helsinki port, the rail tracks also reach the quays; however, there is no rail terminal. If the rail traffic will increase, a rail terminal may be required. At Leipzig-Halle, there is already built a connection between the airport and the high-speed rail network; however, it is not functioning due to lack of demand. On the other hand, the high-speed rail network is built for passenger transport and most of the freight is transshipped to other aircrafts. The conclusion from the analysed cases is therefore that rail interoperability exists to some extent; however, most of the inland transport is done by road. Identified reasons for this are (1) low investments in rail due to the convenience and flexibility of road transport and (2) situations that are outside the terminal's control and regard rail at a national level.

### 10.1.2.7 Short sea shipping

**Table 40. Short sea shipping.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
			X	X	X	

Short sea shipping is considered as an effective means to divert the freight traffic from congested corridors in local communities and reduce the environmental costs. Regarding the port of Helsinki, as Finland can be considered logistically as an island, short sea shipping is the main transport solution for all foreign trade and therefore the main activity conducted at the port. Regarding Constantza, some of the port's most important trading partners are located in Germany, Austria, Slovakia, Czech Republic, Hungary, Romania, Bulgaria, Serbia, Spain, Italy, Slovenia, Greece and Albania. Therefore, short sea shipping becomes a natural alternative (Albania is also approached through river itineraries). Thessaloniki also promotes short sea shipping, and more and more actors which previously used truck now consider this as an alternative. An example is nickel transport from Kastoria to Larymna; recently this transport route was separated in two legs – 150 km by road and 350 km by maritime. Considering the extent of the volumes transferred (500,000 tonnes per year

corresponding to 25,000 trucks), this example clearly shows the occurrence of short sea shipping as an emerging mobility scheme.

### 10.1.2.8 *Deep sea shipping*

**Table 41. Deep sea shipping.**

Leipzig-Halle	Armentières Station	Oslo Bus Terminal	Port of Helsinki	Thessaloniki Port	Constantza Port	Vilnius Airport
				X	X	

Deep sea shipping becomes increasingly important in a globalised world. Furthermore, a proper utilisation of the advantages of deep sea shipping may lower carbon emissions; no vessel uses more fuels than a large tanker ship, however, this is due to the large capacity of the vessels. This mode of transportation has the potential to consume less energy per tonne or TEU carried than any other mode. The ports in both Thessaloniki and Constantza support deep sea shipping as this is one of the main modes of transport for long distance legs for these terminals. For Finland, there are not sufficient volumes for global transport and deep sea shipping.

### 10.1.3 Evaluation of emerging mobility schemes from case studies

The emerging mobility schemes for passenger transport were connected to enhanced bicycle usage, simplifying the payment, real time information, cooperation of transport operators, individual access and egress and electro mobility. The study of these factors illustrate that passenger terminals experience challenges to many of these factors.

Simplifying the payment and offering real time information are important factors for facilitating use of public transport. E-tickets and real time information are two aspects which can reduce barriers and simplify travels for passengers. However, the review shows that there is still some way to go before such conditions are satisfied. None of the terminals had e-tickets which integrated short and long distance transport. Oslo and Armentières do not share information between modes and they are physically separated. This can, at least for Oslo, be connected to competition between modes.

Individual access and egress are dependent of e.g. location, type of modes, public transport services and constraints for driving. The main barrier for cycling to Vaterland is security, while cycling is naturally not a suitable mode of transport for passengers transferring to flights or ferries. Oslo has a high share of passengers arriving and departing with public transport. This is due to restrictive accessibility for driving combined with high frequencies on public transport. Armentières, Thessaloniki and Vilnius have a higher car share that can be explained by good facilities for parking as well as lower quality on public transport (Vilnius and Thessaloniki).

All of the freight terminals are international logistic centers which enables direct transshipment of goods. Moreover, the terminals have directed various measures towards eco- efficiency. Some focus on GHG-emissions, while other are more directed to local pollution. The forthcoming CEN standard EN 16258 contributes to increased

focus on their global responsibility. The main barriers towards integration of an e-logistic platform are related to lack of cooperation of operators, caused by fear of competition.

Rail is an environmental friendly mode of movement of goods. Thus, there are ambitions on increasing the share of such transshipments. The case studies illustrate that there are to some extent rail interoperability, but road transport is the main mode of transport for inland transport. Low investments in rail due to convenience and flexibility of road transport and situations that are outside the terminals control are regarded as the main explanations.

## 10.2 Gaps identified in WP 2

CLOSER Deliverable 2.2 (Nagel et al., 2011) identified possible gaps in mobility schemes and service provision in long/short-distance interfaces. Analysing these gaps can, hopefully, lead to common factors that are challenging when it comes to promoting sustainable transport. In the following we summarize main findings related to gaps.

### 10.2.1.1 *Gaps identified for bus/rail terminals*

Armentières and Vaterland bus terminal have both gaps connected to better integration between modes of transport. The common factors are:

- Missing dynamic bus information
- Not complete ticket integration

Armentières and Vaterland bus terminal does not provide information about other modes of transport. Passengers arriving by train have to walk to the bus station in order to find bus departures and vice versa for bus passengers transferring to train. At least for the Oslo case study the lack of information provision can partly be linked to competition between short and long transport. Thus, it can be challenges for foreign passengers or those who are inexperienced. The gaps for these two terminals are quite similar.

### 10.2.1.2 *Gaps identified for airport (passenger)*

Vilnius is the only case which is solely a passenger airport terminal. It is therefore difficult to study whether the gaps identified are common for other European airports. The main gaps identified were connected to

- Wasted time (train stop too far away, no public transport available for early or late flights)
- Poor information (operators use their own ticketing system, no future plans for same electronic tickets for different modes of transport, missing information about local tickets for the last mile during late and early hours, not sufficiently detailed information boards, and information in local language only)
- Poor quality (customer survey reported that more additional service are required, public transport frequency is quite low, delays during rush hours)



### 10.2.1.3 *Gaps identified for port (passenger)*

Thessaloniki handles both passenger and freight. In this section we point out the gaps related to passenger transport.

The main gaps identified were:

- Poor information (The provision of information is limited to the port services, and does not regard any multimodal or last mile transportation options, thus, an integrated system for the provision of such information is necessary.)
- Poor quality (The most serious problem for the multimodal transportation of passengers when arriving at or departing from the port is not being able to purchase a public transport fare and a lack of the relevant information provision. Also, the recruitment of staff as guides or volunteer guides for the better service of passengers is not foreseen.)

Foreigners and inexperienced passengers may meet the problems due to the above mentioned factors. The results also seem to point to the direction that passenger terminals have some common gaps. Especially evident is the lack of information towards different modes of transport, as well as not complete ticket integration. There is more variation when it comes to the quality of the terminal.

### 10.2.1.4 *Gaps identified for airport (freight)*

Leipzig is cargo and passenger airport. Their main gaps are connected to:

- Lack of customers (The region Leipzig/Halle is in the eastern part of Germany, where there is still a lack of industry and production. That means the airport is not naturally located close to potential customers. )
- Dependency on trucks; no suitable rail service or concept exists for this kind of cargo
- The river passing the terminal is not deep enough for cargo ships of appropriate size

### 10.2.1.5 *Gaps identified for port terminals (freight)*

The case studies involved three ports. This makes it possible to compare gaps and possibly identify whether there are common gaps or patterns fostering sustainable transport. The results can be important when it comes to implementing policies which shall promote environmental friendly transport.

Vuosaari and Constantza identified gaps when it comes to standardisation. However, the gaps include two different aspects. In Vuosaari the main problem is related to information systems of different operators could be better integrated if standardisation was agreed in common. Constantza, on the other hand, focus more on lack on affiliation with international standards. Moreover, this is not regarded as a problem and might imply that there is not a priority issue to promote standardisation towards international standards.

<p>Lack of standardisation (Vuosaari)</p>	<p>Information systems of different operators and other actors in the area could be better integrated if standardisation was agreed in common. As operators are operating in different ports and operators have their own systems, a complete integration would require cooperation of a large group of actors.</p>
<p>Lack of standardisation (Constantza)</p>	<p>The lack of standardisation (affiliation with international standards on several processes, such as building construction, transportation and traffic regulations and barriers, safety and security codes, information sharing protocols, cleanliness etc) is identified as a fact. Nevertheless, it is not mentioned or faced as a problem by the port authorities due to the perception that the existing regulatory framework is considered sufficient to cover issues such as standards on infrastructure elements, information services, transport operation, retail and other services, even though with differentiation from the international standards applied in such situations.</p>

All case studies identified gaps when it comes to lack of appropriate infrastructure. The lack of infrastructure is, in Vuossari, related to expansion possibilities and rail freight terminal. Constantza has more challenges connected to inadequate infrastructure between sea and road, while Thessaloniki states that it is limited need for future interventions (for freight). Thus, the gaps identified are divergent.

<p>Lack of appropriate infrastructure (Vuosaari)</p>	<p>Vuosaari Harbour has new and well maintained infrastructure. The lack of infrastructure is related to expansion possibilities and rail freight terminal. Even though rails reach the quays, if rail transportation increases remarkably, appropriate infrastructure for large-scale efficient operation is missing.</p>
<p>Lack of appropriate infrastructure (Constantza)</p>	<p>The current infrastructure is considered as good, although for the modernisation of the port in terms of sustainability, three relevant ongoing projects will enhance this dynamics: the completion of the Northern breakwater of Constantza Port-extension by 1050m, the road bridge at km 0+540 of the Danube-Black Sea Canal and the Development of the railway capacity in the river-maritime area of the port. Currently, there is inadequate infrastructure between sea and road. However, there is sufficient connection between sea and rail.</p>
<p>Lack of appropriate infrastructure (Thessaloniki)</p>	<p>The needed interventions in terms of infrastructure improvement are limited, and regard the accomplishment of the expansion of the 6<sup>th</sup> pier of the port, a project that is scheduled for the near future.</p>

freight)	
Lack of appropriate infrastructure  (Thessaloniki passenger)	The main problem arises from the lack of financing. At the same time, legal restrictions cause problems (i.e. delays) in construction projects. The main deficiencies are indicated in the passenger terminal, which, due to the relatively low number of the travellers, has not been modernised enough.
	Interventions for the development of parking areas are indicated as catalytic for the improvement of the services provided to passengers.
	The existing infrastructure does not foresee any special facilitation of the interconnectivity of different modes of passenger transportation.

There is the same pattern connected to dependency of mode choice to economy and legislation. There is variation of factors identified which makes it difficult to point to any comparable factors. The main conclusion can therefore be that freight ports vary greatly and that there are, according to the structure in this project, few common factors. E.g. Thessaloniki points out that there is no legislation issue which seems to affect mode of choice. Vuosaari, on the other hand, mention that sulphur regulation may decline transport volumes in the Baltic. Road transport transport is likely to increase in Constantza due to investments in road networks.

Dependency of mode choice to economy and legislation  (Vuosaari)	The sulphur regulation may decline transport volumes in the Baltic Sea which directly affects the ports in the area. There might be possibilities, such as LNG vessels, which would reduce the impact of the sulphur regulation.
Dependency of mode choice to economy and legislation  (Thessaloniki)	At the specific case study, legislation issues do not seem to affect the mode choice.
	Regarding economy, the mode choice is dependent of the port and ship tariffs, concerning the use of the rail network or the road network through trucks. In the first case, the carriers should pay extra fees in order to use the railway, while in the second case, when using their own trucks, the companies have to assess the total cost, based on fuels' prices, packaging (in needed), etc.
Dependency of	At the specific case study, rail is considered as a more

mode choice to economy and legislation (Constantza)	advantageous mode than the road (trucks), as it is more economical, and more flexible, since the road network lacks the appropriate (safe, comfortable, etc.) infrastructure. In the near future, though, the improvement of the road network will probably change the terms of the competition between the two modes. Legislation issues do not affect the mode choice.
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### 10.3 Recommendations from PAG members

In the table below, the relation between PAG recommendations and the situation at the particular terminals are described.

**Table 42. PAG recommendations.**

Policy recommendations			
	1. Integrate the administration of the public transport system	2. Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform	3. Policy and legal frameworks should facilitate intermodal cooperation
<b>Flughafen Leipzig-Halle</b>	Not relevant	Is important, but must not be regulated by authorities, can be left to the market	The absence of more intermodality is not related to policy or legal framework, but to the difficulty of developing appropriate intermodal solutions for the types of goods handled and also to the requests of customers.
<b>Armentières Station</b>	Not relevant because spatial scales and the transport modes associated are different	Irrelevant in case of train and bus articulation	A policy exists in favour of the development of interchange poles. The Armentières case does not show a need for more formalism in the framework
<b>Oslo Bus Terminal Vaterland</b>	Ruter plans, coordinates, orders and markets public transport (except train) in Oslo and Akershus. By including train, Ruter could improve coordination between transport modes. Moreover, there is no clear authority which is responsible for		Authorities and other actors are working on providing systems for ticketing and passengers information. Standards for intermodal connection (e.g. information provision) could improve and facilitate passenger transport.

	transport interchange development. Making counties responsible could facilitate better integration between short and long transport.		
<b>Port of Helsinki – Vuosaari</b>	Not relevant	Not relevant. There are no legislative barriers in Finland.	Currently the situation in Finland is too market driven and there are no frameworks or subsidies promoting intermodality.
<b>Thessaloniki Port</b>	<p><b>Passengers:</b> Thessaloniki's Integrated Transport Authority (ThITA) is in charge of the massive public transport system of Thessaloniki. At the moment, the only massive means of public transportation is bus. After the completion of the metropolitan railway and the establishment of the Urban Public Boat Transport of Thessaloniki, the scope of the administration will be metropolitan, and the need for an integrated system for the coherent provision of efficient services, under the umbrella of ThITA, will be significant.</p>	<p><b>Passengers:</b> Due to the unimodal nature of Thessaloniki's public transport network and the lack of appropriate infrastructure for multimodal passenger transport it is difficult to achieve such harmonization. This requires the existence of more than one public transport modes and enhanced level of multimodal infrastructure. Also, integration of public transport system administration could help to that direction.</p> <p><b>Freight:</b> Relative steps have been made and there is also such infrastructure so multimodality depends on each company business model</p>	<p><b>Freight:</b> The relative legal framework exists. The rail network in the port area enables the accommodation of intermodal shipments, and in this framework attempts are being made through several types of interventions for rendering the port of Thessaloniki as a major transit node in Balkans. Such interventions will improve the intermodal character of the port, but on the other hand, policy making should also turn towards the integration of services and operations by launching initiatives of integrated cargo (i.e. consolidation or logistics centres, freight villages) and also establishing incentives (economic) for promoting such models.</p>
<b>Constantza Port</b>	Not applicable.	The port of Constantza is fully harmonized with modal focused legislation and regulations.	<p><b>Freight:</b> The policy and relative legal framework concerning the facilitation of the intermodal cooperation either exists or is adopted according to the EC directives. Moreover, the NCMPA SA Constantza port authority as well as the rest of the stakeholders have a positive attitude towards the launching of initiatives and the promotion of operational and business models which are in favor of the</p>

			intermodality development. For the time being, the respective level of provided services seems to be “poor” against competition (rival ports in SE Europe). Nevertheless, intermodality and interconnectivity constitute issues with interesting and promising prospects concerning the socio-economic development of the whole adjacent area and for the moment are under governmental responsibility and jurisdiction, even though the recession and the involved stakeholders “crave” for a solution to be provided. In any case, the combination of transport modes is believed to give boost to the port’s attractiveness, providing some extra integration
<b>Vilnius Airport</b>	Administrating public transport system as a whole does benefit to better coordination and reduced staff costs of administrating personnel, however if administrating body is not guaranteed decision making rights and sufficient influence to make a change, only a minor changes will occur.	Clearly understandable goals and corresponding legislation is extremely important to encourage operators to collaborate, as their own initiatives are rarely considered seriously enough by other operators.	Additional support for intermodal cooperation would contribute to development of transport services as a system in a recommended direction, as absence of clear vision leads to chaotic development.
<b>Planning recommendations</b>			
	4. Incorporate the transport planning process with land-use planning		
<b>Flughafen Leipzig-Halle</b>	Transport planning and land-use planning is incorporated.		
<b>Armentières Station</b>	Local transport Plan (PDU) is part of the general metropolitan planning (SCOT) and similarly Regional Transport Plan is part of the Regional Plan. To incorporate transport planning with land-use planning is not necessary, it is in the implementation phase that things can sometimes not happen as foreseen		
<b>Oslo Bus</b>	Transport planning and land-use planning is incorporated.		

<b>Terminal Vaterland</b>	
<b>Port of Helsinki – Vuosaari</b>	Municipalities are responsible for land use planning and building their road network, but major road and rail infrastructure decisions are made on national level. Incorporating these processes could improve transport system as an entity.
<b>Thessaloniki Port</b>	<b>Freight:</b> ThPA SA should exploit all space within the port area to establish freight and logistics centre. Logistics centre initiative has already been launched by employing a logistics advisory board to support actions in this project. Storage capacity of containers has been increased after augmenting the storage area. Extension of pier no 6 will significantly increase TEU handling capacity. Integration of administrative divisions into a single department for efficient space management. Expansion of Free Zone.
<b>Constantza Port</b>	<b>Freight:</b> The incorporation of transport planning process with land use planning is already in progress and fully promoted, as the technical development and the upgrading of provided services is processed in parallel with the expansion of the port's area, according to the respective master plan. The expected outcome includes storage area expansion, building of new terminals and berths and increase in TEU handling capacity of the port. Given the fact that the whole port area constitutes a free-zone, the port authorities believe that the increase in the supply and the upgrading of technical equipment will bring the covetable increase of port's demand, attractiveness and competitiveness in the Balkan area and the Black Sea.
<b>Vilnius Airport</b>	Incorporating planning might lead to delays if stakeholders do not reach an agreement. A very clear long-term strategy must be developed to ensure feasibility of such collaboration.
<b>Financing recommendations</b>	
	5. Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues
	6. Integrate the pricing of the public transport system
<b>Flughafen Leipzig- Halle</b>	The holding and its subsidiaries are owned by public institutions, solely. There is no private partner involved and all persons interviewed are satisfied with this situation.
<b>Armentières Station</b>	A PPP approach has been developed by the Metropolitan Body (LMCU) for housing and commercial development on land next to the station area, but this recommendation fits better to the urban development around the exchange pole.
<b>Oslo Bus Terminal Vaterland</b>	Authorities and other actors are working to establish a system for integrating pricing of the public transport system. This is regarded as important by national authorities for offering a better service for passengers. In Oslo and Akershus it is to some extent possible to use the same ticket between different modes.

<p><b>Port of Helsinki – Vuosaari</b></p>	<p>Not relevant for the particular terminal. Generally PPPs lower the limen to invest in large infrastructure projects and is thus a good recommendation.</p>	<p>Not relevant</p>
<p><b>Thessaloniki Port</b></p>	<p><b>Passengers and freight:</b> Due to the private character of ThPA SA, it is not feasible to foster such partnerships. However, when/if ThPA SA is transformed into a landlord status managing entity, it could more easily establish concession agreements with other private companies to use and exploit plots, buildings and installations like the container terminal case which has already been implemented. In addition, such financing schemes could be developed for the improvement of the communication systems of the port, and the integrated information provision to passengers.</p>	<p><b>Passengers:</b> This recommendation does not concern the port. For reasons of completeness, ticket integration and integrated pricing are not implemented as there is only one public transport mode (bus). Other modes are foreseen, such as metro and boat, and integrated ticketing is also under study, as all these modes are controlled by one authority.</p>
<p><b>Constantza Port</b></p>	<p>Current situation: The port is state owned, the port authority has the management control, and private companies undertake the operations and the telecommunication systems.</p> <p>Near future: The use of PPPs could be a good solution for the future development of the port, since significant investments (road connections, expansion of the port to the south), “demand” (public) land use and these models could solve potential lack of national financing or conflicts between local and regional communities.</p>	<p>Not applicable.</p>
<p><b>Vilnius Airport</b></p>	<p>PPP models is an option if development projects are attractive and feasible (e.g. sufficient flows of passengers, sufficient use of public transport) and transport services as public services might suffer in availability.</p>	<p>A common ticketing system would be beneficial from users’ points of view.</p>
<p><b>Organisational recommendations</b></p>		
	<p>7. Use of business models for cooperation that also publically owned terminals can use</p>	<p>8. Structure the information provision</p>
<p><b>Flughafen Leipzig-Halle</b></p>	<p>Leipzig/Halle is a public owned terminal organised as a private company.</p>	<p>The information for passengers is available, there is also information about e.g. train departures at the airport etc.</p>
<p><b>Armentières Station</b></p>		<p>This recommendation is in line with the good practices. The Region has sometimes difficulties to obtain data and information from SNCF</p>
<p><b>Oslo Bus Terminal Vaterland</b></p>		<p>There are several actors which provide travel planning information. It can be necessary that public</p>



		authorities (in cooperation with private companies), are in charge of the system. In the current system some of the operators are not willing to pay for being a part of the service.
<b>Port of Helsinki – Vuosaari</b>	This recommendation is important. In Finland, not all public terminals are open.	Currently the national PortNet system provides information to all the ports in Finland. This is a good recommendation and could be extended to whole EU and all transport modes.
<b>Thessaloniki Port</b>	<b>Passengers and freight:</b> The existing business model of ThPA SA is very effective because it helps close collaboration between stakeholders and ThPA SA while ensuring confidentiality and equal treatment of all parties in the context of free market competition. Apparently, there is no need for change.	<b>Passengers:</b> The information provision is still in an initial level, a situation that could be justified because of the low volumes. However, the information provision should be improved and re-structured under an integrated framework, if and when relative interventions are made, such as integration of ticketing, or establishment of new infrastructure.  <b>Freight transport:</b> In the freight sector, the information provision is also in an initial level. Investments such as the establishment of electronic platforms for automation of operations and fast and easy information provision are defined as significant and needed. In this direction, relative steps are being made, like the adoption of ERP (Enterprise Resource Planning software), systems of e-payment and capable of reducing customs formalities.
<b>Constantza Port</b>	The port is state owned, while the port authority has the management control and private companies undertake the operations. In addition, the telecommunication systems are under full privatization. Since the whole port is a free zone for all interested stakeholders (from 2007), and taking into consideration that the terminal is publicly owned, the adoption of business models for further cooperation and future development would be beneficial.	A shared information platform (standardized message formats, standardized messages, etc.) among the involved stakeholders is missing. Such a platform should be established for the matching of different systems and the smooth development of new technological interventions.
<b>Vilnius Airport</b>	Cooperation might be difficult for publicly owned terminal due to ownership structure and limitations	Structured information on all modes of transport would highly

	rising from ownership model (state owned companies have to follow stricter rules and procedures)	increase chances of understanding information correctly and planning successful trip.
<b>Infrastructure development recommendations</b>		
	9. Constitute transport infrastructure management body for all modes	10. Adopt or create standards for physical infrastructure interconnectivity
<b>Flughafen Leipzig-Halle</b>		Standardization is an on-going process driven by the market, probably a regulation by authorities would be counterproductive
<b>Armentières Station</b>	This recommendation does not seem to apply for Armentières. Infrastructure management is separated for each mode (train, bus, etc.)	Not applicable; Modes are separated, so there is no need for this (things would be different in case of a tram-train project).
<b>Oslo Bus Terminal Vaterland</b>	Infrastructure management is separated between several authorities and companies. E.g. Rom (a wholly owned subsidiary of NSB AS which is the state-owned monopolist rail passenger transport company) has responsibilities for property development of transport junctions. Some of the interviews point to the direction that this role division is not adequate.	
<b>Port of Helsinki – Vuosaari</b>	Finnish Transport Agency is the management body of all modes in Finland. This is important for better information exchange and common planning.	This recommendation is not favorable for Finland as there are already differences compared to other EU countries (gauge width, truck load weight etc.).
<b>Thessaloniki Port</b>	<b>Passengers and freight:</b> It is still very challenging to be implemented because of non-harmonized legal framework and the dispersed premises of different modes. A common property character (public) is needed to avoid discrepancies.	<b>Passengers:</b> At the moment, there is no physical infrastructure connection among the different modes. When public transport is integrated (metropolitan railway and Urban Public Boat Transport of Thessaloniki), a physical infrastructure connection would enhance the intermodal passenger character of the port.  <b>Freight transport:</b> In the case of goods' transportation, a physical infrastructure exists, since both the road and railway network "reaches" the port piers. A future intervention that will promote the physical infrastructure interconnectivity is the connection of the port with the Egnatia Motorway, which includes three vertical axis-sections of the Transport European

		Network.	
<b>Constantza Port</b>	Each role of the involved stakeholders (operations, services, infrastructure, land, etc.) is explicitly defined in the case of the Constantza port. The Ministry of Transport and Infrastructure has a general supervision, but only in specific issues (i.e. regulatory framework). On the other hand, since a significant number of new interventions are foreseen, including (public) land investments, i.e. road connections, etc., the constitution of an integrated transport infrastructure body, probably under the umbrella of the Ministry of Transport and Infrastructure, could be catalytic for the better monitoring of the relevant investments.	The physical infrastructure interconnectivity regarding sea and rail exists in the port, but between sea and road (truck) is missing.	
<b>Vilnius Airport</b>	A single body well experienced in development of transport infrastructure would be beneficial not only for this specific terminal, but for all terminals in the country and would contribute to better use of best practice and more efficient planning.	Standards are rather difficult to develop for passenger interchanges as there are limited development possibilities for terminals located within the cities or terminals built before implementation of the standards.	
<b>Operations recommendations</b>			
	11. Separate the owner from the operator	12. Establish the cooperative framework between the terminal and the transportation operators	13. Integrate the operations of the public transport interchanges
<b>Flughafen Leipzig-Halle</b>	This is not appropriate for Leipzig/Halle	This is established via Netzwerk Logistik Leipzig/Halle	
<b>Armentières Station</b>	This is the situation for rail, but not applicable for bus.	Not applicable.	It does not seem necessary to have one single operator to overcome the current difficulties
<b>Oslo Bus Terminal Vaterland</b>	Ownership and operators are separated.		
<b>Port of Helsinki – Vuosaari</b>	The Port of Helsinki is operating on a land lord principle and has separated ownership from the operators. This recommendation is important to ensure efficient operation as operators have control over their cargo handling process.	Vuosaari Harbour has several cooperative bodies with different actors in the area. This recommendation is important for efficient and seamless collaboration.	Not relevant

<p><b>Thessaloniki Port</b></p>	<p><b>Passengers and freight:</b> Such a separation has been achieved and is working.</p>	<p><b>Passengers and freight:</b> There is a well structured cooperation and relative procedural framework between the terminal and the transportation operators. Each role is explicitly defined and there are no overlapping issues.</p>	<p><b>Passengers:</b> Although, considered as not applying here, such integration is not implemented and difficult to be pursued because of the lack of interchange infrastructure, scattered infrastructure and totally different character of operations.</p>
<p><b>Constantza Port</b></p>	<p>Such a separation in the specific case study exists.</p>	<p>An internal cooperative framework between the terminal and the transportation operators has been developed. In addition, since the whole port is a free zone, open to all interested stakeholders and customers, the above framework should probably be integrated.</p>	<p>Not applicable.</p>
<p><b>Vilnius Airport</b></p>	<p>Operator has higher interest to increase efficiency and quality of service offered to increase profit than original owner, not paying rent for the infrastructure, however if same body owns and operates, decision making becomes less complicated.</p>	<p>Cooperation is more necessary between operators rather than terminal, as terminal operator has limited possibilities of contributing to transport services.</p>	<p>Difficult to implement due to complicated collaboration procedures.</p>

The information from the previous table is compiled in Table 43 and table 44 below. This is an overview of the degree of attainment to the PAG recommendations for the different ports and terminals using coloration, as well as the degree of consensus for the PAG recommendations by the stakeholders relevant for each particular terminal using letter codes:

<b>Green</b>	Stakeholders agree that the PAG recommendation is/would be beneficial for the terminal.
<b>Yellow</b>	Stakeholders partly agree that/are not sure if the PAG recommendation is/would be beneficial for the terminal.
<b>Red</b>	Stakeholders do not agree with the particular PAG recommendation for the particular terminal.

**Table 43. Degree of consensus for the PAG recommendations.**

Port/terminal:	PAG recommendations number:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Flughafen Leipzig-Halle:													
Armentières Station:													
Oslo Bus Terminal Vaterland:													
Port of Helsinki – Vuosaari:													
Thessaloniki Port:													
Constantza Port:													
Vilnius Airport:													

<b>Green:</b>	The port/terminal complies with the PAG recommendation.
<b>Yellow:</b>	The port/terminal partly complies with the PAG recommendation; it has directed some initiatives, or has planned to direct initiatives in that direction.
<b>Red:</b>	The port/terminal has not directed any initiatives towards the particular PAG recommendation.
<b>Grey:</b>	The PAG recommendation is not applicable for the particular port/terminal.

**Table 44. Degree of attainment for PAG recommendations.**

Port/terminal:	PAG recommendations number:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Flughafen Leipzig-Halle:		Yellow		Green	Red		Green			Yellow	Grey	Green	
Armentières Station:	Grey	Grey	Green	Red	Yellow	Red		Yellow	Red	Grey	Green	Grey	Red
Oslo Bus Terminal Vaterland:	Red		Yellow	Green		Yellow		Yellow	Red		Green		
Port of Helsinki – Vuosaari:			Yellow	Yellow	Red		Yellow	Yellow	Green	Yellow	Green	Green	
Thessaloniki Port:	Yellow	Red	Green	Yellow	Grey	Grey	Red	Yellow	Red	Yellow	Green	Green	Red
Constantza Port:	Grey	Green	Green	Green	Yellow	Grey	Red	Red	Red	Yellow	Green	Green	Grey
Vilnius Airport:	Red	Green	Red	Red	Red	Red	Red	Red	Red	Red	Green	Red	Red

The case studies were used in order to validate the PAG-recommendations. Table 43 illustrate that some of the recommendations are seen as beneficial, while stakeholders disagree on others. All relevant terminals agree on the recommendations (i) integration of the administration of the public transport system; (ii) harmonization of modal focused legislation and regulation as the first step before integration to a multimodal platform; (iii) policy and legal frameworks should facilitate intermodal cooperation; (iv) structuring of the information provision; and (v) separation of the owner from the operator. A common view on these factors strengthens the recommendations.

It is also necessary to investigate the recommendations that receive contrasting views. Recommendation 4 (incorporate the transport planning process with the land-use planning) are regarded by most stakeholders to be (partly) important. However, Armentierés point out that the local transport plan is part of the general metropolitan planning and similarly the regional transport plan is part of the regional plan. Thus, it is not necessary to incorporate transport planning with land-use planning. They state that it is in the implementation phase that things sometimes happen as not foreseen.

Use of business models for cooperation that also publically owned terminal can use are more contested. Thessaloniki states that the existing business model is efficient due to collaboration between stakeholders and they also ensure confidentiality and equal treatment of all parties. The port of Helsinki also states that this recommendation is important. Vilnius highlight that cooperation might be difficult for publicly owned terminal due to current ownership structure and limitations rising from ownership model (state owned companies follow stricter rules and procedures).

In conclusion there are not any of the recommendations that can be seen as falsified. But the recommendations are not suitable for all terminals which might be connected to the heterogeneity when it comes to e.g. location, type of modes, organization and legislation.

## 10.4 CLOSER indicators

In the table below, the 30 core indicators defined in CLOSER WP 3 are filled in for each terminal. Grey cells indicate that the indicator is not relevant for the specific terminal. Green cells indicate that the desired information was obtained. Yellow cells indicate that the desired information was unavailable.

**Table 45. CLOSER core indicators for case terminals.**

ID	Indicator name	Description and unit of measurement	Segment	Interchange level	Aggregated level	Leipzig-Halle	Armentières	Oslo Bus Terminal	Port of Helsinki	Thessaloniki port, passengers	Thessaloniki port, freight	Constantza Port	Vilnius Airport
<b>Policy</b>													
C1	Multimodality rate	Percentage of multimodal versus unimodal shipments or itineraries	All		x								
C2	Modal split in access/egress	Percentage of trips, road, rail, bus, taxi, slow modes (cycling and walking)	Passenger	x	x			32 % walk, 3 % drives, 2% are car passengers, 61 % public transport		Most passengers use cars.			26 % taxi, 7 % car, 50 % passenger, 10 % public, 8 % other
C3	GHG emissions	GHG emissions, grams per passenger km and grams per tonne km	All		x								
<b>Organisational and institutional structure</b>													
C4	Independence of terminal/interchange management	Independence from transport operators and local actors	All	x		Yes	Low	Yes	Yes	Yes	Yes	Yes	Yes
C5	Fair and equal access	Whether all companies have access to a terminal/interchange on equal conditions (yes/no/partial)	All	x	x		Partial	Yes	Yes	Yes	Yes	Yes	Yes
C6	Institutional complexity	Number of institutional levels involved in a) interchange planning b) interchange investments	All	x			3	3	A) 4, B) 2	4	4	Data unavailable	3
<b>Supply side performance</b>													



ID	Indicator name	Description and unit of measurement	Segment	Interchange level		Leipzig-Halle	Armentières	Oslo Bus Terminal	Port of Helsinki	Thessaloniki port, passengers	Thessaloniki port, freight	Constantza Port	Vilnius Airport
				Interchange level	Aggregated level								
C7	Employee productivity	Ratio between flows and inputs, TEU transhipped per employee and year and passengers per employee and year				Data unavailable		514 057 passengers per employee per year	1120 TEUs per employee per year	136.1 passengers per employee per year	621.6 TEUs per employee per year	235.24 TEUs / employee / year	5550 passengers per employee per year
C8	Equipment productivity	TEU lifted per year and per crane	Freight	x		Data unavailable			40 000 TEUs per crane and year		73 968 TEUs per crane and year	4245.02 TEUs / crane / year	
C9	Flows	Number of TEUs or number of passengers per year, respectively	All	x		760 000 tonnes per year	4600 passengers per day	9 818 500 passengers per year	400 000 TEUs per year	64 785 passengers per year	295 870 TEUs per year	556 694 TEUs per year	1 715 000 passengers per year
C10	Energy productivity	Interchange/terminal energy use per year and TEU transhipped or passenger (kWh)	All	x		Data unavailable			21 kWh	Data unavailable	Data unavailable	Data unavailable	Data unavailable
<b>Terminal properties</b>													
C11	Saturation ratio	Ratio between actual volumes and maximum capacity (daily average, %)	All	x		30 % - 35 %	Car park full 90 % of the time	Close to 100 %	50 %	Data unavailable	66 % in TEUs, 37 % in tonnage	19 % for tonnage, 2 % for TEUs	49 %
C12	Expandability	Potential for expandability (% increase compared to today's capacity)	All	x		300 %		0 %	20 %	Data unavailable	133 % increase in TEU capacity	126 %	0 %
C13	Distance from city centre	Number of kilometres from city centre to interchange/terminal	All	x	x	16 km	800 m	0 m	15 km	0.5 km	0.5 km	2 km	7 km
C14	Distance from nearest highway	Number of kilometres from interchange/terminal to nearest highway	All	x		0 km	1 km	< 1 km	0 km	15 km	15 km	2.5 km	2 km

ID	Indicator name	Description and unit of measurement	Segment	Interchange level	Aggregated level	Leipzig-Halle	Armentières	Oslo Bus Terminal	Port of Helsinki	Thessaloniki port, passengers	Thessaloniki port, freight	Constantza Port	Vilnius Airport
C15	Platform access distance	Average walking distance from entrance to platform/gate	Passenger	x			Less than 100 m	About 100 m		500 m			100 m
C16	Airport transfer distance	Average walking distance from arrivals hall to main public transport modes	Passenger airports	x									45 - 300 m
C17	Access/egress cost ratio	Ratio between access/egress cost by car vs public transport	Passenger airports	x	x								140 % (car/public)
C18	Access/egress time ratio	Ratio between access/egress time by car vs public transport	Passenger airports	x	x								75 % (car/public)
C19	Clarity of ways	Clarity of ways within interchange/terminal	Passenger	x			Good: small terminal and visual pedestrian info for connection inside exchange pole	Quite good, although 18 % requested better signs and information		4		5	5
<b>Level of service</b>													
C20	Handling cost	Average price paid per TEU transhipped through the terminal (Euro)	Freight	x					90 €/TEU		100 €/TEU	661 €/TEU	

ID	Indicator name	Description and unit of measurement	Segment	Interchange level		Leipzig-Halle	Armentières	Oslo Bus Terminal	Port of Helsinki	Thessaloniki port, passengers	Thessaloniki port, freight	Constantza Port	Vilnius Airport
				x									
C21	Overall quality	Needs to be defined as an index in passenger transport with components physical effort needed, personal comfort, information, perceived safety/security and facilities	Passenger	x			Good; modernised in 2007, signalling improved, information, urban quality of public spaces	Passengers are overall satisfied		Good			Data unavailable
C22	Ticket integration	Availability of integrated tickets between long and short-distance modes (Yes/No/partial)	Passenger	x	x		Partial : only between train and bus inside Lille Metropolitan area	Partly; only inside Oslo/Akershus		No			No
C23	Information integration	Common information for long and short-distance modes (Yes/No/partial)	Passenger	x	x		Partial: route planner, Transpole employees contribute to inform passengers, separated dynamic (screen) info for bus and trains	No common information for long and short distance modes		No			No
C24	Average interchange time	Average time for transfer between modes (minutes)	Passenger	x			Data unavailable	Data unavailable		5 min (walking time from ferries' platform to bus stop)			2 min (car, bus) 5 min (train)

ID	Indicator name	Description and unit of measurement	Segment	Interchange level		Leipzig-Halle	Armentières	Oslo Bus Terminal	Port of Helsinki	Thessaloniki port, passengers	Thessaloniki port, freight	Constantza Port	Vilnius Airport
				x	x								
C25	Variability of interchange time	Standard deviation of transfer time between modes (minutes)	Passenger	x			Data unavailable	Data unavailable		5 min (walking time from ferries' platform to bus stop)			Up to 5 minutes due to weather
C26	Punctuality	Percentage of arrivals within defined tolerance for delay	All	x	x	100 %	Data unavailable	Data unavailable	Minimal delays, caused by storms	100 %	70 %	Data unavailable	Up to 90 %
C27	Non-movement factor	Non-movement time as share of total origin-destination shipment or travel time	All		x								
C28	Origin-destination speed	Average speed from origin to destination	Freight		x								
C29	Interchange injuries	Number of persons killed or seriously injured per year	Passenger	x	x			Data unavailable		0			0
C30	Loss and damage	Percentage of shipments with loss or damage	Freight	x		0 %			Minimal		0.5 %	Data unavailable	

The overview in Table 45 shows that most indicators were quantified where expected. A few indicators were not relevant for the case studies because they facilitate comparison at a more general level than individual terminals/interchanges.

The use of indicators clearly also facilitates systematic comparison of cases. They may also contribute to easy identification of crucial issues, for instance does indicator C2 *modal split in access/egress* reveal the challenge of car dominance for passengers flying to and from Vilnius airport. More than 80% of the trips take place by car or taxi.

One interesting results is the equipment productivity (indicator C8), suggesting that the port of Thessaloniki has a higher number of TEUs handled per crane than other ports have. On the other hand, Helsinki port seems to have lower handling costs (indicator C20) than Thessaloniki port. Care should however be taken when interpreting results. For instance, as stated for the Leipzig-Halle airport, the punctuality is very close to 100 %, but that is partly caused by a low utilization rate, so it need not only imply a good practice.

There have however been some challenges with a few indicators, for instance has it been difficult to have a consistent delimitation of which employees to consider for indicator C7 “Employee productivity”. Due to the heterogeneity of the case studies, there are also in some cases few cases to compare with.

The indicator summary presented in Table 45 nevertheless suggests that these indicators represent a useful tool for assessment of interfaces between short and long-distance transport. There may however be a need for precision of some indicators, depending on the use of them and the heterogeneity of the objects of study. It is clearly more difficult to find harmonised interpretations of the indicators if a heterogeneous set of terminals are compared.

## 10.5 EC transport policy goals

The European Commission has launched a white paper on transport, *Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system* (Commission of the European Communities, 2011). This paper set out ten ambitious goals for a competitive and resource-efficient transport system, grouped into three categories. These goals were presented in section 1.2. Six of these ten goals are relevant for the case studies, and in the table below these are discussed for the relevant cases. This includes its relevance for the particular case study terminal, as well as initiatives aimed at reaching the policy goal.

**Table 46. EC transport policy goals.**

Developing and deploying new and sustainable fuels and propulsion systems	
	1. Halve the use of ‘conventionally fuelled’ cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030
<b>Flughafen</b>	There is a lot of effort at the airport or related to the companies. This includes testing and

<b>Leipzig-Halle</b>	usage of gas and electric driven vehicles, and the preparation of a connection to the high speed rail network.		
<b>Armentières Station</b>	All the projects regarding improving public transport and bicycle accessibility can be considered as contributing to this objective.		
<b>Oslo Bus Terminal Vaterland</b>	By 2030 the City of Oslo aims to have reduced its greenhouse gas emissions by 50%, compared to 1991 levels. This is not directly related to access/egress at Vaterland Bus Terminal; however, very few people use cars for this purpose. Public transport is most popular.		
<b>Port of Helsinki – Vuosaari</b>	Not relevant.		
<b>Thessaloniki Port</b>	Suggestion for purchasing hybrid straddle-carriers. Introduction of ‘cold-ironing’ method: for passenger transport mainly, ferries that are tied up at the ports can use electric power for their energy needs instead of diesel.		
<b>Constantza Port</b>	Electric power is used more and more during the recent years in port operations. The port authorities, operators, managers and customers seem to have a positive attitude to the gradual replacement of diesel engines with new electric motors, adopting the EU directives’ encouragement for the use of cleaner vehicles, but everything depends on the motivations (e.g. funding) that will be given by the government and the EU to do so. What is more, as a great part of the port is situated within Constantza city borders, the citizens and every other involved stakeholder are in favor of a more ecological operation of the port.		
<b>Vilnius Airport</b>	Up to 90 % of travellers arrive/leave by private car. Most of the cars are ‘conventionally fuelled’ and the terminal is within limits of the city, thus this goal is highly relevant. The terminal (1) is well connected to the city by several modes of public transport; (2) regular surveys are carried out to identify user need, problems and increase attractiveness of public transport; (3) the number of initiatives to increase provision of information on available public transport is steadily increasing and operators are starting to collaborate for better information solutions.		
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>			
	3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050	5. A fully functional and EU-wide multimodal TEN-T ‘core network’ by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.
<b>Flughafen Leipzig-Halle</b>	No appropriate rail services exist for the types of goods handled. But for the logistic area, there is a quite large amount of rail freight already.	Leipzig and Halle and the airport are connected to the railway axis of Priority Project 1. The connection from Berlin to Leipzig/Halle is finished. There is a rail upgrade planned for the connection from Leipzig/Halle to the south (Nürnberg), see	A connection is prepared but currently not used; it is waiting for more customers willing to use it.

		<a href="http://ec.europa.eu/transport/infrastructure/maps/doc/ten-t_pp_axes_projects_2005.pdf">http://ec.europa.eu/transport/infrastructure/maps/doc/ten-t_pp_axes_projects_2005.pdf</a>	
		There is a plan to complete the connection to Erfurt in 2015 and the connection from Erfurt to Nürnberg in 2017.	
<b>Armentières Station</b>	Not relevant.	The project contributes to a better intermodal experience, hence contributes to the implementation of the wide European network.	Not relevant.
<b>Oslo Bus Terminal Vaterland</b>	Not relevant.	Not relevant.	Not relevant.
<b>Port of Helsinki – Vuosaari</b>	Vuosaari Harbour promotes rail transportation.	Vuosaari Harbour is a modern and efficient terminal strengthening TEN-T network.	A rail track combining the Finnish rail network and Vuosaari Harbour was built during the construction phase of the Harbour.
<b>Thessaloniki Port</b>	Not relevant for the case study. Up to now, there is not such action towards this direction. Intermodality policies, though, need to be set and implemented.	Not relevant for the case study. Up to now, there is not such action towards this direction.	Already accomplished in our case study. Additional railway electrification within the network of terminal area is proposed. But this is difficult in our case due to manoeuvring reasons inside narrow port area. Moreover, also high-speed rail network is proposed for the national rail network of Greece.
<b>Constantza Port</b>	Today, a great share of freight trips to and from port is undertaken by energy-efficient and less pollutant modes such as railway and inland waterway, as the port is directly connected to the national and international railway system and with Danube river through the Danube - Black Sea canal, respectively. Nevertheless, the current state is expected to change when the road connection of the port to the national and international motorway system is upgraded in a	Not relevant for the case study. Up to now, there is not such action towards this direction.	The direct interconnection of the port with other transportation systems (motorway, railway and inland waterway, except for the airport) has already been accomplished in the case of Constantza case study. In any case, some upgrading has already been planned.

	few months. However, there is anticipation that the shares of energy-efficient modes will remain at the same level due to the economic recession, as they have proven alleviate the total transportation cost, especially at multimodal logistics supply chains.		
<b>Vilnius Airport</b>	Not relevant.	The airport is connected to TEN-T network, however sufficient information services are not yet provided; reconstruction, expansion and capacity increase of TEN-T roads leading to the airport is planned in near future.	Vilnius airport is the main international airport of Lithuania, therefore this goal applies. There is no inland waterway system as there are only segments of rivers suitable for water traffic; therefore this part of the goal is not relevant. The terminal is already connected by railway line to the rail network by railway line airport-Vilnius train station, however it is not a high speed line since the distance to the main train station is only 5 kilometres.
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>			
	8. Establish the framework for a European multimodal transport information, management and payment system by 2020	10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments	
<b>Flughafen Leipzig-Halle</b>	Not relevant	It cannot be the airport's interest to lose financial support and to switch costs to customers, because they try to get more customers and to come to a more balanced budget.	
<b>Armentières Station</b>	The station does not directly contribute to this goal.	The station does not directly contribute to this goal.	
<b>Oslo Bus Terminal Vaterland</b>	National authorities are developing a system for multimodal transport information, management and payment.	Not relevant	
<b>Port of Helsinki – Vuosaari</b>	Vuosaari Harbour utilises as other Finnish ports a nationwide information system that could be enlarged to whole EU and integrated to multimodal systems.	Vuosaari Harbour promotes and participates in LNG terminal projects. The use of LNG in vessels reduce emissions.	



<b>Thessaloniki Port</b>	'Payment' system is not feasible; for the moment, the port services are separated from the rest of the urban transport network. Generally, it could be applied to passenger transport in ports but there is a need for a better organised and integrated public transport system.	Such policies have not been proposed and implemented yet.
<b>Constantza Port</b>	Up to now, there is not such action towards this direction. Such frameworks and systems have not been proposed and implemented yet, although the port authority point of view is in favor of the affiliation of the port operational, business and management model with standards according to the EU directives.	Such policies have not been proposed and implemented yet, although the port authority point of view is in favour of the affiliation of the port operational, business and management model with standards according to the EU directives.
<b>Vilnius Airport</b>	The airport is a provider of transport services and an interchange point between different modes of transport. Currently, multimodality possibilities are researched (R&D, feasibility studies, etc.).	This goal is already achieved by the airport, as the same institution manages uses and maintains airport infrastructure. Same applies for the railway operator. The system is not yet fully applied in road transport; research projects are carried out for funding solutions of better road network maintenance system.

The information from the previous table is compiled in 47 below. This is an overview of the degree of attainment to the EC transport policy goals for the different ports and terminals using coloration:

<b>Green:</b>	The port/terminal complies with the white paper policy goal.
<b>Yellow:</b>	The port/terminal partly complies with the white paper policy goal; it has directed some initiatives, or has planned to direct some initiatives
<b>Red:</b>	The port/terminal has not directed any initiatives towards the particular policy goal.
<b>Grey:</b>	The policy goal is not relevant for the particular port/terminal.

**Table 47. Degree of attainment for the EC transport policy goals.**

Port/terminal:	EC transport policy goal number:					
	1	3*	5	6*	8	10
Flughafen Leipzig-Halle:	Green	Yellow	Green	Yellow	Grey	Red
Armentières Station:	Yellow	Grey	Yellow	Grey	Red	Red
Oslo Bus Terminal Vaterland:	Yellow	Grey	Grey	Grey	Yellow	Grey
Port of Helsinki – Vuosaari:	Grey	Yellow	Green	Green	Green	Yellow

Thessaloniki Port:	Yellow	Grey	Grey	Green	Red	Red
Constantza Port:	Yellow	Green	Grey	Green	Red	Red
Vilnius Airport:	Yellow	Grey	Yellow	Green	Yellow	Green

\*The third policy goal is only relevant for freight terminals. The sixth policy goal is only relevant for airports, rail terminals and seaports.

## 10.6 Good practices identified

The different case studies have identified several good practices that should be highlighted for future planning, construction and operation of long/short-distance interfaces.

For planning processes, the following practices should be highlighted:

- For Leipzig-Halle, there has been a special legislation framework intending to develop the Eastern part of Germany as fast as possible, and planning processes were passed very fast during the period after the German reunion (1990). The framework shortened up the planning process and reduced the chain of commands for suits to only one level of jurisdiction.
- In Armentières, for the metropolis authority, the project of the exchange pole is concomitant with the realisation of the whole station area and of the rehabilitation and restructuring of the centre town of Armentières. The whole project was designed and discussed with inhabitants and local partners. In terms of planning, there is a positive dynamic of the two main stakeholders, the region and the metropolis, creating a synergy around this interface.

Practices related to ownership and organisation that have been highlighted as good are:

- The Leipzig-Halle airport is led by a holding responsible for all subsidiaries and for both airports in Saxony. Therefore, the competition could be reduced and the co-operation encouraged. The holding and all subsidiaries are in public ownership and strongly connected to the authorities involved. The co-operation between all participants was, and is, very good. There is a political will to develop the airport and the whole region. This led to an establishment of some big companies in the area and the region.
- Vaterland is a public company, and ownership of the terminal is separated from operation. This can be important to establish trust among actors and secure a fair and equal access to the terminal for operators. Vaterland bus terminal emphasise their good relationship with authorities. Moreover, their recommendations have up till now always been taken into account.
- Ruter is a publically owned company that is responsible for planning of public transport in Oslo and the surrounding Akershus county Ruter plans, coordinates, orders and markets public transport (except train) in Oslo and Akershus, and this works well. By including train, Ruter could improve

coordination between transport modes. Moreover, there is no clear authority which is responsible for transport junction development. Making counties responsible could facilitate better integration between short and long transport.

- In Armentières, the coordination of timetables can be seen as a consequence of the fact that all the transport authorities have been involved in the project. This initial investment has fed a willing to make it a success by adapting schedules through negotiations with the transport operators.
- The experience from Helsinki port Vuosaari is that the clear roles of the landlord principle increases service level as operators have control on the whole cargo handling process.
- There has been a spatial reorganisation of administrative services of Thessaloniki Port. All major administrative departments are gathered, allowing for better organisation and operation of the agency;
- The collaboration amongst the different public and private stakeholders seems to be the most significant strength in the Constantza port terminal case study. In addition, the landlord model adopted for the administration and management of the port and its operations and the fact that it is open to all potential customers has proven to be a success story concerning the expandability of business and the further economic development.
- The master plan in Constantza port seems to constitute a key factor as it is utilised as a memorandum of mutual understanding and cooperation amongst partners, facing effectively any hard cases so far. Based on the master plan, a great number of new projects, such as the expandability of the port and the upgrading of infrastructure and equipment are in the phase of implementation and realisation, due to the optimised exploitation of the low budget available.

Several good practices have also been identified related to location of terminals, surroundings and co-localization with other activities and organisations:

- The connection to logistic-related companies and the connection between those companies are supported by a logistic network founded on the initiative of regional logistic actors. Synergies can be used, planning and construction are supported, and the collaboration between different actors is strengthened.
- Armentières is a true multimodal interface with the co-presence of rail, buses, bicycles and private cars; the surroundings are designed and implemented with coherent approach. Legibility of space and functions is very good. Urban and multimodal signalling is very successful. The ground materials are particularly adapted. The whole interface is a piece of urban public space, around the pedestrianised parvis, well articulated with the city.
- Vaterland bus terminal is located in the centre of Oslo with short transfer to rail, metro, tram, bus and taxi. This is an important structural factor facilitating easy transfers between short and long transport. Location was also the highlighted as the most favourable factor for passengers travelling to the terminal.
- Vuosaari Harbour has a central location to Finnish main trade area. Vuosaari is easily accessible by all transport modes and infrastructure is in good condition. There was a separate project during the planning and construction phase concentrating on transport infrastructure for Vuosaari Harbour.

- Many businesses and services are concentrated in the harbour area. This increases the service level of the harbour and creates better possibilities for cooperation. The Port of Helsinki has basic contracts with all the actors in the area and common procedures are managed in different cooperation bodies in operational and executive levels.

Other good practices that should be highlighted are:

- The pricing system in Helsinki port (payment per tonne instead of per loading unit) is good when there is limited space because it promotes certain product categories (break bulk) and discourages low value goods. Related to this, also the location close to main airport promotes the chosen profile (retail).
- Vuosaari Harbour has taken environmental issues into account in several ways regarding nature protection, energy saving and emission of pollutants.
- The same is the case in Thessaloniki port, who has compiled an Environmental Impact Study according to national standards for environmental performance surveillance while outlining environmental policies for handling of different cargo types, they implement a ship's waste reception and management plan, have successfully tackled a dust issue through the introduction of appropriate equipment, and have introduced hybrid vehicles of port equipment that reduced the environmental footprint.
- Vaterland bus terminal is well-functioning when it comes to finance and operation. The terminal runs with profit, upgrades have improved logistics and there has been an efficient use of the terminal. Even though the last survey among passengers was conducted in 2003, the conclusion was that passengers were overall quite satisfied with the use of the terminal.
- In Vilnius, passenger transport operators serving the airport as well as the airport operator react well to complaints of passengers: operators collaborate to adjust time tables to each other if the passengers express a need for changes. Passengers are the driving force to improve service. Bottom-up initiatives should keep being welcomed. Operators are also familiar with transport policy, understand the importance of achieving both national and EU level goals and are willing to adopt new practices.
- Thessaloniki port introduces an "Integrated Information Management System, Enterprise Resource Planning and Business Intelligence" (ERP-BI), with a view to increasing the agency's operating efficiency while reducing costs.
- Modern equipment and techniques are used in Vuosaari Harbour. Gate systems use OCR technology, and working machines are identified by RFID technology. Portnet provides traffic information of all Finnish ports and in can be used by the Internet, XML- or EDI-messages.
- Thessaloniki port is focusing on city-port relations, and publish the newspaper called 'Port.Thess' bi-monthly. This is distributed free to inform citizens on the news of the port of Thessaloniki. They also publish cartoons for children who learn about the port through painting.

## 10.7 Additional case conclusions

In this section we will focus on additional case conclusions based on the review of the terminals. The conclusions are clustered according to EU, airport, passenger, port and conclusions related to both freight and passenger.

### 10.7.1.1 EU level case conclusions

There are especially two aspects which are relevant at the EU level. The first aspect is related to the ongoing conflict between EC and Leipzig-Halle. At the moment there is no common understanding on how to handle infrastructure object owned by a privately organised company with solely public shareholders. Thessaloniki also highlight that it is challenges connected to public authorisation and funding for large construction work. According to Thessaloniki case study, EU approval may be needed to justify public funding activities. The current discussion illustrates the complexity connected to organisation and legislation.

The second topic is related to establish EU level "Portnet" system. Such a system would be useful and efficient to insert and receive vessel traffic information. Upper level guidance and coordination could improve the situation if it would create recommendations for port related information systems that would be in line with other information systems used in logistics. An EU level "Portnet" system could thus harmonise information systems of different ports and operators operating in several ports.

### 10.7.1.2 Airport conclusions

Leipzig-Halle and Vilnius were the two airports which were included in the case studies. It is limited possibilities to draw conclusions for airport terminals since Leipzig-Halle is mainly a freight terminal, while Vilnius is a passenger terminal. Due to the large differences it is challenging to find common conclusions. Some of the relevant conclusions for the case studies are relevant at a general level and they are therefore highlighted in other sections of chapter 10 and 11.

However, it is several important aspects when it comes to Leipzig-Halle. First they have, according to the indicators, 100 % punctuality. However, this is mainly due to the fact that the capacity is not fully used. Low utilization also influences the economic situation and the airport is running into deeper debt. We don't have information that could link the seemingly over dimensioning of the terminal to the planning process. Therefore we cannot conclude why such a development occurred. According to the interviews the planning process was fast because of e.g. political will among the regional authorities, good cooperation and legislation targeted to fasten progress. Anyways, the short planning process might at least indicate that efficiency influence output and it is an open question whether a longer process would have affected such an issue. There is also a good train service for passengers– in particular to the Leipzig Messe, Leipzig Hbf and Halle, but also to the surrounding cities (places like Magdeburg). Good train service and good facilities for transfer are necessary conditions for fostering use of short and long transport.

### 10.7.1.3 Passenger conclusions

Armentières and Oslo Vaterland bus terminal are two terminals which connects bus and rail. Vilnius is also a terminal which only is concerned with passengers. Leipzig-Halle and Thessaloniki involves both freight and passengers. The conclusions in this part will focus on common characteristics based on the case studies related to passengers.

A first conclusion is connected to challenges in coordinating schedules between short and long transport. There are some examples that it is rather the short modes of transport which have to adjust schedules according to long transport modes. Armentières have partially begun to coordinate schedules between short and long transport. In the Armentières case study, all transport authorities have invested in the exchange pole. Joint investments from stakeholders seem to increase the interest in the exchange pole and increased the willingness to coordinate timetables.

Terminals connecting train and bus are important for better integrating short and long transport. One challenge can be related to the overall interest of the actors. In Armentières the SNCF considers the land around stations more as potential incomes than as a strategic asset for the development of exchange poles. In addition the SNCF has no regional strategy for the development of exchange poles. High-level political intervention needed to convince SNCF to give away land to the exchange pole. The lack of competition on operating the regional railway services played a role in convincing the company to accept to contribute to the project. Competition between modes and lack of general strategies/interest for interconnection between short and long transport can thus be an important barriers. Coinciding interests between operators/authorities can facilitate better integration.

A common challenge for most of the passenger terminals is to foster better information systems across modes. Lack of integration can be linked to the competition between short and long transport, technological development, financing and organization. The case study from Norway suggests that there is a need of national projects aimed at providing better information systems across modes. This aspect is also relevant for access/egress of Vilnius airport. This conclusion is fully in line with the European Commission's policy goal *Establish the framework for a European multimodal transport information, management and payment system by 2020*. It should however be pointed out that information provision between modes is of less relevance e.g. if there are high frequency on public transport facilitating easy transfers.

Case studies of passenger rail/bus transport show relatively good connectivity between short and long transport. Thessaloniki suffers from bad location in terms of connectivity to urban public transport. Their main activity is freight. Thus, the port has significant income from parking lots from travels to and from the terminal. Moreover, the case study points out that the passenger terminal seems disorganized, offering only basic services and suffers from lack of planning. Vilnius also emphasizes that low passenger volumes contribute to unprofitable public transport operations. It is therefore difficult to ensure a critical mass to ensure frequency, Moreover their might be incompatible interests between terminals and operators. Terminals can increase revenues by offering parking facilities and it is not necessarily in their interest to reduce their

competitiveness to other modes. There may thus also be different goals between terminal operators and authorities.

#### 10.7.1.4 Port conclusions

There were three ports included in the case studies and the landlord principle is employed by Vuosaari, Thessaloniki and Constantza. The strength of such a model is that operators have the control of the whole cargo handling process and related logistics and services. Thus, operators have more flexible opportunities for developing cargo handling which benefits customers. On the other hand the port loses flexibility on space alternation in changing situation, even though operators have agreed on flexible land use, as the operators own fixed container cranes. Having private cranes is possible in landlord principle, but it is also possible that in landlord principle operators pay rent for the superstructure as for the land.

Rail transport is an important aspect when it comes to the EU goal of optimizing the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes. In Helsinki the case study seems to point out a lack of planning for rail freight at the port. Rail tracks are built, but there is no infrastructure for large-scale operations. A new terminal may also cause capacity problems in land use. It is therefore possible that authorities should have set requirements for facilities. It is also important to emphasise that the main reasons hindering multimodal transport are related to the characteristics of Finnish rail freight, which are: low transport volumes, lack of rail capacity and lack of competition. Therefore there are important factors outside the terminal responsibilities which also can explain lack of use of rail transport. Other aspects are related to the distance of the transshipment and the characteristics of the goods. Thus, the flows need to be suited for rail transport.

Several cases point at the benefits of having co-localisation of ports/terminals and logistics centres. Such centres increase the possibility for efficient large-scale operations and the promotion of rail-based hinterland transport.

The number of actors operating on a terminal can potentially be large. Standardized and integrated information systems can improve efficiency. E.g. common gate systems and integrated information system can remove need for middleware programs between different information systems. Moreover, it might be beneficial to have a broad perspective and integrate systems at a national level. This calls for either national involvement and/or cooperation between other harbours.

As mentioned above in Section 10.7.1.1, an EU level “Portnet” system could harmonise information systems of different ports and operators operating in several ports. Initiatives like the e-freight project<sup>7</sup> are also important for integrated co-modal solutions.

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<sup>7</sup> <http://www.efreightproject.eu/>

### 10.7.1.5 Conclusions related to both freight and passenger transport

#### **Integrated planning**

The case studies illustrate that coordination across modes and organisation may give better processes and operations. Helsinki emphasizes that the situation could be better in the long term with a higher level approach taking all transport modes into account. Vilnius points out that a common framework for planning involving all stakeholders is missing. Better integration could be fostered by combining both freight and passenger needs. Being short of requirements for analyzing elements in a coherent manner is also a challenge. Progress can fail when there is too little integration and exchange between various parts of integrations or between two organizations. Facilitating policies which are in part of operational and planning procedures are means for facilitating policy integration. It is important to bring up adjoining problems at an early stage. Having one responsible actor in charge of transport junctions can alter this challenge. Moreover, having a steering group or a forum consisting of members from relevant actors can create an arena for discussing, analyzing and perceive development in a more coherent view. This would not necessarily, though, avoid competition between bus/rail.

#### **Different criteria for localisation of freight and passenger terminals**

There are different criteria for localisation of freight and passenger terminals. Passenger terminals (for bus and rail) are typically located in centre areas with good connectivity between transport modes. Freight terminals demand large areas of land and are often located in the outskirts of central areas, as well as having good connectivity to especially road, but also rail. Therefore, the various criteria for good interconnections vary and they might be partly incompatible. It can be difficult to ensure a critical mass of passengers to and from terminals located in less central areas. Especially if the public transport and interconnection services are low, as well as the parking facilities and road infrastructure favours car use.

#### **Conflicting goals and perspectives**

Congruent goals and perspectives can be relevant for both passenger and freight transport. Cooperation and implementation can go easier if the participants agree about the direction and goal of a project. Some of the case studies illustrate that it can be difficult to foster cooperation since actors do not share a vision for integration of various transport modes. It can be a state responsibility to secure that state actors include a broader perspective on public transport and not just limited to one form for public transport.

Another perspective can be related to freight. Important goals for ports are to offer efficiency and attract freight while governments might also be concerned with modal split (in hinterland transport). Thus, it is not necessarily a top priority or ports' responsibility to create better conditions for transferring hinterland transport from road to rail.



## 10.8 PAG interpretation of case results

The CLOSER Policy Advisory Group (PAG) is a group of experienced experts that cover different aspects of long/short-distance interfaces. The PAG members represent a wide selection of countries (Norway, Czech Republic, Belgium, Greece and Great Britain), and have background within decision-making, governmental planning, European associations and transport research. The PAG members have been actively involved in the preparation of recommendations that have been analysed in the case studies and in the interpretation of the results that have been derived.

In WP 4 of CLOSER the PAG members contributed to the formulation of a set of recommendations and lessons that could be learnt from the analysis of decision-making processes related to long/short-distance interfaces. These recommendations have been discussed and evaluated for each of the seven CLOSER case studies with a summary in Section 10.3.

The PAG members also verified the selection of the CLOSER case studies through a virtual meeting that took place on December 13, 2011.

Finally, the PAG members were given a draft version of this deliverable and asked to comment on the report. The report was then discussed in the PAG meeting in Thessaloniki on September 12, 2012. The main message from the PAG members was that the cases were very interesting and that a lot of interesting material had been brought forward. Some recommendations were given for the finalisation of the deliverable at hand. This was in particular related to organising conclusions and recommendations more thoroughly by type of terminal/interchange, for instance for freight ports and public transport interchanges separately. While the joint consideration of freight and passenger transport in the CLOSER project gives interesting dimensions, it is also sometimes necessary to treat these segments separately.

## 11 Recommendations

This chapter finalises the case study analysis in CLOSER. Sections 11.1-11.3 define a set of main recommendations from the case studies. These recommendations serve as input to the development of guidebooks in WP 6 of the CLOSER project. Recommendations are presented separately for:

- Freight ports and terminals (Section 11.1)
- Passenger terminals (Section 11.2)
- Decision-making processes for all terminals (Section 11.3)

A set of final remarks are represented in Section 11.4.

### 11.1 Main recommendations for freight ports and terminals

#### *Standardisation connected to common gate system and EU level "Portnet" system*

Port operators have separate gates and procedures, which complicate logistics operator's work. Superstructure owned by operators may be a good solution, but it also reduces flexibility and requires clear operational principles. Vuosaari Harbour utilized AutoID (automatic identification) technology in the gates, in loading and unloading processes and in access control system of machines. The AutoID system used in the gates is based on optical character recognition (OCR) where vehicles are recognized on the basis of their licence plates. A common gate system and integrated information system would improve efficiency of information exchange by removing the need for middleware programmes between information systems. Integrating information systems would have a larger perspective (e.g. national) as operators are operating in other harbours too, making the integration more complex.

E.g. at Vuosaari harbour actors have their own processes and, thus, customers need to cope with different procedures. Harmonising these processes would enable more efficient operation in the harbour and remove one identification gate for vehicles.

The case study from Helsinki also pointed out that EU level "Portnet" system would be useful and efficient to insert and receive vessel traffic information. Upper level (state) guidance and coordination could improve the situation if it would create recommendations for port related information systems that would be in line with other information systems used in logistics. This would harmonise information systems of different ports and operators operating in several ports. This recommendation is especially linked to ports. Also for the port of Thessaloniki it is pointed out that there are challenges connected to standardisation.

#### *Clustering and co-localisation of freight terminals and logistics centres may be beneficial*

The increasing importance of international logistics centres is one of the emerging mobility schemes that were identified in WP 2 of CLOSER. The case study from Helsinki suggests that a single logistic centre only can provide sufficient

infrastructure/superstructure in the area and positive attitude towards the development of rail transportation. Currently there is no rail terminal in Vuosaari Harbour and appropriate infrastructure for large-scale efficient operation is missing. A rail terminal in port area would promote rail transportation to/from port. Thessaloniki suggests implementing a logistics centre that will be better established in the container terminal. A logistics centre with integrated services would strengthen the container terminal. In Leipzig-Halle, one of the success factors of the airport is the co-localisation with the freight village Güterverkehrszentrum Leipzig.

## 11.2 Main recommendations for passenger terminals

### *Need for more integrated planning of public transport systems*

This recommendation is closely connected to recommendation 1 from the Policy Advisory Group members. Lack of having one responsible actor for developing and integrating transport junctions and public transport might be an important barrier towards efficient planning processes. There is a great potential for better coordination and earlier discussions of adjoining problems. At least to some extent there is a fragmented system meaning that actors only have responsibilities for part of the process and have not an interest of developing a public transport system which integrates and coordinates short and long public transport. It is examples of unclear responsibilities and lack of leadership in processes. Barriers for implementation and development can be especial evident in cases where there are no clear owner, or where shared, undefined, unclear or fragmented organizational responsibilities. An amending strategy can be to establish strategies which bridge sectors in a coordinated manner. It might be particularly important to assign a leading actor that can initiate and govern processes. Regional authorities (counties) are perhaps the most suited actors as they possess competence and legitimacy, as well as having a coherent perspective for integration of short and long public transport. Such a strategy can improve coordination and facilitate progress and implementation of measures.

Vilnius is a case in which cooperation between operators are evaluated to be weak. As there is no cooperation, level of integration is also very low. Stakeholders mostly agreed that tighter cooperation is achievable by putting into practice joint initiatives closely coordinated by some external organization with influence over all stakeholders involved, such as governmental institutions. After successful encouraged and supported activities, voluntary cooperation might follow if all the stakeholders are convinced about benefits of collaboration.

Vilnius also has a current regulatory framework which is not oriented to standardize the transport system as a whole. Standards for different modes are not coordinated between each other, which leads to complicated and expensive integration of transport modes. Thus, there is no cooperation and procedural framework for integration of short/long distances transport services. Regulatory framework regarding coordination of services and information provision is necessary and would, for the Vilnius case, improve the overall transport services.

### *Harmonisation of information systems*

Information provision and information systems are vital parts for integrating short and long distance for freight and passenger transport. For passenger transport it is gaps connected to provide travel information between modes of transport. In Armentières the main gap is the missing dynamic bus information inside the railway station, which obliges train users to move out of the station and into the bus are to obtain dynamic information about buses. The same challenges can be compared to Oslo bus terminal Vaterland. Some operators are unwilling to provide travel information between modes of transport. One possibility is to create standards for information systems at terminals. Another suggestion is to have national standards and projects for integrating ticketing and real time information systems.

## 11.3 Main recommendations connected to decision making processes for all terminals

### *Development of master plans*

Deliverable 4.1 (Nathanail and Adamos 2011) identified lessons learned from decision making processes. One of the recommendations was to create a strategic plan in accordance with existing land use development plans. This could synchronize initiatives and projects and thus avoid competition, rivalries and promote balanced development and integration of wider areas.

The case study from Thessaloniki can illustrate this aspect. Thessaloniki, for instance, points out that such a plan is absent. According to the interviews, the implementation of such a plan could strengthen collaboration with stakeholders and make robust perspectives connected to future plans in port operations. Helsinki emphasis that the potential increase in rail transportation could be anticipated better in land use plan. With a higher level approach taking all transport modes into account, the situation could be better in a longer term. Constantza, on the other hand, has many public authorities and bodies involved in port operations. In addition several private companies and stakeholders are involved. In 2001-2002 they created a master plan which comprised the constitutional map according to which any project or activity associated with the port operation and development is planned, routed and processed. Moreover, the role, jurisdiction and responsibilities of all involved actors is determined, as well as communication role. This was seen as vital when it comes to planning, construction, operation and for foster cooperation. The master plan seems to constitute a key factor as it is utilised as a memorandum of mutual understanding and cooperation among partners. Based on the master plan, a great number of new projects are in the phase of implementation and realisation. In such a view the case studies seem to support the PAG-members recommendations.

### *Establishment of forums for proper dialogue between all relevant stakeholders involved in the terminal*

Some of the case studies illustrate that there is important to bring up adjoining problems at an early stage. This is especially important in cases of planning involving

several actors. Steering groups or networks consisting of members from relevant actors can create an arena for discussing, analysing and perceive development in a coherent view.

A recommended strategy to build competence and promote awareness is to establish inter- and intra-organizational networks. Such networks can bridge barriers connected to e.g. fragmented integration of responsibilities, difference in perspectives and policy integration, and thus greatly facilitate local initiatives (Kasa et al 2011:15). Local groups can be an arena for discussing changes, best solutions and sharing of information, which also might foster better cooperation and common understanding among participants. However, mandatory regulations and specific guidelines for participation can be necessary in order to establish such mechanisms.

A few examples can illustrate this point. In Leipzig they have Supervisory Boards in which authorities and operator is involved. One of their tasks is to provide information exchange between logistic companies and authorities. It is also an independent network and operators as a moderator and broker. Thessaloniki has a port development council. The main task is to exchange opinion on port's issues. The board consists of institutional representatives by relevant chambers and users of the port services. According to the interviews this fosters better adjustment and policies that help its customers on their business operations. Helsinki manages common procedures in different cooperation bodies, as operator meetings and cooperation forum. Operators were also included in the planning stage, and their points of views were already taken into account at that stage. Also for Vilnius airport, the case study suggests that a cooperation framework would have positive impact on collaboration of different stakeholders involved in operation and development of the airport. It is suggested that a dedicated institution with power to gather the involved stakeholders could be beneficial.

Forums for proper dialogue can also be linked to integrating citizens and residents in policies. This can be especially important for airports. Both Leipzig- Halle and Vilnius highlight that noise can be challenging. Airport expansion is a very sensitive topic in Vilnius due to surrounding areas being populated and surrounding land use issues. In Leipzig- Halle the residents were involved in the planning which led to a very high acceptance and few public protests.

#### *Integrated planning of new terminals*

This is partly linked to the first recommendation. Helsinki is a case in which the passenger terminal needs were not taken into account in the planning phase for a freight terminal. Development of a new freight terminal was done without considerations on possible future changes that could imply needs for also accommodating passengers from ro-ro<sup>8</sup> ferries. In Oslo the challenges are connected to the planning of new terminals integrating short and long distance transport. Another perspective can also shed light on lack of integrated planning of new terminals. Municipalities may compete in order to secure port development. Not least because a new port gives local authorities much needed tax revenues. Contradictions between

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<sup>8</sup> Roll-on roll-off

municipalities can thus enhance challenges regarding integrated planning of new terminals. A stronger role by national or regional authorities might prevent such dynamics. At least the control mechanism and level of responsibilities are aspects which can foster or hinder economic competition between cities. A same point can be valid when it comes to competition between short and long distance transport. Competition between train and bus (coaches) seems in some cases to be an important factor contributing to lack of progress.

Thus, this serves as an example that a master plan not secures an integrated planning of new terminals. E.g. the political structure or competition between cities/modes of transport might hamper integrated planning. Leipzig- Halle and Oslo bus terminal are examples where regions and municipalities cooperate. In the former, two regions and three cities are involved in the ownership structure and the location. In the German case this has led to less competition between the airports in Dresden and Leipzig. On the other hand there are no regulatory mechanisms preventing the airport from going deeper into dept.

#### *Improve efficiency of planning process*

The number of actors affected by or involved in the actual implementation of measures can be large. Stakeholders, public authorities and operators are some of the instances directly involved. In addition there might be maintenance, security, neighbours and neighbouring facilities that are indirectly affected by the new implementation.

Each of these groups may have the power to delay and some also the organisational, financial, legal or political platform for vetoing a given implementation. Even where there is an overall agreement (or acceptance of the need) to foster better integration between short and long transport, the number and variety of actors, perspectives and interaction make for complex implementation processes (Pressman and Wildavsky 1973). Not only the number of actors but the arena or field in which the projects take place can cause problems. If there is no clear owner of a task, or where shared, undefined, unclear, or fragmented organizational responsibilities create barriers.

In such situations professional stakeholders and actors focussing narrowly on their limited tasks can cause problems. One scenario is where different turf “masters” disagree on who gets the final say, with detrimental effects on the speed of implementation, and the chance of success. Some departmental divisions or stakeholder groups may have other priorities, and even conflicting interest e.g. provision of short and long transport. Such aspects were especially evident in the Oslo case study. Cooperation and implementation can go easier if the participants agree about the direction and goal of a project. It has been especially difficult to foster cooperation in building a new terminal in Oslo since not all actors share a vision for integration of various transport modes. It can be a state responsibility to secure that state actors includes a broader perspective on public transport and not just limited to one form for public transport. Armentières also experienced challenges. The rail operator SNCF, which also possess land for the station building, was originally not willing to make land available for developing the station into an exchange pole. In the end, an agreement was possible after significant efforts were put into convincing the company to accept to contribute to the project.

Adjustment of regulatory and organizational frameworks can be other strategies for improved efficiency in planning process. Solutions may be reducing the number of veto points, reducing the number of participants, putting somebody in charge, or putting in place a process that can govern or resolve disputes between various autonomous actors (Christiansen and Klæboe 2012). In addition it can be necessary to put in place strategies that bridge sectors in a coordinated manner. A leading actor can initiate and govern the process. Having a leading actor that not only has responsibility but also power can facilitate better planning. The interviews from Oslo illustrated such a perspective. Regional authorities are perhaps the most suited actors as they possess competence and legitimacy, as well as having a coherent perspective for integration of short and long transport. Integrating adjoining problems with different authorities at an early stage can also be facilitated by having one responsible actor in place. In Armentières the metropolitan authority was the leader of the development project and might be an comparison to the Oslo case. Armentieres has a commune and regional authority which can be credited having the station developed as an exchange pole.

Leipzig- Halle is an example of having a regulatory framework which allows for fast decisions and planning. The airport owner offers all services from one source and since December 2006 the Infrastructure Acceleration Act was induced to fasten progress in eastern parts of Germany. It has direct impact by reducing some contestation rights and shortening the chain of commands to only one level of jurisdiction. At least this can point to the direction that it is possible to improve efficiency in planning process. However, it is also important to note that the airport is oversized and runs with a deficit. It has not been possible to link this development to the planning process.

## 11.4 Final remarks

This report has summarised the seven case studies that have been conducted in the CLOSER project. The cases have been used to validate earlier developments of the project, in particular the following aspects of interconnections between long and short-distance transport:

- Emerging mobility schemes
- Gaps identified
- Indicators for the assessment of most crucial issues
- Recommendations from the members of the Policy Advisory Group

There are significant differences between passenger and freight transport, in particular in the involvement of the public sector and the financing of transport interchanges.

Several conclusions and recommendations are common for freight and passenger transport, for instance the need for master plans for operations and development for terminals and interchanges, and also that forums should be established for proper dialogue between all relevant stakeholders.

Standardisation is also relevant in both passenger and freight transport, but at different levels. Due to the global dimension of freight flows, there is a need for standardisation across countries and regions, for instance in terms of information systems. The European Union and other pan-national organisations and structures have a particular

role in this respect, as such issues cannot be handled at country level. In passenger transport, there is a need for standardisation and integration of information systems across modes of transport, typically linking local with regional transport systems. These problems need integration at local/regional level, but it is also a stated policy goal of the European Commission to establish the framework for a European multimodal transport information, management and payment system by 2020.

The case analysis, identification of good practices, conclusions and recommendations may be used for further planning, construction and operation of interfaces between short and long-distance freight and passenger transport.

The results from the case studies feed into WP 6 *Recommendations*. The objective of WP 6 is to give guidance and recommendations for establishing new mobility schemes and related organisational patterns at the interface and interconnection between long distance transport networks and local/regional transport networks. WP 6 will produce three separate guidebooks, one for passenger transport, one for freight transport, and the third one for decision-makers. The guidebooks will be major outputs from the CLOSER project.



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## Annex A. Detailed case reports



Connecting LOnG and Short-distance networks for Efficient  
tRansport

## Reporting template for case studies

<b>Name of case study:</b>	Flughafen Leipzig-Halle
<b>Author( s)</b>	Ingrid Nagel
<b>Date:</b>	20/06/2012

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## Guidelines for use

This document forms the basis for case study reporting in CLOSER. The chapters below represent the structure that should be used for the reporting of the cases. In Annex A you will find the questionnaire that may be used as a basis for semi-structured interviews of relevant stakeholders.

Each chapter below contains a box where the main aim of the chapter is described. Specific references to questions in the Annex A questionnaire are included where relevant.

You are mainly expected to collect information and describe your terminal, but some analysis will also be required for the commenting on PAG recommendations, policy achievements, etc.

## 1 Data collection process

Data was collected from webpages of stakeholders, for example:

- <http://www.leipzig-halle-airport.de/en/index.html?newLanguage=en>
- [http://www.mdf-ag.com/en/mf\\_ag.html](http://www.mdf-ag.com/en/mf_ag.html)
- <http://www.portground.com/en/Home.html>
- <http://www.logistik-leipzig-halle.net/en/network.html>
- <http://www.qvzleipzig.de/de/home/index.html>
- <http://www.dhl.de/en/ueber-uns/unternehmensportrait.html>
- [http://statistik.leipzig.de/\(S\(l5oarvujvoysh550xus20y4\)\)/statpubl/index.aspx?cat=1&rub=1](http://statistik.leipzig.de/(S(l5oarvujvoysh550xus20y4))/statpubl/index.aspx?cat=1&rub=1)

Data was collected from information internet providers, for example:

- [http://de.wikipedia.org/wiki/DHL\\_Hub\\_Leipzig](http://de.wikipedia.org/wiki/DHL_Hub_Leipzig)

Some information was taken from media; mostly press (internet) talking about special topics related to the airport, for example

- <http://www.spiegel.de/wirtschaft/0,1518,449989,00.html>  
EU supposes illegal subsidies 2006
- <http://www.verkehrsrundschau.de/eu-verbietet-subventionen-fuer-flughafen-leipzig-halle-725216.html>  
EU prohibit subsidies 2008
- <http://www.kon-ii.de/leipzig-leuchtturm-im-osten-logistik-und-bueromarkt-in-der-region-leipzig-im-aufwind-presse-4091.html>  
Logistic market growing in Leipzig 2012
- <http://mephisto976.uni-leipzig.de/startseite/gesellschaft/beitrag/artikel/flughafen-leipzig-halle-sieht-chancen.html>  
Night flight ban in Frankfurt 2012
- [http://www.nachtflugverbot-leipzig.de/presse\\_bekanntgabe.htm](http://www.nachtflugverbot-leipzig.de/presse_bekanntgabe.htm)  
Reaction on decision of DHL for Leipzig as hub 2004



- <http://www.mz-web.de/servlet/ContentServer?pagename=ksta/page&atype=ksArtikel&aid=1310706175265>  
Less passengers more freight 2011
- <http://www.wiwo.de/unternehmen/dienstleister/flughafen-leipzig-halle-vom-hoffnungstraeger-zur-investitionsruine/6461538.html>  
Airport as Investment ruin 2012

Other sources for information were presentations, brochures and reports provided by different stakeholder, some of them are also available in the internet:

- [http://www.logistik-leipzig-halle.net/uploads/tx\\_abdownloads/files/Fraunhofer\\_SCS\\_Standortgutachten\\_Leipzig-Halle\\_Inhalt.pdf](http://www.logistik-leipzig-halle.net/uploads/tx_abdownloads/files/Fraunhofer_SCS_Standortgutachten_Leipzig-Halle_Inhalt.pdf)  
Only directory available, report must be bought
- [http://www.logistik-leipzig-halle.net/uploads/tx\\_abdownloads/files/Jahresbericht2011\\_WebVersion.pdf](http://www.logistik-leipzig-halle.net/uploads/tx_abdownloads/files/Jahresbericht2011_WebVersion.pdf)  
Annual report for 2011
- [http://www.logistik-leipzig-halle.net/uploads/tx\\_abdownloads/files/WirtschaftsJournal\\_Logistik\\_2011\\_sicherheit.pdf](http://www.logistik-leipzig-halle.net/uploads/tx_abdownloads/files/WirtschaftsJournal_Logistik_2011_sicherheit.pdf)  
Annual report for 2010
- [http://www.logistik-leipzig-halle.net/uploads/tx\\_abdownloads/files/WirtschaftsJournal\\_Logistik\\_2011\\_sicherheit.pdf](http://www.logistik-leipzig-halle.net/uploads/tx_abdownloads/files/WirtschaftsJournal_Logistik_2011_sicherheit.pdf)
- Presentation Leipzig/Halle Airport Europe's Dynamic Cargo Hub (paper version)
- Location study of Fraunhofer SCS (paper version)  
"Logistikregion Leipzig-Halle" Standortgutachten der Fraunhofer SCS

Press releases from the airport, for example

- [http://www.leipzig-halle-airport.de/en/index/unternehmen\\_flughafen/flughafen\\_aktuell/pressemeldung/pmDetail.html?id=923](http://www.leipzig-halle-airport.de/en/index/unternehmen_flughafen/flughafen_aktuell/pressemeldung/pmDetail.html?id=923)  
Air cargo award for Leipzig 2012
- [http://www.leipzig-halle-airport.de/en/index/unternehmen\\_flughafen/flughafen\\_aktuell/pressemeldung/pmDetail.html?id=910](http://www.leipzig-halle-airport.de/en/index/unternehmen_flughafen/flughafen_aktuell/pressemeldung/pmDetail.html?id=910)  
Growth in employees 2012

There were done 4 interviews

1. Dierk Näther, Managing Director, Flughafen Leipzig/Halle GmbH
2. Jan Oberländer, Netzwerk Logistik Leipzig-Halle
3. Robert Hesse, Head of Corporate Communications, Mitteldeutsche Airport Holding
4. (Katrin Weller, Marketing and Sales, LBBW, GVZ Entwicklungsgesellschaft Leipzig mbH)

## 2 Terminal overview

### 2.1 Background

#### 2.1.1 History <sup>1</sup>

The airport Leipzig/Halle is celebrating its 85<sup>th</sup> birthday this year. It was opened 1927, April 16<sup>th</sup> as Flugplatz Schkeuditz. But at the opening date the airport was merely an airfield, a hangar and an administration building. The first runway (length 400 m) was built in 1928. That was the moment when it was also renamed to its current name Flughafen Leipzig/Halle.

#### 2.1.2 Historic development

From 1930 to 1937 there was a lot of construction. A restaurant was added, the administration building was renewed. In 1937 there were 40 departures per day and Leipzig/Halle was the fourth largest airport in Germany. But the development was stopped by the world war. Only the military used the airport during the war, there was no civilian air traffic.

After the war in 1947, the airport was only used as an in-plant airport for the aircraft industry of the GDR (German Democratic Republic). In 1955 a runway of 2500 m was built but rarely used. Since 1963 the airport was used twice a year as "Leipzig Far Airport". The equipment which was necessary for that function was installed and disassembled each time. In 1966 a terminal was built. During the far (4 weeks a year) it was used as an airport terminal. The time in between it was used as a motorway service station.

This arrangement was not appropriate any longer after some years. The airport was extended step by step and on May 19<sup>th</sup> in 1972 it opened as an all-year commercial airport. The number of passengers increased from 16.000 in 1927 to about 550.000 in 1988.

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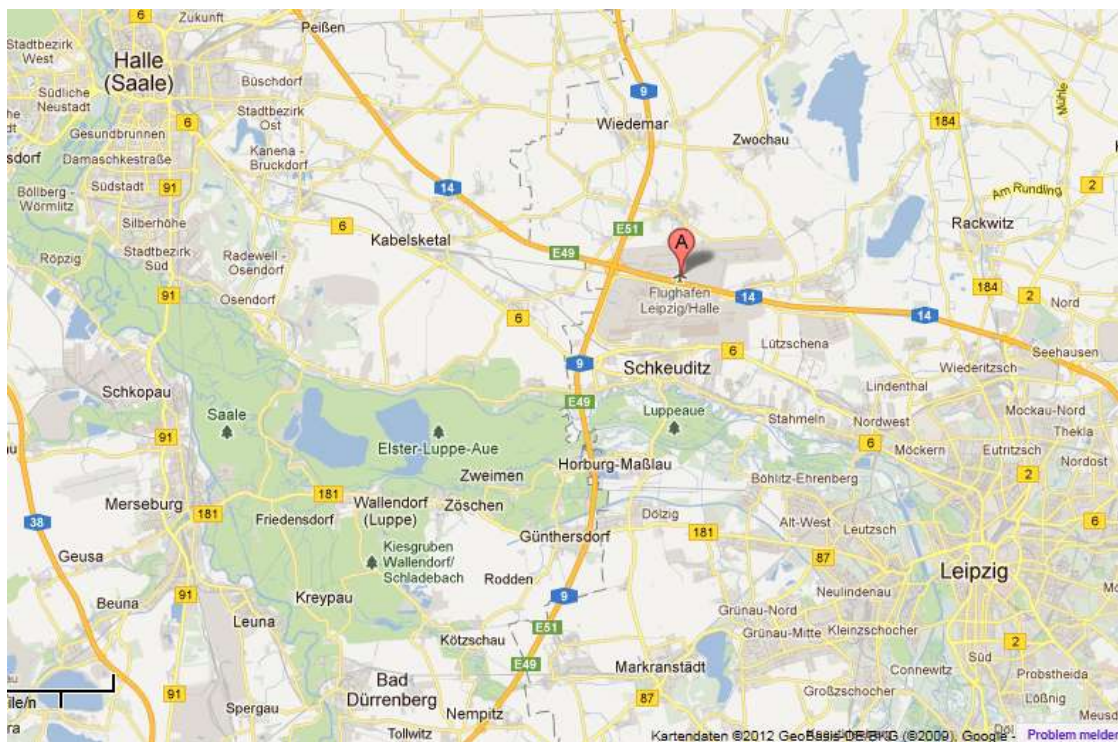
<sup>1</sup>[http://www.leipzig-halle-airport.de/en/index/unternehmen\\_flughafen/geschichte/1945\\_1989.html](http://www.leipzig-halle-airport.de/en/index/unternehmen_flughafen/geschichte/1945_1989.html)  
[http://de.wikipedia.org/wiki/Flughafen\\_Leipzig/Halle](http://de.wikipedia.org/wiki/Flughafen_Leipzig/Halle)

After the German reunification and after the adaptation to the new economic situation, a period of modernisation and construction began. The number of passengers grew, new facilities were allocated. The link to infrastructure (road and rail) was improved significantly. A second runway (3600 m) was built in 1998, and the old runway was rebuilt in 2005 to a new runway (length 3600 m, width 60 m).

The enhancements were carried out supply driven, that means the airport was developed to be prepared for future demands. The excellent facilities combined with a low utilisation and the court decision permitting night flights for express freight without restrictions enabled the resettlement of DHL, which uses the airport since 2008 as their European hub. Since then the airport Leipzig/Halle is mainly a freight airbase, even though it is also used as a passenger airport and for military purposes. The various uses do not hinder each other. Passengers prefer day hours for flights while most of the freight is transported during the night.

## 2.2 Location and area

The airport Leipzig/Halle is located in the eastern part of Germany in Saxony, 16 km from the city of Leipzig and 22 km from the city of Halle (see Figure 1). Both are middle sized cities, Leipzig has about 520.000 inhabitants, Halle has about 230.000.



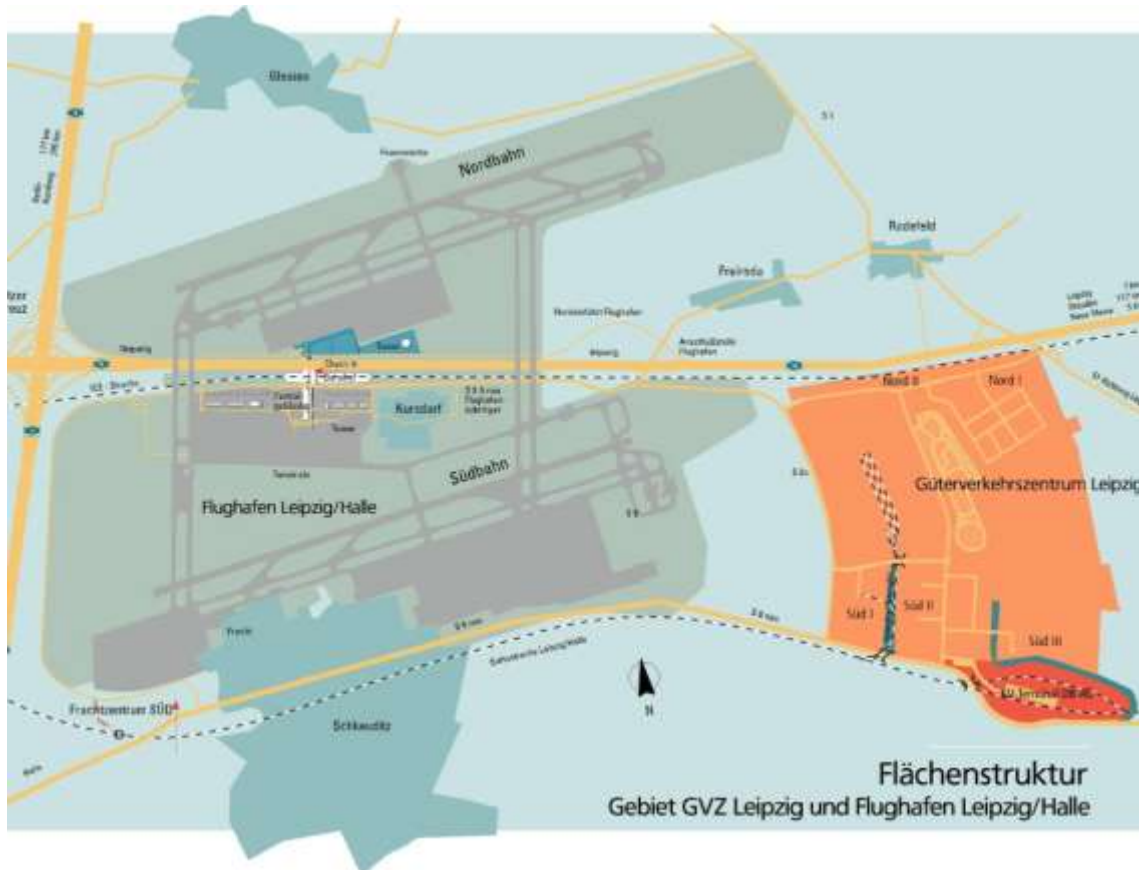
**Figure 1: Airport Leipzig/Halle: Location**  
Source: [maps.google.de](https://maps.google.de)

The airport is very well connected to the road and rail network, see Figure 2. Two main highways, one from Munich to Berlin and one from Dresden to the Baltic Sea, directly pass the airport. The railway station located within the airport is prepared but currently not used for high-speed trains.



**Figure 2: Airport Leipzig/Halle: Area and connection to rail and road**  
Source: [http://www.logistik-leipzig-halle.net/fileadmin/user\\_upload/files/AG3-Investorenansiedlung/Praesentation\\_Region\\_Leipzig-Halle-german.pdf](http://www.logistik-leipzig-halle.net/fileadmin/user_upload/files/AG3-Investorenansiedlung/Praesentation_Region_Leipzig-Halle-german.pdf)

The freight village (Güterverkehrszentrum Leipzig) is located in direct neighborhood; see Figure 3, orange area.



**Figure 3: Airport Leipzig/Halle and GVZ Leipzig**  
**Source: LBBW GVZ Entwicklungsgesellschaft Leipzig mbH**

Besides DHL a lot of carriers and logistic-related companies settled in the area, see Figure 4. These companies include

- PortGround, the subsidiary of the terminal owner, responsible for cargo handling services et al.
- Eurokurier Leipzig GmbH
- AeroLogic GmbH
- Connect Aircargo GmbH
- European Air Transport Leipzig GmbH (DHL Express)
- DHL Hub Leipzig GmbH
- Fenthol & Sandtmann GmbH
- Schnellecke Sachsen GmbH
- Emons Spedition GmbH

But these are only companies which are members of the Netzwerk Logistik Leipzig-Halle and located within the area of the airport or the GVZ. There are a lot more companies close to the motorways, the port in Halle and the cities of Leipzig and Halle.

Some global playing companies such as DHL, BMW, Porsche, Future Electronics, Amazon, Dow Chemical and Dell are also located nearby<sup>2</sup>.



**Figure 4: Airport Leipzig/Halle: Logistic related resettlements**  
 Source: [www.logistik-leipzig-halle.net](http://www.logistik-leipzig-halle.net), [www.maps.google.de](http://www.maps.google.de)

### 2.3 Passenger or freight profile

The airport Leipzig/Halle is operating as a regional passenger airport and an international freight airport, mainly for express and parcel freight. The biggest stakeholder involved is DHL, which in 2008 shifted the European hub from Brussels to Leipzig/Halle. Since then the volume of freight is increasing year by year in Leipzig, see table<sup>3</sup> below. For this case study only the freight profile is analysed.

Year	No. of Passengers	Freight [t]
2007	2.723.000	101.285
2008	2.462.256	442.453
2009	2.421.382	524.082
2010	2.348.597	663.024
2011	2.266.743	760.355

**Figure 5: Number of passengers and freight volume**

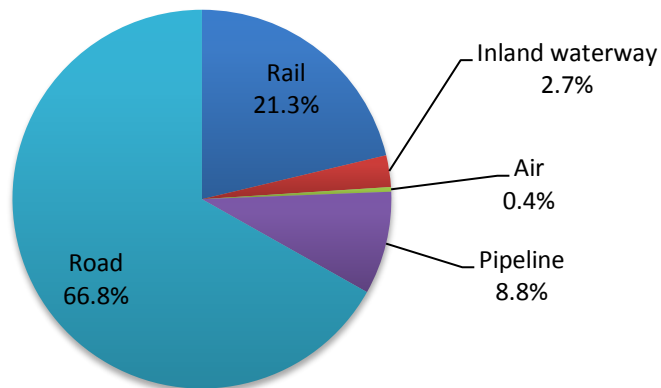
<sup>2</sup> [http://www.leipzig-halle-airport.de/en/index/unternehmen\\_flughafen/flughafen\\_lej.html](http://www.leipzig-halle-airport.de/en/index/unternehmen_flughafen/flughafen_lej.html)

<sup>3</sup> [http://de.wikipedia.org/wiki/Flughafen\\_Leipzig/Halle](http://de.wikipedia.org/wiki/Flughafen_Leipzig/Halle)

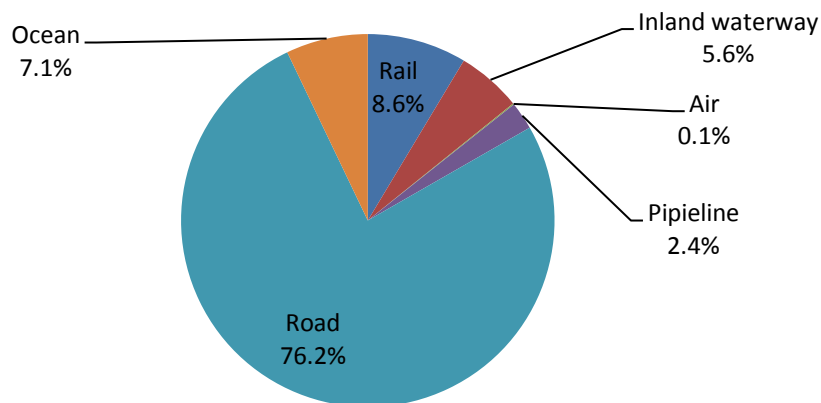
The modal mix for the logistic area Leipzig-Halle is less road-oriented than it is for Germany as a whole, see Figure 6. But looking at the airport in isolation the situation is different. Logically, there is a larger amount of air traffic. Most of the goods are just transhipped from one aircraft to another. The rest of the freight arrives by truck or is delivered by truck from or to destinations in Europe. Transport by rail is rarely used at the airport. Conventionally, air cargo is mostly light, expensive and time critical, while rail (or waterway) cargo is often heavy, large-volume and dirty.

About 90 to 94% of the air freight volume at the airport Leipzig/Halle is due to DHL. That means the airport is specialised in international express and parcel freight. Most of this freight arrives by plane and is submitted by plane. Source and destination are often far away from China to US, but also Europe is served by Leipzig/Halle.

**Modal-Mix in Logistic Area Leipzig-Halle (2009)**



**Modal-Mix in Germany (2009)**



**Figure 6: Modal-Mix in Leipzig-Halle and in Germany**  
**Data Source: Logistikregion Leipzig-Halle<sup>4</sup>**

The logistic area Leipzig-Halle has other priorities on transport. In 2009 about 91.000.000 t were delivered to Leipzig-Halle by land transport. The volume transported from Leipzig by road or rail was in the same order of magnitude. The share of rail traffic to and from Leipzig-Halle is high compared to the situation for freight transport in Germany, see Figure 6. The largest tonnage portion (plus/minus 20%) transported by road or rail comes from bulk goods as ores, pit and quarry, recycling material and waste. But Leipzig-Halle also handles a significant higher amount of coal, petrol and natural gas, coke, petroleum and chemical products, which usually are transported via rail. Especially about 80% of the coke and petroleum freight is transported via rail from and to Leipzig-Halle while this is the case for only about 35% all-over Germany. The source regions are mainly in Germany (97.9 %) where about 80% of the goods arrive from the directly related regions (Saxony and Saxony-Anhalt). The situation is very similar for good submitted from Leipzig-Halle. Looking only at the portion of freight arriving from abroad, about 50% are delivered from Czech Republic and 8% from Poland<sup>4</sup>.

### **3 Planning, ownership and organisation**

#### **3.1 Organisation and ownership, operations**

The airport Leipzig/Halle is owned by Mitteldeutsche Airport Holding, founded in 2000. There had to be found an organisation, appropriately representing all involved authorities on local and regional level. On one hand, the intention was to have a central body responsible for both airports in Saxony to profit from synergies and to avoid an unnecessary competitors' fight. On the other hand, there was a necessity to involve two German Bundesländer (Saxony and Saxony-Anhalt), because the airport is located in Saxony, very close to the border, and was always intended to serve the whole area of Leipzig and Halle.

##### **3.1.1 Ownership structure**

The Mitteldeutsche Airport Holding is a public owned company which is organised as a joint stock company (Mitteldeutsche Flughafen AG). Shareholders are the two neighbourhood states Saxony and Saxony-Anhalt and the three involved cities: Leipzig, Halle and Dresden, see Figure 7.

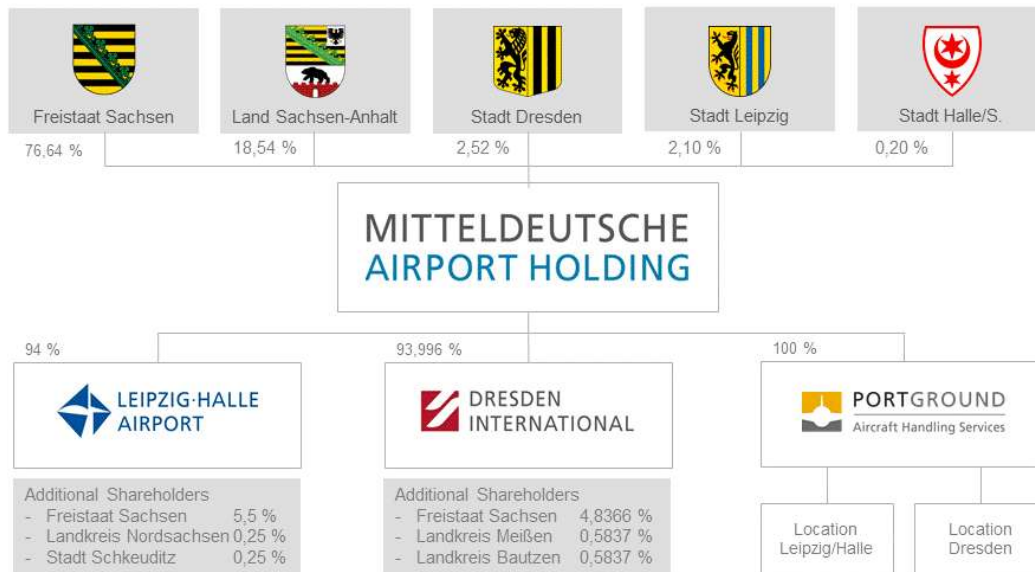
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<sup>4</sup> Standortgutachen der Fraunhofer SCS, Studie im Auftrag des Netzwerk Logistik Leipzig-Halle e.V., 2012



## Shareholders and Corporation

MITTELDEUTSCHE  
AIRPORT HOLDING



**Figure 7: Shareholders of Mitteldeutsche Airport Holding**

Source: <http://www.mdf-ag.com>

With the help of also public owned subsidiaries, the holding is managing two airports, one in Dresden and airport Leipzig/Halle.

Mitteldeutsche Airport Holding is the leading entity of subsidiaries:

- Flughafen Leipzig Halle GmbH (airport operator of airport Leipzig/Halle)
- Flughafen Dresden GmbH (airport operator of airport Dresden)
- PortGround GmbH (handling agent)

All relevant decisions concerning the subsidiaries are taken by the holding. Most of the overarching tasks are taken by the holding, including tasks of a legal nature, taxes, strategic personal planning and recruitment, corporate communication, marketing and procurement.

The Flughafen Leipzig/Halle GmbH is organised as a limited liability company, a stock cooperation with shareholders. This is a typical private sector structure, but in this case all shareholders are public authorities. Of course there are also private companies in the airport area, such as carriers, producers, etc. But they are separated companies renting (or using or buying) space from the airport or the freight village. The road and rail infrastructure is operated by stakeholders as Deutsche Bahn or the motorway authorities.

Nevertheless, the ownership of all relevant subjects as terminal, services, and airport internal infrastructure is combined in one hand. Even most of the land ready for development or resettlement is owned by the Mitteldeutsche Airport Holding or the

airport itself. There are only small areas belonging to the cities or the state. Areas for resettlement of logistic companies are normally rented and are sold only in exceptional cases.

### **3.1.2 Regulatory framework**

Within the wider airport area ownership and management of land and airport infrastructure are not separated. The airport owner/operator offers all services from one source. This allows very fast decisions and planning, which was seen as a great advantage by all interviewees, even the representative of the logistic companies. There is a pre-selection of companies preferred at the airport. These are companies with a direct relation to air transport preferably generating air freight. But nevertheless all indicators show a fair access to the offers of the airport. There was no conflict identified related to undue favouritism.

Supported by Netzwerk Logistik Leipzig-Halle there is a co-operation between carriers, logistic related companies and service companies as for example labour or real estate brokers. This network also serves as mediator between the airport, the authorities and the private companies.

The office of the network representatives is located in an airport terminal next door to the administration building. The headquarters of the airport company and the holding both are working in the administration building of the airport. Everything is close together and this seems to improve the coordination processes.

### **3.1.3 Planning and operation/construction process(es)**

Planning, ensuring of financing and construction could be carried out very fast. There were some main reasons for that:

- Political will, especially of the regional authorities.
- Very good co-operation of all concerned.
- Legislation targeted to fast progress in the eastern part of Germany after the reunion.

During the last years the Infrastructure Acceleration Act fastened up the planning process by reduction of some contestation rights and shortening the chain of commands for suits to only one level of jurisdiction. But this act is going to expire and future planning at the airport will probably take longer. Nevertheless the residents were involved in the planning which led to a very high acceptance and very few public protest.

The main conflicts identified come from the framework for infrastructure support defined by the EC. Since the airport is a privately organised stake company public funding is not authorised by the commission. Thereby it doesn't seem to make any difference that 100% of the shareholders are public authorities. The situation is legally examined at the moment, but causes anxiety. A more subsidiarity principle-oriented view of the EC in relation to regional infrastructure funding would be preferred by the

airport and holding. From their point of view this is relevant for many locations with large infrastructure facilities all over Europe.

There are some other conflicts related to infrastructure, but mainly from the carriers' point of view. The logistic area is connected to the high-speed rail network, but no high-speed train is available. The inland waterway transport is not really usable, even though the port of Halle is prepared. The port was developed but there was not enough money or willingness to ensure that the river is deep enough for cargo ships.

#### **3.1.4 Sharing of information**

There is a lot of information sharing between the terminal operator and local/regional authorities, because authorities are shareholders and involved in the Supervisory Boards. The information exchange between logistic companies and authorities is part of the networks tasks. The network collects information available to members and authorities. Public authorities, for example the Saxon State Ministry for Economic Affairs, Labour and Transportation (SMWA), provide available data to the network, which ensures distribution to the members.

Since the network is independent and operates as a moderator and broker, the competition does not impede the flow of information to the members. But of course, there is a competitive situation between members, which might obstruct the cooperation. The network supports cooperation between partners willing to cooperate, but cannot overcome personal affinities or business barriers if this is not desired by the partners.

#### **3.1.5 Suggested improvements**

All interviewed partners are quite happy with the current situation concerning ownership, organisation and operation.

### **3.2 Financing**

Connected to the changeable German history the history of the airport shows ups and downs. This is also true for financing in the past, coming from different sources with various intentions. The first investment was well planned and successful; the airport was used as a substitute for airports in Leipzig and Halle. But other projects and the assigned budgets seemed to be inadequate. Between 1957 and 1960 a 2500m long and 60m wide runway was built by the GDR government. It was planned for the expected aircraft development, which was stopped shortly after the completion of the runway.

After the German reunion the airport did not have to start from the scratch, but a lot of reconstruction and improvement was necessary. This was financed by the contribution of the shareholders which are all public authorities. This strongly reduces the possibility to receive further subsidies for example from European funds.

Even so the area of Leipzig/Halle is the most dynamic German region related to logistics today, the airport is not able to cover the costs. In 2010 there was a financing

gap of about 62 Million Euro with sales of 92 Million Euro. Partly the reason is 47 Million Euro depreciation for new buildings, but there is still a gap left.

Concerning passengers, the airport is oversized. It was planned for 6 Million Passengers and (expendably) constructed for 4.5 Million, but there are handled only about 2.5 Million passengers per year see Figure 5. The shopping mall does not attract customers and the station is not used for high-speed trains.

Leipzig/Halle is in the list of the worlds' 20 biggest freight airports (second biggest in Germany) but this does not lead to economic success. On the contrary: the gap in financing was much smaller in 2008<sup>5</sup> (about 38 Million Euro, less than half of the sales). The logistic companies including DHL settled in the area because of good conditions, namely the night rating, availability of labour supply on less salary, availability of space for the settlement and expansion, political support and low costs (for example landing charges)<sup>6</sup>. For example DHL is virtually autarchic and therefore contributes less than expectable to the airport profit.

Besides, there is an on-going legal fight with the EC. The conflict issue is a funding for infrastructure with an amount of 400 Million Euro granted from the state (Bundesland). This aid is considered impermissible by the commission. The worst case scenarios analysed in the planning process were exceeded by this decision. Nevertheless this situation is not rated as "lesson learned". The situation has to be clarified legally to establish a legal security for infrastructure projects in Europe.

### 3.3 Indicators related to policy, organisational and institutional structure

Stakeholders, especially larger companies do use indicators, but each company in its own responsibility. Also the network uses indicators, but is still in the beginnings. There are plans at the airport to increase the usage, plans for indicators which will be collected in the future, for example concerning energy productivity.

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<sup>5</sup> before DHL implemented the hub

<sup>6</sup><http://www.wiwo.de/unternehmen/dienstleister/flughafen-leipzig-halle-vom-hoffnungstraeger-zur-investitionsruine/6461538.html>

## 4 Outputs and level of service

### 4.1 Interface and interconnection, related services

Most of the freight (more than 90%) comes from DHL and is handled by DHL. Beside, a large portion of this DHL freight is only related to long-distance transport (air-air), see Figure 8. That means the portion of freight charges using the airport as an interconnection between short- and long-distance traffic is relatively small.



**Figure 8: Handling of air freight by DHL**

Source: [http://www.dp-dhl.com/content/dam/logistik\\_populaer/leipzig\\_hub/hub-leipzig\\_de.pdf](http://www.dp-dhl.com/content/dam/logistik_populaer/leipzig_hub/hub-leipzig_de.pdf)

But there is a part of cargo transshipped from plane to truck or vice versa. The freight is mostly handled by DHL but more and more other shippers are involved.



**Figure 9: DHL freight trucks**

Source: [http://www.dp-dhl.com/content/dam/logistik\\_populaer/leipzig\\_hub/hub-leipzig\\_de.pdf](http://www.dp-dhl.com/content/dam/logistik_populaer/leipzig_hub/hub-leipzig_de.pdf)

The situation is quite different for the whole logistic area, especially for the GVZ, where rail and road is connected and the airport is directly accessible, see Figure 10.



**Figure 10: Interconnection GVZ**  
**Source: LBBW GVZ Entwicklungsgesellschaft Leipzig mbH,**  
**Photographer Frank Schütze, 2011**

## 4.2 Productivity and effectiveness in terminal

The productivity of employees handling cargo is hard to measure at the airport. There are several reasons for this.

- The staff of the airport works for both categories of transportation, passengers and freight.
- The employees of Mitteldeutsche Airport Holding (as an umbrella organisation) and PortGround are responsible for passengers and freight topics of two airports, Leipzig/Halle and Dresden. For example, one of the tasks of PortGround is de-icing of airplanes. This task has to be performed for passenger planes as well as for air freighters.
- Most of the volume of cargo at the airport Leipzig/Halle is related to DHL, who works fairly autonomously with its own staff (currently more than 3000 employees<sup>7</sup>).

Thus, the bare figures can only give a rough estimation of the airport's productivity concerning freight and passenger. In total there are working more than 8000 people for various companies at the airports of Leipzig/Halle and Dresden. About 1000 of those, belong to Mitteldeutsche Airport Holding or the subsidiaries<sup>8</sup>. About 200 employees are

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<sup>7</sup>[http://www.dp-dhl.com/de/presse/pressemitteilungen/2011/deutsche\\_post\\_dhl\\_stellt\\_3000sten\\_mitarbeiter\\_am\\_hub\\_leipzig.html](http://www.dp-dhl.com/de/presse/pressemitteilungen/2011/deutsche_post_dhl_stellt_3000sten_mitarbeiter_am_hub_leipzig.html)

<sup>8</sup> [http://www.mdf-ag.com/de/economy\\_factor.html](http://www.mdf-ag.com/de/economy_factor.html)

directly related to the airport of Dresden and therefore can be taken off the number. PortGround employs about 370 people<sup>9</sup>.

The airport is not fully used. The overall Saturation ratio combined for passengers and cargo is only about 30-35% in average. The utilisation of the runways is even less than 30%.

There is a lot of space for expansion available partly as prepared area, partly as farm land. The area used could be tripled if necessary.

### 4.3 Level of service offered

Punctuality is one of the strengths of Leipzig/Halle. There are nearly no delays caused by the airport and its services. The airport is available 24 each day and it was open even during the last two severe winters without exception. Partly delays resulting from problems at other airports can even be compensated. But this great punctuality is due to the low utilisation rate of the airport, see chapter 4.2. There are no problems to find empty slots for landings and take-offs.

From the airports point of view there exists no loss and very few damage (0.000...1%). Processes are optimised. The staff is well trained and sensitised, due to the high requirements of DHL. It can be assumed, that also DHL itself has a very good ratio, but there are no numbers available.

### 4.4 Indicators related to performance and level of service

During the evaluation no concrete number for indicators C7-C10 could be collected. The collection of data is intended, but no data open to the public is currently available.

<b>PAG recommendation</b>	<b>What is the current situation and is the recommendation important? If so, how?</b>
<b>Policy recommendations</b>	
Integrate the administration of the public transport system	
Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform	Is important, but must not be regulated by authorities, can be left to the market
Policy and legal frameworks should facilitate intermodal cooperation	

<sup>9</sup> <http://www.portground.com/de/Profil-Struktur-Kontakt/Ueber-uns.html>

<b>PAG recommendation</b>	<b>What is the current situation and is the recommendation important? If so, how?</b>
<b>Planning recommendations</b>	
Incorporate the transport planning process with land-use planning	Is in one hand
<b>Financing recommendations</b>	
Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues	See below
Integrate the pricing of the public transport system	
<b>Organizational recommendations</b>	
Use of business models for cooperation that also publically owned terminals can use	Leipzig/Hale is a public owned terminal organised as a private company.
Structure the information provision	
<b>Infrastructure development recommendations</b>	
Constitute transport infrastructure management body for all modes	
Adopt or create standards for physical infrastructure interconnectivity	Standardization is an on-going process driven by the market, probably a regulation by authorities would be counterproductive
<b>Operations recommendations</b>	
Separate the owner from the operator	Is not appropriate for Leipzig/Halle
Establish the cooperative framework between the terminal and the transportation operators	Is established via Netzwerk Logistik Leipzig/Halle
Integrate the operations of the public transport interchanges	

As mentioned in chapter 3.1.1 the holding and its subsidiaries are owned by public institutions, solely. There is no private partner involved and all persons interviewed are happy with this situation. They think it is a very good structure and don't want to change it. But there are also risks.



One of them is obvious when analysing the dispute with the EC. Funding from public institutions for public infrastructural objects is not a problem. However the infrastructure is not owned by one single public institution but organized as a stock cooperation with public shareholders only. This is a typical private sector structure and objects owned by such a private structure are not allowed to be funded by public institutions as a Bundesland. It doesn't matter that this is a private sector structure with all public sector shareholders. If the airport would be owned only by the state of Saxony, the problem would not be there. Including private companies would not really help. But, the model would be another one and maybe it would be more understandable that funding is prohibited. At the moment there is no common understanding of how to handle an infrastructure object, owned by a privately organized company with solely public shareholders. It is expected that this can be legally clarified.

Another risk is visible by the economic situation. The airport Leipzig was chosen as a development project to upgrade the region (East Germany). The holding was founded, because the interests of different public organizations had to be taken into account, for example 2 Bundesländer and 2 middle-sized cities and the small city at the location. On one hand this model works well, supports co-operation and fair access and avoids too much competition between the airports in Leipzig and Dresden. But on the other hand, there is no strong regulatory mechanisms providing the airport from going deeper and deeper into debt. In 1994 the former prime minister of Saxony, responsible for the expansion of the airport after the re-union, expected 6 million passengers per year in the near future. But the airport is far away from reaching this number. Now some partners (especially local municipalities) reduce their stock options. There is discussion on this topic even in Leipzig, initiated for example by The Greens.

## 5 Analysis of gaps

Lack of standardization	A key-trend that affects the whole transportation chain and the absence of which has been identified as significant barrier in transport, is standardization, in terms of transport infrastructure, transport means, transshipment technology, information, packing units, etc. (KOMODA project).
Lack of appropriate infrastructure	The existence of inadequate infrastructure, which blocks the wide development of efficient interfaces. Common problems associated with this gap are the “under dimensioning” and the inappropriate maintenance in existing networks and the lack of financial resources for the development of new interfaces.
Dependency of mode choice to economy and legislation	An indicative example of this gap is identified in the air freight transport, where the basic advantages of this mode – speed and safety - depend on potential changes in restrictions and fuel prices. At the same time, focusing mainly on urban distribution of goods, restrictions such as vehicles’ size and time window, may imply more trips and more vehicles with worse environmental performance, respectively.

### 5.1 Lack of standardization

Since most of the freight is directly connected to DHL, currently standardization is not really a topic in Leipzig/Halle. But, the airport strives for a stronger connection to Eastern European markets. This might lead to more dependency on standardization.

### 5.2 Lack of appropriate infrastructure

Concerning rail the infrastructure is available but not really used. The network and terminal/station is ready for high-speed trains, but there is not high-speed train moving to and from the airport.

Concerning waterways, there is a lack. The closest port (Halle) is ready as a interconnection terminal between road, rail and inland waterway, but the river passing (Saale) is not deep enough for cargo ships of appropriate size.

### 5.3 Dependency of mode choice to economy and legislation

The cargo handled at the airport is not suitable for rail or waterway transport in many cases. Therefore freight is transhipped to or from trucks, if it is not air to air.

## 5.4 Lack of customers

The region Leipzig/Halle is in the eastern part of Germany, where there is still a lack of industry and production. That means the airport is not naturally located close to potential customers. The same is true for passengers. In the catchment area there are not that many people living. The area is developing, some key players settled there already, but this is still not enough for an appropriate workload.

But, Leipzig/Halle is in a good location for providing a gateway to Eastern Europe<sup>10</sup> and further to the East. People responsible for the airport and the logistic area are improving this relation. Since there is a lot of development in the neighbouring countries, the logistic area expects to expand this position as a gateway to the East.

## 6 Emerging mobility schemes and future changes

### 6.1 Emerging mobility schemes

Freight

<b>International logistic centre</b>	Direct access of an ILC to global transport networks enabling the direct transshipment of goods without the need of using an intermediate location
	Increase of sustainability if and when the ILC is connected and cooperates with other centres
<b>Eco-efficient terminals</b>	Adjustment of terminal equipment and transfer vehicles taking into account energy consumption
	Improvement of the sustainability of logistic and operations with port and hinterland terminals
<b>Integration of an e-logistic platform</b>	Creation of interfaces with transport/logistic partners
	Decrease of lead times-costs-environmental impact
<b>Green corridors</b>	Adjustment of terminal technology and equipment in order to connect to green corridors

<sup>10</sup> Approximate distance to Prague 275km, Szczecin 355km, Poznań 425km, Bratislava 590km

<b>Public-private partnerships</b>	Funding opportunities for establishment of new terminals or modernization of existing ones
------------------------------------	--

## 6.2 International logistic centre

The airport is connected via air and road (highways) the GVZ is also connected to the rail network, but no high-speed train is available

## 6.3 Eco-efficient terminals

The airport and the companies related to the airport are working on sustainability. Gas driven and electric vehicles are tested and used. There is an electric vehicle charging station at the airport. There is a rain water recycling facility at the airport. DHL uses a solar plant and combined heat and power. Besides, the airport is involved in research projects to gather information and new ideas and to further improve the situation, for example D-AIR<sup>11</sup>.

## 6.4 Integration of an e-logistic platform

Most of the freight is derived by DHL, who uses modern technology for information exchange.

## 6.5 Green corridors

The connection to the high-speed network (with running high-speed trains) is prepared, but waiting for more customers willing to use it. Currently the critical mass is missing, but if a first big application can be obtained, the operation can be started immediately.

## 6.6 Future perspectives

The airport is perfectly prepared for increasing e-commerce and expresses parcel services. The facilities are available and the conditions at the airport are distinctly good (location in Central Europe, no night flight ban, expandability, qualified workforce, etc.). The airport is also in a good position connecting Eastern Europe to West and Central Europe and serve as a Central European gateway to the eastern part of the world.

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<sup>11</sup> [http://grantseurope.eu/portfolio\\_2/d-air/](http://grantseurope.eu/portfolio_2/d-air/)

## 7 Policy goals

Policy goals	Comment on achievement
<b>Developing and deploying new and sustainable fuels and propulsion systems</b>	
1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030	There is a lot of effort at the airport or related to the companies, see chapters 6.3 and 6.5.
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>	
3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050	Not appropriate for the airport because of freight characteristics which are not compatible for air and rail. But for the logistic area, there is a quite large amount of rail freight already, see Figure 6
5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	
6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.	Is prepared but currently not used
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	
10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	

## 8 Concluding remarks

### 8.1 Main conclusions

The freight volume of the airport Leipzig/Halle is growing fast. The Leipzig/Halle is the second or third biggest cargo airport in Germany (after Frankfurt and in competition with Cologne/Bonn airport). Planning procedures are very fast. All services are provided from one source. Besides, there is a lot of space for expansion and settlement of logistic companies and no problems with slots for landings and take-offs. But this convenient situation occurs, because the airport is only partly utilised. The airport is far away from a balanced budget.

## 8.2 Good practices

The airport is led by a holding responsible for all subsidiaries and for both airports in Saxony. Therefore the competition could be reduced and the co-operation encouraged. The holding and all subsidiaries are in public ownership and strongly connected to the authorities involved.

Due to this and due to a special legislation framework intending to develop the Eastern part of Germany as fast as possible planning processes were passed very fast during the period after the German reunion (1990). The framework shortened up the planning process and reduced the chain of commands for suits to only one level of jurisdiction. But this situation might change in the near future, when the special law ends.

The co-operation between all participants was and is very good. There is a political will to develop the airport and the whole region. This led to an establishment of some big companies in the area and the region.

The connection to logistic-related companies and the connection between those companies are supported by a logistic network founded on the initiative of regional logistic actors. Synergies can be used, planning and construction are supported, and the collaboration between different actors is strengthened.

## 8.3 Bad practices

The planning for the airport was too optimistic. The airport is oversized and losing money. It also might be conceivable that the conditions are a little bit too good, attracting companies to settle in the area and use the airport, but straining on the economic condition of the airport.

Besides there exist different opinions between the local/regional authorities and the European Commission concerning the financing of infrastructure, which now have to be clarified by a court.

The connection to the rail network is not well as desirable. This is mostly a topic for passengers transportation and maybe a topic for the GVZ, because goods transported by air are normally not appropriate for rail (or even waterway) transport.

## 8.4 Suggested improvements?

The airport will try to connect more closely to the market, especially the market in Eastern Europe. This seems to be a good idea, since there are not enough potential customers in the region. It will be hard to attract more passengers and passenger airlines because there is a new airport in Berlin opening soon and probably providing a large offer for passengers. This is why Leipzig is focussing on cargo and will continue. The logistic region is dynamic and there is a chance to get more airport customers to settle in the area.

## Connecting LOnG and Short-distance networks for Efficient tRansport

### Reporting template for case studies

<b>Name of case study:</b>	Armentières
<b>Author( s)</b>	Pierre Christine Belibi, Alain l'Hostis, Université Paris Est LVMT IFSTTAR
<b>Date:</b>	02 July 2012

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## 1 Data collection process

The work has included four interviews with stakeholders.

- M Loïc Lemencel from the Regional Trains service from the Regional Council Nord-Pas-de-Calais
- Ms Anne-Sophie Legendre from the FEDER management funds from the Regional Council Nord-Pas-de-Calais
- Ms Céline Depiere from the Mobility service at the Lille-Métropole Communauté Urbaine
- M Nicolas Augrain from the urbanism service of municipality of Armentières
- Ms Nathalie Elie exchange poles project leader from the Transport service at the Lille-Métropole Communauté Urbaine

The data collection process has also involved three visits on site in 2011 and in 2012. This has been completed by collection of documents on the internet.

## 1 Terminal overview

### 1.1 *Background*

#### 1.1.1 History

Armentières is a railway station open to service in 1849 on the line between Lille and the littoral cities of Dunkerque.

#### 1.1.2 Historic development

Armentières station has been identified in the first PDU (Local Transport Plan) of the Lille Urban Community as one of the exchange poles to be developed by reinforcing the bus system including the station and the city Core of Armentières. This bus development was included in the first set of objectives defined in the PDU in the year 2000.

At the same period the Region, as the Authority for regional train, had set up a policy of development of exchange poles around the railway system as stated in the SRIT (Regional Transport Plan) of 2004. This document included Armentières railway station as an exchange pole to be developed.

The initiative of the development of the Armentières exchange pole can be credited to the LMCU.

Works have been conducted in 2006-2008 and the site is functional in its new characteristics since in 2008.

## 1.2 Location and area

Armentières railway station is located in the Lille Urban Community (LMCU) and inside the Région Nord-Pas-de-Calais. Armentières belongs to the Département of Nord.

The municipality of Armentières is located 14 km at the North-West of Lille and at 20 km from the Airport of Lille Lesquin. It regroups 25 000 inhabitants with a density of 4000 inhabitants per square meter. The Urban Community of Lille counts 1.1 million inhabitants.

The municipality is close to the Belgian border.

The railway station is located at 800 meters from the city core, in an area subject to urban renewal policies.



Figure 1 : general view of the Armentières exchange pole (source PDU 2010)

## WP 5 - Case study reporting



Figure 2 : The projected transit system in Lille Metropolitan Urban Community taken from the Local Transport Plan of 2011 (source PDU 2010)

It is located on the regional railway network on the line to Dunkerque which is the third branch of the regional network mainly centred on Lille.

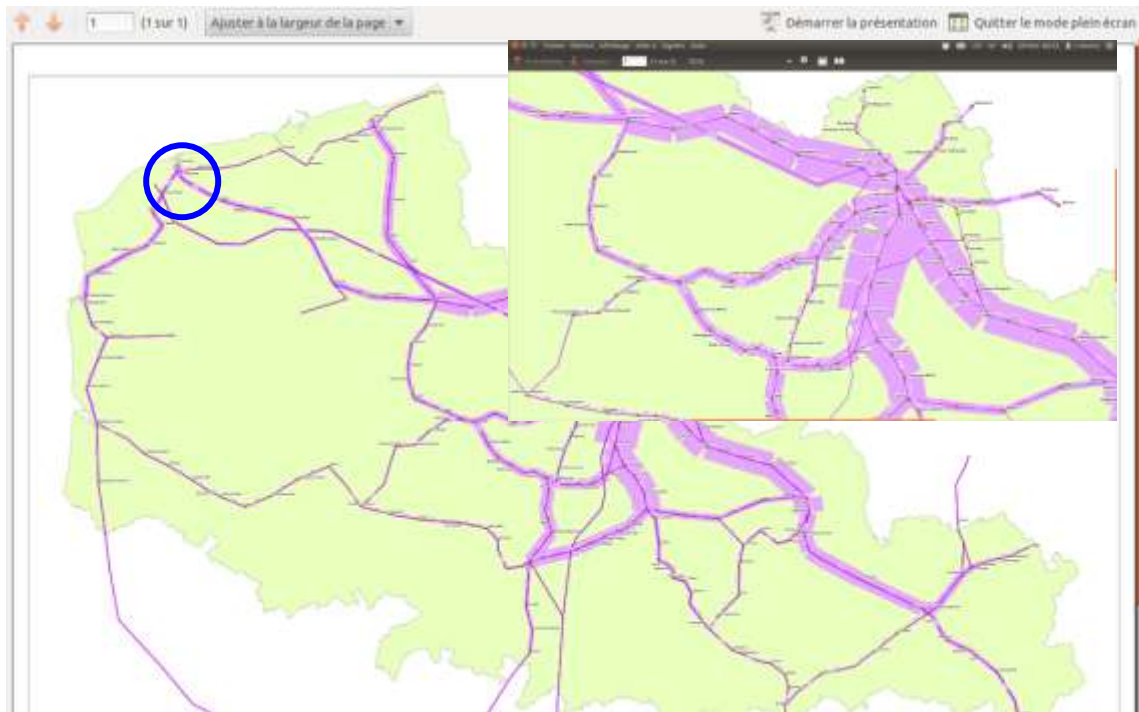


Figure 3 : Armentières located in the network of regional railway passenger flows (source PDU 2010)

It constitutes an entry point in the LMCU territory and a gateway between the regional and metropolitan spaces.

### **1.3 Passenger profile**

The traffic at the railway station of Armentières has increased from 3 300 passengers per day (in and out of train) in 2005 to the level of 4 600 in 2010.

Today, Armentières is the second regional railway station of LMCU territory after the central station of Lille-Flandres which in 2010 had 50 000 regional passengers per day.

At the regional scale Armentières is ranked 10<sup>th</sup>.

In the regional network the lines 8, 8 bis and 12 linking Lille to Dunkerque and Calais.

Two secondary lines serve the freight railway to the stations of Don-Sainghin and Berguette.

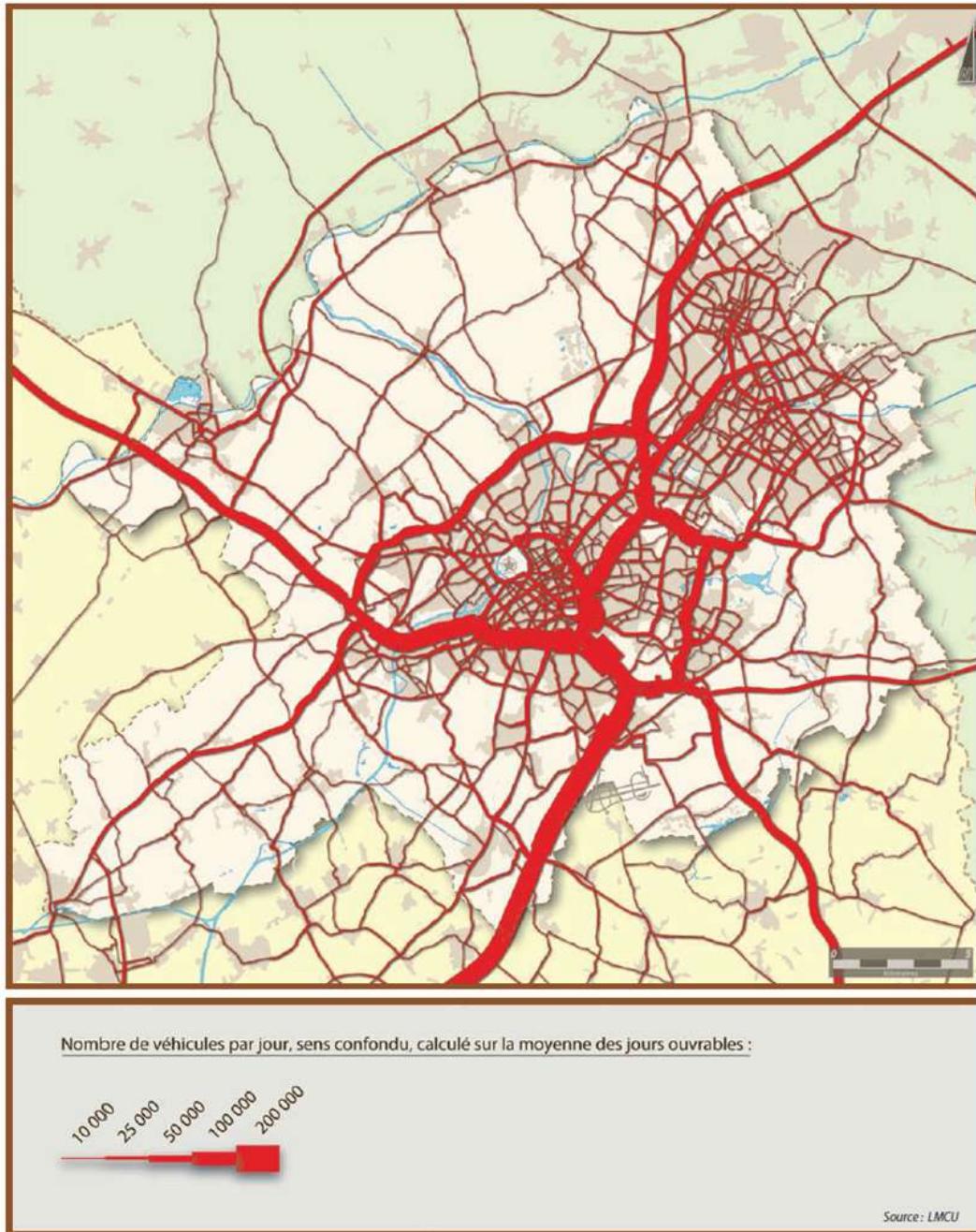


Figure 4 : Road flows in the LMCU territory in 2002 (source PDU 2010)

In terms of modal share Armentières is served by the motorway A26 to Dunkerque and is surrounded by a peri-urban territory.

At the scale of the LMCU the modal share are as follows.

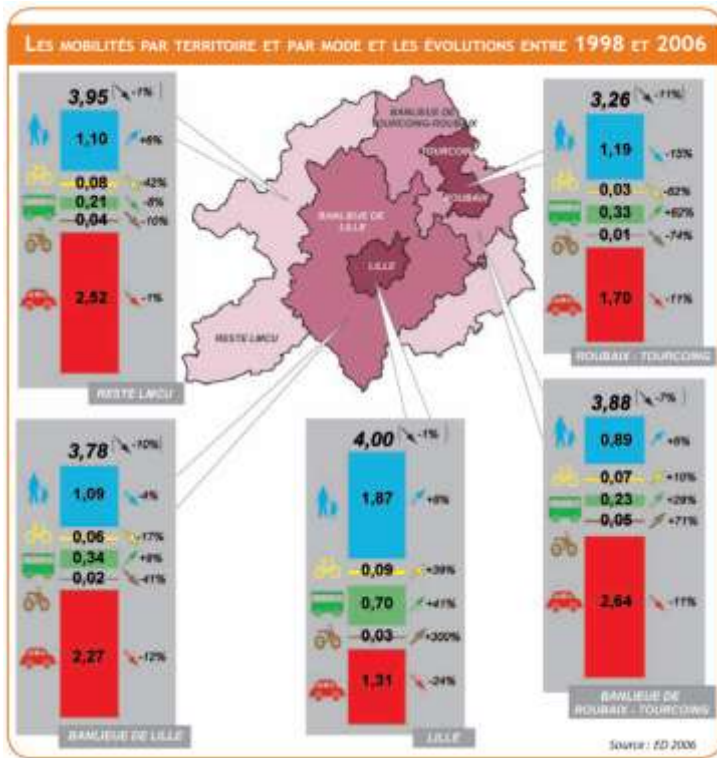


Figure 5 : Modal share by geographic sectors in the Lille Metropolis territory in 2006 (source PDU 2010)

## 1.4 Terminal properties

## 2 Planning, ownership and organisation

The Nord-Pas-de-Calais Regional Council plays a leading role in the planning and design of railway stations and exchange poles located in its area of competence, i.e. the regional territory. Nevertheless, it has no explicit competence in the matter, since its competence concerns the organisation of regional railway transport. The other stakeholders are the SNCF and RFF, rail service and infrastructure companies, the General Council (department level) and local intercommunalities or communes. European FEDER funds occur sometimes and the national state is sometimes involved.

The Region is a stakeholder from the beginning, and generally leads the preliminary studies associated with the definition of needs (mobility, transport urban planning) and means associated with the railway station or exchange pole functioning. The next step concerns the realisation by RFF (infrastructure public company), by SNCF (railway service national company) and by local collectivities of the project-studies in their respective perimeters. Then the works phase occurs.

### **3.1 Organisation and ownership, operations**

#### **2.1.1 Ownership structure**

The terminal is composed of a series of building located in a piece of land and linked through a public space, the “parvis” of the station.

Most of the terminal has been built from former railway related land. The property of land is partly now LMCU. SNCF possess land for the station building and the building itself.

The railway infrastructure is property of RFF. The bus terminal, bicycle parking is property of the urban transport operator Transpole. The car parking is property of Lille Metropole Communauté Urbaine.

The transport operations are run by several companies: SNCF for trains, and Transpole and some other companies for buses.

The ICT system and the services remains the property of the various transport operators.

The integration of the long and short distance transport in terms of property is mainly due to the action of Lille Métropole Communauté Urbaine. One can consider that in the domain of property the cooperation between the stakeholders is good.



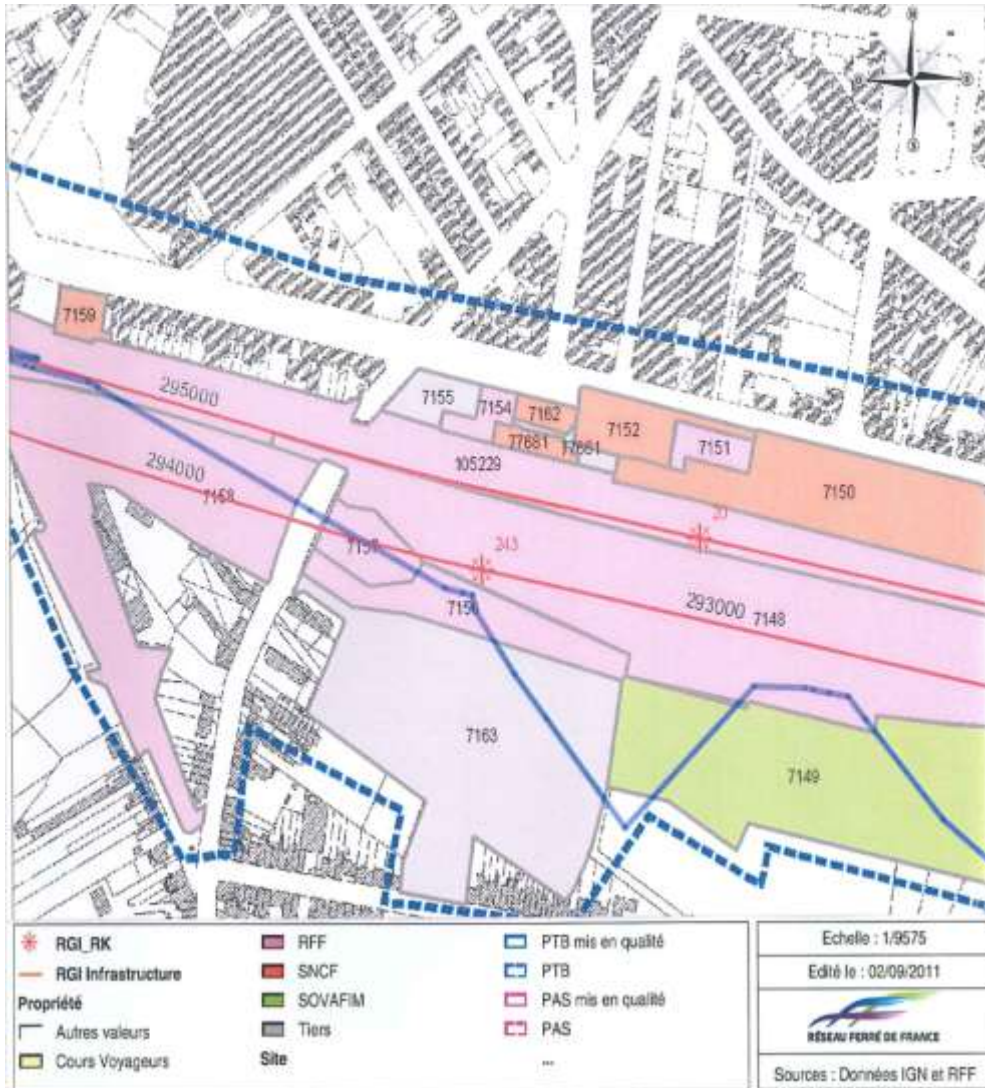


Figure 6 : land ownership of the Armentières terminal area before the project (source Pierre Christine Belibi 2011))

### 2.1.2 Regulatory framework

There is no cooperation and procedural framework for the project apart from the general laws and rules defined by the state. It is important to add that all the stakeholders are independent one to another.

There is no separation of ownership and management of land.

Apart from the special case of rail where RFF is proprietary and SNCF operates the services, there is no separation of ownership and management for infrastructure.

No separation		Separation	
Advantages	Disadvantages	Advantages	Disadvantages
Less procedures in case of intervention		Possibility for introduction of new operators	Procedures are resources consuming (time, money)
Responsibilities are clearly defined			

*Figure 7 : summary of advantages and disadvantages of separation of management and property of infrastructure*

LMCU is proprietary of the bus terminal. The management of the terminal has been added to the general convention of “public service delegation” linking the metropolitan transport authority and its operator. In consequence, Transpole, the public transport metropolitan operator, is in charge of the management and the maintenance of the whole bus terminal. In case of heavy maintenance the LMCU will be involved but the current situation has not made it necessary.

There are several bus operators in the Armentières bus station. The bus terminal has been built inside the perimeter of Lille metropolis. For this reason the management of the pole has been given to Transpole as the metropolitan transport operator. The hypothesis of attributing the management to another transport operator, for instance one of those operating for the Département, did not realised because the equipment belongs to the Metropolitan territory. The metropolitan transport company is here considered as legitimate as the platform operator.

The principle of the “delegation of public service” in the French context of urban transport states that one single company is chosen for operating one complete transport network on the territory of the transport authority. Therefore the hypothesis of having an operator of the metropolitan platform distinct from the metropolitan transport operator is not possible.

The fact that different bus transport operators get access to the platform operated by Transpole seems to pose no problem because the companies are not in concurrence.

In addition, the hypothesis of having an operator of the interface that would be independent of the transport operator has not been stated by the interviewees. This hypothesis does not seem necessary in the case of Armentières.

### **2.1.3 Planning and operation/construction process(es)**

One noticeable delay occurred in the project when it took 2 years to SNCF give an estimation of work to be realized before selling the land for the project. The railway system needs essential communication and energy networks for its functioning. Before sending any piece of railway land a study must be completed to determine if a piece of these networks could be touched. When a wire or a technical building has to be

moved the costs can be extremely high. The long time to produce the information can be considered exaggerated. Nevertheless this phase is crucial because its impact on the project can be very high, to such extent that the design of the project can be modified to avoid moving the networks.

As a company the SNCF has for goal to make some profit at the national level. At the regional level SNCF is the regional transport operator for the Regional Council. The company receives a subvention from the Region and has some objectives of correct operations of the railway network, with indicators of regularity. But it has no objectives of increasing the traffic of passengers. In addition the operations are heavily subsidised: on the price of a ticket, around 75 % comes from subsidies and the passengers contribute to only 25 %. In consequence, the SNCF has not built a regional strategy for the development of exchange poles. When selling its land, the SNCF is confronted to an arbitrage between an immediate profit from urban development projects and an hypothetical future benefit through increase patronage by developing exchange poles. At the regional level, the SNCF considers the land under its property around stations more as potential source of income than as a strategic asset for the development of exchange poles.

The SNCF is willing to profit from the selling of its land for construction projects. The Armentières project was to be built on a piece of land belonging to SNCF but no budget was foreseen by local and regional actors for buying the land. Up to the beginning of works SNCF was not willing to make its land available for the project. Only a high level agreement, made possible by political interventions, has been able to unblock the situation. The SNCF has currently no concurrence in the bidding for operating the regional railway services but this situation may evolve in the future. It is probable that this argument has played a role to convince the company to accept to contribute to the project by selling its land for free.

Thanks to this informal agreement between high-level executives a provisional agreement has been signed the day before the starting of works. The final documents were signed three month after the beginning of works.

This episode shows that beside official procedures, informal relationships has played a key role in the realisation of the project. In consequence improving the procedures is certainly positive but procedures will not solve everything.

We have observed through the interviews some differences in the perspective over the leading roles in the multimodal exchange poles project as seen by the Region and the Metropolitan authority. The metropolitan authority perceives its role as the real leader in the project. The regional authority perceives its own role as being at the initiative and then accompanying the projects lead by the intercommunalities.

This difference however does not pose a problem in the project. In the contrary these different perspective valorizes the roles of each actor and is a factor of a deeper involvement of each stakeholder.

Some key dates of the project:

- The PDU (Local Transport Plan) of 2000 is validated in June 2001
- Studies started in 2002
- Public enquiry in 2003
- The Regional Transport Plan is voted in 2004
- FEDER objective 2 funds were obtained for the period 2006-2008
- Works conducted from 2006 to 2008
- Opening in 2008

In the case à Armentières, there has been no substantial modification in the project between what was initially foreseen and what has been implemented. The back-casting analysis of the project reveals that the key element that could have generate whether a major delay whether a substantial modification of the project is the eventual presence of an element of railway related communication or energy networks on the land foreseen to implement the project.

#### **2.1.4 Sharing of information**

The operators are linked to the authorities through bidding contracts. On the site of Armentières three transport authorities are present: the region, the metropolis and the Département.

The Region, as the transport authority, has asked the SNCF to develop the train services in Armentières in order to support its role of exchange pole.

Some adaptation of the bus timetables to the train schedules occurred. The Département has decided a modification of the interurban bus timetables.

All the transport authorities involved have invested in the exchange pole. They are all willing that this exchange pole be functional in order to valorize their investment. This explains why they have developed some negotiations with the transport operators to coordinate the schedules.

This investment has pushed them to be willing to make it function properly, including the coordination of timetables, which is a key issue for an exchange pole. The involvement of all the transport authorities in the project can be seen as a key element

in the success of the interface, that it be in the realization of the interface and in its long term functioning.

### 2.1.5 Suggested improvements

The main obstacles associated with this kind of project are the multiplicity of stakeholders as well as the differing timings between the two phase studies and the work phase.

The participation of inhabitants in the process depends essentially of the will of local elected actors. The Regional Council can seek the involvement of members of the public through “rail line committees”. In addition this operation can be completed by a proper “urban project” or an “economic development project” associating the citizens and/or the local socio-economic agents.

A major evolution concerns the rising implication of local collectivities (communes and intercommunalities) that more and more understand the interest that the planning of these transport interfaces bears. They contribute more and more in financing.

Armentières was foreseen in the PDU (Local Transport Plan) of 2000. It has represented a new type of project for the metropolitan authority. At the end of the project they realized that there was no guidance in the planning documents to judge if the project was a success or not. In consequence the LMCU decided to introduce a set of assessment indicators for its future projects in the following PDU set up in 2011.

## 2.2 Financing

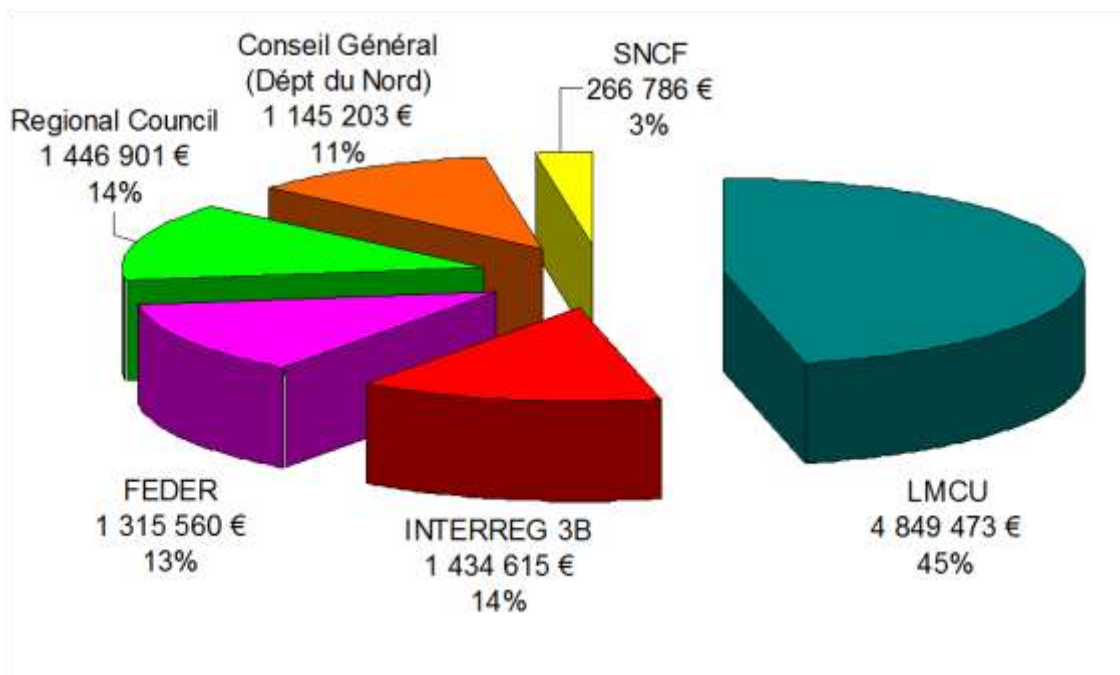


Figure 8 : share of partner financial contribution in the Armentières project

In terms of financing the main partner is the Metropolis authority (LMCU) with nearly half of the funds. The next partner is the Regional Council followed by the Département. It must be noticed that SNCF, the railway operator, is represented in the financing partners but in a different way: it contributed not in money but by providing the land used to build the car park and the bus stop.

	Studies	Land	Decommissioning	Public spaces		Bus station	Car Parking		Bicycle parking
				parvis	streets		Building	Surface	
Lille metropolis	x	x	x	x	x	x	x	x	x
Regional council	x	x	x	x				x	
Conseil général:	x	x		x	x	x			
INTERREG 3 B	x		x	x	x			x	x
FEDER						x	x		
SNCF		x**							

\*\* SNCF contributed through land provision

Figure 9 : contributions of partners to elements of the Armentières project

### 2.3 Indicators related to policy, organisational and institutional structure

As detailed previously, the lack of indicators has been identified as an improvement to be achieved in the new Local Transport Plan (PDU). The need to assess the success of this interface has appeared as a strategic issue for policy making.

The main indicator of the functioning of the exchange pole is the “percentage of intermodal versus unimodal chains door-to-door”. Nevertheless such an indicator is missing due to the lack of intermodal surveys at the station site. The next PDU will hopefully cover this shortcoming through the setting up of an observatory of the mobility on the territory of the LMCU.

### 3 Outputs and level of service

**Aim:** In this chapter we should describe specific interface aspects of the terminal such as how information provision is organised and to what extent and in which format information is given to passengers (for passenger terminals).

#### **Description of data collection from deliverable 5.1:**

Level of service aspects represent the product that is offered to the customers of a service or of an interchange of terminal. It is necessary to capture level of service aspects even though the project is more focused towards decision/making. There are different ways to measure “success” of a long/short-distance interface, but one of them certainly is the level of service delivered. If we could be able to relate level of service to aspects of planning, policy or institutional structure we would be able to draw some very interesting conclusions.

Important level of service aspects as represented by CLOSER core indicators include interchange time, punctuality, ticket integration, and losses and damages in freight transport terminals.

**Support from questions 20 A-C, 26- 29 for passenger terminals and question 30 – 36 for freight of Annex A.**

#### **3.1 *Interface and interconnection, related services***

The ticket integration is currently ingoing in the Armentières case with the introductions in the coming month (in the autumn 2012) of a “smart card” for metropolitan and regional travellers. This card called “pass-pass” should represent a very strong benefit for users by smoothing the travel experience, and for the transport operators by allowing for a better monitoring of the uses.

The information is provided to passengers through various forms:

- Human presence at the railway station desk
- Paper timetables on the wall of the bus terminal and train station
- Leaflet paper timetables for buses and trains available in the train station
- Dynamic information for buses and trains
- Multimodal route planner machine available at the train station

This forms the classical range of information supports. The innovative parts are constituted of the multimodal route planner machine and the dynamic bus information system located in the parvis area.

The interconnection between short and long distance is mainly achieved through the legibility of space and functions of the terminal area.



Figure 10 : the legibility of space and functions in the Armentières project (photo L'Hostis-Belibi)

### **3.2 Productivity and effectiveness in terminal**

### **3.3 Level of service offered**

Indicators C20-C30 (relevant indicators are specified in part I of Annex A)

### **3.4 Indicators related to performance and level of service**

Indicators C7-C10 (relevant indicators are specified in part I of Annex A)



## 4 Analysis of policy recommendation

PAG recommendation	What is the current situation?	is the recommendation important?
<b>Policy recommendations</b>		
Integrate the administration of the public transport system		Not relevant because spatial scales and the transport modes associated are different
Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform		Irrelevant in case of train and bus articulation
Policy and legal frameworks should facilitate intermodal cooperation	A policy exists in favour of the development of interchange poles	The Armentières case does not show a need for more formalism in the framework
<b>Planning recommendations</b>		
Incorporate the transport planning process with land-use planning	Local transport Plan (PDU) is part of the general metropolitan planning (SCOT) and similarly Regional Transport Plan is part of the Regional Plan	The improvements are not necessary in the planning definition, it is in the implementation phase that things can sometimes not happen as foreseen
<b>Financing recommendations</b>		
Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues	A PPP approach has been developed by the Metropolitan Body (LMCU) for housing and commercial development on land next to the station area	More adapted to the urban development around the exchange pole
Integrate the pricing of the public transport system	Public Transport in France is only partially funded by the users; public subsidies	

PAG recommendation	What is the current situation?	is the recommendation important?
are considered necessary		
<b>Organizational recommendations</b>		
Use of business models for cooperation that also publically owned terminals can use		
Structure the information provision	The Region has sometimes difficulties to obtain data and information from SNCF	This recommendation is in line with the good practices
<b>Infrastructure development recommendations</b>		
Constitute transport infrastructure management body for all modes	Infrastructure management is separated for each mode (train, bus, etc.)	Does not seem relevant
Adopt or create standards for physical infrastructure interconnectivity	Modes are separated, train and bus, so there is no need for this (things would be different in case of a tram-train project)	Not applicable
<b>Operations recommendations</b>		
Separate the owner from the operator	Rail: yes Bus: no	Rail: the separation is not very relevant concerning regional rail  Bus: not applicable
Establish the cooperative framework between the terminal and the transportation operators		Not applicable
Integrate the operations of the public transport interchanges	Operations of the interchange is separated by modes: train and bus	Problems remain, but it does not seem necessary to have one single operator to overcome the current

PAG recommendation	What is the current situation?	is the recommendation important? difficulties
--------------------	--------------------------------	--

The problems that remain concerns diverging objectives between stakeholders. Local stakeholders, the metropolis and the region, support the development of exchange poles but the national railway operator, SNCF, do not share this objective.

The general context of the devolution has created a specific framework linking the Region, the Département and the metropolis in a common objective of articulating their respective transport networks. These actors share a common objective of public interest and have no obligation to make some profit. In contrast the SNCF has national objectives fixed by the state and has to make some benefits.

The conflict between the two categories of actors arise when some land belonging to the SNCF are envisaged for the creation of an exchange pole. The SNCF is incited obtain the most profit from its property by selling it at a market price for housing or other activities instead of selling it for free for an exchange pole project.

This poses a real problem to the metropolitan authority (LMCU) which in general is not proprietary of the land around stations. To deal with this issue it is necessary to support a long term strategy for controlling the land. The metropolis can then buy the land or make it buy by a land management public organism long time in advance in order to gain control over land.

According to the metropolis, the integration of the operations of the public transport interchanges could provide two advantages:

1. time saving because action is facilitated because done in a project approach at the national scale; responsibilities and competencies of all actors are more legible; less transaction costs (less need for contracts and documents)
2. the existence of tools for land management at the national level

## 5 Analysis of gaps

### 5.1 Wasted timed

The physical links between transport modes is of high quality.

The distances are short (about 100 meters between bus and train), the sign system is modernized and of relatively good quality.

The project has been organized to deal with these issues through a very high legibility of space and functions around the “parvis”.

### 5.2 Poor information

There is a multimodal planer and information station inside the train station.

The main gap is the missing dynamic bus information inside the railway station, which obliges train users to move out of the station and into the bus area to obtain dynamic information about buses.



Figure 11 : a dynamic real time information for buses coupled with high quality signaling on the parvis at Armentières exchange pole (photo L'Hostis-Belibi)

There is ticket integration but it is not complete. Monthly tickets can be used for train or urban transport, but there no intermodal single-journey ticket. There is an ongoing project of “smart card” for using all transport modes (regional train and urban transport) but not in operation at the date of the report (May 2012).

Last mile corresponds to the bus in Armentières. There is a very good legibility of space when getting out of the railway station: buses are directly visible on the right of the

stations. But there is poor information about buses inside the stations (paper timetables for buses available and intermodal journey planner). The train ticket desk does not sell urban tickets and does not provide accurate information.

The railway station is equipped with a device for computing multimodal planning.

### 5.3 *Poor quality*

In the railway station there is a convenience shop (tobacco, newspapers, sandwiches). There is a lack of shops around the station. The area is under revitalization, one can expect in the future some installation of shops.

There is an absence of multilingual information.

There is some permanent staff dedicated for assistance and security; Armentières is a good practice example in this domain.

The delays level is reasonable.



Figure 12 : Armentières bus terminal, an aesthetic design with functional shortcomings (photo L'Hostis-Belibi)

The design of the bus terminal is of good aesthetic quality as shows the previous picture: the architecture has been classified for its architectural quality. Nevertheless its function of shelter for travellers is not optimal. The roof is too high to protect from wind and rain. This height has been chosen to avoid accumulation exhaust of gases of buses for not to inconvenience users.

## 6 Emerging mobility schemes and future changes

### 6.1 Emerging mobility schemes

### 6.2 Enhanced bicycle usage

The exchange pole is equipped with a parking for bikes. One open parking of 50 slots and one closed with about 30 slots with human security.

Trains can accommodate bicycles. The stairs for access to the platform are equipped with devices for bikes on the side of the stairs.



Figure 13 : bicycle rail on the side of the stairs to the platform in Armentières (photo L'Hostis-Belibi)

### 6.3 Simplifying the payment

The railway station is equipped with computer service for tickets: three machines for regional tickets and one machine for national tickets. No machine in the bus terminal; tickets have to be purchased to the bus drivers.

No registration device (not relevant)

No ticket control for e-tickets running for the time being. The station is equipped with terminals that are foreseen to be functional in a few month time.



Figure 14 : smart card terminal for validation of tickets in Armentières railway station (photo L'Hostis-Belibi)

## 6.4 Real time information

There is no scheduling of route based on real-time data. The route planner present in the railway station only uses theoretical schedules.

Regarding real-time information the systems are running in parallel without real interconnection. There is real-time information for trains inside the railway station, on the railway platforms and on the parvis outside the station. And there is a real-time information system in the bus terminal. But they are:

- physically separated: about 50 meters between the real-time info system on the parvis and the one inside the railway station, and the spaces are different, in and out of the station; in addition a traveller located inside the station cannot see the bus information system and vice versa, he or she needs to get out of the station to access the information; there is some information about buses inside the station but not real-time, under the form of leaflets of timetables.
- not sharing information: each system displays information of its own network and not the other networks

## 6.5 Cooperation of transport operators

The Armentières bus station is a shared terminal because it is operated by one single transport operator and is served by several transport operators.

Coordination of schedule is done with buses timetable relatively adapted to train. As developed earlier in the report the interviewees have explained that the involvement

of the transport authorities in the terminal project has incited them to negotiate adapted schedules with their respective transport operators.

## **6.6 Individual access and egress**

A fence has been installed on the first platform of the railway station to prevent users to walk on the tracks and to force them to use the underground tunnel.

There are reasonable quality bicycle lanes for access to the station.



*Figure 15 : the axis between the station and the city core, favoring public transport and slow modes (photo L'Hostis-Belibi)*

The urban modernization of public spaces around the station is noticeable and particularly between the station and the city core.

## **6.7 Electro mobility**

There is no electro mobility system for the time being.

There is no project of electro-mobility for private cars at the exchange pole.

## **6.8 Future perspectives**

The 450 slots car parking is full on weekdays. A survey from may 2012 showed that the car park is full at 90 %, which constitutes, for the metropolis authority, an indicator of the success of the exchange pole. To such extent that drivers have to park on the surroundings and particularly on a free land beyond the car park. It exists a project to expand the car park on this piece of land that belongs to the metropolis.



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For the time being the car park is free. There is a project by LMCU to ask for a fee at the entrance.

The management of the car park could be given to a private operator.

A gap still exists concerning ticketing of buses inside the railway. A perspective could be to make it possible to buy a bus ticket at the railway station desk, which is not the case today.

## 7 Policy goals

Policy goals	Comment on achievement
<b>Developing and deploying new and sustainable fuels and propulsion systems</b>	
1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030	All the project, improving public transport and bicycle can be considered as contributing to this objective
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>	
5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	The project contributes to a better intermodal experience, hence contributes to the implementation of the wide European network
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	Not directly contributes to this goal
10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	Does not contribute to these goals

## 8 Concluding remarks

### 8.1 *Main conclusions*

Armentières is an urban terminal located only 800 meters away from the city core. This will e.g. increase the importance of the planning phase and preparation for future development if the terminal ever experiences capacity problems. Armentières is also a relatively small terminal. There are only 4,600 passengers per day. This makes walking distances short, and it is easy to get an overview of the terminal.

There are some negotiations with the transport operators to coordinate schedules. This is partly explained by the fact that all transport authorities involved have invested in the terminal. Thus, they are all working for making the terminal to be functional in order to valorise their investment.

There were some challenges connected to make SNCF sell its land for construction projects. The Armentières project was to be built on a piece of land belonging to SNCF, but no budget was foreseen by local and regional actors for buying the land. SNCF was not initially willing to make its land available. Only a high level agreement, made possible by political interventions, has been able to unblock the situation. The SNCF has currently no concurrence in the bidding for operating the regional railway services but this situation may evolve in the future. It is probable that this argument has played a role in convincing the company to accept to contribute to the project by giving away land.

The main gaps were related to “poor information” and “poor quality”. E.g. the ticket integration is not complete and there is missing information about buses inside the train station.

### 8.2 *Good practices*

Armentières is a true multimodal interface with the co-presence of rail, buses, bicycles and private cars.

Legibility of space and functions is very good. Urban and multimodal signaling are very successful. The ground materials are particularly adapted. The whole interface is a piece of urban public space, around the pedestrianised parvis, well articulated with the city.



*Figure 16 : quality in the ground materials and signalling in the Armentières interchange (photo L'Hostis-Belibi)*

The surroundings are designed and implemented with coherent approach.

For the metropolis authority the project of the exchange pole is concomitant with the realisation of the whole station area and of the rehabilitation and restructuring of the centre town of Armentières. The whole project was designed and discussed with inhabitants and local partners.



*Figure 17 : the parvis of Armentières railway station, the legibility of space and functions (photo L'Hostis-Belibi)*

In terms of planning, there is a positive dynamic of the two main stakeholders, the region and the metropolis, creating a synergy around this interface.

The coordination of timetables can be seen as a consequence of the fact that all the transport authorities have been involved in the project. This initial investment has fed a willingness to make it a success by adapting schedules through negotiations with the transport operators.

### **8.3 *Bad practices***

A gap is the missing real-time information on buses inside the railway station.

There is a lack of indicators to assess the success of the interchange, particularly in terms of intermodal behavior. Nevertheless the new PDU (Local Transport Plan) foresees the setting up of a mobility observatory aimed at assessing the efficiency of the measures.

### **8.4 *Suggested improvements?***

We propose to introduce real-time information on buses inside the railway station.

In the case à Armentières, there has been no substantial modification in the project between what was initially foreseen and what has been implemented. The back-casting analysis of the project reveals that the key element that could have generated whether a major delay or a substantial modification of the project is the eventual presence of an element of railway related communication or energy networks on the land foreseen to implement the project.

All the project leaders of the planning of an interface around a railway station should have in mind this information. There should be some flexibility in the first phases of the project so that such a risk could be accommodated (by extra funds or by re-arranging the project) without to put the whole project in danger.

A major improvement would allow for full disabled access to the platforms. It would involve building elevators and enlarging the underground passage. The current situation implies that the disabled persons call the station the day before their travel to get personnel assistance.



*Figure 18 : fences on platform 1 at Armentières railway station (photo L'Hostis-Belibi)*

According to the metropolis actor, the key issue is the control over land property.

Evaluation of PAG recommendations: see table



Connecting LOnG and Short-distance networks for Efficient  
tRansport

## Reporting template for case studies

<b>Name of case study:</b>	Oslo bus terminal Vaterland
<b>Author( s)</b>	Petter Christiansen, Jardar Andersen, Olav Eidhammer, Bjørn Gjerde Johansen
<b>Date:</b>	05072012

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# 1 Data collection process

The data collection process has been supported by several sources. First we have gathered information through reading reports and available literature. This includes the annual reports for Vaterland bus terminal, which gives detail about the financial situation. Second we have conducted two interviews with Knut Bergersen in Akershus public transport terminals and Tom Granquist in Akershus county. Moreover we have interviewed Lars Erik Nybø in the Norwegian Rail Administration, Halvor Jutulstad from Ruter and Tor Saghaug from ROM Eiendom. It has been necessary to have a broad set of data sources in order to describe and analyse the terminal and processes adequately.

## 2 Terminal overview

### 2.1 Background

#### 2.1.1 History and historic development

Vaterland bus terminal opened in 1987 and is the largest bus junction in Norway. The designers of the terminal wanted to construct a building which functioned both as a bus terminal, but also as a building for shopping and business. Today, Akershus county council is located at the terminal, but there are few shopping facilities.

The main aim was to regulate and operate regional traffic, and, if there were enough capacity, include also coaches and airport express. In 2012, both coaches and airport express buses constitute a considerable proportion of traffic in the terminal. Moreover, the terminal aimed to provide good conditions for travellers, and offer drivers improved facilities.

The terminal was originally planned for 450 daily departures and accommodate up to 6000 passengers each day. However, increased demand made it necessary to accommodate twice as much. In 2011 about 1100 buses departure daily and about 27 000 travellers pass the terminal on an average day. Total number of passengers and buses has consequently increased between 240 and 400 %. This was possible due to e.g. shorter slots for buses and pre-payment of tickets which facilitated shorter slot times. The capacity is however about to be reached and there is little room for further expansion in daily departures or passengers without new infrastructure.

### 2.2 Location and area

The bus terminal is located in the centre of Oslo with close connection to rail, tram, metro, local buses and taxies. Picture 1 below illustrates its central location. There are short distances to other transport modes, which facilitates easy transfer for e.g. commuters. There is also walking distance to the main shopping and culture district in Oslo, as well as businesses are located nearby. A large new housing and business district is planned behind the new opera building (the white building in picture 1).



## 2.3 Passenger profile

Vaterland bus terminal is a major transport junction for both local and regional traffic. The majority share (approximately 60 %) of buses is constituted by buses operated by Ruter, which plans, coordinates, orders and markets public transport in Oslo and Akershus. In other words 60 % of total traffic is from areas that can be characterized as the greater Oslo region and involves the major surrounding commuting areas into Oslo. Domestic coaches amount to about 30 %, while international coaches and airport express make 10 % of total traffic (Ruter report 2010). There are some variations in traffic over the week days and during the day. It is usually Fridays that have the most departures and it is most busy between 15.30 and 1630 (ibid).

Measured in the number of passenger this adds up to about 27000 daily travelers. However, it is necessary to study this number in relation to other transport modes in order to understand its relative position to short and long distances transport. In 2005, about 63 000 travelers travelled to Oslo central rail station. A large proportion of these are long-distance journeys outside Oslo and Akershus. 56 000 traveled to the metro station (Civitas 2006). In addition, there are local buses and trams which transported about 50 000 passengers. Metro, local buses and tram carry mostly short-distance trips.

In other words, bus transport is of major importance for travellers for both within and outside of the Oslo region, and the traffic has grown substantially since 2000. This is partly due to changes in the Norwegian coach regulations for long distances. The industry has grown rapidly following the deregulation around 2003 (Aarhaug et al 2011), which in turn reflects increased demand on the Vaterland terminal. In 2028 it is expected that the number of travelers will expand to about 35000- 40000 for the bus terminal.

An important part of the terminals performance is linked to the intermodality and the modal share of transport. There has not been conducted many studies which document such aspects, but a travel survey was carried out in 2003 (Scandiaconsult 2003). According to this survey about 32 % walked to the terminal, 3 % drove car and 2 % were car passengers. About 61 % came to the terminal by public transport. For environmental purposes the share of people driving by car should be as low as possible and car trips are only marginally used as feed transport. Moreover, the mode of transport illustrates the terminals close connection with public transport and reveals

its role as a interchange terminal and close connection to rail, metro, local buses and tram. Almost half of the passengers were commuting and about 46 % use the terminal regularly (ibid). We could also take a look at the end destination for people travelling from Vaterland. About 47 % were travelling to Akershus and 12 % to Oslo. Consequently 41 % had a destination outside Oslo and Akershus. International trips have a marginal position with only 5 % (ibid). This may have changed due to an increase in the coach market since 2003.

In total, the passenger profile illustrates that Vaterland is a vital part of the regions transport system and has a close connection towards other modes of public transport. There are mainly two explanations behind the low car share to the station. First, many commute to the region. Second, the public transport system is of good quality and the facilities for parking and driving are low.

## 2.4 Terminal properties

Location and accessibility are essential aspects for describing the terminals profile. Distances from highway network and distance from city centres illustrate important characteristics affecting the attractiveness and performance of transport chains. However, also the space and capacity concept is necessary describing the physical space characteristics of terminals. In this section we seek to describe these aspects.

### 2.4.1 Saturation ratio and expandability

We have explained earlier that the terminal accommodates over 200 % more buses than originally intended and that there has been a great increase in the number of passengers. Thus, it has been necessary to implement measures which increase efficiency. However, there is little room for further capacity without investments in new infrastructure. In addition the Oslo region faces a large increase in population which will put extra pressure on public transport. Currently there is a discussion whether expanding the terminal or re-locating it above the railways on Oslo central station, but there are no solution to this question in the near future. The terminal needs about 45 platforms. In 2012 there are about 29 platforms.

### 2.4.2 Distances

Vaterland bus terminal is located in the city centre and passengers needs only to take a short walk in order to visit the core junction in Oslo. Picture 2 shows the centre of Oslo city and the red marker is Vaterland bus terminal. The orange lines on the map are the highways in and out of the city, which is located under than 1 kilometer from the terminal. The yellow lines are the main roads for travels in the Oslo and Akershus region.



Picture 2. Map over Oslo

It is not possible to extract the main average walking distances from entrance to gate, since it will vary depending on passengers arriving by train, bus, metro, tram or walking. On the other hand it is not necessary to divide the walking distances between transport modes. At large, there are only a couple of minutes of transfer for any transport mode. Picture 2 and 3 is meant to illustrate the average walking distance from entrance to platforms. Passengers arriving by train have to walk across the bridge in order to reach the bus terminal. The terminal building it selves are about 100 meters in length.



### 3 Planning, ownership and organisation

#### Organisation and ownership, operations

Long and short distance transportation performance is directly linked to policy, planning and regulations. WP4 highlighted that the various institutional settings, regulations and responsibilities is important when it comes to the interconnection of short and long distance transport. We will therefore describe the ownership structure, regulatory framework and planning and operation processes.

##### 3.1.1 Ownership structure

Vaterland bus terminal AS was established in 1986 and the purpose is to own and manage the bus terminal, as well as other linked activities on the terminal. There have

been some changes in the ownership structure. Originally the ownership structure of Vaterland bus terminals was divided between four stakeholders. Akershus county was the largest share owner and owned 62 %. Oslo municipality was the second largest owner with 26 %, while SAS and Rutebil Holding AS owned 8 % and 4 %. Later, Akershus county purchased SAS and Rutebil Holding's shares and currently own 78,5 % of the terminal. Consequently they now only have two owners. Back in 1986 it was Akershus county who financed the infrastructure, while Oslo municipality contributed with the site. Oslo municipality has no other responsibilities when it comes to finance or operation of the terminal. The infrastructure investments for the terminal amounted to 110 million NOK.

However, Vaterland bus terminal have no employees. The terminal, though, has a administrative board consisting of three members from Akershus county and two from Oslo municipality. The board is among others responsible for developing each year's budget. Vaterland bus terminal has no employees since the administration and management of the terminal is delegated to Akershus public transport terminal (APT). This is a fully owned enterprise by Akershus county. Their purpose is to manage, operate and maintain the county bus terminals and park-and-ride facilities. The company is the county agency expertise in matters of planning, construction and operation of public transport terminals and contribute to safeguard the county's obligations under the transport legislation with regard to maintenance of infrastructure for public bus transportation. It is therefore Akershus county, through APT, which has the responsibility connected to management. The managing director of APT is also a secretary for Vaterland bus terminal and ensures the daily administration and management of the terminal.

There have also been some changes in management structure over the years. In 1999 the county council decided to establish Akershus public transport terminals in order to secure a safe management of the terminals. The county council also decided to tender the manpower and management. However, this created challenges connected to changes in the national regulations of VAT and the tendering practise was closed.

According to the management directors of Vaterland, the current model is well-functioning, at least from a pragmatic viewpoint. One main advantage is that multiple owners reduce economic risk. Thus, there can be some positive effects of having multiple owners from a economic perspective. The interviews draw a somewhat different picture when it comes to administration and management. It is easier to have control with only one owner and it is more difficult to harvest large-scale advantages.

Another important point was also highlighted. It is necessary that regional public authorities own the terminal in order to secure effective and accountable competition. Transferring ownership to a private company can lead to negative effects. The current system is open and transparent, which foster trust among actors. One example is when it comes to allocating licenses for buses trafficking into the terminal. This is awarded by public authorities. Vaterland bus terminal then gives a statement and recommendation to the authorities. For instance they can report that there are no free slots between 1600-1700 hours and consequently do not recommend any new departures during that time frame. Current practise has shown that authorities listen to the terminals

statement and gives no licenses during hours which already are full and sets requirements that bus lines have to operate on hours which have free capacity.

### **3.1.2 Regulatory framework**

The number of actors involved in development of the largest transport junctions can be large. Road, rail, public transport operators, infra structure managers, municipalities, counties and national authorities are example of some the instances involved. In addition there might be commuters, neighbours or interest groups which participate in the decision making process.

It is necessary that actors have an overall perspective of the development of a transport junction. Some of the participants may delay, counter or veto a certain development. Even when there is agreement, the number of actors and perspectives call for a complicated process (Pressman and Wildavsky 1973). This highlights the importance of promoting coordination and productive interaction between participants. Vaterland bus terminal is dependent on a range of other actors which directly or indirectly affect its performance. However, there are no regulatory requirements for cooperation. State regulations could arrange for formalized cooperation which makes it mandatory to participate and which function as an arena for early discussions.

Such processes can facilitate progress by exploring and take advantage of opportunities (Kasa et al 2011), promote improved understanding between actors, share information, practices, etc. This can be an effective strategy to manage complex development.

### **3.1.3 Planning and operation/construction process(es)**

Long and short distance transportation performance is closely connected to the planning and construction process(es). Oslo region expects increased demand on public transport the next 20 years and in such a long term perspective it is necessary to expand or build a new bus terminal. Consequently there has been published several reports which investigate these matters and there has been political discussions for development of a new terminal. There have been several possible suggestions for a new site. However, a majority of the actors wants to build a new terminal above the rail tracks at Oslo rail station and, thus, possible foster shorter distances and better coordination between short and long transport.

#### **3.1.3.1 Process for the development of Oslo central station**

The ongoing process for a possible new terminal might illustrate and highlight several organizational aspects which are important when it comes to integrate short and long transport. Consequently we will explain the process into further detail in order to better analyze barriers and good practises.

There has for several years been a discussion of building a new terminal. However, it was around 2005 the actors' concrete caught interest in developing a new terminal at Oslo central station. Originally it was at least two parallel processes investigating development of the central station and possible relocation of the bus terminal.

### **3.1.3.1.1 The first process**

The first process involved Ruter which signaled to Oslo municipality that the area around Oslo central station seemed interesting for developing a new terminal. This was partly due to the facts that the building owned by KLP was seen as an interesting location for building a new terminal. Previously the building was owned by Norwegian Mail, but was sold to KLP. In the end, KLP did not have any interest in locating a bus terminal in the building. Oslo municipality and Akershus county then commissioned Ruter to analyze the structural possibilities for the area. They concluded that the best solution was to transport passengers to the centre areas of Oslo. The next step was to investigate possible locations. A second review was commissioned which stated that a terminal above the rail tracks was considered as the most favourable development. The report looked at several possible developments around Oslo central station and this investigation involved the Norwegian National Rail Administration (NRA) in the process. However NRA wanted to limit development to the area east of Nylandsveien. In the end the report concluded that that the area west for Nylandsveien (and closer to the central station) would be the best solution for travellers.



A third review was commissioned which directly investigated development of the area west for Nylandsveien. The Norwegian National Rail Administration participated in the process, but they were against the projects as a whole. The review had a broad perspective and studied the area in an integrated view. The conclusion was that the best development would be the area west for Oslo central station.

### **3.1.3.1.2 The second process**

In 2005 another partial parallel process was also initiated between ROM Eiendom AS, NRA and the airport express train. ROM was established in 2001 and is a wholly owned subsidiary of NSB AS (state-owned monopolist rail passenger transport



company ). Their core activities are interchangeable hubs development, property development, railway station development and property ownership, management, operation and maintenance. ROM owns about 1000 properties often located in central areas connected to rail lines.

ROM, NRA and the airport express train had a common project which studied Oslo central station as a public transport junction. This was partly due to the fact that the actors acknowledged that there were challenges connected to e.g. capacity and accessible transport. The project had three main goals:

1. To develop an accessible and dense transport junction
2. Offer good services
3. Effective land use.

The project invited architect competitions as well as arranging internal and external seminars. The commission evaluating the architect proposals consisted of members from the agency for planning and building, NRA and independent architects.

By April 2010 a sketch for the area was finished, and one of the architects' suggested developing the bus terminal in relation to Oslo central station. At this point Ruter already had concluded that it was possible to build a new bus terminal above the rail tracks. ROM thought that such a development would be interesting, but they did not have the mandate or responsibility for leading such a process. ROM then took initiative to gather actors to study the future development of Oslo central station and the possible relocation of Oslo bus terminal. The next step involved a broad set of actors which agreed to discuss future development. The National Rail Administration, the Norwegian Road Administration (NRA), Oslo planning and building agency and Ruter was the main actors and Ruter lead the process.

However, parallel to this process, Oslo municipality stated that it should be an area development plan for Oslo central station. This was considered necessary in order to secure a coherent development since other actors also had interests in developing the area around the central station. A report from Oslo planning and building agency concluded that a new bus terminal should be located above the rail tracks.

### **3.1.3.1.3 Results and interests between actors**

There has not been any conclusion on the development of Oslo central station and possible relocating the bus terminal. There is an ongoing process which also analyzes the effects of a possible new terminal above the rail tracks. A new report will be finished around 1. February 2013. Consequently it is too early to conclude on how the area will develop further. The Norwegian Rail Administration has also commissioned own reports for development of Oslo central station.

However, it is of importance to look into further detail about the various interests of the actors involved. This can shed light on important characteristics for connecting short and long transport.

ROM Eiendom AS is, as mentioned earlier, one of the larger property companies in Norway. Their interests are related to developing and manage property, but also development of transport junctions. In other words they have a mandate which is divided between commercial development and developing interconnections for increased use of public transport. Their active role in the above mentioned process indicates that it has been a clear congruent interest between commercial development and development of transport junctions. E.g. they have commissioned own reports about infrastructure development. There are also some indications of ROM, during the last years, have a stronger emphasis on integrating interconnection between short and long transport.

Ruter is also as strongly in favour of relocating a new terminal above the rail tracks. They have an active and leading role in the process by e.g. being responsible for developing several of the reports on the subject. If the authorities approve a new bus terminal, Ruter might apply for developing a zoning plan. In such a process they will invite NRA to participate. NRA then has the possibility to object the zoning plan and the plan is send to the Ministry of Environment which decides to affirm or not affirm the zoning plan. This signalizes that the outcome is still highly uncertain and that the governmental interests in the end are important. Ruter will not have any costs connected to the development of a terminal.

Vaterland bus terminal seems to more expectant for developing a new bus terminal. The bus terminals capacity might be sufficient for the next 5-10 years. However, they have in a public hearing stated that a new bus terminal must be located above the rail tracks. They acknowledge that the authorities have to find a solution for the rail system first. Inter city improvement could strengthen railways market position and consequently reduce the demand for regional buses trafficking to Oslo. Buses could in this perspective operate in areas which is not located close to the train stations. Meanwhile, they have upgraded the terminal. In the meantime Vaterland emphasis that the importance of not allowing for construction in areas which can block future development.

The Norwegian Rail Administration has a more reluctant view for combining a new bus terminal at Oslo central station. First they highlight that NRA has a different time frame than the other actors. Rail has a 10- 40 years perspective. This is a longer perspective compared to other actors, which have a relatively shorter time frame.

Second, and related to the first point, NRA is reluctant to be involved in a development which might reduce their flexibility and block further investments for use of rail. E.g. it is needed to build a new tunnel for trains through Oslo in order to accommodate the increased demand for train in the region. The rail administration argues that there are several possibilities for the design of a new tunnel which also affect e.g. the track structure at the station. The various solutions have implications for the development of the whole central station and NRA states that they have not concluded on how the design of the tunnel shall be. Consequently it is difficult to decide on future development of a possible new bus terminal since they have not concluded on important future solutions. However, some of the other actors state that the design of a new terminal is quite evident and that it still is possible to build a bus terminal.

Third, NRA demands clear solutions for functionality at the terminal. They are uncertain on how pillars at the platforms affect accessibility and occupies space. Moreover the platform use of the terminal is insufficient at the current situation. It is only possible to access the terminals from one entrance. This leads to sub-optimal use of capacity at the platforms. Consequently, rail authority wants to have the flexibility to develop and improve the central station further.

A fourth argument is connected to security. New development shall not lead to increased risks for accidents or terror and it is possible that a new development might increase such risks.

The last point is related to the competition between short and long distance transport and especially between coaches which compete with train passengers. NRA does not necessarily perceive that the best use of the land is to increase competition. The priority should be to make the most attractive terminal for train passengers. Such a view can be linked to NRAs view of questioning the need for a central bus terminal. Another possibility could be to develop a more fine-distributed system for buses, which involve that bus does not need to travel to one central point in the city.

These views illustrate some of the challenges connected to planning and construction processes. Both Oslo municipality, Ruter and Vaterland has been positive to a new terminal, but the rail authorities has been more negative. Thus, the area around Oslo central station has multiple owners and there are various interests for the development of a new transport junction. There are also challenges connected to rail capacity and further investments in rail infrastructure. National authorities want to strengthen the regional rail infrastructure by building double rail tracks to the closest regional centres. Moreover, it is, in a longer time frame, necessary to invest in new tunnels for rail in Oslo. These rail projects could have important consequences for development of the area as a whole and connected to passenger demand and operations at Vaterland bus terminal.

### **3.1.4 Sharing of information**

Information provision for travellers is important when it comes to level of service. Offering real time information about track, departures and lines are necessary for reducing barriers and providing efficient transfers between transport modes. Vaterland bus terminal accommodates buses from local, regional, national and international regions which highlight that such aspects can be an important service for travellers. Especially for long distance travellers it is necessary to get informed about delays and changes in travel time.

Passengers arriving at the terminal have to visit the ticket counter, travel directly to other modes or search for departures on the web. In addition, Vaterland bus terminal does not have any pages on the internet. Passengers have to search directly for travel information at the operator's web-pages.

The information system at the terminal only present time tables connected to buses departing from the terminal. There is no information for passengers transferring to local buses, train, tram or metro. There has been a project aimed at establishing such a

system, but it has halted due to lack of interest from operators. Operators have little interest in providing information about other transport modes and consequently there are separate information system for train, buses at the terminal and public transport for metro and tram. This can be directly linked to competition between modes of transport. Some of the interviews indicate that the rail sector is most reluctant of providing information. Even though they are a national actor and could then have an integrated view on short and long public transport.

Travel information for some public transport is available at internet and at applications for mobiles through "Ruter". However, the information is limited when it comes to mode of transport and geography. The system is commercial which means that operators have to pay for being included in the system. Especially the coach market argues that this it is too costly to participate and therefore the system lacks transport modes and operators. In addition is the travel information limited to the larger Oslo region and does not include other parts of the country.

Another way of organizing travel information could be to have a public organization which is not commercial. Financing can e.g. be national authorities or co-financing by regional authorities. Such a system can secure both that all travel modes are included and that the system covers the whole country.

National authorities currently have a project which intends to establish a national travel database. Involving state authorities might be necessary in order to secure a travel system which includes the whole country and not just restricted to some regions. A national system needs to be based on commercial interest and an important question is related to who should finance the management.

### **3.1.5 Suggested improvements**

There are several possible improvements which can facilitate better integration between short and long transport.

One obvious gap is the information provision connected to offering travel information. Both information system at the terminal and information system by web/mobile can be important services which can ease the transfer between transport modes. One main problem is connected to competition between modes of transport. Currently there are ambitions of improving the situation and there are national projects of developing travel information and integrated ticketing. However, this would not necessarily improve lack of information boards at terminals. Some of the interviews point to the direction that rail authorities should have a broader mandate which is not limited to only rail. An integrated view on short and long transport could improve incentives/responsibilities for e.g. providing information between modes.

Another improvement can be related to having one regional actor which is responsible for developing an integrated perspective for public transport. This could include both bus and train. E.g. counties could be responsible for buying transport services. In this way regional authority can better coordinate transport which takes into account short and long distances and make the public transport system more in line with regional

priorities. A challenge is to take into account that rail often is cross-regional and secure a development coinciding with national interests.

Several of the actors point out the potential for better coordination and earlier discussions of adjoining problems. To some extent there is a fragmented system in the sense that actors only have responsibility for part of the process. This can make it difficult to coordinate and foster good interconnection between short and long transport. In addition, it is often unclear which authority which have responsibilities and consequently there might be a lack of leadership in various processes. Thus, policies can be affected where there is no clear problem owner, or where shared, undefined, unclear, or fragmented organizational responsibilities create barriers for development. One amended strategy can be to put in place strategies that bridge sectors in a coordinated manner. A leading actor can initiate and govern the process, as well as being in charge of developing transport junctions. The counties are perhaps the most natural actor for initiating and leading such processes. They (usually) possess competence and legitimacy, as well as a coherent perspective for integrating short and long transport. Such a strategy can improve coordination and facilitate development in a coherent manner. In the case of Oslo central station, ROM took an (too?) active role in which they did not have sufficient legitimacy or mandate.

According to van Meter and Van Horn (1975) the degree of consensus of goals is important. Implementation will go easier if participants agree about the goals of a project. Several of the actors' emphasis the need for agreeing and sharing on the same goals for transport junction development. It has been especially challenging to foster cooperation due to conflicting interests. This can be partly linked to the fact that the actors don't have visions or mandate for integrating various transport modes. This calls for better understanding and cooperation between authorities and operators. In addition it can be a state responsibility to secure that such views are integrated in organizations which, in fact, are under state responsibility.

Lack of consensus can also be partially linked to a somewhat lack of institutionalisation both between and within organizations. Progress can still fail, even in cases where there is a dedicated part of the organisation in charge of a certain matter. The choice of new infrastructure locations, their physical layout, procurement rules, and operational decisions of an infrastructure manager organisation can make it challenging to promote development within an organization. The Norwegian Rail Administration mentions for instance that there is too little exchange between designers and architects and that it is challenging to analyze issues in a coherent manner. Facilitating policies that are not separate, but part of operational and planning procedures in other parts of the organisation, might be means for securing policy integration. Such aspects are also relevant between organisations. It is important to discuss and bring up adjoining challenges early in a process. An amendment strategy is to have one responsible actor in charge of transport junctions, as well as establish a steering group consisting of members from relevant actors. This can create a new forum for discussing, analyzing and see development in a larger view.

It was mentioned earlier that the actors have different time frames and this can create barriers for cooperation. It is especially the NRA which has a longer perspective. A

systematic problem for NRA is that the Norwegian National Transport Plan, which sets out the main development of transport in Norway, is too unpredictable. This makes it difficult to advance planning and creates uncertainties in processes. A stronger and clearer vision for future planning by the government can be helpful. However, the national government can also push for coordination and cooperation by creating common reviews and finance of such. In 2010 the government earmarked 200 million NOK for a new bus terminal in Oslo.

Introducing economic principles for allocating slots during rush hours can also be a measure used for regulating departures. Theoretically one could expect that the low fare coaches would choose less popular departures and by doing so reducing competition between train and long-distance bus.

### 3.2 Financing

Originally the terminal was financed through loans and there are still about 30 million NOK before the payment is finished. Vaterland has also made investments in order to upgrade and improve facilities at the terminal.

Vaterland gets its financing from various sources. Operating incomes comes from terminal charges and departures charges which are based on slot-times. E.g. longer slot times mean higher charges. Another source of income is rents of buildings. In addition, the terminal has changes its organization from being a private limited company to a county owned company in order to reduce VAT expenses. They have also engaged a consulting company which shall try to find possible fiscal changes.

Vaterland bus terminal points out that it is important to have an organization and a board which is fully committed to financing issues. In addition they have considerable less commercial interest compared to a private company. Their goal is to balance the budget and they don't have to spread profits to shareholders. Such a financing model does not, however, imply that Vaterland or authorities is ignorant about cost-effectiveness. Currently there are discussions about reorganizing management of infrastructure for Oslo municipality and Akershus county and collect all management bodies under the same umbrella. This is an ongoing discussion.

### 3.3 Indicators related to policy, organisational and institutional structure

Vaterland bus terminal does not use indicators in their day to day management. However, they have conducted customer studies in order to measure satisfaction among users.

Deliverable 3.1 provides three indicators for organisational and institutional structure; (i) independence of terminal/interchange management, (ii) fair and equal access and (iii) institutional complexity.

The organisational structure of Vaterland bus terminal is structured to secure independence from transport operators and management. This is regarded as a major strength for the terminal and is partly related to the next indicator. Independence

promotes a fair and transparent access to the terminal which is a prerequisite for a legitimate system. Moreover, Vaterland gives recommendations to authorities when transport operators apply for licences.

The last indicator is related to the number of institutional levels involved in interchange planning/investments. Planning of a new terminal might involve a number of different authorities ranging from rail-, road-, national-, local and regional actors. This is especially the case in Oslo.

## **4 Outputs and level of service**

Levels of service are the products passengers experience when they arrive at the terminal. Important levels of service aspects are related to interchange time, punctuality and ticket integration. Level of service can partly be related to aspects of planning, policy or institutional structure.

### **4.1 Interface and interconnection, related services**

Information provision for passengers is important for offering travelers information connected to e.g. delays and transfer between modes. We have explained earlier that Vaterland only offers information connected to buses and local transport departing at or close to the terminal. There is also a lack of information for passengers arriving at the rail station and transfer to buses at the bus terminal. One main reason for this development is the lack of interest of providing such service between transport operators. A stronger role by national authorities could facilitate improvement in this matter.

Information provision can be a major improvement for passengers travelling by rail or bus. This can especially be the case when one of the transport modes is delayed or not operative. The rail situation in the Oslo region has experienced challenges connected to delays. The last years with e.g. rail is delayed or when in times of delays and

It is also important to note that there is a joint fare system for trains, metro, tram and buses in Oslo and Akershus. This facilitated transfer between short and long transport.

### **4.2 Productivity and effectiveness in terminal**

Productivity and effectiveness is related to the number of passengers and departures. We have explained earlier that the terminal was originally planned for 450 daily departures and accommodate up to 6000 passengers. In 2001 they accommodated around 1100 departures and about 27 000 passengers. Total number of passengers and departures has thus increased between 240 and 400 %. This is partly due to shorter time slots for buses and pre-payment of tickets. In total there are about 9,8 million passengers trafficking at Vaterland bus terminal.

### **4.3 Level of service offered**

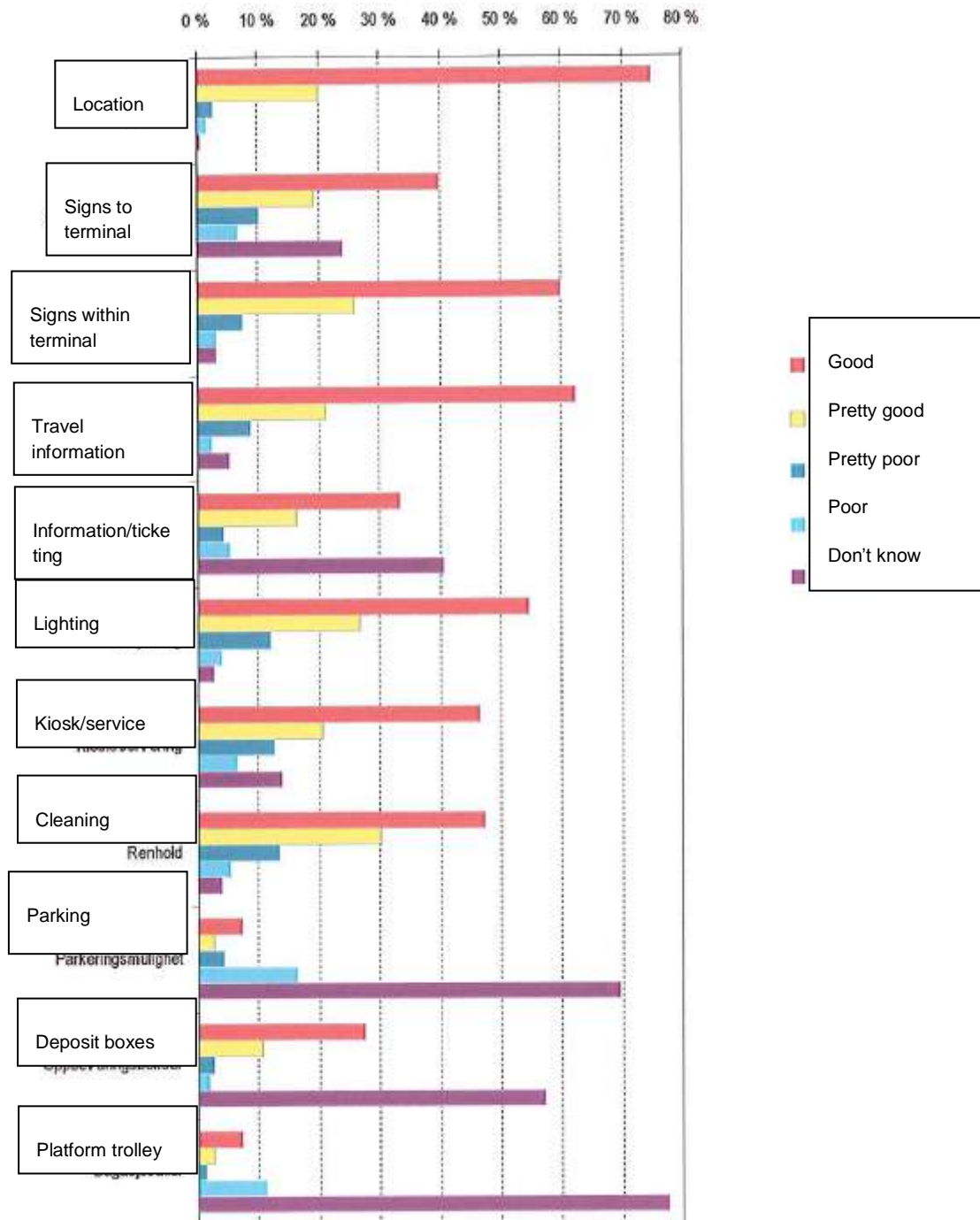
Vaterland bus terminal has not conducted many studies which seek to gather information about passengers experience about the terminals. The last survey was carried out in 2003. The results might not be representative for the current situation due to upgrades of the terminal.

#### **4.3.1 Overall quality**

Anyways the results indicate that passengers are overall quite satisfied with the (use) terminal. Location, signs within terminal and travel information have the highest scores. Not many people use the parking facilities, deposit boxes or platform trolleys. The



passengers were also given the opportunity to suggest measures which would improve the use of the terminal. 18 % answered better signs and information. This was mainly connected to improve longer time frame for travel information, information about incoming buses, information about delays and better capacity at the customer service.



Source: Scandiaconsult 2003:20

### 4.3.2 Ticket integration

There is partial integration of tickets between long and short distance modes. There is a common fare system for travels within Oslo and Akershus. There is not any

integration for longer travels. This is mainly a national responsibility and the government has been working on the matter for some years.

### 4.3.3 Information integration

There is no common information for long and short distance modes. Passengers arriving at the bus terminal do not get information about departing trains and the same situation is for passengers arriving by train. At Oslo bus terminal it is however possible to get travel information for local trips (?).

### 4.3.4 Average interchange time, variability of interchange time, punctuality, non-movement factor and interchange injuries

It has not been possible to extract data on these matters. Regarding punctuality, the bus terminal operates with an incentive system which punishes buses which exceeds their slot time and this can lead to better punctuality at the terminal.

## 4.4 Indicators related to performance and level of service

Employee productivity relates terminal throughput to staff. It also gives details about flows (number of passengers per year). In 2010, according to Vaterland annual report, the terminal had 9.818.500 passengers. According Akershus Public Terminals there were about 19,1 man year working at the terminal. In other words there are 514057 passengers per employee. However, it is necessary to point out that some services are tendered and that the passenger flow is calculated. Thus, it is important to be cautious when interpreting the results.

## 5 Analysis of policy recommendation

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
<b>Policy recommendations</b>	
Integrate the administration of the public transport system	Ruter plans, coordinates, orders and markets public transport (except train) in Oslo and Akershus. By including train Ruter could improve coordination between transport modes. Moreover, there is no clear authority which is responsible for transport junction development. Making counties responsible could facilitate better integration between short and long transport.
Harmonize modal focused legislation and regulation as the first step before	

<b>PAG recommendation</b>	<b>What is the current situation and is the recommendation important? If so, how?</b>
integration to a multimodal platform	
Policy and legal frameworks should facilitate intermodal cooperation	Authorities and other actors are working on providing systems for ticketing and passengers information. Standards for intermodal connection (e.g. information provision) could improve and facilitate passenger transport.
<b>Planning recommendations</b>	
Incorporate the transport planning process with land-use planning	Transport planning and land-use planning is incorporated.
<b>Financing recommendations</b>	
Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues	
Integrate the pricing of the public transport system	Authorities and other actors are working to establish a system for integrating pricing of the public transport system. This is regarded as important by national authorities for offering a better service for passengers. In Oslo and Akershus it is to some extent possible to use the same ticket between different modes.
<b>Organizational recommendations</b>	
Use of business models for cooperation that also publically owned terminals can use	
Structure the information provision	There are several actors which provide travel planning information. It can be necessary that public authorities(,in cooperation with private companies), are in charge of the system. In the current system some of the operators are not willing to pay for being a part of the service.
<b>Infrastructure development recommendations</b>	
Constitute transport infrastructure	Infrastructure management is separated

<b>PAG recommendation</b>	<b>What is the current situation and is the recommendation important? If so, how?</b>
management body for all modes	between several authorities and companies. E.g. Rom (a wholly owned subsidiary of NSB AS which is the state-owned monopolist rail passenger transport company) has responsibilities for property development of transport junctions. Some of the interviews point to the direction that there the role division is not adequate.
Adopt or create standards for physical infrastructure interconnectivity	
<b>Operations recommendations</b>	
Separate the owner from the operator	Ownership and operators are separated.
Establish the cooperative framework between the terminal and the transportation operators	
Integrate the operations of the public transport interchanges	

## 6 Analysis of gaps

### 6.1 Wasted time

Poor links between transport modes and long walking distances between modes of transport are two important factors contributing to facilitating interchange between long and short distance transport. Vaterland bus terminal has a central location connected to rail, tram, metro, bus and taxi. The longest walking distance is between the bus and rail station. A possible new terminal above the rail tracks can further decrease walking distances and improve links between transport modes. However, there are few gaps related to wasted time for Vaterland.

### 6.2 Poor information

There are more challenges connected to providing information. We have explained earlier that some operators are unwilling to provide travel information between modes of transport. Moreover there are national projects aiming at developing a national system for travel information, travel planners and eTicketing (also including mobile phones). It is for instance possible to buy train tickets by mobile phones. The system is operated by NSB and it has just included local public transport trips within Oslo and Akershus. Ruter is also developing their own application for mobile ticketing.

Oslo and Akershus changed the fare system for public transport in 2011. Previously there were 88 different zones in the region. In 2011 the number was reduced to three zones. The changes were also invoked by NSB. Thereby the fare system includes all form of public transport and significantly simplifies the fare system.

## 7 Emerging mobility schemes and future changes

### 7.1 Emerging mobility schemes

About 4 % of all journeys in Oslo urban area are done by cycling and at a general level there are insufficient parking facilities for cycling at terminals. TOI has mapped cycling facilities related to rail stations in some parts of Norway and there is a great potential for improvement when it comes to more and safe bicycle stands.

Simplifying the payment by offering computer equipment for payment services, hardware for registration in terminal and ticket control mechanisms for eTickets are aspects which are not yet sufficiently developed at the terminal. However, for travels within Oslo and Akershus it is developed a system for computer payment services, hardware for registration and ticket control mechanisms.

Real time information boards in terminals and scheduling of routes on base of real time data is limited to (have to check the sit at the terminal).

Cooperation of transport operators relate to shared terminals and coordination of schedules. According to our knowledge there is little coordination of schedules between transport modes. Tram, metro and local buses have such a high frequency that it is not that necessary to coordinate schedules for more regional travels.

Individual access and egress are linked to sufficient, safe and affordable parking areas and release of barriers for private access/egress. Parking facilities includes a car park which costs 240 NOK each day or 30 NOK per hour.

### 7.2 Future perspectives

There will indeed be a lot of future changes, but they are highly uncertain. The bus terminal will have to be moved due to soon-to-come capacity problems. The new location is suggested to be above the Oslo railway station, but the parts have not come to an agreement yet. There are also continuous work on establishing real time information and eTicket mechanisms by public authorities and private actors.

## 8 Policy goals

Policy goals	Comment on achievement
<b>Developing and deploying new and sustainable fuels and propulsion systems</b>	
1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030	By 2030 the City of Oslo aims to have reduced its greenhouse gas emissions by 50%, compared to 1991 levels. The key steps for achieving this target are linked to the phasing out of oil-fired heating and reducing emissions from road transport. All use of fossil fuels for central heating is being phased out and by 2020 there should be zero emissions from heating of buildings.
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>	
3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050	Not relevant
5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	Not relevant for the terminal
6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.	Not relevant
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	National authorities are developing a system for multimodal transport information, management and payment system.
10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	Not relevant for the terminal

## 9 Concluding remarks

The case study makes it possible to describe good and bad practises and special particularities for the terminal. Based on the data collection we seek to identify possible improvements at the terminal.

### 9.1 Main conclusions

Vaterland is a pretty well-functioning terminal when it comes to operation and finance. Vaterland is a public owned company and does not need to share profit to

stakeholders. The terminal has been running in profit and there have been several investments for improving facilities at the terminal. In 2010 the terminal was finished with a project which aimed at upgrading worn-down installations, improvement of logistics and establishing new entrances at the terminal.

Operation and management of the terminal is characterized by low levels of conflicts and good cooperation between actors. Pre-payment of tickets and shorter slots for buses has been important measures to enhance efficiency. The capacity might be sufficient for the next 10-15 years, but there is a need for expanding or relocating the terminal. The process has been challenging and there is not yet any decision on future development. The largest gap is the lack of travel information between short and long transport.

## 9.2 Good practices

Vaterland bus terminal is located in the centre of Oslo with short transfer to rail, metro, tram, bus and taxi. This is an important structural factor facilitating easy transfers between short and long transport. Location was also highlighted as the most favorable factor for passengers travelling to the terminal.

The terminal is well-functioning when it comes to finance and operation. The terminal runs with a profit, upgrades have improved logistics and there has been an efficient use of the terminal. Even though the last survey among passengers was conducted in 2003, the conclusion was that passengers were overall quite satisfied with the use of the terminal.

Vaterland is a public company and ownership of the terminal is separated from operation. This can be important to establish trust among actors and secure a fair and equal access to the terminal for operators. Vaterland bus terminal emphasizes their good relationship with authorities. Moreover, their recommendations have up till now always been taken into account.

For environmental purposes the car share for travels to the terminal should be as low as possible. Vaterland has a low car share and it is likely that it is linked to high charges for parking and good connection to public transport modes.

In Oslo and Akershus there have been several improvements for public transport. In 2011 they established a common fare system for travels within Oslo and Akershus. In addition the zone system for ticketing was reduced from 88 zones to 3. It is also possible to buy tickets electronically and by mobile phones.

## 9.3 Bad practices and suggested improvements

Lack of travel information between transport modes might be the most important barrier for good interconnection between short and long transport at terminals. There has been projects aimed at offering travel information between modes, but it has closed due to lack of interest from operators. Operators have little interest in providing information about other transport modes and consequently there are separate information systems for train, coaches, and local public transport. Some of the interviews indicate that,



despite being a national actor, the rail sector is especially reluctant about providing information.

Travel information for some public transport is available at internet and through applications. A main problem is that the system is geographically limited to mainly Oslo and Akershus. In addition, it does not include all public transport. One main reason can be the commercial nature of the system which excludes operators which does not pay for participating. Especially some of the coaches argue that it is too expensive to participate. National authorities have projects which aim at establishing national travel data systems. An important question is to settle financing of management. One suggestion is to offer a public system where counties are responsible for financing.

Lack of having one responsible actor for developing and integrating transport junctions and public transport might be an important barrier. There are a great potential for better coordination and earlier discussions of adjoining problems. At least to some extent there is a fragmented system meaning that actors only have responsibilities for part of the process and have not an interest of developing a public transport system which integrates and coordinates short and long public transport. It is examples of unclear responsibilities and lack of leadership in processes. Barriers for implementation and development can be especial evident in cases where there are no clear owner, or where shared, undefined, unclear or fragmented organizational responsibilities. An amending strategy can be to establish strategies which bridge sectors in a coordinated manner. It might be particularly important to assign a leading actor that can initiate and govern processes. Regional authorities (counties) are perhaps the most suited actors as they possess competence and legitimacy, as well as having a coherent perspective for integration of short and long public transport. Such a strategy can improve coordination and facilitate progress and implementation of measures.

Be short of requirements for analyzing subjects in a coherent manner is also a challenge. Progress can fail when there is too little integration and exchange between various parts of integrations or between two organizations. Facilitating policies which are in part of operational and planning procedures are means for facilitating policy integration. It is important to bring up adjoining problems at an early stage. Having one responsible actor in charge of transport junctions can alter this challenge. Moreover, having a steering group or a forum consisting of members from relevant actors can create an arena for discussing, analyzing and perceive development in a more coherent view.

Another bad practice is related to lack of consensus on goals. Cooperation and implementation can go easier if the participants agree about the direction and goal of a project. It has been especially difficult to foster cooperation in building a new terminal since the actors does not share a vision for integration of various transport modes. It can be a state responsibility to secure that state actors includes a broader perspective on public transport and not just limited to one form for public transport.

Different time frames between actors and unclear national strategy plans can make it challenging to promote cooperation and planning among transport modes. The

Norwegian Rail Administration especially points out that unpredictability in the National Transport Plan creates uncertainties in future planning.

A last point is connected to the nature of politics. Akershus and Oslo is divided into two counties and several municipalities. This creates a political game in which the various political actors are struggling over resources and projects. Professional advice concerning public transport often fell short of being a priority when other political goals are taken into account.



Connecting LOnG and Short-distance networks for Efficient  
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## Reporting template for case studies

<b>Name of case study:</b>	Vuosaari Harbour, Port of Helsinki, Finland
<b>Author( s)</b>	Jenni Eckhardt
<b>Date:</b>	31.8.2012

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# 1 Data collection process

For the data collection, the following persons and organizations were interviewed:

- Jukka Kallio, Port Manager, Vuosaari Harbour, Port of Helsinki
- Arto Satuli, Terminal Manager, PSO, Vuosaari Harbour, Port of Helsinki
- Finnish Customs

In addition, the web pages of the Port of Helsinki, reports, databases and articles were studied in order to obtain supplementary information.

## 2 Terminal overview

The Port of Helsinki is the main hub for global trade in Finland. It also serves small-scale transit traffic from and to Russia and other CIS countries. Vuosaari Harbour is the main freight harbour of the Port of Helsinki and it is specialised in unitized cargo services, i.e. containers, trucks and trailers. The Port of Helsinki serves also roro traffic from West Harbour and South Harbour to Tallinn and Stockholm on passenger ships. Also general cargo and special transportations are served in Vuosaari.

### 2.1 Background

#### 2.1.1 History

Previously, the Port of Helsinki served unitised cargo in West Harbour and South Harbour, which are located in the city centre of Helsinki. The central location caused challenges in logistics such as congestions and lack of space. It was a logical choice to move the freight operations to another location further from the city centre.

There were two potential locations for the harbour: Vuosaari in Eastern Helsinki and Pikkala in Kirkkonummi, which locates over 30 km from Helsinki to the west. It was mainly a political choice to build the new harbour in Vuosaari in order to maintain the harbour in the municipality of Helsinki and not to lose tax revenues to another municipality. Also logistically Vuosaari is better located due to the shorter distance to the main national highways and the main airport of Finland.

There was no harbour at all in Vuosaari previously, thus it was a green field project. The Port of Helsinki was responsible for the project management. The planning of Vuosaari Harbour started the year 2001 and the construction in the beginning of 2003. Vuosaari Harbour was opened almost six years later in November 2008. The mobilization was fast. Only a week after opening, traffic was flowing, and by the end of the year, all operations and systems were in full flow without delays.

## 2.2 Location and area

Vuosaari Harbour has an important role and a central location in Finnish trade and logistics. Vuosaari is located 15 kilometres east from the city centre of Helsinki, which is the capital of Finland. The capital region is the biggest centre of business activity in the country and almost 30 per cent (1,55 million) of inhabitants live in Uusimaa region (Figure 1), which constitutes only 3 per cent of Finland's surface area. As around 80 per cent of Finnish international trade is transported by sea, ports have a crucial role in the Finnish logistics system. The densest network of logistics centres in Finland is located along the ring road from the airport area in Vantaa towards Vuosaari Harbour and between the two main highways to the north (Figure 2). The main domestic material flows are from south to north.



*Figure 1. Uusimaa region*

Vuosaari is a modern and efficient harbour, with several ship owners, stevedoring companies and other logistics service providers operating in open competition. In the harbour area, there are service areas, a logistics area, and a gate zone next to the ISPS area (Figure 3).

In Vuosaari, there are many services for drivers and for the maintenance and repair of heavy equipment on wheels. These include:

- container transport services
- assignment and customs procedure services
- impartial inspections of goods and vehicles
- weighing functions
- wash and repair services
- express oil change service
- tyre services
- spare part and accessory services
- lubricant and chemical wholesale etc.
- restaurant, grill-kiosk, Internet café
- WC, sauna and shower facilities
- library
- laundry room
- social and meeting facilities
- catering and event services
- service station, small store.

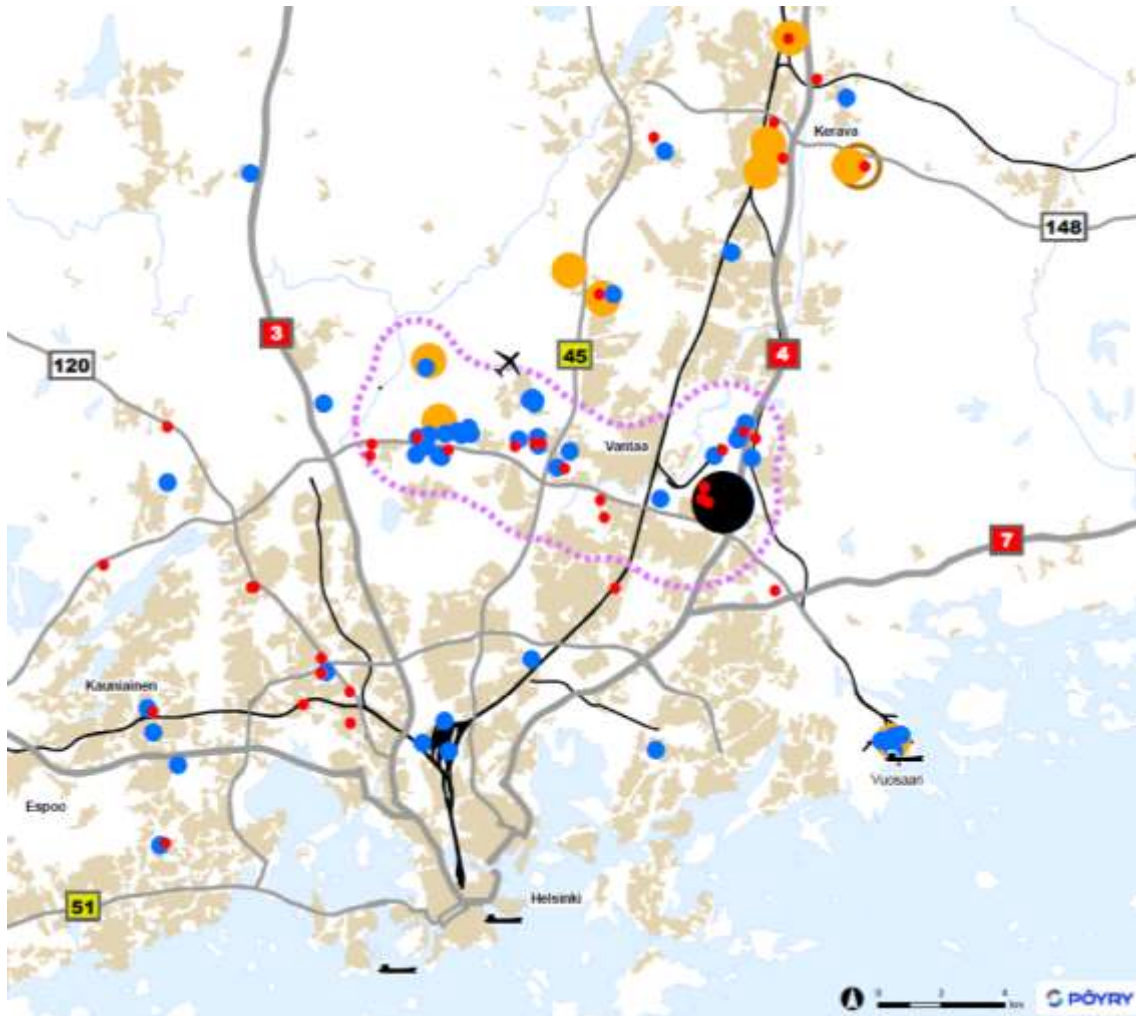


Figure 2. Logistics centres in Helsinki region (Eckhardt & Rantala 2011)

The logistics area next to the Vuosaari Harbour area is meant for incoming and outgoing cargo loading and unloading, containerisation and recontainerisation, short-term storage and other similar logistics operations. The close location of logistics service providers enables flexible and fast movement of goods. Logistics operators in the logistics area include for example: Nurminen Logistics Oyj, SA-TU logistics, Aikaansaavat, Lillbacka Global, Varova and FS Terminals. Also the coffee roastery and office building of Paulig Oy is located in the logistics area. Sponda Oyj is the facility developer responsible for planning, marketing and renting the area.

In the gate zone, there are parking areas for short and long term parking. Also port security and area surveillance, and Customs services are located in the gate zone. Customs perform traffic control, cargo x-ray and vehicle inspections.

Inside the ISPS area there are depot, storage, stevedoring and cargo handling services. The depot companies in the harbour are: Marine Container Yard Oy Ab,



Container Depot Ltd Oy and Arctic Container Oy. The harbour operators are: Finnsteve Oy Ab, Steveco Oy and Multi-Link Terminals Ltd Oy.

Access to Vuosaari Harbour area is efficient by sea, road and rail. A highway level road leads directly to the port and automatic access gates for vehicles makes the entrance smooth. Rail tracks reach the loading/ unloading areas in the quays. The fairway is easily navigable and pilotage is needed around 15 km in costal island area. Also ice breaking services are available in winter time.

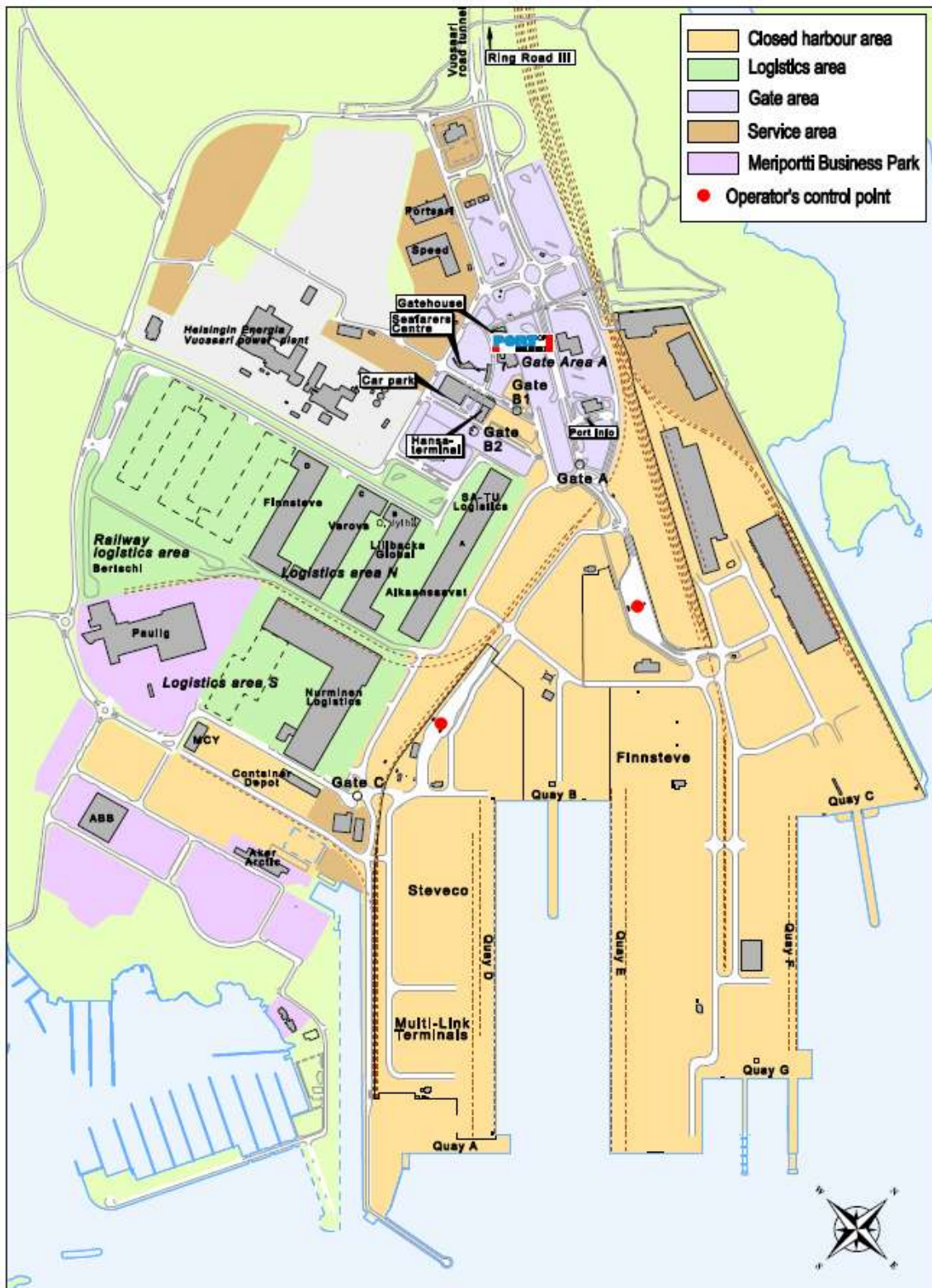


Figure 3. The layout of Vuosaari Harbour Centre (Port of Helsinki 2012)

## 2.3 Freight profile

Vuosaari Harbour has good transport connections of all modes. It has the most frequent scheduled departures to all major Western, Central and Northern European ports from Finland (see Figure 4). The harbour is located in the Eastern part of Helsinki where Ring III starts, which is part of highway E18 (Figure 5). Ring III has connections to other main highways in Finland (E75, E12) connecting Vuosaari directly to the entire Finnish road network. A 19 km long rail track built for the harbour connects it to the main rail network of Finland. In addition, Vuosaari Harbour is located close (18 km) to the main airport of Finland. This is important for combining the material flows of consumer goods using different transport modes.



Figure 4. Liner traffic to Europe in August 2012

The year 2011 the unitized cargo traffic of the Port of Helsinki was 10,2 million tonnes with an increase of 4 per cent from the previous year. 393 619 TEUs of containers (3,2 million tonnes) passed through Vuosaari Harbour. The number of trucks and trailers totalled 520 000 (6,5 million tonnes), of which 54% of vehicles (59% in tonnes) was served in Vuosaari harbour and 46% (41% in tonnes) in West and South Harbours on passenger ships. 38 per cent of the unitized cargo of the Port of Helsinki departs from or arrives to Germany. Estonia (Tallinn) has a share of 29 per cent.

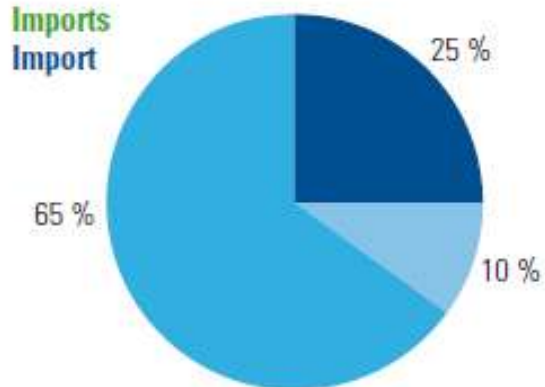
The import traffic of the Port of Helsinki mainly consists of consumer goods (65 %). Raw materials and production inputs account for 25 per cent and investment goods for 10 per cent. Machines and equipment, and forest industry have both a share of 30 per cent in export traffic. Also metal and metal group industry (20%), foodstuff, chemicals and other industry (15%) and electronics and electrical goods industry (5%) are exported from the Port of Helsinki. The cargo traffic at the Port of Helsinki represents approximately 11 per cent (the year 2011) of the Finnish foreign trade transported by sea in tonnes, but approximately two-fifths in value.



Figure 5. Road and rail connections to Vuosaari Harbour (Port of Helsinki 2008)

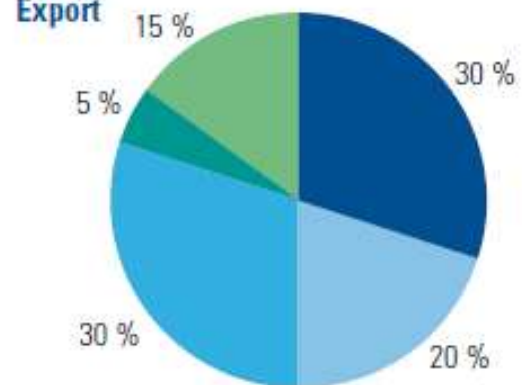
**Profile of unitized cargo traffic**  
**Enhetslasttrafikens profil**

**Imports**  
**Import**



- Raw materials and production inputs  
Råvaror och produktionsföremådenheter
- Investments goods  
Investeringsgod
- Consumer goods  
Konsumtionsvaror

**Exports**  
**Export**



- Forest industry  
Skogsindustri
- Metal and metal goods industry  
Metall- och metallmanufakturindustri
- Machines and equipment  
Maskiner och apparater
- Electronics and electrical goods industry  
Elektronik- och elindustri
- Foodstuffs, chemicals and other industries  
Livsmedels-, kemi- och annan industri

*Figure 6. Profile of unitized cargo traffic 2011 (Port of Helsinki 2011)*

## 2.4 Terminal properties

Vuosaari Harbour has a surface area of 150 hectares of which 122 hectares constitute the terminal area. Container terminals provide inspection, storage and handling services for containers, trucks and trailers. There are ten container cranes in Vuosaari and they are owned, like other cargo handling equipment, by port operators: Finnsteve Oy Ab, Multi-Link terminals Ltd and Steveco Oy. The lifting capacity of container cranes varies and it is up to 90 tonnes with an outreach of 46 metres. Terminal handling equipment includes also straddle carriers, reach stackers, forklifts and terminal tractors.

There are seven quays where the depth of water is 10,5 or 12,5 metres. The total length of container quays is 1460 metres and there are 17 roro berths in Vuosaari. The potential of expandability is around 20 per cent of today's capacity, but there is no need for expansion in the near future as only half of the current maximum capacity is in use.

## 3 Planning, ownership and organisation

### 3.1 Organisation and ownership, operations

#### 3.1.1 Ownership structure

Port of Helsinki is a municipal enterprise fully owned by the city of Helsinki. It operates under the guidance of Board of Municipal Enterprises, which is responsible for operations and profitability of municipal enterprises. The city establishes annually revenue targets for Port of Helsinki, and requires approximately 15% of net revenue returned to the city as income. As a municipality owned enterprise, the Port of Helsinki does not pay state taxes and has a monopoly.

Port of Helsinki has a separate budget. Its operation is based on incomes received from the port users, port operators and other customers. Port users pay fees for port usage and provided services according to the listed prices, which are verified annually. These fees include for example cargo charges based on gross weight, vessel charges based on net tonnage and storage based on TEUs and duration. The price list can be found in the Internet. The land is owned by the City of Helsinki, and the port operators, logistics companies and other enterprises providing services in the port area pay rent for the use of land area and infrastructure. The ownership model of the Port of Helsinki is shown in Figure 7.

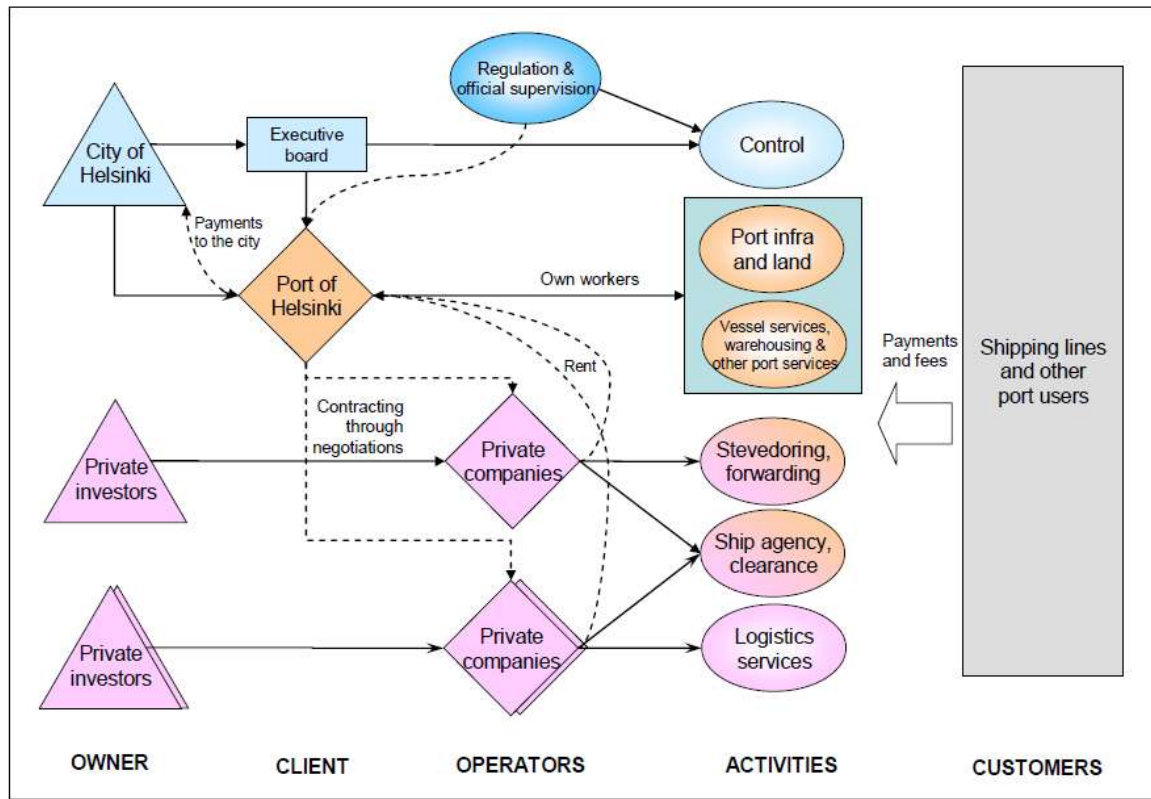


Figure 7. The ownership model of the Port of Helsinki (Rönty et al. 2011)

It has been speculated that the municipality law in Finland will change and drive ports to the municipal-owned company (MOC) model in the future in order to increase competition neutrality. In the corporate model the city of Helsinki would remain as the owner. If the Port of Helsinki was a public limited company, it could for example expand by buying another port.

### 3.1.2 Regulatory framework

Vuosaari Harbour operates on a landlord principle. The Port of Helsinki invests on infrastructure, maintains the port area, and administers the land area and leases it to private operators. The private operators own and are responsible for the superstructure, such as cranes, terminals, machinery, cargo-handling equipment and their information systems. Shippers can buy services based on competitive bidding, independent of the Port of Helsinki.

The strength of the landlord principle is that operators have the control of the whole cargo handling process and related logistics and services. Thus operators have more flexible opportunities for developing cargo handling which benefits customers.

As the operators own fixed container cranes, the port loses flexibility on space alternation in changing situation even though operators have agreed on flexible land use. For example if an operator's volumes decrease, it is difficult to use the area with free capacity for other operators' purposes, because there is superstructure owned by another company.

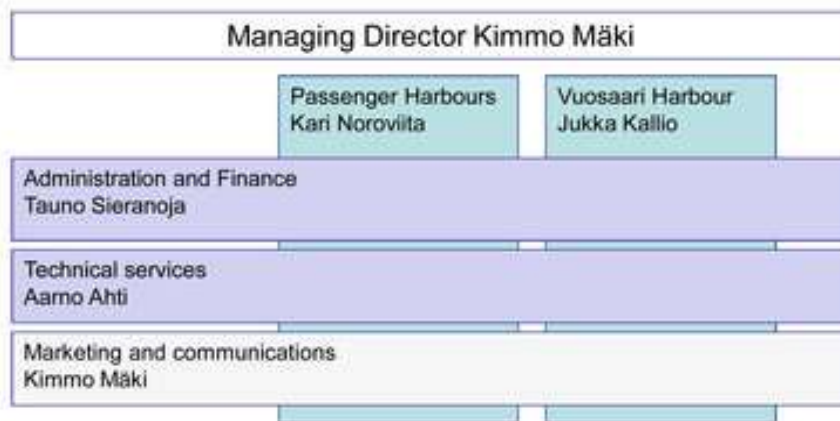


Figure 8. The organization structure of the Port of Helsinki (Port of Helsinki News 2012)

The Port of Helsinki had an organization restructuring and the new organization started in March 2012. The idea is to show clearer client and business responsibilities with even more customer oriented active service culture. The new organization is an array with two business units: Passenger Harbours and Vuosaari Harbour.

### 3.1.3 Planning and operation/construction process(es)

The project management in a harbour building has a great influence on the success of the project. The project manager of the Vuosaari project managed the project well and in time. There were no unexpected delays during the planning and construction of Vuosaari harbour. As in any construction process in Finland, citizens have the right to complain in a certain timeframe after publishing the plans. There were several

complaints related to environmental issues, which did not lead to any changes in the plans, but they took time.

During the construction process, tributyltin (TBT) was found in the sediment of the basin, which caused a risk to interrupt the project. However, TBT was removed successfully, but it imposed extra cost for the building project.

Operators were involved in the planning stage and their points of views were already taken into account at this stage. Also the gate system (presented in chapter 3.1.4) existed in the harbour area from the beginning due to good planning processes.

The Port of Helsinki has basic contracts with all the actors in the area. Common procedures are managed in different cooperation bodies thus as operator meetings (operational level), follower (executive level) and cooperation forum.

There have only been minor conflicts between different stakeholders. For example Vuosaari Harbour finds the requirements of national authorities (Customs, Border Guards) sometimes oversized. In addition, more clear rules, for example related to the maintenance of the area, with operators would clarify cooperation even though it works relatively well already. The disadvantage when operators own their fixed container cranes is that the land use alternation between different operators becomes more complicated in the harbour.

### **3.1.4 Sharing of information**

The port area complies with the ISPS (International Ship and Port Facility Security) regulations.

Vuosaari Harbour utilized AutoID (automatic identification) technology in the gates, in loading and unloading processes and in access control system of machines. The AutoID system used in the gates is based on optical character recognition (OCR) where vehicles are recognized on the basis of their licence plates. OCR technology is also used to identify transport units (e.g. trailer, container) on the basis of their number. The OCR systems reliability is 97%.

When a vehicle approaches a gate, identification information is automatically transferred to the information system, which provides guiding information through display panels. Vehicles that cannot be identified automatically will be guided to the Port Info service point for manual identification. Vehicles leaving the port area are also identified on the gates for security reasons.

As there are several actors in the port area, each of them provides an access pass for their clients. The recognition of machines is based on RFID (Radio Frequency Identification) technology.





Figure 9. Identification in the Vuosaari Harbour area (Port of Helsinki 2009)

After entering the port area the vehicle is guided to the operator gate by display panels. Each operator has its own procedures, for example Steveco has an automatic lane where the driver can sign the arrival on unloading area by a code or a smart card. Then appropriate working machines are guided to the vehicle.

In Vuosaari Harbour, the Port of Helsinki, Customs and different actors have their own IT-systems. There are interfaces enabling communication between different IT-systems. However, this causes challenges for example for the Customs who need to have several interfaces or devices in order to be able to communicate with all the actors in the area. Developing the harbour from “green field” bases has facilitated the system integration of different actors. However, due to competition all information cannot be shared openly.

Despite the large amount of cooperation, actors have their own processes and thus customers need to handle with different procedures. Harmonizing these processes would enable more efficient operation in the harbour and remove one identification gate for vehicles.

The Port of Helsinki uses the Portnet service, which is a service network for nationwide vessel traffic in Finland maintained by Finnish Transport Agency. Ships have to provide information regarding its timetable, route, cargo, any hazardous cargo and maritime fees. It is also possible to give security announcements according to ISPC instructions. The user interface for the PortNet system is Internet-based, but companies can also send notices in EDIFACT or XML formats.

### **3.1.5 Suggested improvements**

In the planning stage of a freight terminal, passenger needs should be considered, because combining passenger and freight terminals can be an efficient solution.

Regarding gate systems, there should be a common gate system for all the actors in the area. Also one EU wide Portnet system for vessel traffic could be created.

Operators should have common procedures to simplify the work of logistics operators having business with them. Operational principles between operators and the harbour should be clear and detailed. Especially if operators own fixed superstructure, principles related to land use alteration between operators should be unequivocal and set in advance in order to ensure efficient port operations in changing situations.

## **3.2 Financing**

The Port of Helsinki was completely responsible for financing Vuosaari Harbour and the logistics area surrounding it. The loan for building Vuosaari Harbour was taken by the city of Helsinki. Vuosaari Harbour is not and has not been subsidized at all. The construction of transport connections to the harbour, including road and rail connections and fairway, were financed equally by the Port of Helsinki and the state of Finland. The main problem related to financing is interest rates.

## **3.3 Indicators related to policy, organisational and institutional structure**

In the planning of terminal the harbour all institutional levels are involved: local, regional, national and international. Regarding investments local (municipality) and national (state) levels are involved.

The Port of Helsinki has a complete independence from transport operators and local actors.

All companies have access to a terminal on equal conditions (time, cost etc.) independent of ownership.

## 4 Outputs and level of service

### 4.1 Interface and interconnection, related services

The close location of logistics operators and shipping companies is crucial for efficient terminal operation and for the level of service. Currently logistics operators are located in terminal, which enables flexible and fast movement of goods, and good cooperation with the harbour. Shipping companies are not located in the Harbour Centre which complicates face-to-face communication between Vuosaari Harbour and the shippers. Shippers and logistics service providers collaborate to some extent even though they are competitors.

Apart from the services offered by logistics service providers and shippers, the most important businesses and services in Vuosaari Harbour area are operators, container depot and container repairs. The services available in Vuosaari Harbour are presented in Chapter 2.2.

Currently only one rail operator transports freight from Vuosaari. The lack of competition affects prices and services available. This problem relates to rail traffic in Finland in general, not only Vuosaari.

### 4.2 Productivity and effectiveness in terminal

Vuosaari Harbour measures productivity and effectiveness by some indicators. Span time indicates the time trucks spend inside the gate area. This shows if unloading and loading operations are efficient. Operators also follow the number of containers lifted by cranes per hour.

### 4.3 Level of service offered

Vuosaari Harbour offers regular and frequent connections to the main European ports with a full capacity 24/7 all year round. The price level is relatively high compared to other ports in Finland, but due to the central location, Vuosaari Harbour is competitive. The pricing system in tonnes instead of units promotes the traffic of certain product categories (break bulk). There are three, independent operators in the harbour, which creates competition affecting positively on the price level of terminal operations.

The delays of arrival traffic are minimal, and they are usually temporary and caused by storms and strikes. Also the loss and damage of shipments is minimal. Thus, Vuosaari Harbour provides reliable sea freight services.

As Vuosaari Harbour was built on "green field" bases, there were good basis for placing different actors close to each other with the premises and infrastructure

required. Thus all the operators and other actors can easily provide high quality services and cooperate. In the landlord principle operators have the control of the whole cargo handling process and related logistics and services. Thus they have good opportunities for developing cargo handling which increases service level.

#### 4.4 Indicators related to performance and level of service

In Vuosaari the ratio between TEU transhipped per employee and year is approximately 1120. This is based on the terminal personnel including mainly stevedoring personnel.

As the freight volumes in Vuosaari Harbour the year 2011 was nearly 400 000 TEU and there are ten container cranes in the harbour, the average TEU lifted per year and per crane is approximately 40 000 TEU. As in Vuosaari Harbour half capacity is in use, TEU lifted per year could be higher with the current equipment.

The energy consumption of Vuosaari Harbour Centre in the year 2011 was 17 265 MWh, of which operators used 68,5 per cent, Vuosaari Harbour 28,5 per cent and the remaining 3 per cent was sold. If half of the energy used by Vuosaari Harbour and operators is considered to be used for trailer and truck traffic, the energy use per TEU is 21 kWh.

## 5 Analysis of policy recommendation

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
<b>Policy recommendations</b>	
Integrate the administration of the public transport system	Not relevant for the particular terminal
Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform	Not relevant for the particular terminal. There are no legislative barriers in Finland.
Policy and legal frameworks should facilitate intermodal cooperation	This is important to increase intermodal transportation. Currently the situation in Finland is too market driven and there are no frameworks or subsidies promoting intermodality.
<b>Planning recommendations</b>	
Incorporate the transport planning process with land-use planning	Municipalities are responsible for land use planning and building their road network, but major road and rail infrastructure decisions are made on national level. Incorporating these processes could improve transport system as an entity.
<b>Financing recommendations</b>	
Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues	Not relevant for the particular terminal. Generally PPPs lower the limen to invest in large infrastructure projects and is thus a good recommendation.
Integrate the pricing of the public transport system	Not relevant for the particular terminal
<b>Organizational recommendations</b>	
Use of business models for cooperation that also publically owned terminals can use	This recommendation is important. In Finland, not all public terminals are open.
Structure the information provision	Currently national PortNet system provides

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
	information to all the ports in Finland. This is a good recommendation and could be extended to whole EU and all transport modes.
<b>Infrastructure development recommendations</b>	
Constitute transport infrastructure management body for all modes	Finnish Transport Agency is the management body of all modes in Finland. This is important for better information exchange and common planning.
Adopt or create standards for physical infrastructure interconnectivity	This recommendation is not favorable for Finland as there are already differences compared to other EU countries (gauge width, truck load weight etc.).
<b>Operations recommendations</b>	
Separate the owner from the operator	The Port of Helsinki is operating on a land lord principle and has separated ownership from the operators. This recommendation is important to ensure efficient operation as operators have control over their cargo handling process.
Establish the cooperative framework between the terminal and the transportation operators	Vuosaari Harbour has several cooperative bodies with different actors in the area. This recommendation is important for efficient and seamless collaboration.
Integrate the operations of the public transport interchanges	Not relevant for the particular terminal

## 6 Analysis of gaps

### 6.1 Lack of standardization

Information systems of different operators and other actors in the area could be better integrated if standardization was agreed in common. As operators are operating in different ports and operators have their own systems, a complete integration would require cooperation of a large group of actors. For example, in addition to Vuosaari Harbour, Finnsteve Oy Ab operates in Port of Turku, Steveco in Port of HaminaKotka Ltd. and Multi-Link terminals Ltd. Oy in Port of HaminaKotka Ltd. and in St. Petersburg. Thus, operators cannot adapt their information systems according to each ports' requirements. Upper level (state) guidance and coordination could improve the situation if it would create recommendations for port related information systems that would be in line with other information systems used in logistics. This could harmonize information systems of different ports and operators operating in several ports. Common standards would improve efficiency of information exchange and would reduce or remove the need for middleware programmes between different information systems.

### 6.2 Lack of appropriate infrastructure

Vuosaari Harbour has new and well maintained infrastructure. The lack of infrastructure is related to expansion possibilities and rail freight terminal. Even though rails reach the quays, if rail transportation increases remarkably, appropriate infrastructure for large-scale efficient operation is missing.

### 6.3 Dependency of mode choice to economy and legislation

The sulphur regulation may decline transport volumes in the Baltic Sea which affect directly the ports in the area. There might be possibilities, such as LNG vessels, which would reduce the impact of the sulphur regulation.

## 7 Emerging mobility schemes and future changes

### 7.1 International logistic centre

Vuosaari Harbour serves only foreign trade and connects Finland by motorways of the sea to European TEN-T network.

### 7.2 Eco-efficient terminals

Vuosaari Harbour has taken environmental issues into account in many ways:

- sewer system that can be closed in a case of chemical leaks
- separate sewing system for wash water and detrimental elements
- sewage disposal
- headworks to prevent leaks on the ground to reach the sea
- preparedness for ground electricity
- the use of condensing water from a power plant to reduce the need and emissions of ice breakers in winter time
- modern machines and equipment with lower emissions and noise
- efficient oil spill prevention and response plan.

### 7.3 Integration of an e-logistic platform

In Vuosaari Harbour, the Port of Helsinki, Customs and different actors have their own IT-systems, but there are interfaces enabling communication between different IT-systems.

### 7.4 Green corridors

Vuosaari Harbour has a direct connection to the Finnish main rail network and for example to Bothnian Corridor, which may become part of TEN-T network. Vuosaari Harbour has also connections to European corridors, for example to Rail Baltica.

### 7.5 Public-private partnerships

The building of Vuosaari harbour was financed by the Port of Helsinki and the loan was taken by the city of Helsinki. Thus PPP model was not used for this terminal.



## 7.6 Rail interoperability

There is no rail terminal in Vuosaari Harbour, but there are rail tracks reaching quays. If the rail traffic will increase, a rail terminal may be required.

## 7.7 Short sea shipping

As Finland can be considered logistically as an island, short sea shipping is the main transport solution for foreign trade.

## 7.8 Future perspectives

International Maritime Organisation's (IMO) intention to impose a limit of 0.1 % sulphur content of shipping fuels by the year 2015 in the Baltic Sea, the North Sea and the English Channel regions, declines competitiveness of sea transportation in these areas. The use of LNG (liquid natural gas) fuel in vessels helps to reach emission limits in sea transportation and may be a good possibility in the future. Currently there are no LNG terminals or other infrastructure needed for LNG available in Finland. The sulphur regulation may decline transport volumes in the Baltic Sea which affect directly the ports in the area. For the Port of Helsinki, the regulation may increase the share of transportation to Estonia with short distance sea transportation. The challenge is that even though there are passengers on ro-ro boats, Vuosaari Harbour is not built for passenger traffic and there is no capacity to build a passenger terminal. Passenger ships have a good concept with 2 km of lane and 2000 passengers and freight ships cannot compete with this. As the passenger terminals of the Port of Helsinki are currently in the city centre, there cannot be a massive increase in volumes. This might force logistics operators to use increasingly ro-ro ships in Vuosaari instead of passenger ships in the city centre.

## 8 Policy goals

Policy goals	Comment on achievement
<b>Developing and deploying new and sustainable fuels and propulsion systems</b>	
1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030	Not relevant for the terminal
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>	
3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050	Vuosaari Harbour promotes rail transportation.
5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	Vuosaari Harbour is a modern and efficient terminal strengthening TEN-T network
6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.	A rail track combining the Finnish rail network and Vuosaari Harbour was built during the construction phase of the Harbour
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	Vuosaari Harbour utilizes as other Finnish ports a nationwide information system that could be enlarged to whole EU and integrated to multimodal systems.
10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	Vuosaari Harbour promotes and participates in LNG terminal projects. The use of LNG in vessels reduces emissions.

## 9 Concluding remarks

### 9.1 Main conclusions

Port connections are crucial in Finland for the global and domestic supply network. The location of Vuosaari is excellent in the main business and logistics concentration of the country. As the material flows are thin in Finland, combining material flows of different transport modes improves efficiency. General cargo distribution from Vuosaari Harbour can be easily combined with air and road freight.

Vuosaari Harbour has rail tracks reaching quays. If the rail traffic will increase, a rail terminal may be required and this may cause capacity problems in land use of the harbour. However, the main reasons hindering multimodal transport in Finland are related to transport volumes, the lack of capacity and the lack of competition. Currently only one operator is offering rail freight services in Finland and competitions could affect positively on services offered and prices. On the other hand it is difficult to get new operators as the volumes in Finland are relatively small on long distances which may make profitable operation more difficult. In addition, there are also capacity problems on the main rail network, and passenger trains having a priority, freight slots are not necessarily good enough to compete with road transport timetables.

Vuosaari Harbour is not a passenger harbour and will not be due to the lack of capacity, which may cause challenges if transport volumes to Tallinn will increase remarkably. Also because of the limited space, Vuosaari Harbour cannot expand its activities to space demanding transportation of forest industry, dry or liquid bulk, car and large-scale transit. Also because of the relatively high prices due to the central location, Vuosaari Harbour is too expensive for low value transportation. The pricing systems in tonnes instead of units favours light and valuable product transportation.

The location of Vuosaari harbour was partly determined by political and financial reasons (tax revenues). Generally in Finland there is no upper level (national or regional) guidance for ports or other logistics centres, which leads to competition between municipalities. There are several reasons why municipalities want a logistics centre in their municipality. The most important ones are that logistics centres create jobs and increase tax revenue and they raise the image and profile of the municipality (Eckhardt & Rantala, 2011). The optimal locations of logistics centres, including ports, require upper level (national) guidance.

## 9.2 Good practices

Vuosaari Harbour has a central location to Finnish main trade area. Vuosaari is easily accessible by all transport modes and infrastructure is in good condition. There was a separate project during the planning and construction phase concentrating on transport infrastructure for Vuosaari Harbour. The main airport locates close the Vuosaari, which promotes the chosen profile (retail). Also the pricing system in tonnes promotes the profile.

Modern equipment and technique is used in Vuosaari Harbour. Gate systems use OCR technology and working machines are identified by RFID technology. Portnet provides traffic information of all Finnish ports and in can be used by the Internet, XML- or EDI-messages.

Many businesses and services are concentrated in the harbour area. This increases the service level of the harbour and creates better possibilities for cooperation. The Port of Helsinki has basic contracts with all the actors in the area and common procedures are managed in different cooperation bodies in operational and executive

levels. Also the clear roles of landlord principle increases service level as operators have control on the whole cargo handling process.

Vuosaari Harbour has taken environmental issues into account in several ways regarding nature protection, energy saving and emission of pollutants.

### 9.3 Bad practices

Passenger terminal needs were not taken into account in the planning phase, which might reduce some possibilities in the future operation. Generally the lack of expandability precludes certain large-volume industry transportation. Also the potential increase in rail transportation could have been anticipated better in the land use plan. With a higher level approach taking all transport modes, passenger and freight transport and future insight into account the result could be better in a long term.

Port operators have separate gates and procedures, which complicate logistics operators' work. Superstructure owned by operators may be a good solution, but it also reduces flexibility and requires clear operational principles.

### 9.4 Suggested improvements?

A common gate system and integrated information system would improve efficiency and improve cooperation. Vuosaari Harbour could be responsible for the initiation of the common gate system. Integrating information systems would have a larger perspective (national for example) as operators are operating in other harbours too making the integration more complex. EU level Portnet systems would be useful and efficient to insert and receive vessel traffic information.

Less bureaucracy and more straightforward operation principles would facilitate planning and construction processes.

In order to shift transportation from road to rail, a single logistics centre only can provide sufficient infrastructure/superstructure in the area and positive attitude towards the development of rail transportation. Other issues should be supported mainly by national level. For example sufficient capacity in the national rail network should be provided in order to enable interesting time slots for freight. Also a network of open rail terminals should be dense and efficient enough. Information and loading technologies are in an important role in efficient transfer from one mode to another. Subsidies could be used to make the transportation of rail freight more profitable in order to better compete with road transportation, especially when volumes are relatively low in Finland expect heavy industry transportation directly from industry plants to ports. Rail

operators should create efficient and innovative services and operation models to promote rail freight. This could be supported for example by national research and development projects.

## 9.5 Evaluation of PAG recommendations

For Finland, the most important recommendations are related to policy and information provision.

Regarding PAG policy recommendations, the recommendation facilitating intermodal cooperation by policy and legal frameworks, is important for Finland. Currently there is no national level support or subsidies to promote intermodal transport. Intermodal transportation is completely market driven, which causes challenges in a sparsely populated country where material flows are narrow and distances are long.

For efficient multimodal transportation, a single window for information provision is important. Currently the national PortNet system provides information to all the ports in Finland. However, all the modes should have interfaces to a common EU wide information system.

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Connecting LOnG and Short-distance networks for Efficient  
tRansport

## Reporting template for case studies

<b>Name of case study:</b>	Thessaloniki port
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# 1 Data collection process

Thessaloniki is the second biggest city in Greece, located in the northern area and the city port is the second biggest in the country in terms of capacity, facilities, etc. Thessaloniki Port Authority is the managing authority of the infrastructure and operations taking place within the restricted area of Thessaloniki's port. Data collection process included web searching for statistical data and relevant information, as well as two interviews with Dr. Dimitrios Makris, who is a sea transport and port operations specialist and Head of the Strategic Planning, Marketing and Sales department of Thessaloniki Port Authority SA (hereinafter ThPA SA). The interviews were carried out on the 4th and 11th of April 2012, at Dr. Makris' office.

The discussion was targeted at the needs of research, also allowing some time for addressing general issues concerning several aspects of the port operations. The web statistics were verified and additional statistical data with regards to port operations performance, in 2011, were provided by Mr. Makris. Those data were valuable for clarifying cargo volumes in the questionnaire tables.

## 2 Terminal overview

### 2.1 Background

#### 2.1.1 Recent historic development

Thessaloniki's port operations started with the establishment of Thessaloniki city in 316 b.C.. The strategic location of Thessaloniki met city's capabilities for port servicing to satisfy the commercial needs of that period of time.

In the recent years, milestones of port's history are the following:

- 1904: Agreement between Turkey and France for the establishment of the company 'Societe Ottomane d 'Exploitation du Port de Salonique' which undertakes the operation of the harbour
- 1914: Establishment of the Free Zone
- 1923: Establishment of a public entity (public law) "Guardianship of Thessaloniki's Free Zone"
- 1925: Launch of the Free Zone
- 1930: Establishment of the Public law Entity "Harbour Fund of Thessaloniki"
- 1953: Integration of the "Guardianship of Thessaloniki's Free Zone" and "Harbour Fund of Thessaloniki" to "Free Zone and Port of Thessaloniki"
- 1970: Transformation of Harbour Fund to "Thessaloniki Port Authority" (THPA SA)
- 1999: Transformation of Thessaloniki Port Authority into a public - private company called "Thessaloniki Port Authority SA" (ThPA SA SA)

- 2001: Introduction of ThPA SA SA into Athens Stock Exchange and a concession agreement for a period of 40 years was concluded between the national government (represented by the Ministers of Finance and Mercantile Marine) and ThPA SA SA, under which ThPA SA was granted the exclusive right to use and exploit the lands, buildings and facilities of Thessaloniki Port Land Zone owned by the Greek State (public sector).

## 2.2 Location and area

The terminal is located in the city of Thessaloniki. Thessaloniki is the biggest city of Northern Greece and the country's second largest city. With a history of twenty - three centuries reflected in its countless ancient Greek, Roman, Byzantine and modern monuments, this port city has a population that reaches to more than a million people and has always been a cosmopolitan metropolis and a powerful economic and cultural force throughout the entire south-eastern European region.

Thessaloniki is very close by road to other Balkan cities such as Beograd (609 km), Sofia (280 km) and Bucharest (608 km).



**Figure 1. Panoramic view of the central area of Thessaloniki (including port area)**

The hinterland port area of Thessaloniki's port is defined east from lighthouse of Epanomi (a village 20 km distance from Thessaloniki) and covers the coastal area to Axios river mouth at the west. The sea port zone is considered until 500 m distance from the coast or 30m sea depth.

The terminal is located at the central-west side of the urban agglomeration of Thessaloniki. Port has fair access to the west road entrance which is part of the main road link between Thessaloniki and Athens by road. This road is called P.A.Th.E.

Highway network (Patra – Athens – Thessaloniki – Evzoni). It is evident that Thessaloniki sets as a vital node in Greek road network. Also, Thessaloniki is almost in the middle of road axis 'Egnatia – Highway' connecting East and West borders of Greece. Moreover, city's hub port facilitates freight transport to Balkans (Albania, FYROM, and Bulgaria) and southern central Europe. Thessaloniki's port is located at the city centre, about 25 kilometres from Thessaloniki's international airport and about 3 kilometres from the Central Railway Station. Apparently, the port could provide combination of transport means; road, rail and air transport combined with maritime.

Maritime connection with other neighbouring ports is strong because of the proximity of port of Thessaloniki to other port terminals around Mediterranean Sea and Balkans. For instance, Piraeus port is 252 nautical miles far from Thessaloniki's port while Volos port is about 140 nm far. Other sea nodes are Constanta, Romania (529 nm from Thessaloniki's port), Limassol, Cyprus (653 nm), Istanbul, Turkey (333 nm), Burgas, Bulgaria (443 nm) and Damietta, Egypt (736 nm).



**Figure 2. Panoramic view of Thessaloniki port**

Concerning land-use, the terminal is located to pure commercial and industrial area which consists of various types of land-use such as commercial, residential and tourist places. Around port area, a commercial district is deployed including freight, commercial and logistics companies. Many large and medium-scale operators and forwarders are very close to port premises and take advantage of the location.



**Figure 3. Layout of the port area indicating piers**

## 2.3 Passenger or freight profile

### 2.3.1 Passenger profile

Geographical coverage of the port is international, national and regional in terms of the extent that transport chain affects origin and destination of transport, respectively. The port services 5% of passenger and 95% of freight national maritime flows.

In order to clarify terms such as 'local', 'regional' and 'national', assumptions were made according to statistics. 'Local' level implies the Prefecture of Thessaloniki whilst 'regional' level defines the zone included in a circle of 200 km radius having Thessaloniki as its centre.

Passengers depart from Thessaloniki for travelling to a regional destination represent 38,2% of the total passenger flow of the terminal. In addition, 44% of that total flow arrives to Thessaloniki originating from a regional destination, as defined above.

**Table 1. Passenger flows from/to port of Thessaloniki (2011)**

Origin (for disembarkation) – Destination (For embarkation)	No of Passengers		
	Disembarkation	Embarkation	Total
Eastern Aegean Sea (Regional)	22,730	19,070	41,800
Sporades Islands (Regional)	5,759	5,662	11,421

Volos (Regional)	3	0	3
Piraeus	3	6	9
Transit			11,502
<b>Overall total</b>	<b>28,495</b>	<b>24,738</b>	<b>64,735</b>

Sea transport service to eastern Aegean Sea islands and Sporades islands is subsidized by the national government. Thessaloniki's port, however, engages very low rate of passenger flow.

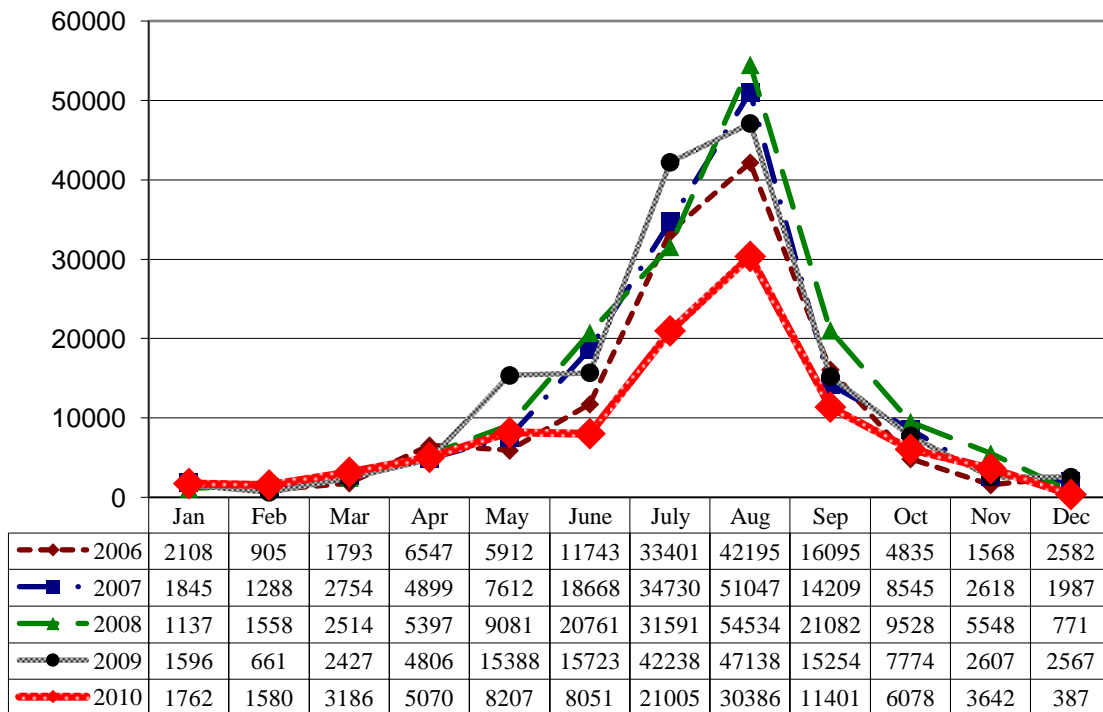
Accurate profiles of modes used to reach or to leave terminal have not been investigated yet, so there are not any data on transport modes used to reach the port or leave it. Within that context it is assumed that the majority of passengers who make use of the terminal use car as a transport mode for arriving to and getting out of the port.

**Table 2. Comparative data regarding passenger flow (2011 and 2010)**

Year Period	2011				2010				Deviation	
	January-December				January-December					
	Disembark- ment	Embark- ment	Transit	Total	Dis/ment	E/ment	Transit	Total	Total	%
Domestic lines	28,495	24,738	0	53,233	41,862	42,854	0	84,716	-31,483	-37.2
Yacht passengers	0	10	23	33	0	0	10	10	23	230
Domestic cruises	0	0	0	0	2,489	2,489	0	4,978	4,978	-
International cruises	6	34	11,479	11,519	56	14	10,981	11,051	468	4.2
<b>Total</b>	<b>28,501</b>	<b>24,782</b>	<b>11,502</b>	<b>64,785</b>	<b>44,407</b>	<b>45,357</b>	<b>10,991</b>	<b>100,755</b>	<b>-35,970</b>	<b>-35.7</b>

The above table represents the variation in passenger flows between years 2011 and 2010. Data show a clear decrease in the number of passengers used the port of Thessaloniki for their travels in Greece. The increase in passenger cruise flows is also evident indicating the significant role that port of Thessaloniki could play for cruising.

**Table 3. Evolution of monthly passenger flow throughout years 2006 to 2010 (Raw data from ThPA SA)**



In table 3, each column represents a month, starting from the left (January) to right (December). The peak values indicate high transport flow in July and August and also September, apparently for holidays. Reduction of passenger volumes over time indicates the parallel decrease in demand for travelling, vacations and business travel needs.

### 2.3.2 Freight profile

Freight flows of ThPA SA employ a significant part of transport profile of the port. Freight transport share between the several spatial scales is a bit vague to be defined because there are not clear data on the origin (or destination, respectively) of the cargos transported. The share of transfer can be estimated only by making assumptions. These assumptions include the integration of local, regional and national level as one and only level here called 'national level'.

Data provided by ThPA SA show that 46,7% of total TEUs flow represent exports from Greece to several other countries. Total amount of TEUs for 2011 is 295,870 and the ones corresponding to exports directly for international transport is 138,213 (46.7% of total). Also, 42,4% reflect imports of cargo (125,360 out of 295,870) and about 10,8% is associated with freight transit (31,681 out of 295,870) (Table 5).

**Table 4. TEU flow per origin and destination (2011)**

Unloading (IN)	
Foreign	125,360
Transit	21,528
Transshipment	303

Domestic	0
<b>Total</b>	<b>147,191</b>
<b>Loading (OUT)</b>	
Foreign (Domestic exports)	138,213
Transit	10,153
Transshipment	303
Domestic	10
<b>Total</b>	<b>148,679</b>
<b>Stevedoring (IN &amp; OUT)</b>	
Foreign	263,573
Transit	31,681
Transshipment	606
Domestic	10
<b>Total</b>	<b>295,870</b>

Transport's chain multimodality for import and export activities is estimated as follows:

- 94,8% of total TEUs for road-maritime and maritime-road transport
- 5,1% of total TEUs for rail-maritime and maritime-rail transport

According to the table 5 36,584 of 38,576 TEUs are being transferred by trucks while 1,992 of them are being transferred by wagons from Thessaloniki's port to other Balkan countries. Obviously, the first leg (hinterland) cargo transport is being performed by trucks and thus freight is transhipped to vessels for international maritime transport. Respectively, for import activities, cargo is being loaded to trucks or wagons and distributed to further inland destinations (locally, regionally or even nationally).

Figure 4 clearly projects the evolution of TEU flow in the past twelve years showcasing the reduced value of handled TEUs in the facilities of port of Thessaloniki. After a seamless increasing trend, a sharp drop takes place in 2008 following then a smooth increase in handled TEUs until 2011. Obviously, the global economic condition is being reflected in the diagram, especially after 2008.



**Table 5. Type of container and transport mode used for exporting operations to Balkan countries – Total flow per mode**

Fyrom - Serbia- Bulgaria -Albania										
Year			2011				2010			
Time period			Jan-Dec				Jan-Dec			
			20'	40'	Total		20'	40'	Total	
			Full	Full	Pieces	TEUs	Full	Full	Pieces	TEUs
<b>Fyrom-Serbia</b>	Origin	Road	3,688	1,401	5,089	6,490	3,713	990	4,703	5,693
		Rail	67	0	67	67	108	1	109	110
		<b>Total</b>	<b>3,755</b>	<b>1,401</b>	<b>5,156</b>	<b>6,557</b>	<b>3,821</b>	<b>991</b>	<b>4,812</b>	<b>5,803</b>
	Destination	Road	5,311	4,413	9,724	14,137	4,607	4,035	8,642	12,677
		Rail	1,049	438	1,487	1,925	955	634	1,589	2,223
		<b>Total</b>	<b>6,360</b>	<b>4,851</b>	<b>11,211</b>	<b>16,062</b>	<b>5,562</b>	<b>4,669</b>	<b>10,231</b>	<b>14,900</b>
	<b>Total</b>		<b>10,115</b>	<b>6,252</b>	<b>16,367</b>	<b>22,619</b>	<b>9,383</b>	<b>5,660</b>	<b>15,043</b>	<b>20,703</b>
<b>Bulgaria</b>	Origin	Road	723	851	1,574	2,425	549	528	1,077	1,605
		Rail	0	0	0	0	0	0	0	0
		<b>Total</b>	<b>723</b>	<b>851</b>	<b>1,574</b>	<b>2,425</b>	<b>549</b>	<b>528</b>	<b>1,077</b>	<b>1,605</b>
	Destination	Road	3,242	4,773	8,015	12,788	2,135	2,664	4,799	7,463
		Rail	0	0	0	0	0	0	0	0
		<b>Total</b>	<b>3,242</b>	<b>4,773</b>	<b>8,015</b>	<b>12,788</b>	<b>2,135</b>	<b>2,664</b>	<b>4,799</b>	<b>7,463</b>
	<b>Total</b>		<b>3,965</b>	<b>5,624</b>	<b>9,589</b>	<b>15,213</b>	<b>2,684</b>	<b>3,192</b>	<b>5,876</b>	<b>9,068</b>
<b>Albania</b>	Origin	Road	0	2	2	4	56	0	56	56
		Rail	0	0	0	0	0	0	0	0
		<b>Total</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>56</b>	<b>0</b>	<b>56</b>	<b>56</b>
	Destination	Road	174	283	457	740	261	312	573	885
		Rail	0	0	0	0	0	0	0	0
		<b>Total</b>	<b>174</b>	<b>283</b>	<b>457</b>	<b>740</b>	<b>261</b>	<b>312</b>	<b>573</b>	<b>885</b>
	<b>Total</b>		<b>174</b>	<b>285</b>	<b>459</b>	<b>744</b>	<b>317</b>	<b>312</b>	<b>629</b>	<b>941</b>
<b>Overall total</b>	Origin	Road	4,411	2,254	6,665	8,919	4,318	1,518	5,836	7,354
		Rail	67	0	67	67	108	1	109	110
		<b>Total</b>	<b>4,478</b>	<b>2,254</b>	<b>6,732</b>	<b>8,986</b>	<b>4,426</b>	<b>1,519</b>	<b>5,945</b>	<b>7,464</b>
	Destination	Road	8,727	9,469	18,196	27,665	7,003	7,011	14,014	21,025
		Rail	1,049	438	1,487	1,925	955	634	1,589	2,223
		<b>Total</b>	<b>9,776</b>	<b>9,907</b>	<b>19,683</b>	<b>29,590</b>	<b>7,958</b>	<b>7,645</b>	<b>15,603</b>	<b>23,248</b>
	<b>Total</b>		<b>14,254</b>	<b>12,161</b>	<b>26,415</b>	<b>38,576</b>	<b>12,384</b>	<b>9,164</b>	<b>21,548</b>	<b>30,712</b>

Note: This data is being collected during the egress of containers from port area.

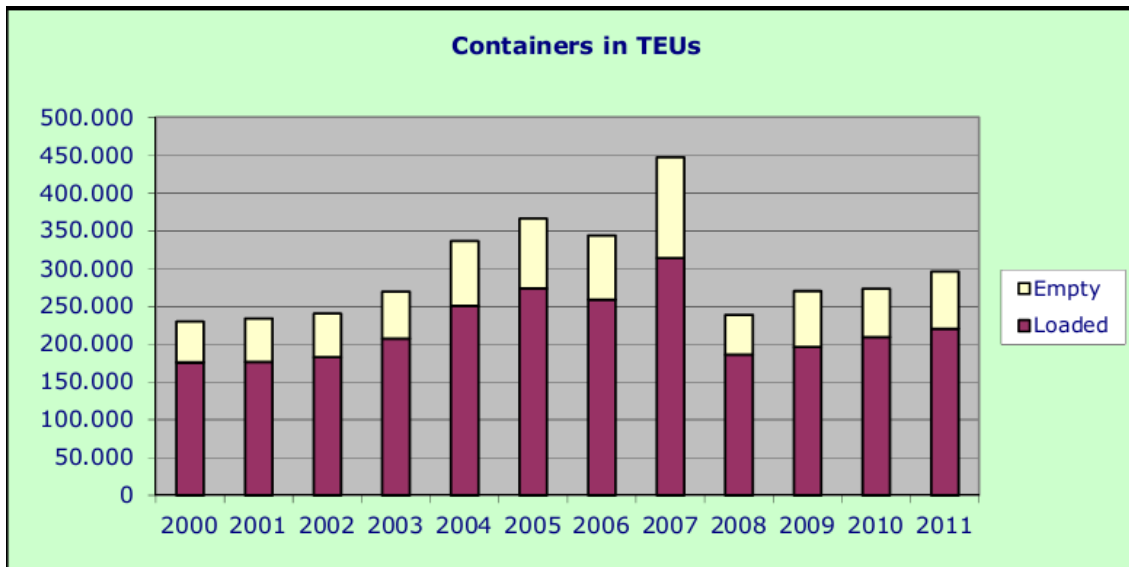


Figure 4. Evolution of TEU flow in port of Thessaloniki over time

Year	Loaded	Empty	Total	% Difference
2000	125.453	37.542	162.995	4,43
2001	126.560	38.737	165.297	1,41
2002	129.966	38.933	168.899	2,18
2003	143.630	41.247	184.877	9,46
2004	172.899	56.800	229.699	24,24
2005	188.817	60.042	248.859	8,34
2006	180.137	54.487	234.624	-5,72
2007	220.160	87.094	307.254	30,96
2008	132.083	32.873	164.956	-46,31
2009	138.765	49.240	188.005	13,97
2010	147.990	41.979	189.969	15,16
2011	154.961	49.142	204.103	7,44

Table 6. Waterborne containers throughput at ThPA SA area in units

The trend for containers is similar to the one regarding TEUs for table 6. After a continuous increase of containers handled in ThPA SA, in 2008 a sharp decline occurred. Then, for each year, a slight increase in containers handling is highlighted.

## 2.4 Vehicle transportation

Table 7 shows the type of vehicles that were transported by ferries. Cars are carrying the basic part of the pie and this is reasonable in the context of passenger transport. Trucks which mainly represent transport for professional needs are the second type of vehicle that is serviced by ferry transport. Also, it should be mentioned the significant decrease that is pinpointed in the year 2011 compared with year 2010 which, in turn, could reflect impacts of economic downturn.

**Table 7. Comparative data regarding vehicles roll-on ferries (2011 and 2010)**

Year	Disembarkment				Embarkment			
	Trucks	Buses	Cars	Motocycles	Trucks	Buses	Cars	Motocycles
2011	2,293	0	4,313	1,060	1,923	0	3,584	960
2010	2,548	5	6,831	1,595	2,737	15	6,700	1,547

## 2.5 Terminal properties

The terminal area consists of a passenger terminal, a container terminal and a conventional cargo terminal. Also, there is a space for cultural events and two restricted parking areas. Terminal provides a variety of services to its users, such as:

- Cargos: Loading, unloading, servicing and storage of all kinds of cargos (containers, bulk and general cargo) from - to: ships, trucks and rail wagons.
- Ships: Anchoring, mooring, water supplies, power - telecommunication supply, ship's garbage management.
- Passengers: Modern passenger terminal providing ships and cruise liners passengers with a plethora of services.
- Leasing of storage space for port activities in the Free Zone and the Free Port
- Usual handling with or without customs supervision.

The port area hosts the following departments: harbour master's office, customs control offices, sanitary and veterinary control station, state chemical laboratory, Hellenic Railways Organisation offices, fire brigade station, pilotage, towage and lashing/unlashing companies.

The terminal area also encompasses a Free Zone. Free Zones are restricted areas in which operating companies enjoy special advantages regarding economic and tax alleviations and logistics privileges and generally operating in environment which underpins business activities. According to Customs Law, Free Zones are customs institutions towards servicing free trade and practically, cargos could not be subject to formal customs clearance. Free Zone in the port of Thessaloniki was established in 1914. It operates in line with the EU customs code. It also facilitates international trade and 'in-transit' cargos. No import dues and taxes paid and there are limited customs formalities upon entry of cargos and there are capabilities of unlimited storage duration.

Port of Thessaloniki offers a range of advantages like excellent road and rail link to the corresponding European networks Free Zone (Control Type I), operating according to

the European Union customs code, possibility of immediate ship berthing, storage exemptions for transit cargos, discount contracts to customers moving large quantities of cargo transshipment, directly or through the quays, without customs formalities, double/triple track railway network along all the quays, RO/RO facilities in the conventional port and the container terminal, cargo full security conditions, hazardous cargo handling in accordance with the current legislation requirements, etc.

## **2.5.1 Freight terminal**

### **2.5.1.1 Container terminal**

The containers are handled through a specially arranged area located in the western part of pier 6. The 550 metres long and 340 metres wide Container Terminal can berth ships with a draught of 12 m. As a part of the Free Zone, it covers a surface area of 254,000 m<sup>2</sup> with an on-site storage capacity of 4,696 TEUs in ground slots. The container terminal was designed and created in accordance with state-of-the-art technologies and is equipped with modern container handling equipment. The terminal includes manned technical support facilities.



**Figure 5a. Container terminal (stevedoring activities)**



**Figure 5b. Container terminal (stevedoring activities)**

The Container Terminal is linked by a double track railway to the national railway networks. To load-unload containers from/to the railway wagons, the terminal disposes of 1 transtainer of 50 ton lifting capacity. The Container Terminal disposes of 336 plugs (380V) for reefer containers.

**Table 8. Handling equipment of container terminal**

straddle carriers	16
tractors	4
front lifts	5
trailers	20
forklifts	40
Reachstackers	1
Container cranes	4

The Container Terminal is the destination of shipping lines such as: MSC, Maersk, Yang Ming Lines, CAN MAR, CMA CGM, SBS Lines, Evergreen, China Shipping, Hapag Lloyd, K-Line, Senator, Hanjin Shipping, NYK Lines, BULCON, Norasia.

### **2.5.1.2 Conventional cargo terminal**

Conventional cargo is accommodated in the Terrestrial Zone of Thessaloniki's port in an area extending on a total surface of approximately 1,000,000 m<sup>2</sup> with quay length of

4,000 m and depth up to 12 m. Quays 10 to 14 constitute the conventional cargo Free Port.

The conventional cargo handling equipment consists of:

- 44 rail-mounted power driven cranes, with a lifting capacity of 40 tonnes.
- One (1) Gottwald HMK 260 EG mobile harbor crane, with a lifting capacity of 100 tonnes,
- Two (2) mobile cranes, with a lifting capacity of 120 and 150 tonnes respectively,
- 78 Forklifts (lifting capacity up to 37tonnes)
- 24 Loaders
- Other cargo-handling equipment (derricks, platforms, etc.)

The storage of conventional cargoes takes place in 85,000 m<sup>2</sup> of warehouses (out of which 21,500 m<sup>2</sup> and a reefer warehouse of 4,000 m<sup>2</sup> are located in the Free Zone). Sheds cover an area of 12,000 m<sup>2</sup> while outdoor storage areas are 500,000 m<sup>2</sup>



**Figure 6. Conventional cargo terminal**

The main customers of the conventional cargo terminals are AEE Chalivos (transports mainly iron and steel products and scrap), Sidenor (mainly transports scrap), Titan (transports pet coke, mortar, clinker and cement), Skopje Steel Industry (transports iron and steel products) and LARCO (mine and solid fuel).

The Free Port handles community cargo from/to EU member states and community/domestic cargo from/to Greek harbours. Quays 15 to 24 constitute the conventional

cargo terminal of the Free Zone. Cargos of all origins and destinations, including the above, are handled in the Free Zone.

The table below shows the type of cargo that was handled within freight terminal in 2011 and 2010 and the variation between them. This is also the basic type of cargo that is handled at the port. Types of cargo include liquid bulk, dry bulk (conventional terminal) and containers (container terminal). Liquid bulk contains crude oil, refined products, and liquefied gas. Dry bulk consists of cereals, oil seeds, coal, ores, and fertiliser. General cargo includes metal sheets, fruits, tobacco, etc.

YEAR	2011			2010			Difference %
	IN	OUT	TOTAL	IN	OUT	TOTAL	
<b>TOTAL TONNAGE (in tonne)</b>	<b>9.889.554</b>	<b>3.818.759</b>	<b>13.708.313</b>	<b>11.980.560</b>	<b>4.146.664</b>	<b>16.127.224</b>	<b>-15,00</b>
<b>LIQUID BULK</b>	<b>5.327.456</b>	<b>767.865</b>	<b>6.095.321</b>	<b>6.965.028</b>	<b>1.324.696</b>	<b>8.289.724</b>	<b>-26,47</b>
Crude oil	1.798.391	0	1.798.391	4.023.570	0	4.023.570	<b>-55,30</b>
Refined Products	3.212.851	762.000	3.974.851	2.699.564	1.292.262	3.991.826	<b>-0,43</b>
Liquefied gas	273.214	1.345	274.559	230.627	16.280	246.907	<b>11,20</b>
Other Liquid Bulk	43.000	4.520	47.520	11.267	16.154	27.421	<b>73,30</b>
<b>DRY BULK</b>	<b>2.524.478</b>	<b>1.068.479</b>	<b>3.592.957</b>	<b>3.029.954</b>	<b>1.014.664</b>	<b>4.044.618</b>	<b>-11,17</b>
Cereals	93.544	74.613	168.157	44.162	115.764	159.926	5,15
Cattle feed/Fodder/Oil Seeds	134.494	4.441	138.935	159.878	12.375	172.253	-19,34
Coal	479.241	0	479.241	638.537	9.751	648.288	-26,08
Ores	1.215.519	703.155	1.918.674	1.346.998	329.231	1.676.229	14,46
Fertiliser	56.768	0	56.768	49.839	0	49.839	13,90
Other dry bulk	544.912	286.270	831.182	790.540	547.543	1.338.083	-37,88
<b>GENERAL CARGO</b>	<b>2.037.620</b>	<b>1.982.415</b>	<b>4.020.035</b>	<b>1.985.578</b>	<b>1.807.304</b>	<b>3.792.882</b>	<b>5,99</b>
Containers/Flats*	1.433.847	1.581.473	3.015.320	1.397.463	1.462.518	2.859.981	5,43
Ro/ro	22.930	38.874	61.804	25.480	54.740	80.220	-22,96
Other General Cargo	580.843	362.068	942.911	562.635	290.046	852.681	10,58

**Table 9. Waterborne traffic.** (\*Tare weight included)

## 2.5.2 Passenger terminal

For the facilitation of cruise traffic there is special configuration of the docks and a properly organized part of the passenger terminal "Macedonia", which meets the Schengen Treaty. The Passenger Port is able to simultaneously accommodate up to three medium-sized cruise ships or alternatively one medium-sized and one large cruise ship. The Passenger port of Thessaloniki has facilitated in the past several of the largest cruise ships.

Cruise passengers could get services such as: WC's, Card Phones, Vending machines, Wi-fi spots, Check-in counters, ATMs, customs control. Cruise ships could be provided with services such as: berthing, anchoring, waste reception, water supply, storage facilities, medical first aid station, chemical laboratory, fire brigade department, pilotage, lashing/unlashing and cruise ship supplies. There are also some other services that are not provided exactly by ThPA SA but by private companies, such as: mooring – unmooring, towage, luggage handling, bunkering and ship supplies (food, consumables, etc.).

Cruise ships are facilitated at the area between the 1st and the 2nd pier. The cruise terminal can facilitate cruise ships up to 400m (length) at the quays 4 - 8 and cruise ships up to 230m (length) at quay 9. The pier between quays 4-8 can facilitate simultaneously two cruise ships of about 200m. The depth of the cruise terminal (at the

quay front) is 8 m between quays 4 - 8 and 8.6 m in quay 9. The average depth is 8.20 m at a distance of five meters (towards sea) from the quay walls 4 - 8. Total quay length reaches 6,200 m and average sea depth around port is about 12 meters. Area of coverage reaches 1,500,000 m<sup>2</sup> and storage area covers 600,000 m<sup>2</sup>. The cruise terminal is well protected from weather conditions (winds, undulation etc.) providing a safe berthing for cruise ships.



**Figure 7. Passenger terminal**

Coastal (ferry) traffic plays an important role in the ports' activity as it links Thessaloniki with the Greek islands. Ferry lines are operating throughout the year, while the service frequency is increasing during the summer period, serving the following destinations:

- North Aegean Islands,
- Dodecanese, Samos
- Cyclades and Crete,
- Northern Sporades.

The port of Thessaloniki is the gateway to the Aegean islands, serving the travel needs of the city's residents, especially during the summer months. The Passenger Port also has a large waiting area for trucks and private vehicles before embarkation.

### **2.5.3 Culture and communication area**

Adopting a modern approach and enhancing the relation between the port and the city, ThPA SA disposes of premises to host multipurpose activities. A series of warehouses on the 1st pier have been internally rearranged to host modern multipurpose uses and



events (conferences, seminars, exhibitions, film projections and reception halls), while preserving intact their traditional architecture.

The combined use of those premises, the operation of the three museums (Film, Photography, Modern Art) and of Thessaloniki Film Festival have established the 1st pier as a venue of cultural activities, popular to the city public and the traditional port as a pole of attraction of both local and foreign visitors.



**Figure 8. Warehouse A of pier 1, capable of hosting cultural events**

#### **2.5.4 Parking areas**

ThPA SA in the context of exploiting land and infrastructure, apart from using warehouses as event hosting places, it manages two private parking areas of total capacity of 595 parking spaces. These two areas are located close to urban commercial centre assist traffic congestion upgrading, in parallel, citizens quality of life, due to the fact that they are strategically located in terms of access of the city centre.

ThPA SA attempts to provide its infrastructure for urban needs (cultural events, mobility needs, etc) so as to foster closer cooperation between the port and the city. Main aim of ThPA SA is to incorporate the entire available infrastructure to citizens' activities with respect to environmental issues. To this end, the operation of these two parking stations helps mitigation of traffic congestion in the central area of Thessaloniki.

Parking area of passenger terminal includes 245 parking lots is located near passenger terminal to facilitate and alleviate traffic which could take place in front of passenger

terminal. Also Gate 6 parking area (350 parking lots) is located at city west access area.

### 2.5.5 Technical attributes

Terminal's strategic location facilitates freight forwarding to a great extent. Terminal's attributes depict its capability and capacity to perform and serve well-known shippers, travel agents and logistics service providers and meet their needs. Below, there are some indicators that can describe terminal properties and be associated indirectly to the level of service:

- **Saturation ratio:** is the ratio between actual volumes and maximum capacity (%). This indicator represents how much of the terminal/interchange capacity is utilized. ThPA SA full capacity in TEUs is about 450,000 per year. Number of TEUs handled within ThPA SA (2011) was 295,870. So, the saturation ratio is 66% for TEUs.
- **Expandability:** is the potential for expandability of interchange/terminal, basically estimated as % increase potential from today's transshipment capacity. Today, the major project carried out within port's area is the expansion and enhancement of 6th pier. This will boost transshipment capacity to 1,200,000 TEUs annually and this is translated into 133% increase compared to the current maximum capacity of 450,000 TEUs.
- **Distance from city centre:** Number of kilometres from city centre to terminal. This indicator reflects interaction of terminal with the neighbouring land-uses, transport network, commercial activities, etc..Thessaloniki's city centre is about 1,0 kilometre far for terminals central commercial gate. The passengers gate is even closer to city centre (0,5 km).
- **Distance from nearest highway:** Distance of port's central commercial gate to the nearest highway (which is the main North – South road axis of Greece) is about 1,5 kilometres.
- **Platform access distance:** implies the distance covered on foot from terminal's main entrance to platform (quay) where ships are departing, and is about 500 meters.
- **Clarity of ways:** implies the plainness in which services and facilities are explained by signage, design, etc. This indicator is a tool for helping passengers realize and identify the proper ways for satisfying their terminal-related needs. For instance, it may refer to proper signalling and marking and information provision within the terminal. The scale starts from 1 (less clear identification of ways) to 5 (maximum clarity of ways identified) and it was structured theoretically to depict the clarity inside terminal ,in a simple way. Empirical estimation of the interviewer considers ThPA SA to score 4 out of 5.

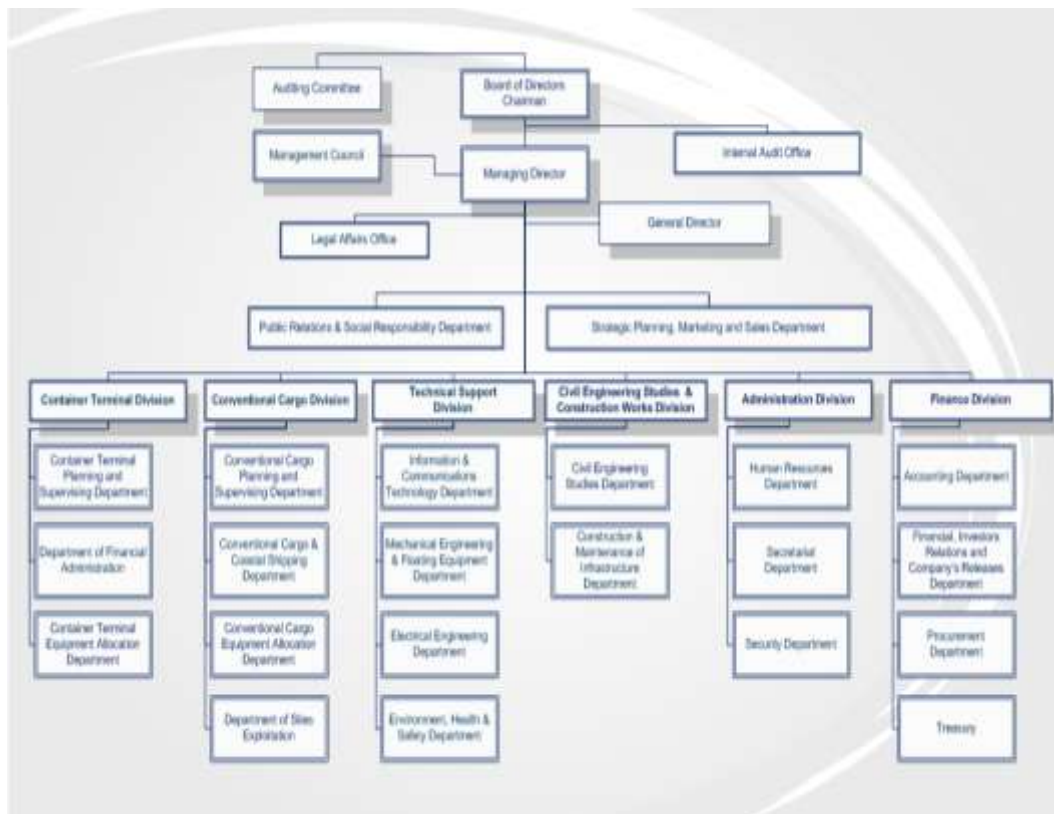
### **3 Planning, ownership and organisation**

#### Organisation and ownership, operations

##### **3.1.1 Ownership, management and operational structure**

ThPA SA SA was established in 1999 as a private entity (private law of public utility) with managing and operating responsibilities of port facilities. The land and infrastructure were conceded by National government to ThPA SA (according to concession contract signed on June 27<sup>th</sup> of 2001) for operation, management and exploitation until 2041. Since May 14<sup>th</sup> of 2012, 74% of total shares of public sector in ThPA SA SA are transferred to Hellenic Republic Asset Development Fund SA. This fund will use public sector property for further privatization and Greek debt servicing. Currently, national government indirectly owns ThPA SA. Land and infrastructure belong to national government too, but operations are being performed by ThPA SA SA as well as all other services provided. ICT-systems operation and maintenance are subject to ThPA SA's responsibility too.

Due to the fact that ThPA SA is the managing body of port operations, all other involved stakeholders are in close contact with ThPA SA. Especially those stakeholders who take a direct advantage of port services (i.e. logistics service providers) share a relationship of interdependence between stakeholders. Besides this, ThPA SA's responsibilities are vital either for strategic planning of operations and management of port services or for policy making as well as for launching marketing strategies to strengthen its position into market competition.



**Figure 9. Internal organizational structure of ThPA SA SA.**

Different types of stakeholders play an important role (one way or another) to the overall performance and operations of ThPA SA:

- ✓ European Union carries mainly a legislative and regulatory role. ThPA SA is always in line with EU policy regarding port operation and services and relevant issues.
- ✓ National government also plays a vital role in regulatory part which defines the framework of operations, services, management, etc. in national level. Legal initiatives concerning port operations of government should be instantly adopted by port managing entities. Also, national government set policy goals regarding ports development policy. It should be also mentioned that national government (on behalf of public sector) is considered as the infrastructure provider.
- ✓ Regional and local authorities (Administrative authority of Central Macedonia and municipality of Thessaloniki) try to cooperate and coordinate their actions in terms of urban development initiatives. Practically, conflicts of tasks between regional level authorities and port managing entity are rare.
- ✓ Freight forwarders are the demand side stakeholders which make use of port's facilities to accomplish their business objectives. Their role is crucial and they support financial viability of ThPA SA. Tight relationship between them and ThPA SA is essential.
- ✓ Terminal manager and operator – ThPA SA – is responsible for the management, operation and maintenance of port's premises as well as systems (equipment) operation and maintenance.

- ✓ The transport (and logistics) operators are the cornerstone of port's economic viability. They are also part of demand-side stakeholders.
- ✓ Rail operator (hereinafter OSE) owns the rail network inside and outside port's restricted area. Also, OSE is performing rail transport of goods with the cooperation of respective logistics service providers from and to the port.
- ✓ In passenger transport, travel agents provide a 5% part of each ticket's fare to ThPA SA. In general, ThPA SA's role in passenger transport is very limited, in addition travel agents are the most responsible for ticketing and travelling issues.
- ✓ Dockers are considered as employees of ThPA SA SA under the framework of formally so called profession 'stevedores'. They are responsible for providing mainly stevedoring services within port area.
- ✓ Customs officers are employees of the national government (ministry of economy - public sector). Their core tasks are to perform customs clearance, a process in which they check and verify all types of cargos entering the restricted port area. Customs and harbour master are public authorities and they have not competing interest with the rest ThPA SA staff. Harbour master plays a police safeguarding role in coastal and marine area (instead of police).

It is evident that some kinds of stakeholders have stronger relationships with port managing entity such as the private sector (demand – side stakeholders) that are considered as ThPA SA SA customers.

Every month the port development council is assembled and its main task is to exchange opinions on port's issues and decisions are made on tackling any problems appearing. Port development council is a non-institutionalized advisory board that consists of institutional representatives by relevant chambers and users of port services. Representatives who participate are coming from the following bodies: ThPA SA SA, International Naval Union, Commercial and Industrial Chamber of Thessaloniki, Union of travel agents in Macedonia and Thrace, Association of customs agents of Thessaloniki, Association of Shipping agents in Thessaloniki, Greek International Business Association, Federation of industries of Northern Greece, Association of international freight forwarders and logistics enterprises of Greece, Association of Transport enterprises of northern Greece and Navy Retirement Fund.

Many freight forwarding and transport operating private companies are members of the aforementioned associations. This justifies the need for assembling the council whose main role is to discuss and suggests solutions on the potential issues addressed. This advisory channel is valuable for ThPA SA because it helps managing authority of the port to adjust and launch policies that help its customers on their business operations.

### **3.1.2 Regulatory framework**

Thessaloniki Port Authority Societe Anonyme (ThPA SA) established in 1999 in line with legal framework 2688/1999 which stipulated the transformation of Thessaloniki Port Authority, a public law entity, into Thessaloniki Port Authority Societe Anonyme,

Private Law Company. ThPA SA is governed by respective provisions of Greek legal framework 2688/1999 and its amendment as legal framework 2881/2001. It is also in line with some legal provisions of framework 2190/1920 (referring to Societe Anonymes) and also Legislative Decree No 2551/1953 (2007 data that have not been changed yet).

As mentioned before, national government (on behalf of Greek public sector) conceded land and infrastructure (systems, ICT, equipments, etc) of the port of Thessaloniki to ThPA SA in accordance with the legal framework 2892/2001. The above contract was ratified by Law 3654/2008 on 3/4/2008 and approved by the Regular General Meeting of the Shareholders of ThPA SA on 30/6/2008. By this law, the initial term of the contract was extended from 40 to 50 years, so it expires in 2051 and the exclusive right of ThPA SA to use and exploit the land and infrastructure can be conceded by ThPA SA to third parties for purposes related to the provision of port services and facilities and for a period of time not exceeding the contract extension.

Board of Directors of ThPA SA is provisioned by the same legal framework pursued to establish ThPA SA, (No 2688/1999). In this regard, it is outlined who is in charge of nomination of the members of Board of Directors in compliance with shareholding of the company and their interrelationship with the other shareholders. ThPA SA is also governed and operating in accordance with the Code of Corporate governance which defines the responsibilities of BoD (Board of Directors) and other shareholders. It also defines principles and under which BoD is being validated by internal and external bodies. This code was compiled by ThPA SA administration, taking into account Greek legal frameworks 2190/1920, 3604/2007, 3884/2010, 3873/2010 and 3016/2002, 2693/2008. Moreover, Code of Corporate Governance which was published by Hellenic Federation of Enterprises in January 2011 was taken in consideration as well as principles of Corporate Governance by OECD.

ThPA SA is internally working in line with the framework described in Regulation of Internal Organization and Operation (4726/20-4-2011) published to the Government Gazette in May, 20<sup>th</sup> of 2011. This regulatory layout was determined by BoD of ThPA SA and also parties of trade unions of employees in ThPA SA. This framework outlines the tasks and responsibilities of each Division of ThPA SA and processes defining staff turnover. General Staff Regulation is also another internal document-based framework framework that determines staff issues and responsibilities.

As a reminder, by May the 14<sup>th</sup> of 2012 and according to legal framework 3986/2011 and 195/2011 and also the decision of the Ministerial Committee for Privatization and Restructuring., 74,27% of the total shareholding structure (previously in the property of national government) 'belongs' to Hellenic Republic Asset Development Fund SA, a fund managed by national government. This fund is structured for privatization of public asset. However, national government, indirectly, though, still owns the majority of shares.

Regarding Port Development Council, there is not any institutional framework that outlines its establishment and operation. This council is a pure advisory board whose main role is to arrange priorities regarding port's operations and management. All

members of the council (who are representatives of specialized associations mentioned before) are internally appointed by their corresponding body and associations to represent them in the board. Also, the relationship between participants of that advisory board is internally defined based on oral consensus between participants. Thus, there is not any legal or institutional character as far as Port Development Council is concerned. Participating parties in Port Development Council share common interest on enhancing level of service while also interested in cost mitigating actions. Therefore, there is strong homogeneity in perspectives of involved stakeholders.

### **3.1.3 Planning and operation/construction process(es) – Financing and funding as part of planning process**

The private company's layout of ThPA SA characterizes all internal processes. Strategic planning, internal operations and construction projects are processes that totally rely on ThPA SA initiatives. National government in terms of public sector does not have or have not previously had any involvement in such processes. The only kind of involvement that could be pinpointed is related to legal and institutional framework of the official (national and EU) sector which urges ThPA SA to pursue it.

As far as financing concerns, ThPA SA is a self-financed private body and all funding sources are internal. Operation and maintenance of land and infrastructure (including facilities and equipment) are subject to internal sources. In special cases the port managing entity could recourse to external bank loans for investing to costly projects. National government is co-funding (subsidizing) only in rare cases, when projects are considered as of high importance that serve country's infrastructure development.

Special attention should be paid in the publishing needs for ThPA SA investments. Each initiative that is about to be launched should be firstly included within scheduled-projects context in annual reports. Similar to the previous action is the one that requires the integration of each project in the program of investments compiled by ThPA SA. This facilitates processes that have to do with national government involvement especially when funding issues occur.

On the other side, planning and construction processes rely on similar principles. They are determined by all previously mentioned regulatory codes and legal frameworks that exist. According to the concession contract (2001), ThPA SA has the right to launch such initiatives. Special division (Sales and Strategic Planning) of ThPA SA launches initiatives to be implemented and the process that is followed is outlined by national legislation with auxiliary directives of EU. The national government could interfere only in cases of national projects of high importance where different processes are being pursued.

ThPA SA is the responsible body for safeguarding safety regulations and rest legal regulations during construction works. It is also responsible for the assignment of projects construction and implementation and the authorization and validation for projects to be established and all appropriate terms to be adhered. Furthermore,

planning of each project relies on ThPA SA even if this project is funded by national government (in cases of high importance national initiatives).

Other planning issues include policy-making (apart from construction projects) require the involvement of several stakeholder groups depending on the nature of the initiative. Nevertheless, the usual process which is followed contains either the implementation of national legislations or port policies (National Port Policy determined by national government) by port managing bodies around Greece or the assessment of the initiative proposed by ThPA SA planning division by national government. In the latter, the idea is provided by Port Development Council and then better structured by Strategic Planning Division of ThPA SA. BoD is the next level of decision-making and according to the recommendation and acceptance, the project is then addressed to national government for further authorizations or remarks. In some cases, though, the steps could be made a bit different due to which board fosters the initiative.

Under the light of planning and operations also, in some projects ThPA SA plays the role of contracting authority. For instance, container terminal was conceded to a private company for use and exploitation (operating) by ThPA SA, by crystal clear calls contracting. Public Private Partnership framework is not used because ThPA SA could not act as a public sector entity. The only kind of concession that could be established was the one adhered in the case of container terminal.

Port services (stevedoring, anchoring, etc.) depend on the ownership status of managing authority. In the case of ThPA SA, services and policies are being elaborated by ThPA SA instead of those which national government should execute and are clearly defined in the concession contract. Planning process is absolutely upon ThPA SA. In general, ThPA SA acts as a stand-alone entity of private interest. The role of public sector (national authorities, EU) is regulatory and sometimes financial.

With respect to discrepancies, great issue to be tackled is potential delays taking place between strategic planning of an initiative and its implementation. ThPA SA has ensured the rapid arrangement of such issues by establishing a proper and efficient system which abates internal bureaucracy. So delays are not identified during implementation processes due to ThPA SA ineffectiveness. Usually, drawbacks occur by national government's bureaucracy. This includes delays in funding, permissions and amendments of legal framework to ease ThPA SA initiatives and policy-making. The problem gets worse when it contains the involvement of official sector for huge construction works. The reason is that such initiatives require (according to Concession Contract) the authorization and funding of national government. But this is prohibited in compliance with European Law which considers that public subsidizing to private initiatives violates the conditions of free market competition. To this light, special authorizations and funding may be needed by EU for justification of public funding activities. All that could cause a significant delay in the accomplishment of the project. Legal framework needs to be clarified and improved to facilitate funding and financing of new infrastructure.



### **3.1.4 Sharing of information**

With respect to freight transport information sharing between stakeholders, ThPA SA has established an integrated platform called TOS (Terminal Operating System) which develops technological applications that optimize the existing services provided by the company while updating and improving its competitiveness. TOS assists yard and gate planning and it is open only for transactions at the container terminal, not in the conventional cargo one. This electronic platform is available to involved stakeholders (freight forwarders, ThPA SA corresponding parties, etc) for scheduling cargo loading and unloading.

Terminal upgrade in operations and infrastructure is achieved through:

- The installation and use of advanced telecommunication networks.
- The securing of an automatic and safe control of movements to and from the Terminal from the land and the sea.
- The optimisation of container receipt/delivery time and space.
- The control of collection/stowage in the stowage area.
- The graphic surveillance of container position (GIS-GSP)
- The automated integration of relevant actions.
- The provision of alternative communication systems.
- The electronic submission of official documents.
- The electronic information of customers with regard to the position and state of the containers in the Container Terminal

For passenger transport, information could be obtained through call centre of Thessaloniki's master Harbour which is aware of ferries schedule (arrivals and departures) as well as other passenger related information. Besides this, travel agent offices that are located near passenger terminal have the main responsibility for providing information on ships schedules.

ThPA SA has created a 24h customer information board that allows citizens and travellers to be informed on several issues. Complaints, clarifications and information could be easily elicited by this call board. Also, for deriving such information email services are provided.

### **3.1.5 Suggested improvements**

The new administrative model proposed relies on two pillars:

- A port authority based on the landlord port model. The landlord port model is designed with a view to decreasing the investment costs for port operators, thereby making the port attractive for additional operators as well. Terminal handling charges could then be lowered, which is beneficial to the port users. Instead of the port providing both commercial and regulatory functions, the private sector is invited to set up and operate commercial facilities while the port authorities continue to own the land and basic infrastructure assets as well as discharge their regulatory functions.

- In line with the above recommendation, access could be allowed to a variety of port service providers (i.e. stevedoring companies) which will be focused in a specific activity. These providers will be delegated services by the central port administration through grant concessions and other leasing tools. Hence, port authority will be flexible to diversify operations into disparate terminal facilities.

Other strategic actions could include:

- Project master plan and business plan of the port, to provide the long term strategic planning.
- Fostering the implementation of a logistics centre inside port area which will assist port operations
- Efficient exploitation of the port real estate
- Strengthening of relationship between port managing entity and citizens of Thessaloniki by launching initiatives of corporate social responsibility. The exploitation of 1<sup>st</sup> pier towards this direction could facilitate achievement of this goal.

### 3.2 Indicators related to policy, organisational and institutional structure

Policy-related indicators are the following ones:

**Multimodality rate.** It reflects the percentage of multimodal versus unimodal shipments or itineraries. It could represent the degree of multimodality at an aggregated level (typically for a region) and apparently it has as prerequisites the appropriate infrastructure for multimodal transport chain.

As far as freight terminal regards, multimodality reflect Roll-on Roll-off activities that represent only 0,5% of total cargo shipments. In passenger transport, multimodality is more often culture because of the car ferries. Due to the complex character of this data, it was assumed that a vehicle (car, truck, or motorcycle – no buses were registered) could employ two passengers. For 7,666 vehicles that were identified in disembarkment phase and 6,467 that were embarked in ships, there are 15,332 passengers disembarking and 12,934 passengers embarking leading to a total of 28,266 passengers out of 64,785. Hence, in 2011, 44% of total passenger flow used multimodal way of travelling.

**Modal split in access/egress.** It implies the percentage of trips made by road, rail, bus, taxi or slow modes. Lack of data makes it hard to depict a trend. However, the majority of access and egress to/from the port is being identified using cars or taxis.

Organisational and institutional structure could be prescribed by three indicators:

**Independence of terminal/interchange management.** This stands for independence from transport operators and local actors. This indicator requires description if there are dependencies (formal or informal). Often (but not always), independence is desired.

ThPA SA acting as a stand-alone private body is totally independent from national government and other private sector entities. The only conflict with other private companies relies on market competition ('customers' like freight forwarders, transport operators, etc.)

**Fair and equal access.** Whether all companies have access to a terminal/interchange on equal conditions (yes/no/partial). As it is written clearly in Concession Contract (2001), '...ThPA SA should ensure equal access and equal treatment of port users and favourable and adverse distinction between them should be avoided'. And so happens.

**Institutional complexity.** This term reflects the number of institutional levels involved in a) interchange planning b) interchange investments. In Thessaloniki port case, investments are part of general planning and this could vary from 3 or 4 different levels according to each case.

Although, the indicators described above could capture, in one way or another, policy and institutional structure effectiveness, there are not used by ThPA SA to measure efficiency of policy-making, institutional complexity, etc., neither the rest stakeholders do. Nevertheless, empirical judgment related directly to economic performance could be considered as indices that could map the policy and institutional structure capacity. Any issues addressed during planning processes or structural pitfalls that may appear are being immediately tackled so as to ensure that policy-making, planning and implementation processes are efficient.

## **4 Outputs and level of service**

### **4.1 Interface and interconnection, related services**

#### **4.1.1 Ticket integration and information provision for passengers**

Level of service in passenger and freight terminals is indicative criterion for attracting customers. Indeed, level of service in passenger interchange terminals consists of added-value services which make passenger transport more seamless. Ticket integration is one of those added-value services which is being pinpointed at multi-modal trips. Passenger terminal of Thessaloniki's port has not considered incorporating such service yet, more probably due to urban transport network issues. Lack of integrated passenger transport network in city of Thessaloniki which sources from the existence of a monopole in urban public transport modes (only diesel buses passenger service) and the inexistence of organized urban passenger service network may cause incapability to introduce such service.

In addition, information provision for travellers – valuable and useful service – has been integrated into terminal. Stakeholders involved in passenger terminal cooperate with each other regarding information sharing. Passengers and stakeholders constitute an internal information provision network which (maybe due to the low passenger volume of port and thus limited requirements) works fine. Apart from website, call centre of Thessaloniki's coast guard can provide information on arrival and departure of ships,

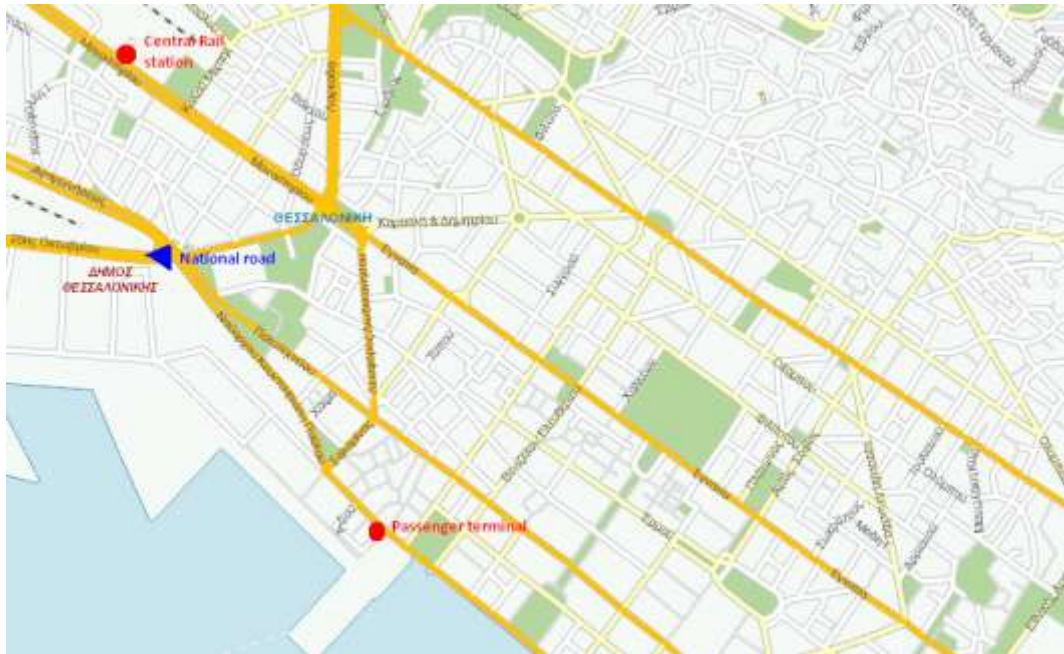
whereas travel agents mainly offer information services on schedules of passenger vessels. Also, there is an ICT system called TRANSLOG NET providing real-time information on passenger transport. This system uses electronic Variable Message Signs which inform passengers on arrivals and departures of ferries.

Information provision for passengers is also organized through the use of Info Kiosks, a small automated boxes that provide information to passengers about the city, ferries scheduling, etc. The same kind of information could be derived either by a special board organized by ThPA SA, able to provide 24h information service or by phone call to Thessaloniki Harbour master for departures, arrivals and delays of the ships. Travel agents could also inform users and travellers for ferries trip scheduling. Wi-fi hot spots are spaces with strong wi-fi signal and users could use their laptops or cell phones to acquire internet access. Another service, not directly linked to information, is the existence of Automated Teller Machines, a service that will cover financing needs of users.

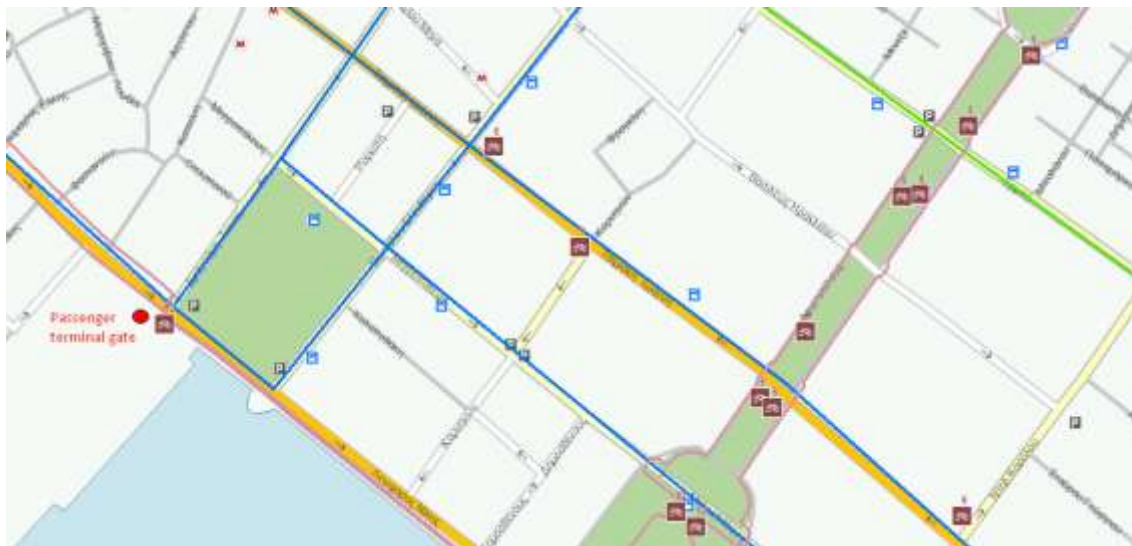
#### **4.1.2 Interconnection between long and short distances**

##### **4.1.2.1 Passenger transport**

Infrastructure in passenger terminal is capable of servicing multimodality needs but there is still room for improvements. The existing infrastructure encompasses two restricted parking areas very close to passenger terminal in order for servicing access/egress. Taxi station is just outside terminal for those who would like to reach terminal with a taxi or leave it and bikeway access to the terminal is available. Although there is not high level of service regarding interconnection with urban public transport, outside the terminal there is a bus stop that facilitates access to the central and eastern side of the city. Close to the passenger terminal is located the rail terminal, but it is accessible only with taxi. National road network is also easily accessible as it is around a kilometre away from the central gate of passenger terminal. These are, in a nutshell, the access networks to the passenger terminal of port of Thessaloniki.



**Figure 10. Distances of transport terminals over city context**



**Figure 11. Urban public transport network (blue) and bikeway network (pink) around passenger terminal**

#### **4.1.2.2 Freight transport**

The location of freight terminal facilitates, as previously indicated, the cooperation of freight forwarding companies with ThPA SA. The fact that freight terminal is close to industrial area of Thessaloniki, where many freight forwarders are established, boosts business capacity of them. It is considered that around fifty shippers and twenty logistics service providers (LSPs) are cooperating with the managing entity of freight terminal. Consequently, terminal's level of service is intuitively upgraded as the last (or first) leg of transportation is performed in a very short period of time.

It is worth mentioning the transport chains that are being serviced through freight terminal. From Indonesia and Malaysia cargo vessels reach Thessaloniki port and then cargo is transhipped to rail wagons which are destined to Northern Greece and FYROM. Cargo type is minerals for nickels processing plants and thus is used the conventional cargo terminal. Another worth-mentioning supply chain includes as origin Ukraine (via maritime transport) and through transshipment, destination Greece (via road transport) and FYROM (via rail). Cargo type is coal for cement industry. Steel products are being transported to Italy, Spain and China through Thessaloniki's port. This type of transport chain has as origin Greece or FYROM. Finally, it should be highlighted that final consumer goods with a destination to Balkan countries are being transhipped in container terminal of Thessaloniki's port. Usually, vessels are travelling from China and Hong Kong.

#### **4.1.3 Suggestions regarding improvements**

Yet, further improvements could be achieved; a freight centre including co-location of shippers and LSPs would be a solution that could interact with terminal and offer more and better services, with foci to freight forwarding and operating. Services that require collaboration of shippers and LSPs contain road transport, logistics services, labelling, city logistics and other logistical sub-services. Hence, interface of respective transport legs could be improved due to the integration of logistics activities and involved stakeholders into an efficient centre.

To enhance information provision, the establishment of a port community system, an internet-based platform, could ease information provision and sharing both for freight and passenger transport activities. This integrated platform could act as a tool for channelling of desired data for operators and an excellent information board for travellers. Lately, more added-value services could be incorporated like e-ticketing and e-bay planning. The additional potential of logging in via cell phone could provide information to a greater extent.

## **4.2 Productivity and effectiveness in terminal**

ThPA's SA turnover for the fiscal year of 2011 amounted to € 51,222,138 against € 49,617,466 for the correspondent fiscal year of 2010 exhibiting an increase by 3.23%, attributed to the increase of the sales of the Container Terminal by 6.01%, to the increase of the sales of the rest provisions of services to ships and cargoes by 5.35% and to the increase of the sales of the conventional port by 0.35%. As a result of the increase of the sales and the decrease of the expenses, the gross profits amounted to the sum of € 16,215,195 (against € 11,557,575 in 2010) exhibiting an increase of 40,30 %.

**Figure 12. Monthly evolution of TEUs volume over the years 2006-2010.**

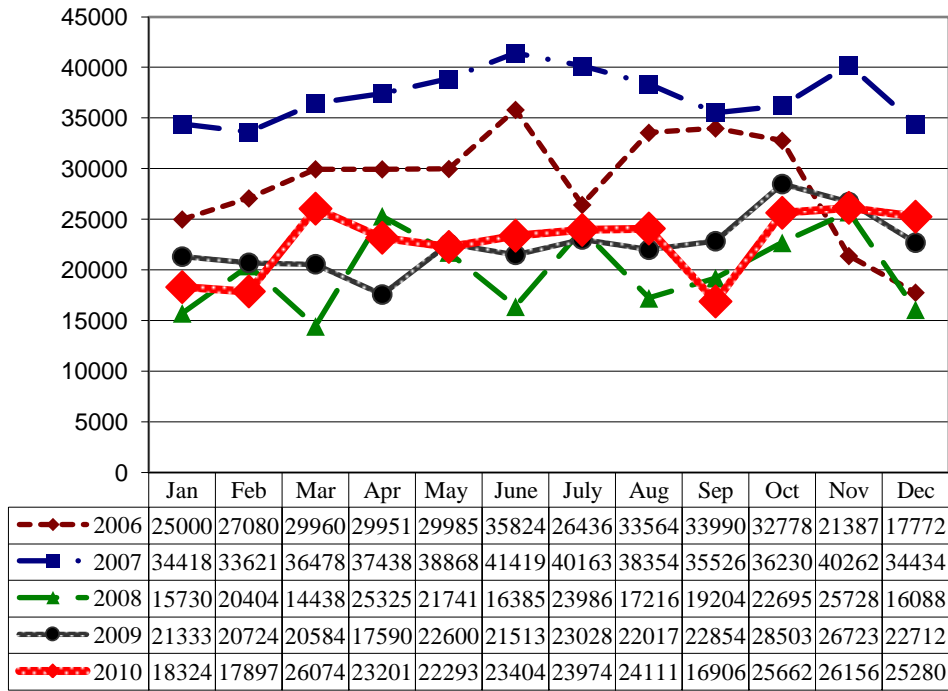
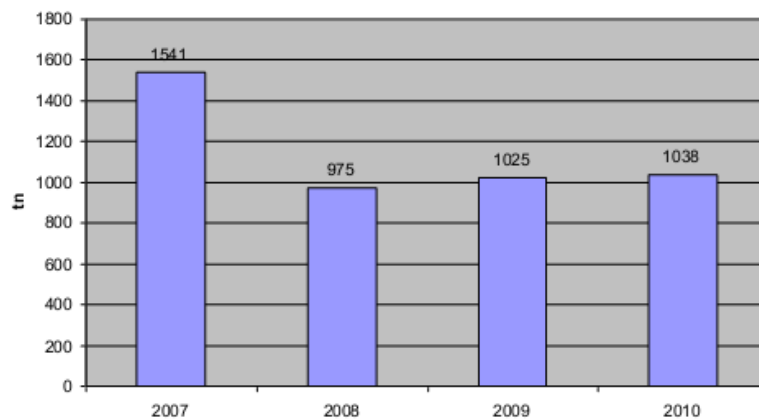
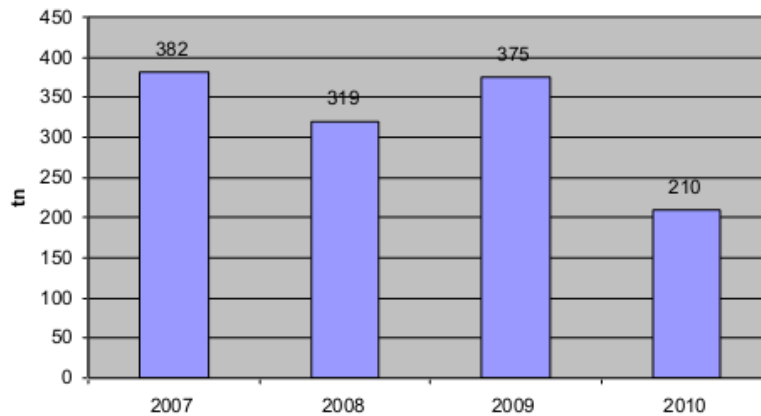


Table 8 presents TEUs volume per month for years 2006 to 2010 (2011 data are yet to be compiled). A productivity indicator that could be estimated from these values is the ratio between the lowest and highest monthly throughput (volume) handled by the port terminal. For the year 2010, it is equal to 65% and for year 2009 is 62%. In 2006 the same ration was 50%. As a result, the ratio varies between 60 to 65% indicating a relatively moderate fluctuation.

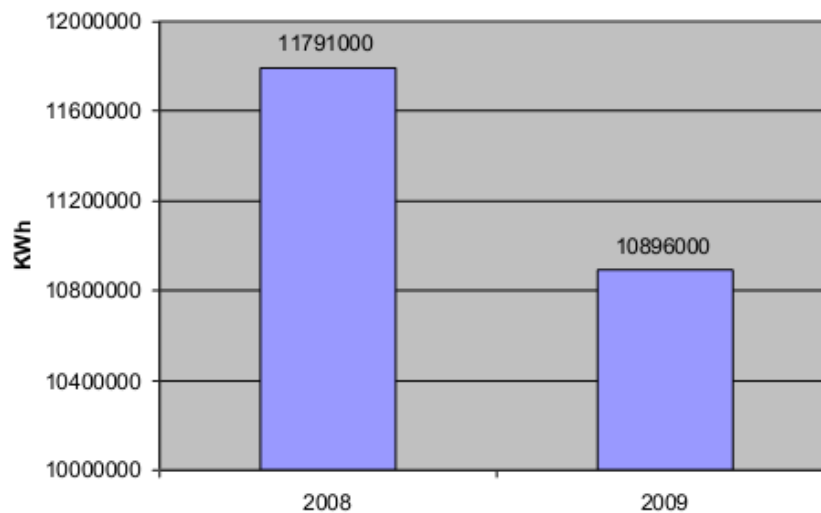
Two more productivity indicators precisely showcase productivity level of terminal. Equipment productivity is related to TEU (terminal throughput) lifted per year and per crane. Four cranes used in the year 2011, so there is an amount of 73968 TEUs/crane. Energy productivity refers to terminal energy use per year and TEU transhipped or passenger. Energy use in interchange/terminal related to the production in terms of TEU (freight transport) or passengers (passenger transport). The lower energy use, the better it is. An indicative value for the year 2009 is 40,33 KWh/ TEU (for total 270,181 TEUs) and 68,88 KWh/ passenger (for total 158,181 passengers).



**Figure 13. Fuel-diesel oil consumption**



**Figure 14. Heating oil consumption**



**Figure 15. Electrical energy consumption**

### 4.3 Indicators related to performance and level of service offered

Level of service can be described better by performance, economy and other types of indicators.

- Handling cost is about 100 €/TEU and reflects the average price paid per TEU through its handling of the terminal. It has to do with typical customer and other average values of affecting factors.
- Overall quality is better mapped by empirical estimation and complies with passenger transport. According to the interviewee, for Thessaloniki port, this indicator scores “good” as an average value of criteria like physical effort needed, personal comfort, information, perceived safety/security, etc.
- Time indicators of interchange concern average interchange time (average time for transfer between transport modes) which is about five to ten minutes in



passenger transport, and variability of interchange time, with respect to deviation, which is about 5 minutes. This indicates that walking time from ferries' platform to bus stop outside the terminal is approximately five to ten minutes.

- Punctuality is a grassroots indicator and representative for performance measurements. ThPA SA achieves satisfactory scores. This means 100% for passenger transport and 70% for freight transport. It is assumed that term 'punctuality' indicates a deviation between actual times of arrival/departure and scheduled ones of thirty minutes for freight transport and ten minutes for passenger transport.
- Safety of people and security of goods indicates that in a period of ten years there was only one fatality in ThPA SA personnel.
- Also, in loading and unloading activities people who are involved are continuously exposed to danger. Shipments involving goods damaged or corrupted or even lost represent 0,5 % out of total shipments that are performed.
- Employee productivity is measured taking into consideration employees, TEUs and passengers per year (2011). ThPA SA employs 476 employees for year 2011. Data inspection shows that each employee handles 621,6 TEUs and also corresponds to 136,1 passengers.

Other empirical indicators that are used to measure performance of freight terminal are the following:

- Time-related indicators (turnaround time, service times, etc.)
- Punctuality (in time frame, quantity, damages or not and proper documentation)
- Customer satisfaction
- Demand availability of equipment.

## 5 Analysis of Policy Advisory Group (PAG) Recommendations

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
<b>Policy recommendations</b>	
Integrate the administration of the public transport system	<p><b>Passengers:</b></p> <p>Thessaloniki's Integrated Transport Authority (ThITA) is in charge of the massive public transport system of Thessaloniki. At</p>

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
	<p>the moment, the only massive means of public transportation is bus.</p> <p>After the completion of the metropolitan railway and the establishment of the Urban Public Boat Transport of Thessaloniki, the scope of the administration will be metropolitan, and the need for an integrated system for the coherent provision of efficient services, under the umbrella of ThITA, will be significant.</p>
<p>Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform</p>	<p><b>Passengers:</b></p> <p>Due to the unimodal nature of Thessaloniki's public transport network and the lack of appropriate infrastructure for multimodal passenger transport it is difficult to achieve such harmonization. This requires the existence of more than one public transport modes and enhanced level of multimodal infrastructure. Also, integration of public transport system administration could help to that direction.</p> <p><b>Freight:</b></p> <p>Relative steps have been made and there is also such infrastructure so multimodality depends on each company business model.</p>
<p>Policy and legal frameworks should facilitate intermodal cooperation</p>	<p><b>Freight transport:</b></p> <p>The relative legal framework exists.</p> <p>The rail network in the port area, enables the accommodation of intermodal shipments, and in this framework, attempts are being made, through several types of interventions, for rendering the port of Thessaloniki as major transit node in Balkans.</p> <p>Such interventions, will improve the intermodal character of the port, but, on the other hand, policy making should also turn towards the integration of services and</p>

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
	operations by launching initiatives of integrated cargo (i.e. consolidation or logistics centres, freight villages) and also establishing incentives (economic) for promoting such models.
<b>Planning recommendations</b>	
Incorporate the transport planning process with land-use planning	<p><b>Freight transport:</b></p> <p>ThPA SA should exploit all space within port area to establish freight and logistics centre. Logistics centre initiative has been already launched by employing a logistics advisory board to support actions in this project. Storage capacity of containers has been increased after augmenting the storage area. Extension of pier no 6 will increase significantly TEUs handling capacity. Integration of administrative divisions into a single department for efficient space management. Expansion of Free Zone.</p>
<b>Financing recommendations</b>	
Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues	<p><b>Passengers and freight transport:</b></p> <p>Due to the private character of ThPA SA, it is not feasible to foster such partnerships.</p> <p>However, when/if ThPA SA is transformed into a landlord status managing entity, it could more easily establish concession agreements with other private companies to use and exploit plots, buildings and installations like the container terminal case which has already been implemented.</p> <p>In addition, such financing schemes could be developed for the improvement of the communication systems of the port, and the integrated information provision to passengers.</p>
Integrate the pricing of the public transport system	<p><b>Passengers:</b></p> <p>This recommendation does not concern the</p>

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
	<p>port. For reasons of completeness, ticket integration and integrated pricing are not implemented as there is only one public transport mode (bus). Other modes are foreseen, such as metro and boat, and integrated ticketing is also under study, as all these modes are controlled by one authority.</p>
<p><b>Organizational recommendations</b></p>	
<p>Use of business models for cooperation that also publically owned terminals can use</p>	<p><b>Passengers and freight transport:</b></p> <p>The existing business model of ThPA SA is very effective because it helps close collaboration between stakeholders and ThPA SA while ensuring confidentiality and equal treatment of all parties in the context of free market competition. Apparently, there is no need for change.</p>
<p>Structure the information provision</p>	<p><b>Passengers:</b></p> <p>The information provision is still in an initial level, a situation that could be probably justified because of the low volumes.</p> <p>Though, the information provision should be improved and re-structured under an integrated framework, if and when relative interventions are made, such as integration of ticketing, or establishment of new infrastructure.</p> <p><b>Freight transport:</b></p> <p>In the freight sector, the information provision is also in an initial level.</p> <p>Investments such as the establishment of electronic platforms for automation of operations and fast and easy information provision are defined as significant and needed. In this direction, relative steps are being made, like the adoption of ERP (Enterprise Resource Planning software), systems of e-payment and capable of</p>

<b>PAG recommendation</b>	<b>What is the current situation and is the recommendation important? If so, how?</b>
	reducing customs formalities.
<b>Infrastructure development recommendations</b>	
Constitute transport infrastructure management body for all modes	<p><b>Passengers and freight transport:</b></p> <p>It is still very challenging to be implemented because of non-harmonized legal framework and the dispersed premises of different modes. A common property character (public) is needed to avoid discrepancies.</p>
Adopt or create standards for physical infrastructure interconnectivity	<p><b>Passengers:</b></p> <p>At the moment, there is no physical infrastructure connection among the different modes.</p> <p>When public transport is integrated (metropolitan railway and Urban Public Boat Transport of Thessaloniki), a physical infrastructure connection would enhance the intermodal passenger character of the port.</p> <p><b>Freight transport:</b></p> <p>In the case of goods' transportation, a physical infrastructure exists, since both the road (trucks) and railway network "reaches" the port piers. A future intervention that will promote the physical infrastructure interconnectivity is the connection of the port with the Egnatia Motorway, which includes three vertical axes-sections of the Transport European Network.</p>
<b>Operations recommendations</b>	
Separate the owner from the operator	<p><b>Passengers and freight transport:</b></p> <p>Such a separation has been achieved and is working.</p>
Establish the cooperative framework between the terminal and the transportation operators	<p><b>Passengers and freight transport:</b></p> <p>There is a well structured cooperation and relative procedural framework between the terminal and the transportation operators.</p>

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
	Each role is explicitly defined and there are no overlapping issues.
Integrate the operations of the public transport interchanges	<p><b>Passengers:</b></p> <p>Although, considered as not applying here, such integration is not implemented and difficult to be pursued because of the lack of interchange infrastructure, scattered infrastructure and totally different character of operations.</p>

## 6 Analysis of gaps

### Freight

Lack of standardization	A key-trend that affects the whole transportation chain and the absence of which has been identified as significant barrier in transport, is standardization, in terms of transport infrastructure, transport means, transshipment technology, information, packing units, etc. (KOMODA project).
Lack of appropriate infrastructure	The existence of inadequate infrastructure, which blocks the wide development of efficient interfaces. Common problems associated with this gap are the “under dimensioning” and the inappropriate maintenance in existing networks and the lack of financial resources for the development of new interfaces.
Dependency of mode choice to economy and legislation	An indicative example of this gap is identified in the air freight transport, where the basic advantages of this mode – speed and safety - depend on potential changes in restrictions and fuel prices. At the same time, focusing mainly on urban distribution of goods, restrictions such as vehicles’ size and time window, may imply more trips and more vehicles with worse environmental performance, respectively.

### Passengers

Wasted time	<p>Poor links between transport modes.</p> <p>Long walking distances between modes of transport, bad signage.</p>
Poor information	<p>Poor information about multi-modal options.</p> <p>Insufficient information exchange between different operators.</p> <p>Single mode tickets.</p> <p>Missing information about local tickets for the last mile.</p> <p>Complexity of fare structures.</p> <p>Unavailable or undetectable multi-modal planning services.</p>

Poor quality	Insufficient additional services (i.e. shops). Unavailable multilingual information. Few members of staff providing assistance and security. Low frequency of services. Poor reliability of services (delays).
Foreigners and inexperienced passengers	When arriving in a foreign city, people often call a taxi, as they were not able to find reliable information of the available transportation system beforehand. Similarly, citizens who rarely use public transportation tend to take their private car (equipped with a navigation system) in order to move through their hometown – despite having to accept high parking fees – as they feel insecure when it comes to going by bus or tram.

## 6.1 Lack of standardization

The port operates under specific European and national standards, such as:

- The ISO9001/2008, regarding the container terminal of the port, following EU standards.
- The ISO9001/2008 for the total bulk load of the conventional port, apart from the grain, regarding the certification of handling activities.
- The Greek certification ELOT/1429, referring to the managerial capability of organizations implementing project of public interest-quality.
- The certification PERS (Port Environmental Review System) of Lloyds.

## 6.2 Lack of appropriate infrastructure

In the port of Thessaloniki, the problem in the development of infrastructure arises from the lack of financing. At the same time, legal restrictions cause problems (i.e. delays) in construction projects. More specifically, there are legal restrictions for the port concessions with duration beyond three years, and in the case of big construction projects, before commencing of the project, a ruling of the court of auditors and a common ministerial decision (three ministries) are needed.

Assessing the appropriateness of the existing infrastructure, the main deficiencies are indicated in the passenger terminal, which, due to the relatively low number of the travellers, has not been modernized enough, and, thus, direct interventions are needed for the improvement of the provided services. Also, interventions for the development of parking areas are indicated as catalytic for the improvement of the services provided to passengers. In addition, it has to be mentioned that the existing infrastructure does not foresee any special facilitation of the interconnectivity of different modes of passenger transportation.

Regarding the freight sector, the needed interventions, in terms of infrastructure improvement are limited, and regard the accomplishment of the expansion of the 6<sup>th</sup> pier of the port, a project that is scheduled for the near future.

### 6.3 Dependency of mode choice to economy and legislation

At the specific case study, legislation issues seem that do not affect the mode choice.

Regarding economy, the mode choice is dependent of the port and ship tariffs, concerning the use of the rail network or the road network through trucks. In the first case, the carriers should pay extra fees in order to use the railway, while in the second case, when using their own trucks, the companies have to assess the total cost, based on fuels' prices, packaging (in needed), etc.

### 6.4 Wasted time

Regarding the links among different transport modes, it can be mentioned that the port is at a driving distance of 16 kilometers from the International "Macedonia" Airport and at a mere kilometer from the Railway Station. In addition, nearby the station, several bus terminals are located having as a destination the city center, and the eastern and northwestern areas of Thessaloniki.

### 6.5 Poor information

Thessaloniki Port Authority S.A. has expanded and upgraded the communication infrastructure within the port, developing a modern digital communication network (web site, electronic mail node). The port also uses a digital telephone network and has developed specialized applications regarding the dissemination of the information through mobile telephony and personal digital assistance (PDA), the promotion of electronic exchange and the dispatch of documents using numerous modern technologies. Inside the passenger terminal, there is a touch-screen Infokiosk (Infopoint) with internet access and a Wi-Fi Access Point that allow internet free access to any device equipped with a 802.11b compliant network card.

Also, through the programme "TRANSLOGNET" and the use of electronic Variable Message Signs, information is provided to passengers (i.e. ferries arrivals, information, timetables). Also, a special electronic gate for information on passenger services is available through the website of the port.

As presented above, the provision of information is limited to the port services, and does not regard any multimodal or last mile transportation options, thus, an integrated system for the provision of such information is necessary.

### 6.6 Poor quality

The most serious problem for the multimodal transportation of passengers, when arriving at or departing from the port, is the lack of the ability of purchasing a public transport fare and the relevant information provision. Also, the recruitment of staff as guides or volunteer guides for the better service of passengers is not foreseen.

On the other hand, regarding additional services provided to passengers, the cruise passenger terminal is hosted in a neoclassical building, which meets the requirements of the Schengen treaty and the International Ship and Port Facility Security Code (ISPS



code). In addition, the terminal includes Duty Free shops, Infokisosk and wireless access points, while there are several signs that guide cruise passengers to the city centre and the mayor tourist attractions. Also, when assessing punctuality, ThPA has an excellent score of 100%, meaning that 100% of ferries do not arrive later or earlier than ten minutes.

As a conclusion, the weakness of the provided quality of services is focused on the lack of the integrated ticketing and information provision.

## 6.7 Foreigners and inexperienced passengers

Foreigners and inexperienced passengers may meet the problems described in the previous paragraphs, and concern mainly the poor information provision at the port, about the interconnection of the port with the surface transportation network

# 7 Emerging mobility schemes and future changes

**Aim: This chapter covers two topics. First of all, emerging mobility schemes as identified in WP 2 are discussed for the case study. Secondly, expected future changes and perspectives should be described for the case study.**

## 7.1 Emerging mobility schemes

### Freight

International logistic centre	Direct access of an ILC to global transport networks enabling the direct transshipment of goods without the need of using an intermediate location.
	Increase of sustainability if and when the ILC is connected and cooperates with other centres.
Eco-efficient terminals	Adjustment of terminal equipment and transfer vehicles taking into account energy consumption.
	Improvement of the sustainability of logistic and operations with port and hinterland terminals.
Integration of an e-logistic platform	Creation of interfaces with transport/logistic partners.
	Decrease of lead times-costs-environmental impact.
TRANS European Network	Adjustment of terminal structure and properties in order to connect to TRANS networks

Public-private partnerships	Funding opportunities for establishment of new terminals or modernization of existing ones.
Rail interoperability	Modernization of existing rail terminals.
Short sea shipping	Increase of investments and increase of short-distance maritime lines in ports in order to provide a competitive alternative to road transport.
Deep sea shipping	Further development of infrastructure and logistics of ports.

### Passengers

Enhanced bicycle usage	<ul style="list-style-type: none"> <li>- more bicycle stands at terminals</li> <li>- safe bicycle stands</li> <li>- possibility to take bicycles into vehicles</li> </ul>
Simplifying the payment	<ul style="list-style-type: none"> <li>- computer equipment for payment services</li> <li>- hardware for registration in terminals</li> <li>- ticket control mechanisms for eTickets</li> </ul>
Real time information	<ul style="list-style-type: none"> <li>- information boards in terminals</li> <li>- scheduling of routes on base of real time data</li> </ul>
Cooperation of transport operators	<ul style="list-style-type: none"> <li>- shared terminals</li> <li>- coordination of schedules</li> </ul>
Individual Access and Egress	<ul style="list-style-type: none"> <li>- sufficient, safe and affordable parking areas/stands for private vehicles</li> <li>- appropriate equipment in terminal area</li> <li>- release of barriers for private access/egress (bicycle lanes,...)</li> </ul>
Electro mobility	<ul style="list-style-type: none"> <li>- possibility to charge batteries in the parking area</li> </ul>

## 7.2 International logistic centre

The current freight volume and transport needs are fulfilled by the private logistics centers that operate around port area. The status quo is characterized by the existence of logistics service providers who have their own warehouses. There is a great potential that the international logistics centre is not initiated and could not facilitate logistics operations of service providers because each one of them is already satisfied.

The case of small logistics depots could be explored to be fostered assisting small logistics providers by offering consolidated services that could mitigate costs. A great possibility is to look for a location outside port area, where ThPA SA could act only advisory and not as funding scheme.

### 7.3 Eco-efficient terminals

The Thessaloniki Port Authority has a well established Environmental Management System (EMS) in place, which documents the port's environmental policy, environmental aspects, legislative requirements, responsibilities, etc.

The system is based on PERS (Port Environment Review System) and has been continually improved by Organization's staff since its inception to reflect bet port practices. The major environmental issues that the port faces are the insurance of the sustainable operation on port land, the sustainable use of the port by shipping, lessees and operations and the effective responses to port incidents. Relative aspects indicated are dust, port waste, ship-generated waste, sea water quality, resources consumption and emergencies.

In order to achieve an eco-efficient performance, ThPA will employ the following principles:

- **Environmental improvement:** The aim is to integrate the environmental issues of sustainable development into the planning and decision-making processes of the port.
- **Environmental management system (EMS):** Implementation of relative EMS processes in order to organize the port's activities, products and services in such way that will enable the continuous improvement of the port's environment.
- **Legal compliance:** Establishment of relevant organization and development of the necessary procedures for the delivery of conformity with all relative international and national legislation, as well as contribution to achieving compliance with other relative policies and guidelines. ThPA S.A. endorses the European Sea Ports Organization (ESPO) Environmental Code of Practice. Also, in September 2012, a legal framework outlining the terms of environmental-friendly operations will be ready as a framework of compliance with environmental rules. Cargo interchange, dust issues, complaints by neighboring hotels of environmental burden sourced by port operations, etc. will be taken into consideration and a range of measures will be implemented by port authority to be in line with those terms.
- **Natural conservation:** The ThPA will make efforts to sustain natural resources and enhance nature conservation by integrating these objectives into any port development projects.
- **Communication – Consultation:** The ThPA will try to enrich its own scientific knowledge by developing external partnerships (i.e. the local academic community) and establishing a framework with procedures for the communication of environmental information, both internally but also externally within the local community, the general public and governmental bodies.

- **Training – Awareness and Skills:** Initiatives will be taken for the training of the port staff of all levels in order to raise awareness regarding the importance of the environmental issues. In addition, attention will be given to the development of skills that will enable the staff to fulfill their environmental responsibilities and obligations.
- **Safety, Health, and Environment:** Commitment to high standards of health and safety within the workplace so as to safeguard the well being of those working at, visiting or living near the operations of the port.
- **Energy use – Technology:** The ThPA will make efforts to improve the energy efficiency and the resource consumption, as well as adopt technological best practices. Promotion of multimodality is a core objective by ThPA SA and actions towards this direction will be forced (wider use of rail, better interconnections in passenger transport chain, etc.)
- **Pollution prevention:** Development and usage of management techniques for the conservation and protection of the water resources, the promotion of clean air, the minimization of noise and the reduction and recycling of the waste resulting from the port's operations and ships.
- **Coastal zone management:** Support of processes that are related to the Integrated Coastal Zone Management.
- **Environment monitoring:** Monitoring, evaluation and review of the port's environmental performance (i.e. policy, action plans, etc.) and the environmental quality of the port area, focusing on significant environmental aspects and on the identification of appropriate performance indicators.
- **Emergency response:** Provision of efficient management of accidents and incidents with significant environmental impacts through an Environmental Emergency Preparedness and Response Plan.
- **Publishing:** Periodic publishing of an Environmental Report regarding ThPA commitment and progress in the improvement of the port's environmental performance.

#### 7.4 Integration of an e-logistic platform (freight transport)

An e-logistic platform exists at the container terminal. Its operations include entrance/exist control, loading/unloading monitoring, and storage. Arrival registration is submitted electronically by the shipping agents, and approval is issued. If a client operation is installed at the customer's system, the latter may be informed of the status of the shipment, concerning the arrival, staying and departing the port at any time.

An e-logistic platform could approach the desired level of integrated information by providing atomization of processes such as loading and unloading of vessels, storage

scheduling and generally e-organization and e-management of operations. The added-value in comparison with the existing Terminal Operation System is that it will include the conventional cargo terminal, equal and fair entrance of forwarders, logistics service providers, and rest stakeholders and professionals. This platform will be suitable for port operations and will not concern any activities outside the port's responsibility area. One step forward could be the scheduling of next leg of transport through such e-platform. This idea could encompass e-multimodality policy and facilitate interconnection through electronic platforms of information exchange. The more the activities included in this platform, the less is the time to waste on formalities.

## 7.5 Trans-European network

One of the objectives of ThPA in the near future is the promotion of the connection of the port with the Egnatia Motorway, an investment, which in fact requires the finalization of a segment of 800 meters. In this way, since the Egnatia motorway will include three vertical axes which constitute sections of the Transport European Network (Siatista - Kristallopigi link to Albania, Thessaloniki-Serres-Promachonas, link to Bulgaria, and Ardanio-Ormenio, link to Bulgaria), the perspectives of the development of the port are significantly increased.

## 7.6 Public-private partnerships

The private status of ThPA SA does not foster the development of public-private partnerships. Though, since the transformation of ThPA SA into a landlord status managing entity is planned, the establishment of concession agreements with other private companies is foreseen, including, for example, the concession of the container terminal, etc. The first 'candidate' service to be conceded is container terminal. Private companies which operate in the port usually keener on mitigating operational costs and may directly launch multimodal policies as they are proven to be more sustainable and cost-efficient.

## 7.7 Rail interoperability

At specific piers of the port, the trains arrive directly from the point of origin, without any further interventions, ready for transshipment, onboard the ship. To this extend, interoperability exists as concerns freight transport.

Technical issues do not exist. Such key issues are pinpointed between rail systems of neighboring countries. Such railway network for passengers does not reach the port, rail interoperability does not apply.

Infrastructure modernization, interventions on rail accesses around port, double track for upgrading level of service and other types of interventions to the physical structures of the rail system are indispensable for improving interconnection and facilitating multimodal trips.

## 7.8 Short sea shipping

Public boat transport shall not be treated as short sea shipping. A good practice of short sea shipping of port of Thessaloniki is described in detail below (see 'clarifications' sub-chapter). This case of LARCO hinterland transport is the flagship of multimodality in port of Thessaloniki.

## 7.9 Deep sea shipping

Deep sea shipping, truck and rail are the three different modes in the specific case study. The share of transfer between deep sea shipping and rail is 5,2% (of TEU) and between truck and deep sea shipping 94,8% (of TEU), respectively.

## 7.10 Enhanced bicycle usage

The bicycle way network runs along the port facilities, providing access to passengers and civilians, within the context of port openness towards the city. Bicycle network is less than 200 meters far from the passenger terminal. In this direction, the existing physical properties meet the needs of multimodal passenger transport.

ThPA SA plans to establish cruising along with use of bicycles for cruisers. The plan constitutes of a private initiative capable of hiring bikes to be used by passengers of cruise ships which stay in the city of Thessaloniki overnight. Biking could facilitate passengers' mobility in the city. Bicycles will be stored and parked in a depot suitable for accommodating light vehicles. This may not be considered as an indicative kind of multimodal transport, because there is not any explicit transport leg (origin – destination), though, it could be treated as combined transport that supports urban mobility.

## 7.11 Simplifying the payment

Regarding the payment system in the port, there is computer equipment for payment services, but no ticket control mechanisms for e-tickets. On the other hand, there are small branches of shipping agents in the wider area of the terminal that provide passenger transport services.

Nevertheless, ticketing channels and payment rely on travel agents only. Surely, e-ticketing could upgrade the level of service in passenger transport by the automatization of the pre-trip processes, providing benefits to passengers, such as time savings and enhancement of the level of interconnection.

## 7.12 Real time information (passenger transport)

As it has already been mentioned in the previous paragraphs, through the programme "TRANSLOGNET" and the use of electronic Variable Message Signs, information is provided to passengers (i.e. ferries arrivals, information, timetables), as well as a special electronic gate for information on passenger services is available through the website of the port.

But, the provision of information is limited to services provided by the port, and does not include any information for multimodal or last mile transportation. For the moment, there is no planning for establishing a real time multimodal information system for the passengers.

### 7.13 Cooperation of transport operators

Cooperation among the transport operators in the port exists. In terms of information sharing, an integrated information platform exists for container shipments, such a platform is not available for the rest of the cargo and passengers. This cooperation covers the coordination of schedules, while the harbor master (Hellenic Coast Guard) provides information on passenger transport issues (by phone or in person), and the travel agents provide information on their corresponding ferry transport, respectively.

The basic cooperation scheme among the port co-operators is the port development council. This scheme guarantees swift and frequent addressing of issues and timely fostering of development initiatives, which underpin policies such as multimodality, through the strong relationships that are developed within this framework. Collaborative schemes of such terminals contribute to faster tackling of problems and their 'win-win' strategy ensures port operations' efficiency through the deployment of appropriate policies.

### 7.14 Individual Access and Egress

The bicycle way runs along the port facilities, enabling access and egress by bicycle. Public bus stops exist in the vicinity of the port. Finally, the port provides sufficient, safe and affordable parking areas/stands for private vehicles, enabling port access by car, as well.

Terminal's properties for efficient interconnection concerning passenger transport could be considered as adequate, since passenger volumes can easily be served by the existing infrastructure. Besides this, docks that accommodate ferries are almost 200 m. far from parking area, the bus stops and the bicycle lanes. Regarding the bus stops located outside the passenger terminal, service two bus lines. The first one ends at the IKEA transit node in the eastern Thessaloniki, providing a direct link to Thessaloniki airport and the second one connects the port with other central areas of Thessaloniki, providing indirect access to any other passenger-interest destinations like rail station, interurban bus station, etc for further transit needs, respectively.

### 7.15 Electro mobility

Such a scheme is not indicated now or planned for the near future due to the limited space for maneuvering (regarding rail system). Though, special attempts are being made towards obtaining hybrid port equipment for 'greener' operations, which will work as an added value for the enhancement of the sustainable level of the ports' services.

## 7.16 Future perspectives

Referring to future perspectives for the development of the port and the potential improvement of the services provided to passengers a new transportation means is under construction and regards the urban public boat transport of Thessaloniki, which foresees the connection of the centre of the Thessaloniki with the eastern areas (Municipalities of Kalamaria and Thermaikos). The project, expected to be finalised in 2013, will service 15.000 passengers daily, and approximately 5.400.000 passengers, annually. The specific project will be of high importance for the improvement of the level of services of the port to its passengers, since it will enable the more efficient (in terms of time, cost, quality, safety) transportation of the passengers that arrive at or departing from the port.

In addition, a metro station is under construction in the area of the Railway Station, which will provide an alternative means of transportation to passengers. The perspective is that the reconstruction of the existing infrastructure will drive to a modernized integrated bus-railway-metro station, which, will be located closely to the port, and will work as an added value for the improvement of the provided services to passengers.



## 8 Policy goals

Policy goals	Comment on achievement
<b>Developing and deploying new and sustainable fuels and propulsion systems</b>	
1. Halve the use of ‘conventionally fuelled’ cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030	Suggestion for purchasing hybrid straddle-carriers. Introduction of ‘cold-ironing’ method: for passenger transport mainly, ferries that are tied up at the ports, instead of diesel they could use electric power for their energy needs (paradigms: Malmö port)
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>	
3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050	Not relevant for the case study. Up to now, there is not such action towards this direction. Intermodality policies, though, need to be set and implemented.
5. A fully functional and EU-wide multimodal TEN-T ‘core network’ by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	Not relevant for the case study. Up to now, there is not such action towards this direction.
6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.	Already accomplished in our case study. Additional railway electrification within the network of terminal area is proposed. But this is difficult in our case due to manoeuvring reasons inside narrow port area. Moreover, also high-speed rail network is proposed for the national rail network of Greece.
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	‘Payment’ system is not feasible up to now. For the moment, the port services are diversified from the rest urban transport network it is difficult to implement such integrated system. Generally, it could be applied to passenger transport in ports but there is a need for a better organized and integrated public transport system.
10. Move towards full application of ‘user pays’ and ‘polluter pays’ principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	Such policies have not been proposed and implemented yet.

## 9 Concluding remarks

### 9.1 Main conclusions

Terminal's location can be described as strategic because it facilitates both operations of freight profile and it also provides access to travellers. Freight operators take advantage of the location of terminal because most private companies cooperating with ThPA SA are located with industrial area of Thessaloniki, very close to the terminal. The location of the terminal in the central west area of Thessaloniki makes convenient for travellers and visitors to reach the terminal and it is finally in the proper location for performing 'last-mile' distribution when needed.

Concerning its position on the geostrategic map of Balkans, Thessaloniki's port could provide excellent road access to Albania, Serbia, Bulgaria and Romania and so rail access. It is also the bigger port that satisfies the maritime transport needs of northern Greece both for passenger and freight. It is also 20 km far from international airport of Thessaloniki for efficient maritime to air transport flow.

Freight terminal is separated into container terminal and conventional cargo terminal. Both terminals achieve high scores at cargo traffic showing a slight increase in recent years. Until 2007, growth of freight flows was worth-highlighting and especially that year it approached almost saturation. Then, freight flows addressed a sharp drop and since 2008 a smooth increase is taking place. In addition, passenger flow was reasonably high, but when it came to global and Greek economic crisis it started reducing.

ThPA SA has as high priority to approach citizens of Thessaloniki. To this end, it organizes and host several events in port area and especially warehouse A of pier no1. Several cultural events take place there, strengthening the relationship of Thessaloniki's visitors and citizens with the port. There could also be hosted conferences and meetings under the warehouses which are tailored for such events.

Revenues by private parking areas financially support viability of ThPA SA and also act as interconnection infrastructure for passenger multimodal transport. Both parking areas include many lots in order to serve park and ride park and walk (when entering central area of the city).

Pertaining to ownership and organization, ThPA SA as being private company is a stand-alone, self-financed entity acting totally as a private enterprise being, though, under the supervision of Ministry of Development, Competitiveness and Shipping (until recently national government was the owner of the 74% of ThPA SA) . It falls upon legal and regulatory framework of national government but its internal processes and operations are outlined by non-institutionalized framework. So does with stakeholders, under the framework of the fully working port development council, which is advisory board discussing the issues relevant to the port. This operational status that does not hinder free market competition has had tangible results in recent years, leading to remarkable rise of the profitability ratios (coupled with other successive policies) and adequate level of service achieving very well at punctuality issues and cargo handling.

However, needs for privatization of the terminal led to the transfer of all shares previously owned by national government (on behalf public sector) to Hellenic Republic Asset Development Fund. Privatization of terminal could generate problems in the future according to stevedores' attitude towards that fact.

Information provision is better in freight terminal than in passenger where only basic information is being provided concerning ferry scheduling and also through the usual ways of communication. Maybe this is related to not intensive information needs of travellers that are fully met by Harbour Master call centre or by information provision of travel agents. In freight operations, the port is being identified as more organized, having already established a Terminal Operation System for information on interested containers. This platform is very specialized and difficult to be handled by the variety of users. In this regard, special light should be shed on optimizing this service both from national government (adjusting regulatory framework and channelling of funding sources) and from ThPA SA (financing information provision). Integration of services related to multimodal public transport system is yet hard to be structured.

## 9.2 Good practices

ThPA SA has proceeded to the implementation of a range of projects and initiatives that are widely known and have improved the company image of ThPA SA throughout last years. Some company actions have been awarded by market institutions as effective for their business impact and for social welfare. Below, there is a list of recent initiatives for each business aspect, considered as good practices although many of them have not finalized yet, but their impact is expected to as planned.

1. Institutional and Operational Modernisation of Thessaloniki Port Authority SA:
  - Procurement processes standardization that ensures the economic interests of the organization and reduces wastage.
  - Spatial reorganization of administrative services of Thessaloniki Port. All major administrative departments gathered, allowing for better organization and operation of the Agency.
  - In collaboration with the Customs division, their operation is now expanded on weekends and evening to enhance customer satisfaction
2. Works of port infrastructure and superstructure:
  - Expansion of 6th pier is in progress and will boost port's capacity in TEUs handling to 133% or 1,200,000 TEUs. This is the largest development project carried out at the port of Thessaloniki which guarantees the long-term growth.
  - Expand Free Zone Area to outer city region, helping to increase terminal capacity and improve environmental context of port operations
  - Marking in road network of the port and so increased the road safety level
3. Environmental awareness:

- Compiling of Environmental Impact Study according to national standards for environmental performance surveillance while outlining environmental policies for handling of different cargo types.
  - Moreover, in harmonization with the community directive 2000/59/CE and the MARPOL 73/78 Convention, ThPA S.A. implements a ship's waste reception and management plan.
  - Under the framework of integrated environmental policy, ThPA SA proceeded to shape ten actions that will change outlook of the port towards 'greener' directions.
  - Successful tackling of dust issue through the introduction of appropriate equipment
  - Introduction of hybrid vehicles of port equipment that reduced the environmental footprint
4. Property development of ThPA SA:
- Promotion of the 1<sup>st</sup> pier facilities as places hosting events and business meetings



**Figure 16. Aerial view of pier no1.**

5. Introduction - Expanding use of new technologies into port operations:
- Operation of electronic payment system and issuing electronic invoices.
  - Introduction of "Integrated Information Management System, Enterprise Resource Planning and Business Intelligence (ERP-BI)», with a view to increasing the agency's operating efficiency while reducing costs.
6. Marketing:
- Invoice attractive port services to attract more cargo to the port of Thessaloniki.
  - Promotion of port of Thessaloniki as a cruise destination and provide contacts with companies and shipping agents cruise. The goal was to increase cruise traffic and impact was positive as passenger cruise faced an increase of about 20% in 2011 compared to 2010.
7. City-port relations:

- Publication of the newspaper called 'Port.Thess' bi-monthly and distributed free to inform citizens on the news of the port of Thessaloniki.
- Publication of cartoons for children who learn about the port through painting.

Apart from the above initiatives which were successful or expected to be, ThPA SA had been awarded by national and international institutions for company's high performance. Within the context of national 'business awards MONEY – George Ouzounis', ThPA SA had been awarded 2<sup>nd</sup> prize for 'best international market company' award and 3<sup>rd</sup> prize for 'best public sector company'.

ThPA SA had also been awarded with the 2<sup>nd</sup> prize in the international competition of ESPO Award 2011. The first prize had been awarded to Stockholm port authority. The context of the competition was related to the relationship of port with the rest city, through the implementation of a range of actions underpinned by port authorities. Social events organized by ThPA SA and cooperation with university departments of shipping and transport were the main dissemination actions that were appraised and led to this European distinction.

### 9.3 Bad practices

Although there were some measures and activities that proven successful and were branded as good practices with positive outcomes, some initiatives did not prove their effectiveness and there were some lessons elicited by them. One of them is the lack of Key Performance Indicators and in general, a framework of measuring services performance. Some empirical elements may have led to estimation of performance aspects but a sounder, European framework is needed for assessing services impacts. This will surely improve estimation process and have as a result more precise business plans.

Lack of Master Plan and business plan could also be a case. Its implementation in cooperation with rest stakeholders will strengthen their collaboration and make robust and homogeneous perspectives towards future plans in port operations. Moreover, it will introduce a range of targeted actions providing a future path to be seamlessly followed by whichever administration scheme may occur.

In addition, special focus needs to be made at passenger terminal. Due to the low volume of passenger transport, terminal seems disorganized offering only basic services suffering from lack of planning. A reformulation in its layout and services could render it as attractive to travel audience. Thus, the terminal could gain benefits by this change and work towards rolling out local and regional tourism, because up to now, low investments in the terminal and low level of service have led to low transport volume and so happens with the revenues by passenger transport.

Sometimes, projects approved to be implemented by managing entity were obstructed by huge bureaucracy of Greek public sector. Even though, this was not exactly internal malpractice of ThPA SA, but it sabotaged port's development process. Rapid authorization and mitigating bureaucracy is the key to close this void from planning to implementation. Development and adjustments of legal framework and legal assistance

by European Union could alleviate the problem and make regulatory framework more flexible.

## 9.4 Suggested improvements

Inefficiencies and malpractices have concluded, in the hindsight, to the introduction of measures and initiatives that deal with the existing gaps and could close all these voids. There are some kinds of provided services in which although the level of service may be low (i.e. information provision), they shall not be treated as bad practices. Some directions are outlined below:

- Force new research fields especially focusing on adopting indicator framework for mapping port performance in several domains. Introduction of indicators will lead to safer and more accurate modeling of impacts
- Better cooperation with EU and authorities to adjust existing framework so as to increase port management efficiency
- Implementation of the logistics centre that will be better established in the container terminal. Integrated services, operations and cargo have proven to be a key solution for freight transport activities
- Construction of a marine project of a capacity of 250 yachts in the first pier. Port outlook should be enhanced to attract yacht tourism and increase port's revenues
- A severe attempt towards optimizing information sharing and provision channels should be undertaken comported with national government assistance (both funding and technical). The introduction of wider integrated e-platforms (such as port community system), with easy-to-use interfaces, for scheduling and monitoring loading and unloading operations and deriving all necessary information for passengers is one of the core actions for coping with that issue. This platform could be easily (and equally) accessed by interested private sector, travel agents, shippers and final users (passengers). The study for the Bay Plan of Container Terminal could be an add-on service
- Expansion of Free Zone for reducing customs formalities
- Wider use of services concession to external parties by ThPA SA. i.e. establishing of sub-terminals managed by different companies (under concession framework) in conventional port according to cargo type loaded/unloaded. This will increase operations efficiency and flexibility
- Upgrading access to the national road network and Egnatia Odos through the construction of road infrastructure for 800 m. Direct link to Egnatia Odos implies faster access to hinterland
- Launching a car terminal will result in intrusion of ThPA SA into new market share and new income source.
- Actions towards more efficient operation of railway transport system to provide improved access to south Balkan countries
- Urge energy efficiency initiatives by incorporating Renewable Source of Energy into supply needs of the port. Photovoltaic systems and natural gas could enhance energy autonomy of the terminal
- Investigation and initiating of actions that enhance 'sales' of cruise terminal

- Ameliorating level of security of cargos by establishing CCTV systems in accordance to ISPS security codes
- Establishment of collaboration schemes with other public and private parties of Thessaloniki and deploy a port-visit strategy in order for citizens to acknowledge port facilities
- Planning of investments to interconnectivity infrastructure for safer and faster access to passenger terminal:
  - For bikeways, an extension of the network inside the passenger terminal could be a solution
  - Construction of a bus stop just outside passenger terminal that would be serviced by as many bus lines as it could

## 9.5 Evaluation of PAG recommendations

Assessing the applicability of the recommendations provided by the CLOSER's Policy Advisory Group in the specific case study, the following conclusions per stage of the decision making process (policy, planning, financing, organizational schemes, infrastructure development and operations) can be mentioned:

- **Policy recommendations:** The two recommendations apply to the freight sector of the port, and both of them could be useful for its future development. More specifically, the establishment of a policy framework for the integration of the intermodal character of the port, as well as the incorporation of the transport planning process with land-use planning, should be taken into consideration by the involved stakeholders, in order to achieve a high-level provision of services, and the establishment of a successful and viable freight and logistics centre, respectively.
- **Financing recommendations:** The first recommendation of this category seems that cannot be applied in the case of Thessaloniki's port, since the private character of ThPA SA, does not foster the development of PPPs. Regarding the integration of public transport pricing, such an integration cannot (at least yet) be implemented, due to the lack of the appropriate infrastructure and the relative alternative mode services (only bus services).
- **Organizational recommendations:** ThPA's business model can be considered as effective, since it helps the coherent collaboration between ThPA SA and stakeholders, ensuring confidentiality and equal terms of competition. In the case of the information provision, it has to be mentioned that this service is at an initial level both for freight and passengers sectors, so this recommendation could be useful for the relative involved bodies.
- **Infrastructure development recommendations:** The constitution of a transport infrastructure management body for all modes, both for freight and passengers' transport seems to be very challenging in the port of Thessaloniki, mainly due to the absence of a relative harmonized legal framework. Regarding the second PAG recommendation, thus the adoption or creation of standards

for physical infrastructure interconnectivity, in the case of passengers transportation, there is no such an interconnectivity, while in the freight sector, the port is already connected to the rail and road networks, with the perspective this physical connection to be further integrated (connection of the port with Egnatia Motorway and axes of the Transport European Network).

- **Operations recommendations:** PAG members recommended the separation of the owner from the operator, which has been achieved and works well in the specific case study. In addition, regarding the second recommendation of this category, thus, the establishment of a cooperative framework between the terminal and the transportation operations, it has to be mentioned that this recommendation also applies to the port of Thessaloniki, since such a framework exists and defines clearly the competences of each stakeholder. Finally, the last operation recommendation referring to the integration of the operations of the public transport interchanges is difficult to be pursued due to the lack of interchange infrastructure, scattered infrastructure and the totally different character of the operations.

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## Reporting template for case studies

<b>Name of case study:</b>	Constantza Port
<b>Author( s)</b>	Eftihia Nathanail, Michael Gogas, Konstantinos Papoutsis & Giannis Adamos
<b>Date:</b>	08/06/2012

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# 1 Data collection process

The data collection process was conducted by contacting National Company "Maritime Ports Administration" SA (NCMPA) Constantza representatives. A visit at the Constantza port authority premises also took place on the 8<sup>th</sup> and 9<sup>th</sup> of May, 2012. According to the suggestion from the part of Mr. Aurelian Andrei Popa, General Manager, the contact person was Ms Emilia Horovei, Head of Public Relations and Protocol Department. Apart from Ms Horovei and her partners, the Head of Marketing Department also attended the two day meeting, while several representatives both from the freight and passenger port were present, as well.

As NC MPA SA Constantza constitutes a joint stock company under the authority of Romanian Ministry of Transport and Infrastructure (MTI), several legislative issues are controlled and determined directly by the MTI. Thus, a contact with the MTI was decided to be accomplished via the intervention and agency of Ms Horovei in mid May, 2012, in order to document several legal and institutional issues.

## 2 Terminal overview

### 2.1 Historic development

The port's history is tightly connected to the City of Constantza. Concerning several historical thresholds of Constantza port, the main and most important events are briefly listed below:

- Although the first record attestation of Constantza was late (2nd century B.C.), according to the archaeological evidence, the ancient Tomis was discovered during the 6th century B.C. The city-port was organized initially as an emporium - trade center for Greek merchants and locals. In time, Tomis adopted all the evolutionary characteristics of a Greek polis. The Greek influence was maintained until the first century B.C., when the territory located between Danube and Black Sea enters under Roman occupation. The port had a prosperous economy for the next centuries and the town was named after the Roman emperor, Constantine.
- In 1857, the Turkish authorities leased the construction of the port and railway between Constantza and Cernavoda to an English company "Danube and Black Sea Railway and Kustendge harbour Company Ltd.". Constantza Port benefited of modern endowment and facilities for the first time.
- After the Independence War in 1877, the first initiatives regarding the construction of a port planned to take advantage of Constantza's strategic location and economical growth of the new state became real. The Romanian state ransomed the port facilities from the English company and contacted foreign specialists for the development of port extension and invested also in the construction of the impressive bridge at Cernavoda.
- Until 1909, when Constantza Port was officially inaugurated, dredge works were made, the breakwaters and the quays were built; also six basins and storage

tanks had been developed for oil and the cereal silos. Having these facilities, the Port of Constantza registered in 1911 a total traffic of 1.4 million tons.

- Between the World Wars, other infrastructure facilities were added: corn drying facility, the administrative headquarters, the stock exchange and the floating dock. The traffic reached the 6.2 million tons in 1937, a figure that ranked the Port of Constantza amongst the first European ports.
- Unfortunately, Constantza and the entire country suffered damages from the two World Wars, Soviet occupation and communist dictatorship. The south extension works of the port started in 1967. An important role in the port development was played by Black Sea - Danube Canal, which was inaugurated in 1984.
- Since 1st January 2007, the Port of Constantza has become Free Zone.
- Currently, there are several projects in progress, in order to build new facilities for cargo handling and to improve the transport connections between Constantza Port and its hinterland. These projects are mainly located in the South part of the port.

Constantza port was officially founded in 1909, as a harbour covering a total area of 722 hectares. Later, beginning with 1976, its total area expanded to reach the 3926 hectares, out of which 1312 ha is land and 2614 ha is water.

Within the new age of the port, the land and infrastructure were initially purchased and funded by the Romanian government. Later, the regional and local authorities took part in the development plan, but, also, any initiative and investment scheme from the part of the private domain were welcomed by the state and port authorities, aiming at the enhancement of the level of service provided to customers, as well as at the attraction of the biggest possible market share at the Black Sea. Eventually, amongst the partners of Constantza port, apart from public bodies and authorities, several stevedoring companies, large shippers, forwarders and retailers are included.

## 2.2 Location and area

Constantza is located at the eastern part of Romania, by the Black Sea, 250 km from the capital city of Bucharest and only 85 nautical miles from Danube river mouth. It is ranked fifth in population amongst Romanian cities with 387593 inhabitants. Amongst the main business and financial facilities of the wider region, Constantza port is the biggest hub in the Black Sea and constitutes a major transportation gate between the sea and the hinterland.

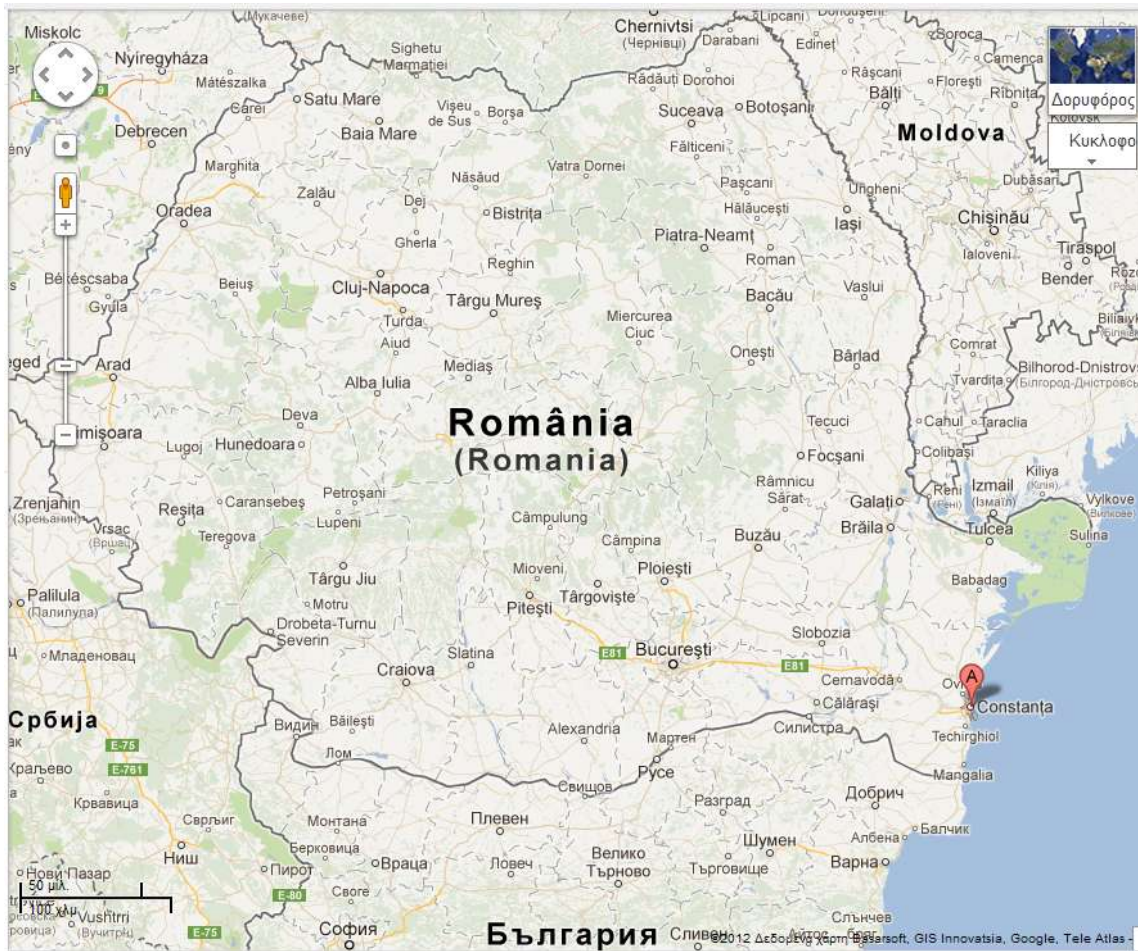
The Port of Constantza, Romania, constitutes a maritime and river port cluster located at the crossroads of the trade routes (TEN-T Paneuropean Transport Networks) linking the markets of the landlocked European countries to Transcaucasus, Central Asia and the Far East (see Fig.1).



**Figure 1: The Constantza port terminal’s position versus the TEN-T networks**

The maritime and river ports are connected through the “Danube – Black Sea Canal”, a key point for Constantza port as important cargo volumes are carried through the Danube river at low cost in comparison with road and rail competitive routes in the Eastern Europe. The port has excellent connections with the Central and Eastern European countries through the Corridor IV (rail and road), Corridor VII - Danube (inland waterway), to which it is linked by the Danube-Black Sea Canal, and Corridor IX (road), a branch of which passes through Bucharest (see Fig.2).

The two satellite ports Midia and Mangalia that are located 25km north and 38km south from Constantza Port respectively, are part of the Romanian maritime port system under the coordination of the ministry of transport and infrastructure (MTI) and NC Maritime Ports Administration SA Constantza.



**Figure 2: The location of Constantza port terminal in Romania (Google map)**

Concerning the maritime port, it is located on the Western coast of the Black Sea, at 179 nautical miles from the Bosphorus Strait and 85 nautical miles from the Sulina Branch, through which the Danube flows into the sea. It covers 3,926 ha of which 1,313 ha is land and the rest of 2,613 ha is water. The two breakwaters located northwards and southwards shelter the port, creating the safest conditions for port activities. The present length of the North breakwater is 8,344 m and the South breakwater is 5,560 m.



**Figure 3: The port of Constantza in Romania (aerial view)**

Constantza Port is both a maritime and a river port. Facilities offered by the port allow accommodation of any type of river vessel. The connection of the port with the Danube river is made through the Danube-Black Sea Canal, which represents one of the main strengths of Constantza Port. Due to low costs and considerable cargo volumes that can be carried, the Danube is one of the most advantageous transportation routes, an efficient alternative to the European rail and road congested transport.

In order to cope with the future growth of river traffic, which is soon foreseen to register 17 million tons/year, the NCMPSA SA Constantza has started a new investment for a Barge Terminal. Such investment will improve the sailing conditions and develop facilities for the accommodation of river vessels in the South part of the port.

### 2.3 Passenger and freight profile

Constantza port's major throughput comes mainly from the freight operations and activities (sea and river), according to the general profile of the port. In addition, there is also a passenger port operating nearby and, even though there are no regular lines any more, a considerable amount of passengers visit the port of Constantza through cruises.

In particular, the port of Constantza is mainly a transit port providing services for several types of cargo and containers. The few passengers visit the port in the context of cruise trips, as Constantza constitutes one of the most popular touristic destinations in the Black Sea. Almost the 99% of vessels embarking and disembarking to and from the port of Constantza constitute freight ships. Their detailed classification will be presented later on in the current paragraph. So, in the following text, the data to be



presented will be concentrated mostly on figures associated with freight activities. The data were extracted by the 2010 annual report published by the port authority.

Pertaining to the port's geographical coverage, the port terminal of Constantza covers local, regional, national and international transportation needs for Romania. Concerning the origination of the port, in the terminal's target area, mostly European and Asian countries are included. In particular, the origins/destinations are:

- Germany,
- Austria,
- Slovakia,
- Czech Republic,
- Hungary,
- Romania,
- Bulgaria,
- Serbia,
- Spain,
- Italy,
- Slovenia,
- Greece and
- Albania, approached through sea and / or river itineraries.

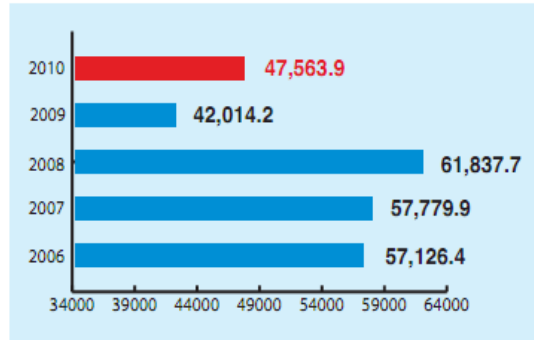
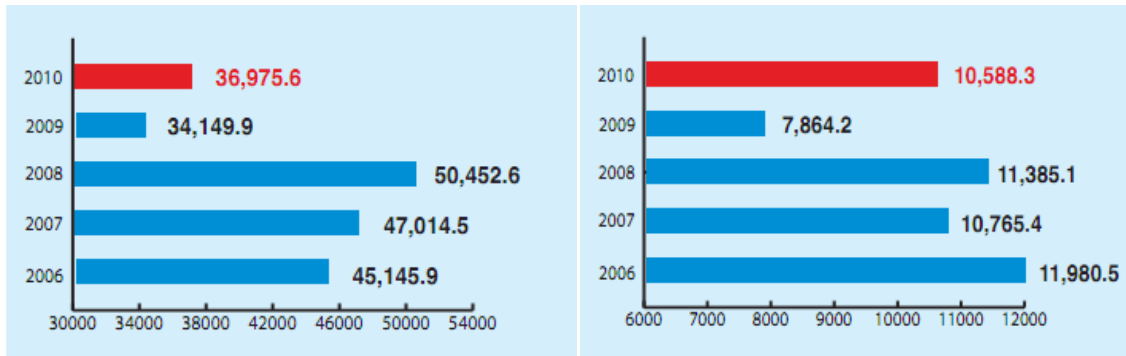
In Asia, the affiliated countries of Syria, The Netherlands, Turkmenistan, Kazakhstan and UAE (United Arab Emirates) are reached only through scheduled sea routes.

The highest traffic figures were registered in 1988, when 62.3 million tons were operated.

Today's port handling capacity reaches the 100 million tons / year, as within the port there are 156 berths (140 berths operational). The total quay length reaches the 29.83 km, while the depths range between 8 and 19 meters, allowing the accommodation of tankers with capacity of 165,000 dwt and bulk carriers of 220,000 dwt.

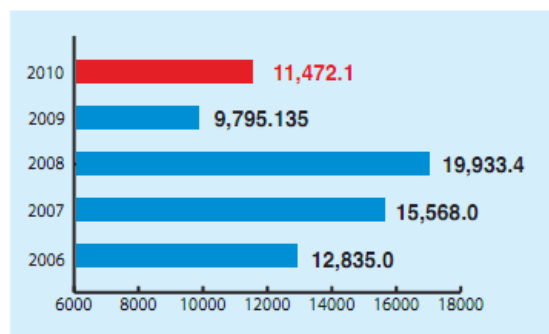
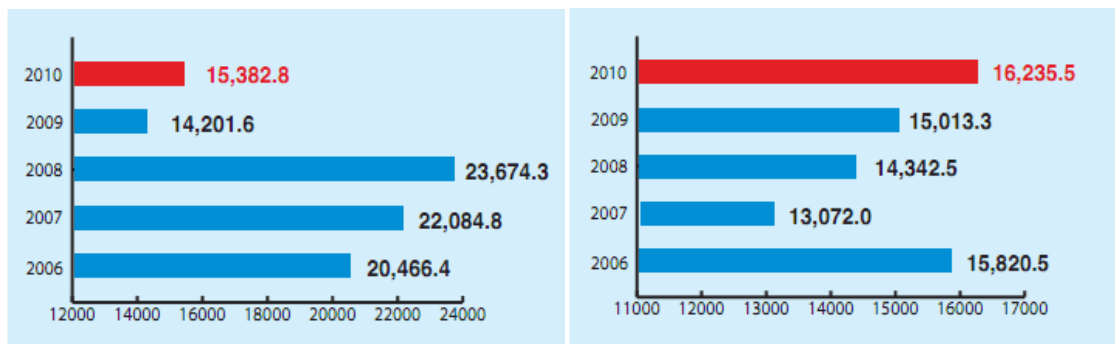
The port is both maritime and river, servicing freight and passengers (only cruises and no regular lines). As far as some traffic figures of 2011 are concerned, more than 200 river cargo vessels / day were recorded. The port facilities provided allow for the accommodation of any type of river cargo vessel. In 2010, after 2 years of recession, there was an increase of 13,2% in traffic.

In 2010, the total annual freight traffic reached the 47,564 millions of tons, with 36,796 millions of tons maritime and 10,588 millions of tons river cargo (see Fig.4).



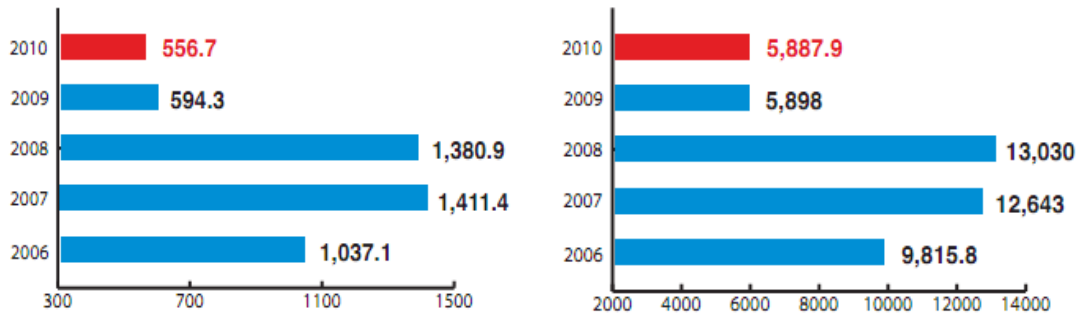
**Figure 4: Constantza port's maritime (up left), river (up right) and total annual freight traffic (in million tons)**

During the same year, the transit flows were estimated at 11,472 millions of tons, while the imports and exports reached the 15,383 and 16,236 millions of tons, respectively (see Fig.5).



**Figure 5: Constantza port's imports(up right), exports (up left) and transit annual flows (in million tons)**

As far as the container traffic is concerned, during the last year a considerable reduction was recorded. The total units serviced at annual basis in 2010 reached the 353711, while the estimated TEUs reached the 557000, producing a total cargo load of almost 6 millions of tons (see Fig.6).



**Figure 6: Constantza port's total annual TEUs (in thousands of units) and respective cargo load (in million tons)**

For instance, focusing especially on the case of the south container terminal of the port of Constantza, the container traffic in Constantza suffered the most, during the last five years, dropping from 1411414 TEUs in 2007 to 556694 TEUs in 2010. Apart from the considerable shrink of the Romanian economy, Constantza lost also traffic due to new container facilities developed Ilycevsck-Odessa and Novorossiysk, meaning less transit boxes for those destinations now covered by direct calls. Under such conditions, operators in Constantza had to adapt and survive under low traffic.

The main shareholder was DP World (Dubai) and that did not change through the last years, but they had to cooperate with other groups of companies in order to overcome the economic recession. In practice, the collaboration scheme was accomplished successfully, without causing any serious conflicts without the involvement of any company to the operations of the others, even though they were rival business groups ending up to the current situation, bringing up the prevailing role of the DP World over the others. The percentage of (%) market share evolution of the operators through those years is presented in the context of Table 1.

**Table 1: Traffic market share (%) in the container terminal of Constantza port**

Year/ Company	DP World	Socep	Umex	APM
<b>2007</b>	80,5	13,1	1,8	4,6
<b>2008</b>	77,9	16,8	2,4	2,8
<b>2009</b>	90,6	7,1	2,3	0,0
<b>2010</b>	95,2	4,0	0,8	0,0

DP World is dominating the traffic, due to its facilities and position, reaching about 95% market share in 2010. This is due to the fact that in 2009, operators like Socep and Umex shifted immediately to other types of cargo, as their position in the port

corroborated with their facilities and know-how permitted such a quick wise move. With a dedicated terminal, DP World can only expect better days and the reprise of the container traffic generated by economic growth. Nevertheless, they should be aware that transit will never be the same as before in the Black Sea, so they should consider seriously about transit to Central Europe as an alternative. As for the APM, their business diminished constantly and is now close to zero.

The almost 47,564 millions of tons serviced by the terminal in the port of Constantza in 2010 (see Fig.6) are classified in the following cargo categories:

- Liquid bulk,
- Dry bulk,
- Containers,
- RoRo and
- General cargo.

The loaded and unloaded tons per cargo category are depicted in the context of Table 2.

**Table 2: Constantza port terminal's cargo categories and respective volumes (in tons)**

<i>tonnes</i>	Unloaded	Loaded	Total
liquid bulk	7,883,075	3,327,865	11,210,940
dry bulk	11,621,887	15,535,504	27,157,391
containers	2,771,023	2,980,506	5,751,529
containers (IMO cargo)	57,997	78,353	136,350
Ro-Ro (self propelled)	4,033	151,500	155,533
Ro-Ro (non propelled)	233	675	908
General cargo	1,034,751	2,116,334	3,151,085
general cargo (IMO)	120	23	143
<b>total</b>	<b>23,373,119</b>	<b>24,190,760</b>	<b>47,563,879</b>

As per the freight ships, it seems that, through the years, the Danube river exploitation is transformed into an interesting solution, concerning the transportation of goods amongst the central European countries and the Black Sea. The number of sea vessels in 2010 reached almost the 8000, while the maritime ones were much smaller in number with a total of 5202 ships (see Table3).

**Table 3: Number of maritime and river vessels at the port of Constantza (in units)**

year	2005	2006	2007	2008	2009	2010
maritime	5,510	5,771	5,760	5,950	5,023	5,202
river	8,778	8,181	7,235	8,033	6,808	7,943
<b>total</b>	<b>14,288</b>	<b>13,952</b>	<b>12,995</b>	<b>13,983</b>	<b>11,831</b>	<b>13,145</b>

Focusing on the port of Constantza maritime traffic for 2010, it is clear that almost 99% of the total ships were freight vessels, while only 1% of them were passenger ships (57) and yachts (4). This fact provides proof that the greatest share of Constantza port's throughput comes from freight activities.

Nevertheless, in the near future, as soon as some infrastructure and superstructure is built, some regular lines for passengers are planned to be set in operation. In the next decade, the short sea shipping is believed to increase the contribution of the passenger terminal to the total port's throughput.

Up until now, focusing on 2010, the majority of freight ships transported general cargo (3143), while there were many tankers (648), as well as some container ships (523) and bulk carriers (423). The maritime traffic per ship category is presented in Table 4.

**Table 4: Maritime traffic per ship category in the port of Constantza (number of ships)**

year	2005	2006	2007	2008	2009	2010
bulk carrier	511	477	361	419	395	423
ferryboat	25	20	11	14	2	0
general cargo	2,657	2,730	2,852	2,777	2,735	3,143
heavy lift	5	13	12	9	1	0
livestock	30	46	56	23	33	87
LPG	53	60	65	100	101	84
OBO	7	3	1	4	1	3
passenger	85	75	75	81	51	57
portcontainer	909	966	1,137	1,298	697	523
reefer	105	113	105	84	60	40
ro-ro	35	49	55	62	53	75
tank	994	1,128	962	962	725	648
yacht	0	2	3	4	7	4
other	94	89	65	113	93	115
<b>total</b>	<b>5,510</b>	<b>5,771</b>	<b>5,760</b>	<b>5,950</b>	<b>5,023</b>	<b>5,202</b>

The passenger traffic consists of cruise ships, while there are also some yachts recorded especially during the touristic period in the summer. The total number of passengers for 2010 reached the 21300 persons (see Fig.7 and Table 5).

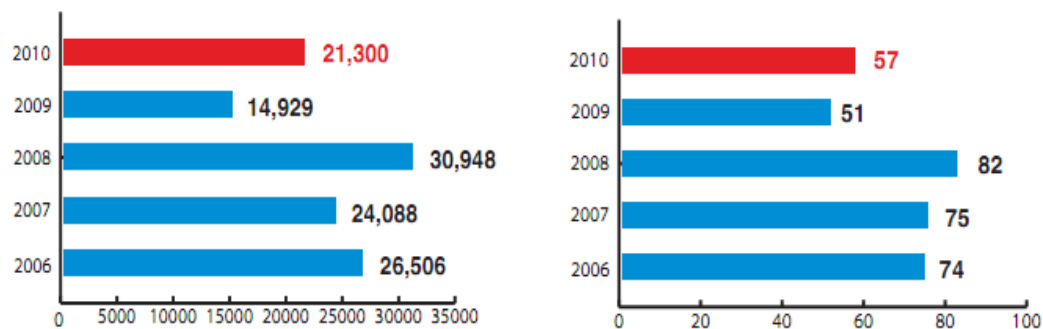


Figure 7: Passenger traffic (number of ships and passengers) in Constantza port

Table 5: Passenger traffic (number of ships and passengers) in Constantza port

	2005	2006	2007	2008	2009	2010
passengers	24,511	26,506	24,088	30,948	14,929	21,300
passenger vessels	85	74	75	82	51	57

As far as the transported goods are concerned, they were also classified and grouped into cargo categories according to their type. Based on the data depicted in Table 6, the majority of them constitute agricultural or industrial products.

**Table 6: Freight traffic (in thousands of tons) in Constantza port**

year	2005	2006	2007	2008	2009	2010
cereals	6,009.9	7,168.5	4,257.9	6,670.4	10,418.7	12,062
fresh fruits & vegetables	169.2	181.6	1879.7	132.7	81.4	71.1
livestock	19.9	40.8	75.6	20.2	10.9	35.1
foodstuff, drink & tobacco	551.2	537.6	302.8	432.9	303	368.9
seeds, vegetal oils, fats	453.7	877.1	895.6	1,131.5	1,567.1	1,759.9
wood, cork, timber	1,012	906.4	9714	836.1	838.4	961.9
natural & chemical fertilizers	2,310.4	2,093.2	1,863.5	1,896.2	1,344.5	1,765.9
raw mineral products	651.2	610.5	671.6	505.5	304.4	221.3
ferrous ore, scrap	12,626.1	8,670	10,794	11,379.6	3,843.1	5,354.1
nonferrous ore	3,441.6	3,127.3	999	693.8	550.2	2,560.7
textiles, fibers, leather, furs	1.1	6.2	0.8	14.3	18.7	73.5
paper pulp & paper waste	5.4	9.2	4.8	0	0.5	4.1
coal, coke	3,472.3	3,411.6	4,798.2	7,109.4	2,731.7	2,988.6
crude oil	8,682.9	8,567.4	8,543.1	8,814.9	6,919.6	5,501.1
oil products & natural gas	5,295.2	4,978.3	3,772.3	4,135.2	3,954.1	4,107.7
coal & natural gas tars	252.6	410.1	371.9	367.6	244.0	186.5
chemical products	1,354.4	1,039.7	1,561.5	1,291.1	828.4	1,543.5
cement, building materials	2,302.1	1,605.6	1,133.7	953.5	321.1	280.5
glass, ceramic products	0	5.4	21.9	47.8	60.6	75.2
metals, metal made products	3,453.9	3,136.2	1,005.1	700.4	550.8	2,580.8
machine tools, transport equip.	92.4	88.3	137.0	178.7	243.7	265.9
general cargo / other goods	7,752.6	9,979	12,723.6	13,086.8	5,904.5	5,884.9
<b>total</b>	<b>60,631.7</b>	<b>57,126.4</b>	<b>57,779.9</b>	<b>61,837.7</b>	<b>42,014.2</b>	<b>47,563.9</b>

Some additional terminal features and characteristics, as well as several financial data are presented in the following paragraph, in order to accomplish a holistic approach of the port of Constantza and its attributes.

## 2.4 Terminal properties

The port complex covers an area of 3926 hectares and consists of the old part to the north and the new part to the south.

The north part is entirely operational and consists of 12 basins with water depth between 8,0 and 13,5m, also including 15,5km of quay and 82 berths. It has specialized terminals for ores, coal, crude oil and oil products, grain, chemical products rolled metals, containers, general cargo, platforms and warehouses.

The south part is partly operational. Completion works on the southern side have already started to host new terminals in a favoured zone with high water depths. It has 13km of quays, 70 operational berths and handling capacity, including platforms and

warehouses, for containers, ores, coal, phosphate, crude oil and oil products, rolled metals and general goods. Part of the traffic is handled as Ro-Ro and ferry cargo.

The south port encompasses the entrance to the Danube-Black Sea canal, which is part of Europe's most important inland waterway, the Rhine-Main-Danube corridor (VII corridor of TEN-T). There is also a dedicated river/maritime basin for transshipment of cargo into river barges. Important cargo quantities are carried by river, between Constantza and Central and Eastern European countries: Bulgaria, Serbia, Hungary, Austria, Slovakia and Germany. River traffic is very important for Constantza Port, having a share of 18% of the total traffic in 2008.

Almost 80% of the cargo handled at the port of Constantza is bulk cargo, separated into two halves:

1. The first half of it is liquid bulk, mainly crude oil and derivative products.
2. The other half is dry bulk, mainly iron ore and nonferrous ores, coal, coke, phosphate, apatite and cereals.

General cargo consists of imports of industrial equipment, foods, fertilizers and chemical products, clothes and electrical appliances and exports of furniture and wood products, fertilisers and chemical products, foodstuffs, textiles, glass products and cars.

In this paragraph, the focus is set on issues regarding the appropriateness of land, the sufficiency of the terminal's capacity, infrastructure and superstructure to provided services of high level. In addition, taking into consideration the ongoing and future projects associated to the port's enlargement and upgrading, some financial data are depicted, given the fact that funding constitutes a fundamental factor for the accomplishment of any future business pursuit. Any data presented in this paragraph was based on the annual report for 2010, as well as on the 2011-2012 handbook, both published by Constantza port authority.

Terminal's strategic location facilitates freight forwarding to a great extent. Terminal's attributes and characteristics depict its capability and capacity to perform and serve well-known shippers, travel agents and logistics service providers and meet their needs. The level of provided services has proven to be satisfactory, according to many large carriers' point of view; nevertheless, even greater development prospects will arise for the hub and its adjacent area on condition that additional improvements will be elaborated. In the context of the following text, a small reference is attempted to several indicators that can prescribe terminal properties:

- Saturation ratio: is the ratio between actual volumes and maximum capacity (%). This indicator represents how much of the terminal/interchange capacity is utilized. The Constantza port terminal's full capacity in tonnes is about 255 millions of tons per year. The current (2010) amount of tons and TEUs handled within the port and the container terminal was 47,564 millions of tons and 567000 units, respectively. So, the saturation ratio is only 19% concerning the tonnage of the port and only 2% for TEUs, meaning that there is plenty of space for much more cargo.



- **Expandability:** is the potential for expandability of interchange/terminal, basically estimated as % increase potential from today's transshipment capacity. In the future, as long as the freight traffic increases, one of the main concerns will be the expansion of the container terminal, in order to boost the transshipment capacity. Additional to the 31 hectares of existing land, there are some 39 more hectares in case the expandability project is decided to be processed. That means that the container terminal has the potential to over-double its size (about 226%), translated into a 126% increase. Accordingly, if needed (not necessary right now) in the future, the entire port has great potential for expansion, especially towards its southern bound.
- **Distance from city centre:** Number of kilometres from city centre to interchange terminal. This indicator reflects interaction of terminal with the neighbouring land-uses, transport network, commercial activities, etc. The port of Constantza, the container terminal and all the access gates are located not more than 2,0 kilometres far from the city centre.
- **Distance from nearest highway:** the shortest distance is the better for the terminal, because it provides access to core national road network and hence, it improves transport flexibility. The distance of port's central commercial gate to the nearest highway is about 2,5 kilometres.
- **Clarity of ways:** implies the plainness in which services and facilities are explained by signage, design, etc. This indicator is a tool for helping passengers and freight vehicle drivers or users realize and identify the proper ways for satisfying their terminal-related needs. It is estimated empirically through a scale between 1 and 5. 1 represents less clear identification of ways and 5 implies the maximum clarity of ways identified. It is believed by the NCMPA representatives that the port of Constantza scores 5.

Pertaining to the business profile, the terminal is a joint stock company under the authority of Romanian Ministry of Transport and Infrastructure (MTI), performing mainly the following tasks:

1. Provide repair, maintenance, development and modernization of infrastructure.
2. Making the port proper infrastructure available to users, avoiding discrimination.
3. Providing and / or monitoring safety services inside the port.
4. Issuing licences for activities in Free Zones of Constanta and Mazarabi ports and operational permits for activities in the ports of Mangalia and Midia.
5. Assuring signalling of access fairways and min water depths in port basins and at berths.
6. Keeping the register of the port workers performing specific activities in the port.
7. Fulfilling Romanian State commitments assumed by international agreements and conventions (under delegation of MTI of Romania).

8. Drawing up development plans for the maritime ports according to policy and development programs elaborated by MTI and port regulation.
9. Implementing development programs related to the maritime ports' infrastructure.
10. Promoting competitive environment and free market principles in maritime and cargo related services performed within the ports.

Inside the port area, there are separate terminals for:

- liquid and dry bulk,
- containers,
- break bulk (perishable goods and general cargo, such as metallic, chemical, timber and forest products, fertilizers etc),
- RoRo/Ferry,
- passengers,
- LPG (liquefied petroleum gas),
- barges and river tugs.

As for the provided services, the most important of them are listed below:

#### **A) Cargo services**

1. Provision of equipment for loading/unloading
2. Storage of goods and stowage
3. Agency in the loading of technical gas
4. Cargo inspection and survey
5. Disinfection
6. Distribution of gas fuels through pipes – Transport via pipelines
7. Freight forwarding
8. Transshipment on combined transport
9. Intermediation services in trade of cars, industrial equipments, ships and aircrafts
10. Lashing
11. Manufacture of cement and concrete
12. Manufacture of fabricated metal products and components
13. Maritime and coastal transport of cargo
14. Other retail sale in non-specialised stores
15. Packing
16. Processing and preserving of poultry meat
17. Reclamation of recyclable sorted materials
18. Retail sale in non-specialized stores
19. Retail sale of fuels
20. Retail trade of other products
21. Seed processing for propagation
22. Technical testing and analysis
23. Weighting

24. Wholesale of fuels, beverages, sugar, chocolate and sugar confectionery, tobacco, chemical products, china and glassware, construction materials, containers, cosmetic products and perfumery, edible oils, electrical home appliances, electronic and telecommunication equipment and parts, grains, lubricating naval oils and greases, meat products, metals and ores, food including fish crustaceans, intermediate products, scraps, textiles, wood material, motor vehicle parts and accessories.

## **B) Marine services**

1. Loading/Unloading of vessels
2. Mooring/Unmooring of ships
3. Pilotage
4. Naval design
5. Activities for evaluation of insurance risks
6. Agency
7. Assistance, salvage and refloating of ships
8. Bunkering (by tank car, ship or tanker ship and other devices)
9. Cleaning and degassing of tankers ships
10. Cleaning of barns and storage places of vessels
11. Fumigation services
12. Inland freight water transport to/ from the port
13. On yard repairs of vessels and of marine platforms
14. Periodical inspection of ships
15. Remediation and clean up (removal) of hazardous waste (exclusively for ships)
16. Sewerage (exclusively for ships)
17. Ship chandlers
18. Ship-building and construction of floating structures
19. Ships repairs (on/ outside the shipyards)
20. Technical consultancy for ships
21. Tour operators activities
22. Towage
23. Transport of passengers to and from drilling platforms

## **C) Other services**

1. Activities and services of decontamination
2. Building construction and construction works of other engineering projects, but also demolition of constructions if necessary
3. Cartographic and spatial information activities and hydrographic measurements
4. Civil engineering
5. Collection of non-hazardous waste
6. Consulting activities for machinery
7. Courier activities
8. Customs clearance

9. Dismantling of cars and out of use equipment for scrap recovery
10. Diving services
11. Dyeing, painting and windows glass fitting
12. Fire fighting and fire extinction activities
13. Food and beverage
14. General cleaning of buildings
15. Installation of machinery and industrial equipment
16. Land passenger transport
17. Maintenance and repair of motor vehicles
18. Financial intermediation
19. Human health activities
20. Plumbing activities
21. Printing of newspapers and press releases
22. Private security activities
23. Rental and repairing of electrical equipment
24. Renting of leased real estate
25. Security systems service activities
26. Service activities incidental to land transportation
27. Storage of non-hazardous waste
28. Technical and commercial consulting activities
29. Wired telecommunications activities - Wiring and wireless networks (telephone, internet)

#### **D) Logistics services in container terminal**

1. Cross-docking.
2. Container handling.
3. Container storage.
4. Loading/Unloading of containers and other load units (e.g. rollers, pallets and other unitised cargo).
5. Last mile distribution/deliveries.
6. Local collection of goods
7. Warehousing of general cargo, including refrigerated and/or cold products and perishable goods.
8. Quality control of products.
9. Tracking of shipments.

In addition, as mentioned above, aiming at the upgrading of provided services, there is a number of ongoing and planned development projects, funded either by Romanian or from European financial sources.

Concerning the land-use of the port's adjacent area, the terminal is located to a pure commercial and industrial area, surrounded by the old part of the city of Constantza, but still close enough to the city centre where commercial, residential and tourist activities are developed (see Fig.8).



**Figure 8: The port terminal and the city of Constantza in Romania (aerial view)**

Any transport, commercial and logistics companies are not located around the terminal; instead, they are situated in the port area. In particular, many large and medium-scale operators and forwarders co-exist with port facilities and take advantage of the advantageous location. Nevertheless, the urban commercial area is very close to city port, facilitating the urban distribution of goods.

### **3 Planning, ownership and organisation**

#### **Organisation and ownership, operations**

##### **3.1.1 Ownership structure**

The port of Constantza complex consists of the old part to the north and the new part to the south. Together with the satellite ports of Midia and Magalia constitute one of the most important interconnectivity points in the wider area of the Black Sea, concerning the connection of long and short distance combined transport assignments.

The port of Constantza and its ports-Midia and Mangalia, also including the Tomis Marina are public-private maritime ports owned by the Romanian State. The state is responsible for their regulation and function through the tasks entrusted and discharged by National Company "Maritime Ports Administration" S.A. Constantza and Romanian Naval Authority (RNA). Both of them are being subordinated to the Ministry of Transports and Infrastructure. Under the Romanian ministry of transport, the National Company "Maritime Ports Administration" SA (NCMPA) Constantza has the role of port authority for the port of Constantza, as well as for several neighboring Romanian ports (Midia and Mangalia, including Tomis Marina) located in the adjacent area. The agglomeration of those ports formulates a big cluster, forming a major sea and river port, covering a total area of 4 square km.

National Company "Maritime Ports Administration" S.A. Constantza (MPA SA Constantza) was set up through the Romanian Government Decision no.517/1998, altered and completed by Government Decision no.464/2003, through the reorganization of the former Autonomous Enterprise "Constantza Port Administration". MPA is a joint stock company assigned by the Ministry of Transports and Infrastructure to develop activities of national public interest in its capacity of a port administration. The company fulfils the port authority function for Constantza, Midia, Mangalia ports and Tomis Marina.

The NCMPA Constantza has adopted the business model of a landlord port. According to that model, the port authority builds the wharves destined for rent or leasing to a terminal operator (e.g. stevedoring companies). The operator invests in cargo-handling equipment (machinery and equipment such as forklifts, cranes, etc), hires longshore labourers to operate such lift machinery and negotiates contracts with ocean carriers (steamship services) to handle the unloading and loading of ship cargoes.

From its position, it aims to provide quality and competitive services to the ports customers, to offer a developed transport infrastructure, as well as security, safety and environmental port conditions. On that base, the major pursuit of the NCMPA is the encouragement of the cargo traffic and the transformation of the Constantza port to an important transit center - by offering the shortest transport alternative to the center of Europe and becoming a leading regional distribution center for its hinterland. In particular, the aim of the NCMPA Constantza is threefold:

1. Establish hub position of Constanta port in Black Sea
2. Become Europe's eastern combined transport gateway
3. Increase efficiency and attract business & logistics activities

Concerning the NCMPA main responsibilities, in order to fulfil the port authority function and in its capacity as administration, the company performs the following tasks:

1. Drawing up of development plans for the maritime ports according to the policy and development programs elaborated by Ministry of Transport and Operational Rules for Maritime Ports.
2. Coordination of the activities allowed to be performed within the maritime ports;
3. Implementation of the development programs regarding the maritime ports infrastructures.
4. Issuing permits in order to authorise companies that are developing activities of naval transport within the maritime ports.
5. Approval of performing activities within ports, other than those subject to the authorisation of Ministry of Transport by issuance of operational permits.
6. Providing operational, administration, repair and maintenance services for maintaining minimal technical characteristics of the naval transport infrastructure that have been given under concession or administration, as well as the owned property in the ports of Constantza, Midia and Mangalia, and make it available to users in a non-discriminatory manner, according to the regulations in force.
7. Establishing the order of arrival and departure for the vessels in the maritime ports, berths allotment and issuance of berthing permits.
8. Performing controls to vessels operation, forbidding or stopping them in cases specified by regulations in force.
9. Rendering of services and performing of operations and works in order to fulfill the commitments the Romanian State assumed by international agreements and conventions Romania took part in, such as: search and rescue, case of pollution fight and prevention.

10. Representing the Ministry of Transport in relation with the concessionaires of naval transport infrastructure or safety services.
11. Supervision of loading and unloading, transport and transit of dangerous substances or dangerous cargo in the maritime ports.
12. Rendering the hydro-technical constructions to the port operators for berthing or handling vessels.

Concerning the NCMPA executive body, the general assembly of shareholders, constituted by the representatives of the shareholders is the management body of the company that decides on its activity and its economical policies. By the time the state is the main shareholder, its interests are supervised by three officials of the Ministry of Transports and Infrastructure and by an official of the Ministry of Public Finances assigned by the Minister of Transports and Infrastructure's official order.

The company is headed by the Board of Administration appointed by the Minister of Transports and Infrastructure's order and is composed by 7 members as following:

- The president of the Board of Administration, elected as General Manager of the MPA SA Constantza,
- two officials of the Ministry of Transports and Infrastructure,
- an official of the Ministry of Public Finances,
- an official of Fondul Proprietatea,
- an official of the City Council and
- an expert in the activities related to the company.

The Board of Administration is validated by the General Assembly of Shareholders. By the time the State is the main shareholder; the Board of Administration and its President are appointed and dismissed by the Minister of Transports and Infrastructure's order. The company has 3 divisions and 4 sub-units with branch status.

The Romanian Naval Authority is the state authority in the field of safety of navigation, being the specialized technical body of the Romanian Ministry of Transport, Constructions and Tourism. It is a public institution with juridical personality. The Romanian Naval Authority took over all the rights and obligations of both Inspectorate of Civil Navigation (ICN) and Romanian Register of Shipping, which merged.

Within the Port of Constantza the maritime and cargo related services are mainly carried out by private companies in a competitive environment, applying the free market principles.

The Commission in charge to coordinate for the movement of maritime and river vessels in Constantza, Midia and Mangalia Maritime Ports is carrying out its activity in the Port of Constantza being responsible for the traffic coordination of maritime and river vessels, the order settlement of arrival/departure and transit of the maritime and river vessels in Constantza, Mangalia and Midia Ports, as well for berth allotment. The presidency and secretariat of the Commission is carried out by MPA who is also responsible for the daily publication on a paper support and electronic format of the Informative Bulletin of the maritime and river vessels which contains data regarding the

maritime and river vessels identification, port operation progress and goods identification.

Authorisation of public port services is transparent, nondiscriminatory, objective and public .

The Romanian Naval Authority issues authorization for safety public services and services of great importance for the port, such as loading - unloading, bunkering and supplying. For authorization of activities that use the port infrastructure, notification from MPAC is compulsory required. For other activities that do not need an authorization from the Romanian Naval Authority, MPA SA Constantza issues operation permits within the port area, granted in following specific procedure.

Other independent authorities in the port of Constantza are:

- ✓ National Customs Authority,
- ✓ Administration of Navigable Canals,
- ✓ National Environment Guard,
- ✓ Border Phytosanitary Quarantine Inspectorate Constantza,
- ✓ Coast Guard,
- ✓ National Sanitary Veterinary and Food Safety Authority and
- ✓ Transport Police Department.

All authorities are in full collaboration, under the coordination of NCMPA and the supervision of the Romanian Ministry of Transports and Infrastructure (MTI). Thus, the NCMPA Constantza and the MTI are the two main bodies in charge of the planning, management, policy making and promotion of marketing strategies, regarding issues associated with long/short distance intermodality. Of course, there are other public and / or private bodies and institutions involved in the decision making, such as various stakeholders, regional and local authorities or terminal operators, owners and users, or even infrastructure providers, stevedoring companies and rail operators. Nevertheless, their role and contribution is secondary, meaning that any suggestion should be authorised and approved by MTI and NCMPA.

Hence, in any case, especially today, it is worth mentioning that there is satisfactory cooperation and integration amongst the two leading authorities (NCMPA and MTI) and the rest of the involved parts stakeholder groups or even customers, when it comes to deal with management issues concerning the port of Constantza.

### **3.1.2 Regulatory framework**

Concerning the regulatory framework associated to the port of Constantza, it should be stressed that there is an established cooperation and procedural framework, according to which, every involved body's role, jurisdiction and obligation is explicitly specified. Thus, any operational and business activity is characterized and co-acted by the collaboration and mutual understanding amongst all the involved bodies and stakeholder groups. Given that the cooperation of all the involved parts is guaranteed, the ultimate goal is the aiming at the economic development of the terminal and its adjacent area.



As a result, there are no conflicts recorded amongst private terminal operators and NCMPA or local authorities, concerning issues on planning, financing, construction and maintenance. On the contrary, it seems that there is a prevailing collaboration spirit when a new project is planned to be realized, aiming at the socio-economic development of the region. In fact, as long as there is a win – win situation amongst stakeholders, the authorities' role is rather supervisory and complementary, in a way that the public body is just checking the compliance of operations and activities with the national and EU maritime policy and directives.

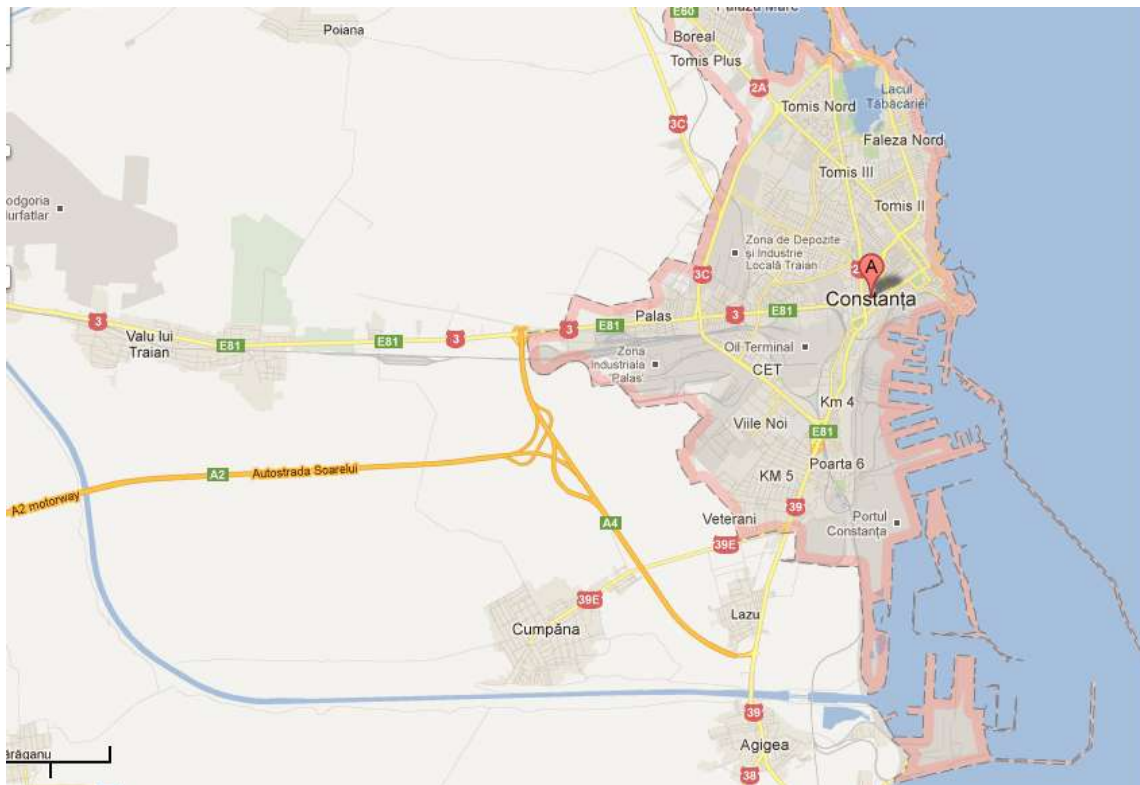
As far as the lessons learned through the years are concerned, it seems that in planning, finance, construction and operation of terminals, the cooperation amongst the involved groups of stakeholders is fundamental for any project to be accomplished, but everyone's role, responsibility and jurisdiction must be clarified and be predetermined through a legal and institutional framework. On that base, in order to come up with a holistic approach and mutual agreement concerning the development prospects of the port and its terminals, in 2001-2002 the Constantza port Master Plan was created.

The Master Plan constitutes the constitutional map according to which any project or activity associated with the port operation and development is planned, routed and processed. In the context of the Master Plan, the role, jurisdiction and responsibilities of all involved parts, members and stakeholders, as well as the communication code amongst them is determined, in order to reassure uniform behaviour and justice for all, avoiding misunderstanding and conflicts.

For the port of Constantza, this code is vital as there are many public authorities and bodies, as well as several private companies and stakeholders involved in the port operations.

### **3.1.3 Planning and operation/construction process(es)**

As far as the operational profile of the terminal is concerned, the port of Constantza constitutes a special logistics area and is one of the main distribution centers for the Central and Eastern Europe. It is situated at the eastern part of the city of Constantza, Romania (see Fig.4).



**Figure 9: The location of the port terminal in the city of Constantza (Google map)**

The terminal's geographical position offers many advantages, such as:

- ✓ Multi-purpose port with modern facilities and sufficient water depths in the port basins to accommodate the largest vessels passing through the Suez Canal.
- ✓ Direct access to the Central and Eastern European countries through the Pan-European Corridor VII - the Danube.
- ✓ A hub for the container traffic in the Black Sea.
- ✓ Good connections with all modes of transport, with direct access to the national and international inland waterway (Danube), railway and road (A2 motorway from Bucharest to Constantza) networks and pipelines. In addition, even though there are only seasonal regular flights for passengers, the direct access to Mihail Kogalniceanu military/public airport, just 26km northwest from the city of Constantza, may provide connection to national and international air transport destinations, providing services for cargo on request.
- ✓ Modern facilities for passenger vessels and especially for cruise ships. In particular, the terminal may provide transport accommodation and leisure facilities and services, including passenger terminal with capacity of 100000 passengers / year and berthing front of 293m to accommodate vessels up to 11m draught.
- ✓ Land availability and great potential for future expansion, especially at the southern part of the terminal.
- ✓ The fact that the entire port is a free zone, providing an area with relaxed customs, immigration, visa, and/or taxation jurisdiction with respect to the country of location. Customs facilitations are provided for all commercial operations performed through the port.

- ✓ The fact that the operation of the terminal is 24/7, meaning that it is always open and in position to provide services to customers.

Several undergoing and future development projects towards sustainable development are associated with the port of Constantza terminal. The most important of them are listed below:

- ✓ Upgrading of road and rail connections to national and international networks.
- ✓ Infrastructure and superstructure works on piers for special terminal development, including road/rail construction works and mooring constructions.
- ✓ Development of artificial island inside the port to build new platforms.
- ✓ Dredging works and berth extension for increase in capacity.
- ✓ Shore protection and soil consolidation and management of Constanta adjacent areas.
- ✓ Upgrade lighting level in port and reduce road lighting system power supply through the replacement of old systems with new, advanced, more efficient and liable ones.
- ✓ Upgrading of port's safety system.

The total budget of the afore-mentioned projects is estimated to surplus the 1 billion €.

Funding is to be covered by Sectorial Operational Programme, European Gateways Platform project, East Europe Transnational Cooperation Programme, together with some national and port authority funding.

Within the ongoing projects, the following three, bulleted below, are considered to be of big importance and thus, of high prioritization:

1. The Completion of the Northern breakwater of Constantza Port - extension by 1,050m. The objective of the project is the improvement of the operation conditions by decreasing the waves agitation, increasing the safety of vessels by ensuring a protection of the sailing lines and reducing the destructive effects of waves upon the port facilities. The estimated budget of the project reaches the 121 million €.
2. The Road bridge at km 0+540 of the Danube-Black Sea Canal. The project started as a necessity of connecting the port with the Bucharest-Constantza highway through the ring of the Constantza city and creating an alternative by the execution of a connection ring with the existing national road and in the same time creating a direct link between the North and South areas of the Port of Constantza without transiting the town. The estimated budget of the project reaches the 30.14 million €.
3. The Development of the railway capacity in the river-maritime area of Constantza Port. The project consists of completing a systematized rail complex in the river-maritime sector of the Constantza Port that will assure the optimal and unitary serving of the existing and future port operators. In the first

stage, that is the object of this project, only the railways serving the existing operators will be executed, based on the traffic forecasts until 2020. The estimated value of the project: Euro 17.6 million €.

The role of the port authority in the port of Constantza has been allocated to the NC Maritime Ports Administration SA (NC MPA), an ex-national and now joint stock company. The NC MPA, together with the Romanian Ministry of Transport and Infrastructure (MTI) play a supervisory role in any project is launched, concerning the port, according to the Master Plan. Nevertheless, when it comes to the decision making, the NCMPA and the MTI, after taking into consideration the requirements from the demand side stakeholders, they take the respective measures and actions as far as the management of land and infrastructure is concerned. The port of Constantza has adopted the business model of the landlord port, meaning that any land and infrastructure inside the port is property of the Romanian state and is governed by the MTI and the NCMPA.

The ownership and management are partly separated in public bodies and private companies. This fact has the advantage of having better control and more rapid solving of problems, ensuring the interest from the part of the private domain as they are potential stakeholders. Nevertheless, such a model often attracts many coordination difficulties and probably involves additional costs. So, in any case, the port authority of Constantza port is in favour of the landlord port when it comes to the ownership of land and infrastructure, but for the management, a more flexible public private partnership (PPP) scheme is the most preferable one.

On the same base, the management of land and infrastructure is separated from the operational activities of the terminal. The management is under the control of the port authority, while the operation is undertaken by private companies. The benefit coming from such a choice is believed to be the enhancement of the provided services and their upgrading to a higher level, guaranteeing the attraction of more potential customers and wealth. Another strong point is that the operation of the port is becoming independent from the politics, meaning that any negative circumstance will not have big impact on the successful operation of the terminal. According to the Constantza port representatives, the model adopted today guarantees the separation of management from the operation, towards the fastening of the development procedures.

#### **3.1.4 Sharing of information**

As far as the ownership, management and operation of the information and communication systems are concerned, the NC MPA Constantza SA is no longer in charge of any of those tasks. In particular, during the last five years, there has been a full privatization of the whole telecommunication domain. The private companies have undertaken the task of providing reliable, direct and high level information and communication services either by phone or internet and also to provide for any of the systems technological upgrading and updating, according to the demand market requirements.

As per the lessons learned, it was found out that it is important that operators and authorities are in position of sharing and exchanging information. In addition, as long as it is not confidential data, this information should be available to all stakeholders at the same time, in order to promote further development without wasting valuable time and money. In that sense, the existing cooperation amongst operators and authorities regarding the information provision in the port of Constantza should be supported and further strengthened via e-mails, websites, specialized technology or software programs and internet tools. Nevertheless, especially in the case of the diffusion of confidential information (e.g. financial data), the fear of competition in combination with the economic recession may constitute potential barriers towards information sharing techniques.

### **3.1.5 Suggested improvements**

Concerning any infrastructural planning, designing and construction, any decision taken will be based on the master plan. Hence, everything depends on the increase of the demand. Nevertheless, it seems that the renovation of infrastructure, equipment and superstructure of the old part of the port at the north, as well as the expandability of the southern part of the port, including the building of new quays, berths, terminals, warehouses and platforms is inevitable, in order to boost the demand and attract more customers. On condition that some private initiative and investment is attracted, together with own and state funding, those projects will be elaborated in the near future.

As far as the administrative model adopted, the port authority is already based on the landlord port model, in favour of the diminishing of investment costs for port operators, making the port attractive to even more new operators as well. Also, terminal handling charges are lowered enough, in order for the port to be faced as beneficial by its current and potential users and customers. Thus, instead of allocating the provision of both commercial and regulatory functions to the port, the private sector is invited to set up and operate commercial facilities while the port authorities continue to own the land and basic infrastructure assets discharging their regulatory functions.

In addition, the open public private partnership (PPP) model allows access to a variety of port service providers (i.e. stevedoring companies) which will be focused in a specific activity. These providers will be delegated services by the central port administration through grant concessions and other leasing tools. What is more, the stakeholders' interest and active contribution seemed to be guaranteed.

Furthermore, public authorities will be in charge of developing and amending regulatory and legislative framework and performing respective audits. Also, they will be responsible for sanitary control of facilities and generally they will stand as supportive framework of port management and operations servicing public utility. As far as the role and responsibilities of each one of the regulating authorities are concerned, they are briefly listed below, according to the opinion of the NCMPA representatives:

- European Union/Commission: Production of policy directives on maritime and inland waterway policy and diffusion of guidelines and best practice.

- National authority: Comply with the European policy and directives and adapt them according to circumstances and case study needs in order to set the legal, institutional and operational framework.
- Regional authority: Never being involved in port's operational and development plans as long as there is regional and local benefit, as well. In the case study of Constantza, the port is state owned, coordinated by MTI and NCMPA, so the regional authorities have almost no jurisdiction for interventions.
- Local authority: In some cases, probably they could provide some technical instructions mainly on infrastructural issues.

In any case, the NCMPA believes that the existing regulatory framework properly and satisfactorily covers the required standards on infrastructural elements, information services, transport operations, safety/security, retail and other services, so no further improvements may be elaborated for the time being.

As per the systems and technologies used for the circulation, communication and diffusion of information associated with the transport of passengers and goods, the responsible persons from the port of Constantza have evidence and proof from the port customers that the provided services range at a very satisfactory level. On that basis, the only possible improvement might be the use of some more advanced and state of the art technological equipment, in order to make the diffusion of information more rapid – close to real time.

To sum up, according to the port authority, it is not necessary to have an institutional body which centralizes the planning and management of interfaces and coordinates all the involved stakeholders. On the contrary, it is essential to have a dedicated institutional body in charge of promoting long/short distance intermodality. To this point, especially in the case of Constantza, there do not seem to exist any rivalries amongst companies freight/passenger terminals and regions and these conditions are in favour of further socio-economic development and also the increase of the level of provided services.

Also NCMPA are in favour of the harmonization of the regulations on physical and information standards in long/short distance interchanges. Moreover, they acknowledge the importance and utility of the existence of a regulatory framework for the agreements amongst different administrations and authorities. Finally, further improvements may be necessary on regulations associated with the physical accessibility and information services for passengers and freight customers, while some modifications may also be required concerning the better management of shops (e.g. duty free) and commercial activities.

## 3.2 Financing

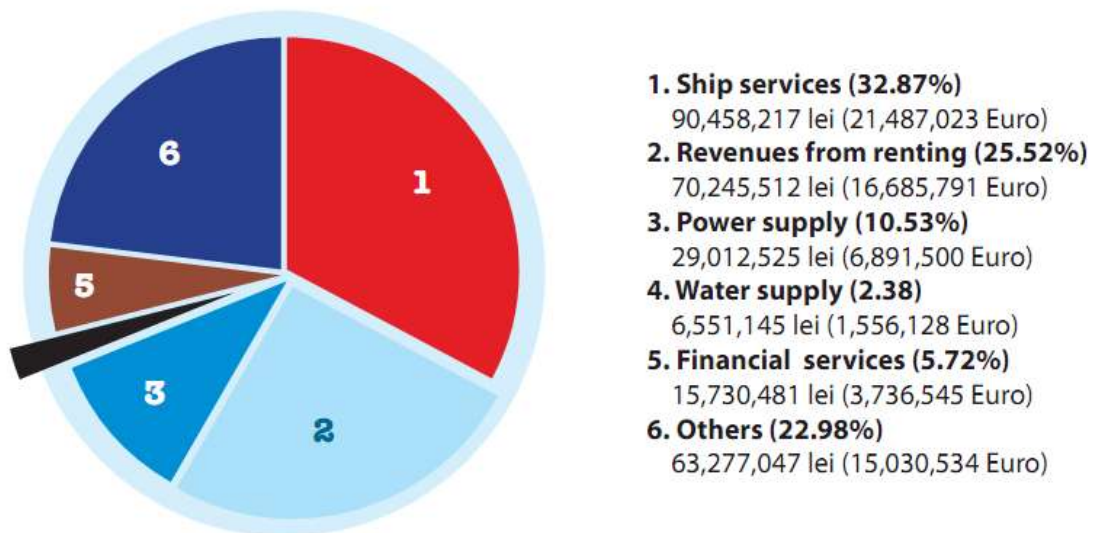
The terminal was initially (before 1998 when it was transformed into a joint stock Company) financed by the Romanian state as it had been public property, together with the contribution of some private investors, under a public private partnership (PPP) scheme. Nevertheless, up until today, there is no public subsidy. On the contrary, it

seems that the port of Constantza constitutes a bargain for private investors, providing the opportunity for stakeholders and customers to lease land, infrastructure and equipment and at the same time be in charge of their own provided services and operations.

In addition, according to the NCMPA representatives, no significant barriers concerning communication, coordination, initiative, finance, control and legislation were mentioned or recorded associated with the integrated planning and financial process, the infrastructure phase and the cooperation amongst stakeholders and the information sharing. On the other hand, financing difficulties and delays concerning public funding or private investment, as well as legislation issues when it comes to the diffusion of confidential information are often recorded.

Within the last section of the current paragraph, the focus is set on some financial and economical data concerning the port, its attributes and development plan.

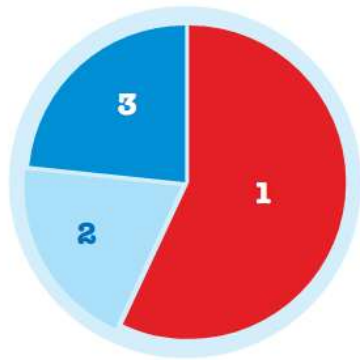
The total income of NC MPA SA for 2010 reached 65,4 millions €. The revenue structure in figure 10 illustrates that the most important sources are ship services and the renting of infrastructure, superstructure and mechanical equipment (for further detailed analysis see Fig.10).



**Figure 10: Revenue structure for the port of Constantza**

Finally, as far as the funding resources are concerned, they mostly come from self owned investment schemes or sources (57,15% of total) and budgetary allocations (19,6% of total).

The role of the European Union is ancillary, but also important, with a total contribution of 23,25% to the required investments and funding (see Fig.10).

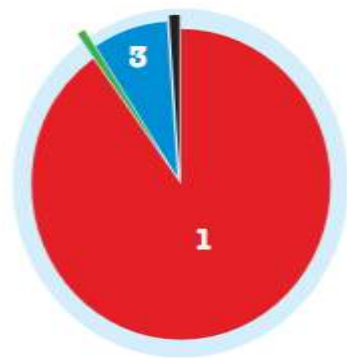


## Resources

- 1. own sources (57.15%)**  
22,315,801 lei / 5,300,791 Euro
- 2. budgetary allocations (19.6%)**  
7,650,892 lei / 1,817,357 Euro
- 3. European fund for Regional Development (23.25%)**  
9,078,475 lei / 2,156,459 Euro

**Figure 11: Allocation of resources in the port of Constantza**

The allocation of resources for 2010 is presented in Figure 12, where it is made very clear that the prioritization is set on infrastructure projects' funding.



## Structure

- 1. infrastructure (90.11%)**  
35,185,115 lei / 8,357,708 Euro
- 2. superstructure (0.75%)**  
289,419 lei / 68,747 Euro
- 3. equipment (8.11%)**  
3,167,690 lei / 752,438 Euro
- 4. other (1.03%)**  
402,944 lei / 95,713 Euro

**Figure 12: Allocation of resources in the port of Constantza**

In conclusion, the port of Constantza is not only the biggest and most important port in the Black Sea, but it also constitutes an interconnectivity point for land and water transport, connecting the markets of central Europe to the eastern ones. Its great potential to expand, in combination with its location close to the Danube corridor provides an opportunity for further development and exploitation not only at local, regional or national level, but also internationally. To this point, it should be highlighted that the highest traffic figures were registered in 1988, when 62.3 million tonnes were operated. This fact is indicative of the great potential of the port to become a controlling factor of the socio-economic growth of Romania, playing a key role in the combined transportation chain amongst Europe and Asia.

Nevertheless, any development plans may be accomplished only on condition that the port operation is in compliance with the EU's maritime policy and some projects associated to the port are embodied in Framework Projects and other policy actions in order for them to be financed.

### 3.3 Indicators related to policy, organisational and institutional structure

According to the NCMPA representatives, every authority and every single department in the port has adopted an individual system for the effectiveness measurement,



involving a number of indicators. But, as this information constitutes data classified as confidential, there was no access to it.

Nevertheless, concerning the standard services provided by the port authorities and terminal operators, the most important indices are associated with:

- The formal and/or informal independence of the terminal management from the transport operators and any local actors.
- The fair and equal access conditions, concerning the opportunities and possibilities provided by the terminal to companies (potential customers) to do so.
- The complexity of the institutional framework and structure, associated with the number of levels involved in the interchange planning, as well as in the interchange investments.

## **4 Outputs and level of service**

### **4.1 Interface and interconnection, related services**

The main freight transport supply chains served from the terminal (provided by the NCMPTA) have as origin point the central European and the Balkan transdunabian countries and especially Austria, Serbia and Hungary. The destination of cargo is usually Middle East, Far East and USA.

Concerning the regular container lines, the main world container lines provide a fast and efficient connection between Constantza Port and the most important ports of the world. Direct services linking the Port of Constantza and Far East ports in the last years, have had as a result the changing into a hub for the Black Sea Region and a distribution centre for Central and Eastern Europe.

The increase of 276% for the container traffic, from 206,449 TEU in 2003 to 776,594 TEU in 2005, has determined the employment of vessels with a capacity of 5,500 - 6,000 TEU, for the calls at Constantza Port. The container transit has increased to 62% of total container traffic in 2005, Constantza serving the Black Sea ports through feeder services. Also the trend was the same for the period 2006 - 2007, when it was registered an increase of 36%, from 1,037,077 TEU for 2006 to 1,411,370 TEU registered in 2007.

Starting with 2005, alongside with sea container services were launched river services for container transport on the Danube, connecting the river ports of Constantza and Belgrad. In the near future, it is scheduled to be inaugurated a new river service between Constantza and Hungarian and Austrian river ports.

The regular container lines (as presented in the port of Constantza internet site) are listed in the context of Table 7:

**Table 7: List of container regular lines for Constantza port**

No	<u>Regular line's name</u>	<u>Regular line's route</u>	<u>Local agent</u>
1	ZIMROM INTEGRATED SHIPPING SERVICES	Haifa - Limassol - Novorossiysk - Constantza - Varna - Izmit - Thessaloniki - Izmir - Piraeus.	<u>ZIMROM SHIPPING SRL</u>
2	CMA CGM FRENCH LINE/ AZOV - BLACK SEA	Constantza - Mariupol - Taganrog-Constantza	<u>CMA CGM ROMANIA SA</u>
3	CMA CGM FRENCH LINE / BLACK SEA	Malta - Constantza - Poti - Trabzon -Novorossiysk - Odessa - Constantza - Varna - Malta	<u>CMA CGM ROMANIA SA</u>
4	CMA CGM FRENCH LINE	Dahlian - Tianjin - Pusan - Shanghai - Ningbo - Taipei - Chiwan - Yantian - Tanjung Pelepas - Port Kelang - Izmit - Mardas - Constantza - Ilyicevsk - Odessa - Damietta	<u>CMA CGM ROMANIA SA</u>
5	EMES FEEDERING SAM	Cagliari - Izmir - Marport - Constantza - Odessa - Varna - Constantza - Marport - Cagliari	<u>ROMAR SHIPPING AGENCY SRL</u>
6	ABX - PACIFIC INTERNATIONAL LINE SINGAPORE - PIL	Shanghai - Ningbo - Shekou - Singapore - Port Kelang - Damietta - Istanbul - Constantza - Ilyicevsk - Damietta - Shanghai	<u>ROMAR SHIPPING AGENCY SRL</u>
7	TAVRIA LINE	Kherson - Constantza - Dnepropetrovsk	<u>ECONOMU INTERNATIONAL SHIPPING AGENCY S.R.L.</u>
8	ABX (ASIA BLACK SEA EXPRESS)	Ningbo-Shanghai-Shekou-Hong Kong-Singapore-Suez Canal-Port Said-Ashdod-Istanbul-Constanta-Odessa-Istanbul-Ashdod-Port Said-Suez Canal-Singapore-Ningbo-Shanghai-Shekou	<u>ECONOMU INTERNATIONAL SHIPPING AGENCY S.R.L.</u>
9	MAERSK LINE AP MOLLER MAERSK AS DENMARK	Xingang - Dalian - Qindao -Pusan - Ningbo - Yantian - Tanjung Pelepas - Port Kelang - Port Said - Izmit - Ambarli - Constantza - Ilyicevsk - Port Said - Damietta	<u>MAERSK ROMANIA SRL</u>

No	<u>Regular line's name</u>	<u>Regular line's route</u>	<u>Local agent</u>
10	MAERSK LINE SEAGO LINE	Ambarli- Poti - Constantza - Ambarli	<u>MAERSK ROMANIA SRL</u>
11	ABX (ASIA BLACK SEA EXPRESS)	Ningbo-Shanghai- Shekou-Hong Kong- Singapore-Suez Canal- Port Said-Ashdod- Istanbul-Constanta- Odessa-Istanbul-Ashdod- Port Said-Suez Canal- Singapore-Ningbo- Shanghai-Shekou	<u>AMITY SHIPPING SRL</u>
12	MSC	Constantza - Istanbul - Gemlik - Izmir - Haifa - Ashdod - Alexandria - Pireu - Constantza	<u>MSC ROMANIA SHIPPING SRL</u> <u>BUC.</u>
13	EVERGREEN LINE	Pireu - Odessa - Constanta - Varna - Pireu	<u>BOSPHORUS SHIPPING</u> <u>AGENCY ROMANIA S.R.L.</u>
14	UNITED FEEDER SERVICES	Constantza - Poti - Novorossiysk - Varna - Constantza	<u>BLUE SHIPPING AGENCY SRL</u>
15	ABX (ASIA - MAREA NEAGRA) - CSCL	Shanghai - Ningbo - Shekou - Singapore - Port Kelang - Damietta - Istanbul - Constantza - Ilyicevsk - Damietta - Shanghai	<u>CHINA</u> <u>SHIPPING(ROMANIA)AGENCY</u> <u>CO LTD</u>
16	ABX (ASIA - MAREA NEAGRA) - K-LINE	Shanghai - Ningbo - Shekou - Singapore - Port Kelang - Damietta - Istanbul - Constantza - Ilyicevsk - Damietta - Shanghai	<u>KAPITAL LEADING</u> <u>TRANSPORT SRL</u>
17	WAN HAI LINES	Shanghai - Ningbo - Shekou - Singapore - Port Kelang - Damietta - Istanbul - Constantza - Ilyicevsk - Damietta - Shanghai	<u>SILK ROUTE SHIPPING SRL</u>
18	ABX (ASIA - MAREA NEAGRA) - YANG MING LINE	Shanghai - Ningbo - Shekou - Singapore - Port Kelang - Damietta - Istanbul - Constantza - Ilyicevsk - Damietta - Shanghai	<u>TEAM LOGISTIC SPECIALISTS</u> <u>SRL</u>

Concerning the regular break bulk lines, at present, liner vessels are calling at Constantza carrying various general cargoes. Such services connect Constantza Port with the ports located in Black Sea and Marmara Sea.

Concerning the regular Ro-Ro/Ferry lines, ferry services provide a fast and direct link on the West - East axis, within the TRACECA Transport Corridor, connecting the European Transport Network with Central Asia. Regular ferry services ensure the transport of different type of commodities to and from Georgia and Turkey. At the beginning of 2006, a Ro-Ro line is connecting Mediterranean ports with the Port of Constantza. The unique regular Ro-Ro/Ferry line is presented in Table 8.

**Table 8: List of Ro-Ro/Ferry regular lines for Constantza port**

No	Regular line's name	Regular line's route	Local agent
1	PENDIK-CONSTANTA RO-RO SERVICE	Constantza - Pendik - Constanta	TEAM CHARTERING AND SHIPPING SERVICES SRL

## 4.2 Productivity and effectiveness in terminal

Pertaining to the productivity and effectiveness indices of the Constantza port terminal, in the context of this paragraph a brief presentation of related indicators and their values is attempted. All the estimations were made according to data concerning the port of Constantza which are published either on annual reports and handbooks or on the internet site of the port. These indicators are associated with intermodality options, legal and institutional framework, some financial data, workload and appropriateness of land taking into consideration the terminal's location.

Thus, there are several data directly or indirectly related with the productivity of the port terminal based on respective attributes. For instance, to prove that the port terminal constitutes an intermodal interconnectivity point of the transport chain, it was estimated that the intermodal transport chains prevail over the unimodal ones by 90% of the total.

Amongst all data presented within the previous table, there are several indicators directly associated with the productivity of the port terminal. One of the most important was estimated for the port terminal of Constantza: the ratio between the lowest and highest monthly throughput (volume) handled by the port terminal in Constantza. The respective value equals to 70% approximately, meaning that the variability of traffic does not record any considerable changes throughout the whole year.

## 4.3 Level of service offered

Performance measurement is based on empirical assumptions and KPI (Key Performance Indicators). Even though several indicators are utilized both by the terminal and its stakeholders, such information constitutes confidential data and, for the time being there is little access to them. In addition, overall capacity of port activities is estimated by experienced specialists and sea transport professionals. Nevertheless, port executives expressed their positive attitude towards the publication of such indicators and their values in the future, especially under the conditions of the existence of an integrated evaluation framework of ports' capacity defined or accepted by EC.

However, when indicators were utilized to capture performance of ports' activities, some of them would be:

- Time-related indicators (turnaround time, service times, etc.).
- Punctuality (in time frame, quantity, damages or not and proper documentation).
- Customer satisfaction.
- Demand - availability of equipment ratio.

#### 4.4 Indicators related to performance and level of service

Several indicators are associated either to the performance or the level of the provided in the Constantza port terminal. Concerning the supply side performance there are indicators related to the employee or the equipment productivity, the incoming and outgoing flows of passengers and cargo services by the terminal at annual basis and the energy productivity expressing the amount of energy used for the completion of the provided services. Up until now, there has been a preliminary estimation of two (2) indicators:

1. The daily workload of each employee, measured in TEUs handled. Its value is produced if the mean daily number of TEUs handled per day in the terminal is divided by the employees performing this task. The respective value equals to 235,24 TEUs / employee / day approximately.
2. The ratio between volume and facilities, measured through the mean number of TEUs handled by a typical crane per day. The respective value equals to 4245,02 TEUs / crane / day approximately.

Besides, concerning the evaluation of the level of services provided by the terminal, there are some more indicators to be estimated, such as the handling cost, the overall quality index, the opportunity of achieving ticket and information integration between long and short distance trips, the average interchange and its variability time when switching different modes of transport. Also, there are some indicators concerning the punctuality of shippings, assignments and deliveries, as well as the safety and security issues emerging during passenger and freight transports.

## 5 Analysis of Policy Advisory Group Recommendations

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
<b>Policy recommendations</b>	
Integrate the administration of the public transport system	Not applicable.

<b>PAG recommendation</b>	<b>What is the current situation and is the recommendation important? If so, how?</b>
Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform	The port of Constantza is fully harmonized with modal focused legislation and regulations.
Policy and legal frameworks should facilitate intermodal cooperation	No data available.
<b>Planning recommendations</b>	
Incorporate the transport planning process with land-use planning	No data available.
<b>Financing recommendations</b>	
Pursue Private-Public Partnerships (PPPs) models to solve complex local and regional problems and financing issues	<p><b>Current situation:</b> The port is state owned, the port authority has the management control, private companies undertake the operations and the telecommunication systems.</p> <p><b>Near future:</b> The use of PPPs could be a good solution for the future development of the port, since significant investments (road connections, expansion of the port to the south), “demand” (public) land use and these models could solve potential lack of national financing or conflicts between local and regional communities.</p>
Integrate the pricing of the public transport system	Not applicable.
<b>Organizational recommendations</b>	
Use of business models for cooperation that also publically owned terminals can use	<p>The port is state owned, while the port authority has the management control and private companies undertake the operations. In addition, the telecommunication systems are under full privatization.</p> <p>Since the whole port is a free zone for all interested stakeholders (from 2007), and taking into consideration that the terminal is publically owned, the adoption of business models for further cooperation and future development would be beneficial.</p>

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
Structure the information provision	<p><b>Freight:</b> In the case of freight transport, a shared information platform (standardized message formats, standardized messages, etc.) among the involved stakeholders is missing. Such a platform should be established for the matching of different systems and the smooth development of new technological interventions.</p>
<b>Infrastructure development recommendations</b>	
Constitute transport infrastructure management body for all modes	<p>Each role of the involved stakeholders (operations, services, infrastructure, land, etc.) is explicitly defined in the case of the Constantza port. The Ministry of Transport and Infrastructure has a general supervision, but only in specific issues (i.e. regulatory framework).</p> <p>On the other hand, since a significant number of new interventions is foreseen, including (public) land investments, i.e. road connections, etc., the constitution of an integrated transport infrastructure body, probably under the umbrella of the Ministry of Transport and Infrastructure, could be catalytic for the better monitoring of the relevant investments.</p>
Adopt or create standards for physical infrastructure interconnectivity	The physical infrastructure interconnectivity regarding sea and rail exists in the port, but between sea and road (truck) is missing.
<b>Operations recommendations</b>	
Separate the owner from the operator	Such a separation in the specific case study exists.
Establish the cooperative framework between the terminal and the transportation operators	<p>An internal cooperative framework between the terminal and the transportation operators has been developed.</p> <p>In addition, since the whole port is a free zone, open to all interested stakeholders and customers, the above framework should probably be integrated.</p>

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
Integrate the operations of the public transport interchanges	Not applicable.

## 6 Analysis of gaps

**Aim: WP 2 identified in Deliverable 2.2 a set of gaps that should also be studied in relation to the case studies. Below you find a list of gaps that are considered relevant for your case study. Please describe for each gap:**

- Its relevance and implications for the case study terminal
- Initiatives aimed at reducing the gaps

### Freight

Lack of standardization	A key-trend that affects the whole transportation chain and the absence of which has been identified as significant barrier in transport, is standardization, in terms of transport infrastructure, transport means, transshipment technology, information, packing units, etc. (KOMODA project).
Lack of appropriate infrastructure	The existence of inadequate infrastructure, which blocks the wide development of efficient interfaces. Common problems associated with this gap are the “under dimensioning” and the inappropriate maintenance in existing networks and the lack of financial resources for the development of new interfaces.
Dependency of mode choice to economy and legislation	An indicative example of this gap is identified in the air freight transport, where the basic advantages of this mode – speed and safety - depend on potential changes in restrictions and fuel prices. At the same time, focusing mainly on urban distribution of goods, restrictions such as vehicles’ size and time window, may imply more trips and more vehicles with worse environmental performance, respectively.

### Passengers

Wasted time	Poor links between transport modes. Long walking distances between modes of transport, bad signage.
Poor information	Poor information about multi-modal options. Insufficient information exchange between different operators. Single mode tickets. Missing information about local tickets for the last mile. Complexity of fare structures.



	Unavailable or undetectable multi-modal planning services.
Poor quality	Insufficient additional services (i.e. shops). Unavailable multilingual information. Few members of staff providing assistance and security. Low frequency of services. Poor reliability of services (delays).
Foreigners and inexperienced passengers	When arriving in a foreign city, people often call a taxi, as they were not able to find reliable information of the available transportation system beforehand. Similarly, citizens who rarely use public transportation tend to take their private car (equipped with a navigation system) in order to move through their hometown – despite having to accept high parking fees – as they feel insecure when it comes to going by bus or tram.

## 6.1 Lack of standardization

The lack of standardization was not mentioned as a problem by the port authorities. The existing regulatory framework is considered that covers issues such as standards on infrastructure elements, information services, transport operation, retail and other services.

## 6.2 Lack of appropriate infrastructure

The current infrastructure is considered good, although for the modernization of the port in terms of sustainability, three relevant ongoing projects will enhance this dynamics: the completion of the Northern breakwater of Constantza Port-extension by 1050m, the road bridge at km 0+540 of the Danube-Black Sea Canal and the Development of the railway capacity in the river-maritime area of the port.

## 6.3 Dependency of mode choice to economy and legislation

At the specific case study, rail is considered as a more advantageous mode than the road (trucks), as it is more economical, and more flexible, since the road network lacks the appropriate (safe, comfortable, etc.) infrastructure. In the near future, though, the improvement of the road network will probably change the terms of the competition between the two modes. Legislation issues do not affect the mode choice.

# 7 Emerging mobility schemes and future changes

## 7.1 Emerging mobility schemes

Freight

<b>International logistic centre</b>	Direct access of an ILC to global transport
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	networks enabling the direct transshipment of goods without the need of using an intermediate location
	Increase of sustainability if and when the ILC is connected and cooperates with other centres
<b>Eco-efficient terminals</b>	Adjustment of terminal equipment and transfer of vehicles taking into account energy consumption
	Improvement of the sustainability of logistic and operations with port and hinterland terminals
<b>Integration of an e-logistic platform</b>	Creation of interfaces with transport/logistic partners
	Decrease of lead times-costs-environmental impact
<b>Green corridors</b>	Adjustment of terminal technology and equipment in order to connect to green corridors
<b>Public-private partnerships</b>	Funding opportunities for establishment of new terminals or modernization of existing ones
<b>Rail interoperability</b>	Modernization of existing rail terminals
<b>Short sea shipping</b>	Increase of investments and increase of short-distance maritime lines in ports in order to provide a competitive alternative to road transport
<b>Deep sea shipping</b>	Further development of infrastructure and logistics of ports

## 7.2 International logistic centre

The port is a special logistic area working as an international logistic centre, providing significant services, such as loading/unloading of containers and other load units, warehousing of general cargo, quality control of products, tracking of shipments, etc. In addition, the strategic location of the port enhances its dynamics as the most important interconnectivity point in the wider inland area and the Black Sea.

### 7.3 Eco-efficient terminals

Eco-efficient issues are taken under consideration by the port authorities (i.e. adjustment of the terminal's equipment and transfer vehicles taking into account energy consumption), but an integrated environmental policy framework is missing.

### 7.4 Integration of an e-logistic platform

The current situation in the port is that an integrated e-logistic platform, regarding for example the sharing of information, is missing among the involved stakeholders (operators, shippers, authorities, etc.). This lack is mainly caused by the fear of competition, especially, when referring to financial data.

### 7.5 Green corridors

There is no perspective for this scheme.

### 7.6 Public-private partnerships

The NCMPA Constantza is a joint company assigned by the Ministry of Transports and Infrastructure to develop activities of national public interest in its capacity of a port administration. The company had adopted the business model of a landlord port, which foresees that the port authority builds the wharves destined for rent or leasing to a terminal operator. Especially regarding the sharing of information, a full privatization of the whole communication domain had been done.

The development of public-private partnerships is under consideration for the (near) future development of the port, including interventions, such as the expansion of the port to the south, the building of new terminals, the completion of the road connection of the port with the national motorway network, etc.

### 7.7 Rail interoperability

This scheme is not relevant for the specific case study.

### 7.8 Short sea shipping

Such a scheme is not indicated or planned for the near future.

### 7.9 Deep sea shipping

Deep sea shipping, truck and rail are the three different modes in the specific case study.

## 8 Policy goals

Policy goals	Comment on achievement
Developing and deploying new and sustainable fuels and propulsion systems	

1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centres by 2030	No data available.
<b>Optimising the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes</b>	
3. Thirty per cent of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030 and more than 50 % by 2050	No data available.
5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.	No data available.
6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.	No data available.
<b>Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives</b>	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	No data available.
10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	No data available.

## 9 Concluding remarks

### 9.1 Main conclusions

Even though there is considerable lack of information, waiting for data feedback from the part of the Romanian Ministry of Transport and Infrastructure, in the context of the current paragraph, a brief approach to the determination of the identification of the Constantza port terminal is attempted. The port of Constantza operates as a special logistics area, providing services of a regional, national and international oriented freight centre. Together with the two satellite ports of Midia and Magalia north and south from the main port by the Black Sea and the Tomis marina used exclusively by boats' and yachts' owners, the port of Constantza is considered to be a port cluster. Apart from the sea port, there is a river port nearby, as well, servicing considerable volumes of cargo coming from or destined to the central European countries. The maritime and river ports are connected with each other through the "Danube – Black Sea Canal", which constitutes a very important connector and a key point for the Constantza port, providing the opportunity for important cargo volumes to be carried through the Danube river at low cost in comparison with road and rail competitive routes in East Europe.

The sea port terminal has proven to be the most important interconnectivity point in its wider inland area and the Black Sea concerning intermodal freight transport. Despite of the fact that it constitutes mainly a transit port, there is a considerable amount of freight volumes handled by the port terminal. The most important trade bonds are developed with the East and Far East countries, while there are also several destination points towards the countries of the Mediterranean and the United States. Besides, the passenger transport is insignificant, as there are no regular lines from / to the port and the only passengers visiting the site come from cruises. However, the very good connections with the local, regional and national road and rail way networks and its privileged geographical location in the Black Sea are very promising for the development of the business cycle both for the freight and passenger transport and could prove to be considerably beneficial, facilitating the attraction of more customers in the near future. In addition, significant industrial and commercial areas are located in the port's proximity area, creating with the city of Constantza an important transportation, business and socio-economic node in the eastern Romania, by the Black Sea.

As far as ownership, administrative and operational issues are concerned, the last couple of decades the terminal management (ownership, operations, ICT, finance and planning) were not affected by any changes occurred. In particular, the port of Constantza today constitutes a landlord transit port for freight and passengers. The port authority is the National Company MPA SA Constantza, under the supervision of the Romanian Ministry of Transport and Infrastructure. Nevertheless, there is no control and pressure set from the part of the government, as there are no special legal and institutional standards and barriers applied in the port's operational, economical and business profile. On the contrary, the whole port is a free zone from 2007 and is open to all interested potential stakeholders and customers, creating an extra motivation to potential customers to regard it as an interesting business opportunity for partnership.

On the other hand, any development plans (e.g. expandability of land or infrastructure) are in compliance with the governmental, regional and local authorities' development scheme, in accordance with the master plan of 2001-2002. Especially concerning the information and communication services provided by the port (phone and internet information), within the past five (5) years, there has been a privatization of the communication operator.

Finally, according to the data collected so far, it seems that the provided services' level is very high, taking into consideration the respective low costs and prices involved. So, the port may be simulated with a new business or company rising in parallel with the socio-economic development of the wider area (Romania) where it is settled in. The only thing missing seems to be the lack of sufficient traffic in the wider area, mainly due to the expanded economical recession.

## 9.2 Good practices

Amongst the good practices, the collaboration amongst the different public and private stakeholders seems to be the most significant strength in the Constantza port terminal case study. In addition, the landlord model adopted for the administration and

management of the port and its operations and the fact that it is open to all potential customers has proven to be a success story concerning the expandability of business and the further economic development. The master plan seems to constitute a key factor as it is utilised as a memorandum of mutual understanding and cooperation amongst partners, facing effectively any hard cases so far. Based on the master plan, a great number of new projects, such as the expandability of the port and the upgrading of infrastructure and equipment are in the phase of implementation and realization, due to the optimised exploitation of the low budget available.

### 9.3 Bad practices

As far as the problems and hard cases are concerned, the only worth mentioned hard case is the delay recorded concerning the completion and upgrading of the road network. In any case the port is planned to be connected to the national high speed and capacity motorway network in the very near future, as the local network, currently in use, has proven to be insufficient to service the large volumes of freight traffic attracted in the wider area network due to the operation of the port.

### 9.4 Suggested improvements

Due to the unavailability of data, only the most important improvements are briefly listed below:

- ✓ Completion of road connection of port with the national motorway network.
- ✓ Expansion of port to the south.
- ✓ Building of new terminals.
- ✓ Upgrading of equipment or purchasing new machinery for the new terminals to be constructed.
- ✓ Realization or upgrading of road and railway connection and initiation of business communication with local airport (Mihail Kogalniceanu) on condition that it is also upgraded as far as its operational profile is concerned, providing services both for charter (current situation) and regular flights.



Connecting LOnG and Short-distance networks for Efficient tRansport

Reporting template for case studies

Name of case study:	Vilnius international airport
Author( s)	Ieva Markucevičiūtė Andrius Jaržemskis Vytautas Jaržemskis
Date:	2012-05-11

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# 1 Data collection process

Two approaches were used to gather data for the case study report of Vilnius international airport:

1. Publicly available data (desk research) – website of Vilnius international report, other case studies, feasibility studies, research papers, statistics databases, etc. these sources were mostly used for general description, description of the terminal and to describe regulatory framework.
2. Case study questionnaire – questionnaire was used to obtain data which was not available from the public data sources. Questionnaire was also used to update gathered data if publicly available data was outdated, insufficient or not suitable for case study report in other ways.

Several versions of the questionnaires based on original template were prepared. Questionnaires were translated to Lithuanian language to ensure that interviewed stakeholders understood each of the questions. Questionnaires were adapted to each stakeholder, concentrating on specific questions that specific stakeholder would be able to answer and provide accurate data.

Following stakeholders were identified and contacted to participate in the interviews:

- SE Vilnius international airport. Current operator of Vilnius international airport. The aim of the company is to ensure public services while operating Vilnius International Airport and to carry out other activities in order to meet public interests. Commerce director was interviewed.
- ME Communication services is a local public transport authority responsible for the organisation of the public transport, maintenance of routes' network, hiring of operators, issuing and selling of public transport tickets, ticket control of the passengers, maintenance of information system for passengers, gathering and analysing of data on passenger carriage within the city, management of parking system, traffic control and drafting of legal documents and legislation. Head of operations and research division was interviewed.
- JSC Lithuanian Railways. The only railway operator in Lithuania serving both passenger and freight transport. Deputy Director of passenger transportation directorate was interviewed.
- KAUTRA Ltd. One of the largest passenger transport operators in Lithuania, operating busses. Marketing director was interviewed.

## 2 Terminal overview

### 2.1 Background

#### 2.1.1 History

The terminal of Vilnius Airport was built and taken into use in 1932. The airport was used as a military airfield during the World War II, but resumed its activity as a civil airport in 1944. This building did not survive to this day.

The present buildings of the airport were constructed in the year 1945 -1954, during the post-war period. The arrival terminal was built by prisoners of war. The building of Vilnius International Airport is included into the Register of Immovable Cultural Heritage of the Republic of Lithuania. The facade of the building is decorated with arched hovel containing sculptures. In the centre of the hall remained the ornamented columns, stucco-decorated ceiling and the massive chandelier. <sup>1</sup>

Vilnius International Airport is a member of the Airports Council International (ACI Europe) from 1992.<sup>2</sup>

#### 2.1.2 Historic development

There were some changes in some aspects of Vilnius International Airport during the period of last 5 years.

##### ***Ownership/Management***

The Government of the Republic of Lithuania in year 2010 supported the projects of legislative changes to transform Vilnius International Airport from public company into joint-stock company in the future. But these legislative changes are not approved yet.

This management model would make asset management of a company more flexible, would increase opportunities to attract private capital and would allow managing a company more effectively and making the company's management decisions more operatively.

In 2010 Vilnius airport was enabled to transfer by tender the centralized infrastructure management to a private subject. This kind of regulation makes it possible to increase the Vilnius airport revenues while reducing the costs.

##### ***Operation***

There were intentions to build a private passenger terminal in 2008, but these plans were halted.

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<sup>1</sup> <http://www.vilnius-airport.lt/en/airport/history/>

<sup>2</sup> <http://www.vilnius-airport.lt/en/airport/international-cooperation/>

## **ICT**

There is already large-screen display with flight information at Vilnius International Airport. "Airport-free" wireless Internet is available.

In 2010 in departure terminal passenger screening station information readers were put into use. It helps to speed up the verification process of the vouchers of registration of departing passengers.

In 2011 Tourist Information Centre in Vilnius airport arrival hall was opened. The wall of the centre is equipped with an advertising information terminal to find information about most important city services in Lithuanian and English languages.

Tourist Information Centre will serve taxi ordering service operating on a pre-paid principle – taxi is ordered by phone, payment is executed, and the guest gets traveler's check. It is very important change because there were some problems with illegal higher taxi charges for travellers from the airport.

## **Finance**

From year 2010 Vilnius International Airport was supposed to conduct financial accounting by International accounting standards. Previously national business accounting standards were used. There are still a lot of improvements to be done to switch to international accounting standards, so this process is not yet completed.

Vilnius International Airport in the last few years is operating non-profitable. It is planning to fix that by enlarging non-aviation income from parking lots, rental of premises, advertisement and services for Business club.

Some of the reconstruction and other projects of an airport are financed with help of EU structural funds and Republic of Lithuania.

## **Planning**

In year 2011 – 2012 the preparation of Master plan was carried out. The aim of the project was to prepare a Master plan of Vilnius Airport by assessing the variety of possible scenarios of further development of the airport in the perspective by one or another scenario.

Several key activities can be identified from the strategic objectives:

- Cost reduction by optimizing the activities: reduction of number of employees by eliminating activities and functions, which are uncharacteristic to the airport, transfer of some functions to professionals, ensuring lower cost of services and higher quality of service provision;
- Orientation to augmentation of non-aviation services;
- Attraction of new airline companies.

In the period of 2011 – 2014 preparation of a set of territorial planning documents is planned to be completed. A set of special and detailed plans will be prepared to establish the schedule of management and use of the territory, to determine the boundaries of the sanitary protection zone and to structure an optimal territory required for the activity of the airport.

### ***Reconstruction and other projects***

In 2007 the Departures Area was redesigned and now is more spacious and provides more comfort for travellers. The infrastructure of the Terminal is adapted to separate the Schengen and non-Schengen passenger flows. This separation ensures more efficient servicing of the departing passengers in accordance with the security requirements applicable for the Schengen countries.

With support of EU structural funds Vilnius International Airport has carried out or intend to carry out some reconstruction projects. In the period of 2009 – 2011 reconstructions of the apron surface and taxiways were done. In 2011 – 2013 projects of reconstruction of fire secure station and perimeter fence are carrying out. The perimeter fence should protect people around from the impact of harmful noise. In 2010 – 2013 projects of northern apron expansion, taxiway extension, a new taxiway construction should be done, which should reduce the atmospheric air pollution and noise level in the territory of the airport.

With support of Republic of Lithuania in 2011 – 2012 the 4-level departing passengers' registered baggage check system implementation at International Vilnius Airport should be done.

In 2011 – 2012 passenger terminal galleries reconstruction project 2011 – 2012 should be finished. It would shorten the duration of transfer of the passengers of connective flights from 40 to 20 minutes and to direct the flows of passengers arriving from the European Union airports and from other airports, where the aviation safety standards are equalled to the European Union standards. In 2010 – 2015 surface wastewater handling project should be done.

## **2.2 Location and area**

Vilnius International Airport is located on a plateau in South of Municipality of Vilnius city. The airport occupies an area of 326 ha. The length of the airfield perimeter is 10,54 km. Vilnius International Airport is surrounded by an industrial part of the Vilnius city.

Vilnius International Airport plays an important role in the transport system. It is the biggest of the four airports in Lithuania. Other airports are in Kaunas, Palanga and Šiauliai (see picture 1).

Vilnius and Kaunas act as a multi airport system and cover almost the entire territory of Lithuania (accessible in 2 hour trip by car). Vilnius is the main airport and Kaunas operates as a secondary airport, oriented to serve low-cost airlines. Palanga (3 hours and 30 minutes away from Vilnius by car) is also an international airport. Šiauliai is a

military airport, specialized in freight, but also open for civil passenger flights. The Riga Airport (in neighbour country Latvia, 3 hours and 30 minutes away from Vilnius by car) is also attractive alternative for people living in Northern Lithuania, as Riga airport is international hub with large number of direct flights to European cities.



**Picture 1.** Lithuanian airports

Vilnius International Airport is well accessible not only by car, but also by public transport: inter-city bus, scheduled city bus, scheduled city taxi (vans), taxi and train.

The Vilnius International Airport is only 7 kilometres away from the city centre. You can drive this distance by car in 15 minutes. City buses No. 1 and No. 2 provide a service to the airport from 5:28 in the morning (first bus) to 22:05 in the evening (last bus).

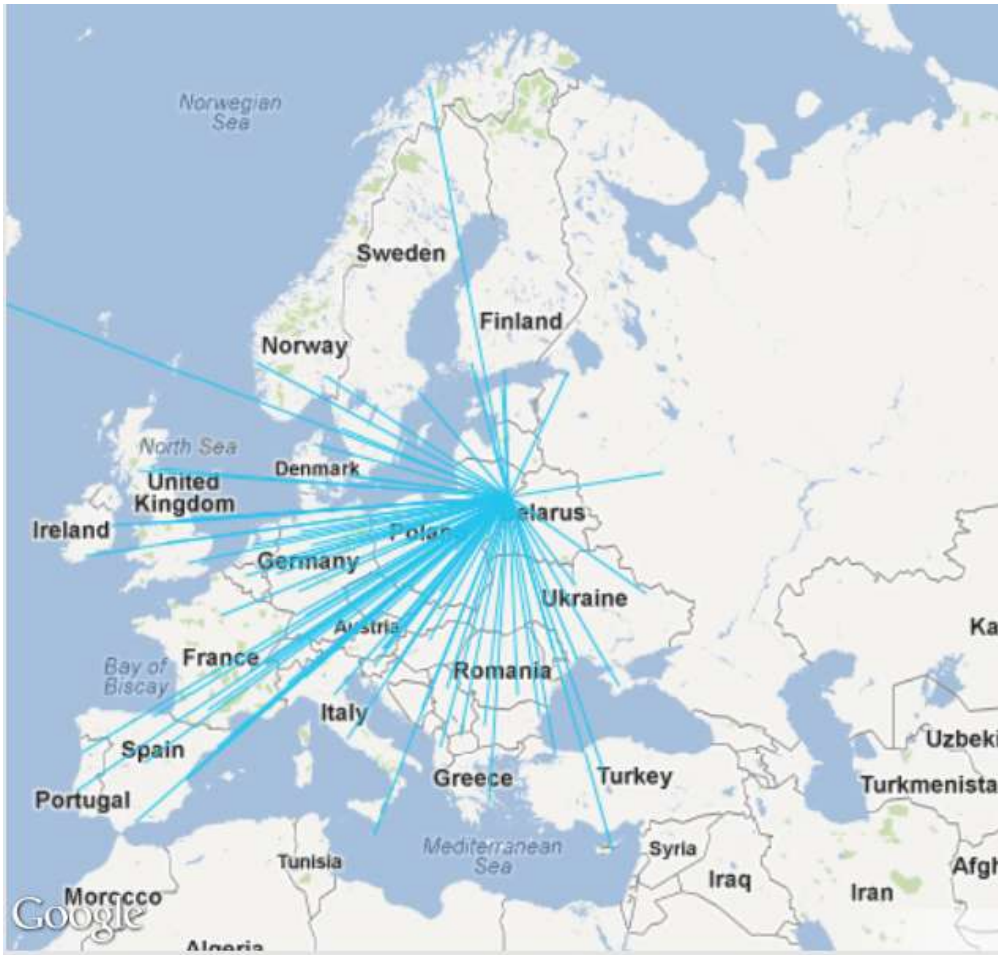
It is also well-connected to the main bus and rail station for inter-city travel. Airport Express service (Vilnius bus station – Airport) runs from 7:40 to 22:50. You can also get from Palanga through Klaipėda (the port city of Lithuania) and Kaunas directly to Vilnius Airport.

A special scheduled train runs from Vilnius Railway Station to the airport. The railway stop, stairs, and passenger lift are installed just outside the airport terminal. For the safety of passengers there is lighting and a video surveillance system. The train runs back and forth from 5:45 to 21:29. Schedules of the airport train are composed to match inter-city train schedules.

## 2.3 Passenger or freight profile

### Main geographical and transport coverage

Vilnius International Airport geographical coverage is Europe. Regular flights, displayed in picture 2, are operated mainly to European countries.



**Picture 2.** Regular flight map<sup>3</sup>

Charter flights are operated to some touristic African counties: Morocco, Tunisia, Egypt and Israel.<sup>4</sup>

Vilnius International Airport Newsletter (2011 January) announces top 10 most popular flight directions: Riga (11,10% of passengers), Copenhagen (10,70%), Frankfurt (7,50%), Antalya (7,00%), London (6,00%), Dublin (5,80%), Prague (5,00%), Helsinki (4,60%), Warsaw (3,90%), Hurgada (3,70%) and other (34,70%).<sup>5</sup>

In year 2009 Vilnius International Airport passenger survey has showed that 44% of travellers are traveling on a job / business (38%) and research / study (6%) purposes, are called the 'business' segment. 56% of the passengers fall into the so-called "leisure" segment, which is distinguished into recreation / sightseeing purpose (31%) and personal purpose (as the visiting friends and relatives) (21%).<sup>6</sup>

<sup>3</sup> <http://www.rechargeinvilnius.com/en/f/how-to-get-here-72>

<sup>4</sup> <http://www.vilnius-airport.lt/en/tips-for-passangers/flight-map/>

<sup>5</sup> <http://www.vno.lt/lt/naujienos/naujienlaskiai/issamiai.php?id=16448>

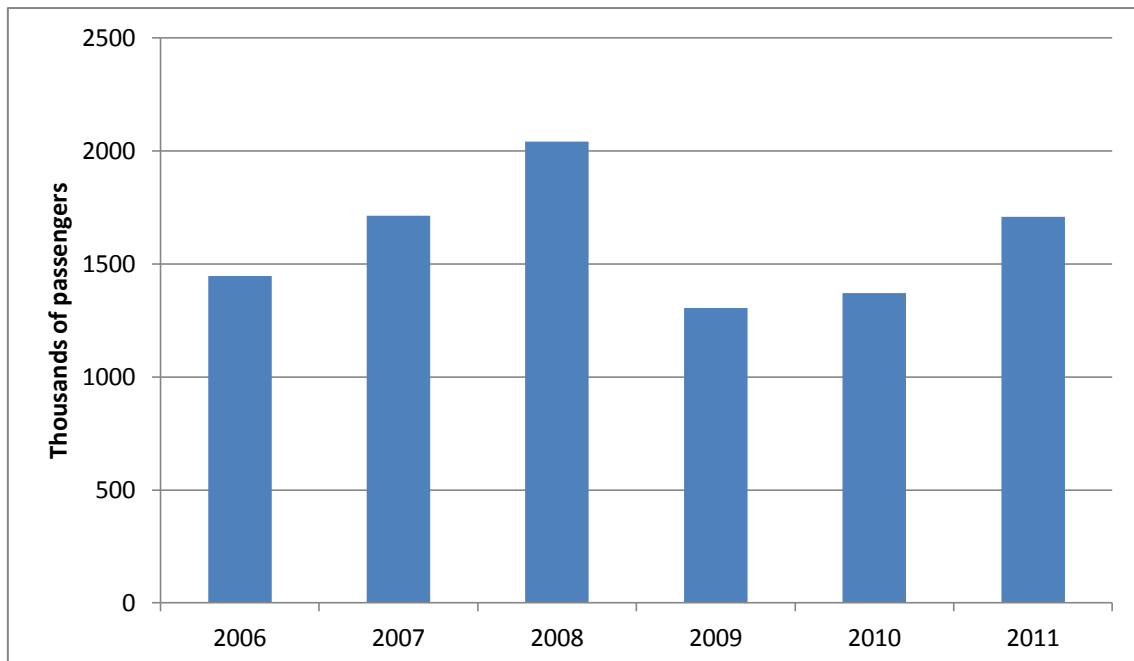
<sup>6</sup> <http://simonas.bartkus.lt/blog/2010/01/03/vilniaus-oro-uosto-keleiviu-tyrimas-1-koks-yra-keleivio-profilis/>

Passenger survey carried out by Ltd. RAIT (one of public opinion researchers in Lithuania) reveals that in 2010 the share of travellers on business matters increased in comparison with 2009. In 2009 the share of business travellers was 38 per cent of all travellers, in 2010 – 46 per cent.<sup>7</sup> On the first 3 months of 2011 the number of business travellers was also bigger than on the same months of 2010.

It is believed that this business segment growth is a result of opened or increased frequency of routes that are likely to be the destinations of business travellers. This is Amsterdam, Stockholm, Munich, Milan, directions, increased number of flights to Frankfurt.<sup>8</sup>

### Annual number of passengers

Annual number of arriving departing passengers from 2006 to 2011 is visualised in picture 3.



**Picture 3.** Annual number of arriving and departing passengers at Vilnius International Airport<sup>9</sup>

Picture 3 displays that number of passengers in Vilnius International Airport highly increased from 2006 to 2008, during the economic rush. In 2009 this number fell sharply and in 2011 it still has not reached the level of 2008.

<sup>7</sup> <http://www.vilnius-airport.lt/lt/naujienos/oro-uosto-naujienos/issamiai.php?id=17234>

<sup>8</sup> <http://www.vilnius-airport.lt/lt/naujienos/naujienlaskiai/issamiai.php?id=18838>

<sup>9</sup> <http://db1.stat.gov.lt/statbank/default.asp?w=1280>



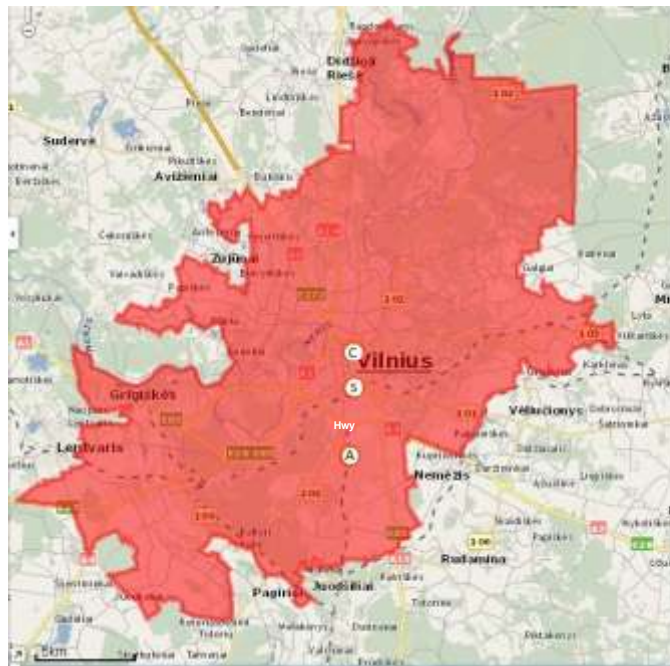
## Modal share

This criterion does not apply, as Vilnius international airport only provides single mode of transport.

## 2.4 Terminal properties

### *Terminal location and access*

Distance from city centre to the terminal is only 7 kilometres and to the Vilnius central bus and rail station – 5 kilometres. You can see the map below (Picture 4) with these objects. Distance from nearest highway (M7) to the terminal is 2 kilometres and there are plans to connect Vilnius International Airport to IX B transport corridor.<sup>10</sup>



**Picture 4.** Vilnius City Municipality: A – Vilnius International Airport, S – Vilnius Central Bus and Railway Station, C – Centre of Vilnius.

Average costs to access or egress the airport from the city centre by public transport are 2.50 Litass while the costs of the same distance by car are 3.5 Litass if only fuel costs are counted and 4.9 Litass if ownership costs of a car are included. The ratio between access/egress cost by car vs public transport is showed with the formulas below:

Formula 1

$$\text{Cost ratio} = \frac{\text{Average cost by car (with ownership costs)}}{\text{Average cost by public transport}} = \frac{4.9}{2.5} = 196\%$$

<sup>10</sup> <http://kauno.diena.lt/naujienos/transportas/vilniaus-oro-uosto-link-bus-nutiestas-dar-vienas-greitkelis-354491#axzz1t2Pae0Ov>

And

Formula 2

$$\text{Cost ratio} = \frac{\text{Average cost by car (without ownership costs)}}{\text{Average cost by public transport}} = \frac{3.5}{2.5} = 140\%$$

We can see that public transport is both ways cheaper but most passengers as we could see in chapter "Passenger profile" choose to access or egress the airport by car. One of the reasons is access/egress speed.

The access or egress time from or to city centre ratio by car vs public transport is:

Formula 3

$$\text{Time ratio} = \frac{\text{Average time by car}}{\text{Average time by public transport}} = \frac{15 \text{ min}}{20 \text{ min}} = 75\%$$

Other reasons are comfort of the ride, independence from public transport schedules: there are no public transport services apart from taxi after 23:00 in the evening, but there is still significant number of flights, especially from low-cost airlines.

### ***Terminal interchange properties***

Vilnius airport appeals to many travellers - it is a convenient, small and cosy, it is easy to orient in it.

Terminal properties of Vilnius International Airport in terms of size are small. Average walking distance from entrance to platform/gate is about 100 metres. Average walking distance from arrivals hall to main public transport modes is also short. Nearest bus stop is only 45 metres away from arrivals hall and nearest rail stop is 300 metres away from arrivals hall.

Clarity of ways within interchange/terminal especially in their design/signage could be evaluated in 5 (in scale from 1 to 5, where 1 stands for poor clarity and 5 stands for perfect clarity). Passenger surveys show that clarity of information system is evaluated at the highest score of all rated services.

### ***Terminal potential***

Capacity of terminal is not utilised at maximum capability. Ratio between actual volumes and maximum capacity is:

Formula 4

$$\text{Saturation ratio} = \frac{\text{Actual volumes}}{\text{Maximum capacity}} = \frac{1,715}{3,5} = 49\% (4)$$

Potential for expandability of terminal is close to zero, because terminal is located near to the area of residence and sanitary airport development zone is limited.

## 3 Planning, ownership and organisation

### 3.1 Organisation and ownership, operations

#### 3.1.1 Ownership structure

Land where Vilnius international airport is located is owned by state. Rights of managing this land are trusted to state enterprise Vilnius international airport. Trust is a type of land use rights in Lithuania, which allows the trustee to operate and use trusted land in favour of the society in a way that is allowed by legislation. This means, that **owner and operator of the land is the same public body** – state of Lithuania, therefore ownership and management of land are not separated.

Infrastructure (buildings, runways, etc.) and ICT of Vilnius international airport are both owned and managed by state enterprise Vilnius international airport, therefore **management and operation of terminal infrastructure is carried out by the same public body**. Currently, the airport is state enterprise but plans to reorganize it to limited company, as it would make airport management more flexible – limited companies are regulated by different laws than state enterprises in Lithuania, making it easier to attract public-private partnership, hire employees and organize public procedures. State enterprises are strictly regulated and must follow complicated procedures when subcontracting services or purchasing necessary supplies. This also applies for partnerships, therefore limited company has greater freedom to negotiate, choose suppliers and contract services. This flexibility could contribute to better, quicker and more efficient from financial point of view decision making. State enterprises are also protected from market competition to an extent and more favoured by public (considered more transparent) but these advantages are lesser than disadvantages in particular case of Vilnius international airport.

Vilnius international **airport is operated by state enterprise (SE) Vilnius international airport** (*in Lithuanian* Vilniaus tarptautinis oro uostas, VĮ). All the services regarding operating the airport are carried out by the operator. Retail and catering services for passengers are provided by 41 independent businesses renting retail space in the airport passenger areas.

SE Vilnius international airport also owns 6 surrounding paid short and long term parking lots, out of which several are contracted and managed by other companies. SE Vilnius international airport also provides paid parking lots containing up to 45 taxi cabs.

**SE Vilnius international airport does not own infrastructure of other operators**, such as railway and railway stop, as well as any information service ICT dedicated to provide information on train traffic. Same applies for both city busses, operated by municipality enterprise Communication services and intercity busses, operated by private companies KAUTRA Ltd. and TOKS, Ltd. These operators each have their separate bus stops and information systems providing information on company's traffic.

## **Conclusion**

Land, infrastructure and ICT of Vilnius international airport are owned by the state of Lithuania. Operation and services regarding users of air transport are provided by state enterprise Vilnius international airport. Specific infrastructure (such as bus and rail stops) and means of information provision (such as information boards) of passenger transport operators serving Vilnius international airport are owned by operators.

### **Integration of long/short distance transport**

SE Vilnius international airport does not own or manage any passenger transport service activities. All the passenger transport to/from the airport are provided by either state (SC Lithuanian railways) or municipality (ME Communication services) enterprise or private operators such as JSC TOKS and JSC KAUTRA, as well as smaller operators, providing services with mini buses and taxis. These are the main stakeholders passenger transport operators identified as relevant for this particular case study. Ministry of transport and communications is stakeholder representing interest of the state of Lithuania in this case study; also, the ministry is founder of the SE Vilnius international airport and representatives of ministry form the managing board of the enterprise.

Responsibilities and roles of each of the stakeholders mentioned above are presented in table 1

**Table 1.** Roles of stakeholders in the operation of the terminal

Stakeholder	Role and responsibilities
Ministry of transport and communications of Lithuania	<p>Responsible for shaping transport policy and organizing, coordinating and overseeing its implementation.</p> <p>Planning: the ministry can affect strategic goals and encourage long/short distance transport integration, therefore possible influence of the ministry on planning and policy can be considered as high.</p> <p>The ministry does not have direct responsibility or legal right to provide, coordinate or otherwise interfere with integration of long/short distance transport services in Vilnius international airport, therefore responsibilities on management of long/short distance transport integration are low.</p>
SE Vilnius international airport	<p>Operator and manager of Vilnius international airport.</p> <p>The institution is not responsible for planning, management or policy development of long/short distance transport integration; however institution provides information on plain schedules for better coordination of passenger transport schedules.</p> <p>The institution has more significant role on promotion and marketing: SE Vilnius international airport cooperates with</p>

Stakeholder	Role and responsibilities
	passenger transport operators to provide information for passengers on available transport services.
SC Lithuanian railways	<p>The only railway operators in Lithuania providing both passenger and freight transport services. Operates a route dedicated to transport passengers to/from airport to/from Vilnius train station, which is also located next to the bus station and Vilnius city public transport routes.</p> <p>The institution mostly plans, manages and forms policy for railway transport and manages own promotion and marketing, however if there is request from the public or other transport operators to slightly adjust schedules or exchange information (e.g. hanging information boards on public transport from the train station to the city) the institution cooperates.</p>
ME Communication services	<p>Responsible for the organisation of the public transport in Vilnius city. In case of Vilnius airport, MESP is responsible for schedules and planning of Vilnius city public transport routes to the airport.</p> <p>The institution is not responsible for planning, management and policy forming of long/short distance transport integration. ME Communication services is responsible for coordinating and displaying information on city busses going to the airport. Institution is responsible for own information board and infrastructure of bus stop. Cooperates with other operators on level of information exchange, e.g. coordination of schedules to optimize bus time tables in accordance with inter-city busses and trains as well as flights, also cooperates on information provision, e.g. displaying schemes and schedules of city public transport in railway station and inter-city bus station.</p>
KAUTRA, JSC and TOKS, JSC	<p>Operators of largest private companies providing passenger transport services by buses.</p> <p>These institutions do not influence planning management or policy formation of long/short distance transport integration.</p> <p>These institutions cooperate with other operators to provide information on other transport services if requested and if that information is not increasing competition for their own business.</p>
Other operators (operators of minibus services)	<p>These operators provide small scale passenger service.</p> <p>These institutions have no influence on long/short distance transport integration at all as they are small, highly flexible businesses without need to adapt to anyone. These</p>

Stakeholder	Role and responsibilities
	institutions are supposed to provide transport on different routes than city transport in order not to compete with city busses, therefore they fill some transport gaps.
Taxi operators	<p>All the taxi operators serving Vilnius city also transport passengers to the airport. Several companies have purchased rights to park in the dedicated taxi parking lot at the exit of arrival terminal of the airport.</p> <p>Influence of these companies on planning, management and policy long/short distance transport integration is indirect: taxi is second most popular way to arrive to the airport, therefore other operators compete for passenger flows and adapt their strategies to attract passengers using taxis.</p> <p>Taxi companies do not cooperate with other operators, however they cooperate with Vilnius international airport, e.g. initiatives on safe and fair taxi services, information on available operators, taxi service vouchers, etc.</p>

There is also no integration through ICT, such as passenger information system, except for instructions for passengers on the airport website on what means of transport are available and where to find schedule and other specific information on each operator.

Out of the interviewed stakeholders (please see chapter one for the information on the interviews carried out) none operators indicated cooperating with other operators. Cooperation only happens between passenger transport operators and the airport operator in some cases, e.g. if some changes are required to open a new route.

### **Conclusion**

Cooperation can be evaluated as very weak – the only examples of cooperation are exchange of information or information provision on non-competitive transport services. As there is no cooperation, level of integration is also very low.

Interviewed stakeholders agreed, that increased collaboration would be beneficial in the following ways:

- Increased coverage of public transport services: currently there are service gaps during early and late hours, when passengers can only arrive by private cars or taxis, however even if there would be dedicated late trips, public transport neither city, nor inter-city public transport services are available; therefore coverage of early and late hours would only be beneficial for passengers if all passenger transport network would be adapted;
- Increased travel experience and efficiency: stakeholders agreed, that more effective exchange of information would have positive impact on quality of

passenger service, e.g. additional coordination of to adjust timetables or more flexible service, e.g. train waiting for bus running late due to late flight. This level of integration is only possible if functioning and tested collaboration framework is set up; therefore stakeholders should start with less complicated joint initiatives to create and develop cooperation traditions.

- Better information service and reduction of development and installation cost of information systems: stakeholders agreed, that common travel information system for passengers covering all modes of transport available would benefit for travellers not only in terminal, but overall passenger transport network. Costs of creating such system could be shared between stakeholders. Stakeholders also indicated, that there should be a clear leader to organise such initiative (municipality, ministry or other government body) in order to coordinate different operators. It was additionally stressed, that at the moment stakeholders are doubtful about successful cooperation between state and private public transport operators and strong arguments are required to prove benefits of collaboration in any field.

Stakeholders mostly agreed that tighter cooperation is achievable by putting into practice joint initiatives closely coordinated by some type of external organization with influence over all stakeholders involved, such as governmental institutions. After successful encouraged and supported activities, voluntary cooperation might follow if all the stakeholders are convinced about benefits of collaboration.

### **3.1.2 Regulatory framework**

Relevant aspects of cooperation procedures and network will be provided in this chapter.

#### ***Influence of different stakeholders on integrated intermodal long/short distance transport service***

Results in the table 2 are based on the interviews carried out. Interviewed stakeholders shared quite similar opinions on the question and single table representing results was composed.

As interviewees indicated, there is high contribution to integrate intermodal long/short distance transport from EU and National authorities through overall strategic objectives. EU has strong political views on promotion of public transport use instead of cars. These policies are well reflected in national strategy and operators (note that pressure mostly applies to operators that are owned by state or municipality, e.g. Lithuanian railways, Vilnius city buses) feel pressure to provide better service and increase passenger experience. This pressure is less relevant to private operators, however they are still affected and indicated influence of EU and National authorities as high.

Interviewees indicated that both terminal owner and transport operators contribute feebly to the integration of intermodal long/short distance transport, as operators only show initiatives on irregular exchange of some information, which is lowest level of integration possible.

Interviewees indicated, that passengers contribute to integration of services, as they complain or suggest to improve schedule times (e.g. to delay train for several minutes to make it to the bus). Customers are the most influential on everyone and since most of travellers arrive/leave terminal by car, it is complicated to provide adequate public transport services with extremely limited resources (railway and city bus services are economically unfeasible in this route, however municipality and state subsidizes these as social services to the society).

**Table 2.** Contribution of various stakeholders to integrated intermodal long/short distance transport service

Stakeholders	Very high	High	Neither high or low	Low	Very Low
EU		x			
National authorities		x			
Regional authorities <sup>11</sup>	-	-	-	-	-
Local authorities				x	
Transport operator – long distance				x	
Transport operator – short distance				x	
Terminal owner				x	
Terminal operator				x	
Infrastructure provider				x	
Demand side stakeholder/customer		x			
Other (please specify)	-	-	-	-	-

### **Conclusion**

Influence of transport operators on overall integrated intermodal long/short distance transport service is low and influence of transport policy makers is high. This may seem as viable system, however it does not work in reality, as transport policy is not obligatory therefore even if there is trend of transport service integration this policy is not implemented by transport services providers or interchange owner/manager.

### **Cooperation and procedural framework**

Explanation for current situation could be that there is no cooperation and procedural framework for integration of short/long distance transport services. Any initiatives to coordinate schedules and improve passenger services are independent initiatives of passenger transport operators. In the table 3, answers of interviewed stakeholders are provided.

<sup>11</sup> There are no regions in Lithuania, therefore there is no regional authorities



**Table 3.** Existence of cooperation and procedural framework where the role/jurisdiction/obligation is explicitly specified for each of the issues below

	Yes	No	Partly	Please explain the main advantages or disadvantages regarding the establishment of (not having) a procedural framework?
Land		x		If long term strategies of different institutions are not coordinated, there might be problems with use of particular pieces of land.
Infrastructure			x	Due to safety and other standard reasons expansion of infrastructure is limited/regulated by legal acts.
Operation		x		Each operator may operate as they please. Stakeholders agree that integration would be beneficial however they are sceptical if this concept is realistic.
ICT-system		x		Each operator may choose how they provide their information. Stakeholders stated, that are cons and pros for current situation: <ul style="list-style-type: none"> <li>• Cons. Unified system would both be more cost-efficient and more useful for end user.</li> <li>• Pros. Financing of unified system would be very complicated and expensive to very different standards of transport modes; responsibility of administrating such system also seems very unattractive for most of the stakeholders, as they have limited impact on other operators.</li> </ul>
Service		x		Each operator may change their services as they please, however that results in unnecessary competition which greatly reduces chances of collaboration and integration.

Interviewed stakeholders stated, that current framework is not sufficient. Results of the interview regarding sufficiency of existing regulatory framework are represented in the table 4.

**Table 4.** Do you think that the existing regulatory framework properly covers the following issues?

	Yes	No	Please explain why
Standards on infrastructural elements		x	There are standards for infrastructure elements of different transport modes; however these standards do not cover elements that are object of multimodal interchange, thus integration of differently standardized infrastructure elements is rather complicated both because there are no guidelines and because there are no regulations to avoid possible conflicts while setting interchange of different modes of transport.
Standards on information services		x	There are regulations regarding information provision on schedules, but these only cover separate modes of transport and are not unified standards.
Standards on transport operations		x	There are no standards for transport operations.
Standards for retail and other services	x		Retail and other services must meet requirements of hygiene.
Safety and security	x		EU and national regulation covers standards on security and safety of transport services, but these regulations are mostly dedicated for specific modes of transport.
Other (specify)	-	-	-

Stakeholders did not come to an agreement what measures would contribute to better collaboration and integration of transport services. Following models were proposed by stakeholders:

- Vilnius municipality should be responsible for all coordination of public transport services and information provision in the terminal, as it is of great strategic influence for the municipality and is mostly used by passengers from

surrounding area as well as tourists coming to see capital city. In this case, costs of coordinating collaboration and setting up information system would be fully funded by municipality budget or costs shared by municipality and state;

- Ministry of transport and communications should have a department dedicated to transport integration processes not only within the terminal, but covering whole passenger transport system in Lithuania. This body should have legal power to ensure involvement of stakeholders to the collaboration procedures. Experts from Vilnius technical university suggest this model as well, since independent body is more flexible and does not represent interests of particular institutions, therefore other stakeholders involved would not feel competition. Also, since such organization would represent interests of the state and would be influential on transport policy, stakeholders would be more willing to collaborate to protect their own interests. In this case funding of institution would be responsibility of the state and initiatives would be co-funded by stakeholders involved.

### **Conclusions**

Current regulatory framework is not oriented to standardize transport system as a whole, but is dedicated to standardize specific modes of transport. Standards for different modes are not coordinated between themselves, which leads to complicated and expensive integration of transport modes.

Interviewees agreed, that regulatory framework regarding coordination of services and information provision is necessary and would improve overall transport services. Regulation on physical standards were not considered as very important in this case, as passengers are mobile and can transfer between transport modes quite easily.

### **3.1.3 Planning and operation/construction process(es)**

This chapter was composed based on interview results. Results are provided in table 5 and explained in the paragraph below the table.

**Table 5.** Which stakeholders participate in the interconnection/terminal between short and long distance transport?

Stakeholders	Planning	Finance	Construction	Maintenance
EU	x			
National authorities	x	x	x	x
Regional authorities	-	-	-	-
Local authorities	x	x	x	x
Transport operator – long distance	x			
Transport operator –	x			

short distance				
Terminal owner <sup>12</sup>	-	-	-	-
Terminal operator	-	-	-	-
Infrastructure provider	-	-	-	-
Demand side stakeholder/customer	x			
Other (please specify)	-	-	-	-

Airport is developed based on EU regulations (e.g. Schengen requirements for terminal, safety regulations, promotion of public transport use, etc.). EU transport policies also affect interchange development (e.g. rail connection to the airport). EU might also be co-founder of projects related to integrated transport however currently there were no projects co-funded by EU targeted specifically on long/short distance transport integration.

National and local authorities are the most influential in this particular case of Vilnius international airport as state is owner and manager of the infrastructure of the airport, owner of railway operator and local municipality is owner of city buses. These are the main stakeholders responsible for construction and maintenance of the interchange, as well as founder or co-founders.

Transport operators and customers only contribute to the planning.

Vilnius airport expansion is always very sensitive topic, as the airport is located within limits of Vilnius city. Due to surrounding areas populated by several thousand people any development becomes complicated both because of impact local community and surrounding land use issues. Conflicts regarding planning and operation of the Vilnius international airport usually regard several topics:

- Development and expansion of operation and infrastructure the airport itself. Main conflicts tend to rise between state (as it is owner and manager of the airport) and inhabitants of small neighbouring towns with approximate population of 3000 people. Main issue is that increase of air traffic would result in increased noise. Noise affects both life quality and value of property of local people, who react to most of development projects with written complaint, which, according to legal acts of Lithuania, have to be considered in development project. Finding compromises to such problems takes up to several years and level of conflict could be indicated as high.
- Development of surrounding area. Main conflicts are between state and owners of land. Development, such as planned road connection, face issues if land,

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<sup>12</sup> Terminal owner, operator and infrastructure provider is state (National authority)

where construction is planned is not owned by state but is owned by local people or companies. At this point owners usually try to benefit from selling land for prices that are inadequate to market prices. Legal regulations regarding use of land for national purposes are not strict and process of obtaining necessary land might take several years.

- Development of passenger transport connection. Passenger transport connections are already established (such as railway) and road transport does not require additional development at the current state, therefore no conflicts regarding construction processes are relevant for this case study.

A structured framework and procedure of expansion of objects, such as main airport of the country, involving number of different stakeholders, would increase transparency and would create clear boundaries who is responsible for what aspects.

### ***Homogeneity/difference in perspectives of various stakeholders***

Two main groups of stakeholders with different perspectives are to be distinguished in case of Vilnius international airport:

- Public interest – state as owner and manager of airport and railway operator and municipality, as local authority and owner of city busses company. These stakeholders are oriented to fulfil public interest and provide social services on non-commercial basis (to provide unprofitable services necessary for society);
- Private interest – commercial operators oriented to profit from their passenger transportation activities.

Due to these completely different perspectives, collaboration initiatives become highly complicated if stakeholders from opposite groups are involved. There is no strong interest from private operators to improve something as it will increase cost and would require negotiating with public institution, which are considered slow and inflexible. Public companies consider private operators only profit seeking and impossible to work with. There are only few examples of collaboration and comments about same institution might be completely different if different stakeholders are questioned. This lack of actual communication and collaboration beyond just verbal agreements leads to current situation of public transport serving the terminal, that public transport services are considered to be used only in worst case scenario.

### ***Conclusion***

Main conflicts regarding operation and construction processes are between the state, which is owner and manager of the airport, and inhabitants of surrounding areas, which actively resist most of development projects resulting in delays or even termination of development projects. There are no significant conflicts between airport and transport operators regarding operation and construction.

A cooperation framework would have positive impact on collaboration of different stakeholders involved in operation and development of the airport. Collaboration

framework could be encouraged by a dedicated institution with power to involve representatives of the stakeholders for round table discussions and actual initiatives.

### 3.1.4 Sharing of information

Sharing of information between transport operators and/or the terminal is completely voluntary process. There is no legal framework to regulate sharing of information between operators, however all operators provide data on passenger numbers and some other indicators to the Statistics department of Lithuania. Other information is shared between operators under individual agreements (mostly on schedules or passenger flows for better coordination). Main barriers for information sharing are commercial and strategic secrets of companies or financial issues, if gathering specific information requires additional funding.

At the moment, there is no information gathered that would be vital for all operators to know at the same time. In the long run, sharing of information would contribute to better image of public transport and increase in service quality, but only exchange of information is not sufficient.

### 3.1.5 Suggested improvements

Based on carried out interviews and research carried out, following suggestions were made:

**Table 6.** Suggested improvements in the planning, finance, construction and operation of the terminal

Planning:	Interviews revealed that currently a common framework for planning involving all stakeholders is missing. Stakeholders agreed that round-table discussions would have positive impact on planning of public transport development in the area of the airport however this discussion should be mandatory (regulated by legal acts) in order to achieve any results.
Finance:	Currently, public transport initiatives are mostly funded by operators. Joint initiatives could be used to implement joint information system or other similar development projects. This would reduce costs of operators and also would contribute to single but more informative system for passengers.
Construction:	Construction projects of large scale should also be discussed with other stakeholders in order to evaluate impact before the project implementation. Adjustments are easier to make in planning stage to ensure better integration of transport modes or better solutions of existing problems.
Operation:	Public transport operators should find a compromise to adjust working hours to the working hours of the terminal to cover early and late flights, which are impossible to make with the public transport (except for the taxi service).

Lessons learned: passengers using the terminal are extremely sensitive to any discomfort in the public transport systems. An example is train connection to the

airport: the walking distance from the terminal to the train is less than 150 metres, but passengers have to cross three streets and carry their luggage all the way. This disadvantage and insufficient schedules contributed to small numbers of passengers using train to access/egress the airport and choosing private cars instead, which can drop off passengers next to the door of departure terminal. As public transport is less popular than private cars, careful planning and marketing must be carried out to attract car users to try out and use public transport.

### 3.2 Financing

The terminal and surrounding land is owned by state, and the operator of the terminal is state entity, therefore no additional charges for rent occur. Following table explains funding sources for terminal related expenditures.

**Table 7.** Are the costs of land rent, infrastructure, operations or ICT systems subsidized?

	National authority	Local authority	Other (please specify)	Not subsidized
Is the land costs subsidized by	Owned by state and used under right of trust by the operator.			
Are the infrastructure costs subsidized by	Owned and development funded by state and used under right of trust by the operator.	Infrastructure for city public transport is funded.	EU structural funds, such like Cohesion fund co-funded some of development projects. Railway infrastructure is funded by railway operator.	
Are the operation costs subsidized by	Operator is state enterprise and loss is subsidized by state.			
Are the costs of ICT systems subsidized by	Owned and development funded by state and used under right of trust by the operator.	ICT providing information on city public transport is funded.	ICT providing information on train transport is funded by railway operator.	

Table 7 indicates that each of transport operators funds their infrastructure and ICT systems by themselves. This model has advantages as there are no issues with

sharing costs or project delays if one of the partners fails to provide funding, however projects of larger scale are difficult to fund. Overview of barriers based on information gathered during interviews will be presented in the table below.

**Table 8.** What are the main financial barriers connected to financing the four aspects mentioned below?

<p>Infrastructure</p>	<p>Large scale infrastructure projects are very difficult to fund, but these are mostly development of the airport itself and are not really concern of other stakeholders.</p> <p>Development of road infrastructure around the airport is responsibility of state and sometimes municipality, but not of transport operators. Infrastructure development projects usually of large scale and require significant funding which is rarely possible by state only, therefore in this case development highly depends on support from EU funds.</p> <p>Railway infrastructure development is funded by the national railway operator and is limited by its own financial possibilities.</p>
<p>Operations</p>	<p>Passenger transport services provided are limited by actual cost and profits of specific trips, e.g. during late hours there might be only 5 passengers per bus, making trip a huge loss for the operator. Due to low use of public transport and limited subsidies for unprofitable trips, operators cut down number of trips available and working hours of public transport.</p>
<p>Retail and other services</p>	<p>Retailers are limited by actual profit received from business in the airport and corresponding decisions are made if operating a business is not profitable.</p>
<p>Information services</p>	<p>Developing and installing information systems is pricey and single operators face difficulties with such projects, therefore systems of limited functionality are used or printed schedules are handed.</p>

Operators face difficulties with funding additional projects apart from providing public transport services, which, in most cases are not profitable. Due to operation at loss, additional services or ICT projects are rare and slow.

### 3.3 Indicators related to policy, organisational and institutional structure

Stakeholders use indicators for promoting efficiency and highlighting areas which are problematic not actively. However Vilnius International Airport initiates passenger



satisfaction surveys and market research and announces the results, which could give some useful information for a purpose of improvements of efficiency and detection of problematic areas.

Indicators from these researches are mainly oriented to quality of services of Vilnius International Airport and cover the satisfaction of passengers with services of Vilnius International Airport, demand for additional non-aviation services, factors, that would encourage using the service of Vilnius International Airport more often. These indicators are followed because Vilnius International Airport carries out a policy of increase of non-aviation revenue.

#### Policy indicators

The modes of accessing or egressing the airport are also measured and percentage of each access or egress type at different times of a day is calculated. These indicators help to improve the service of parking lot as well as public transport service offered.

Also such statistics as purposes of travels (business, personal, leisure and etc.), travel directions are collected and analysed.

Passenger and aircraft statistics by flight type (regular, not regular) and type of transport (international, local), number of accidents and number of people affected by accidents are collected by Department of Statistics of Lithuania.

Qualitative surveys are carried out as well to indicate specific problems passengers are facing.

#### Organisational and institutional structure indicators

Terminal management model and institutional complexity is evaluated by carrying out studies, but not through indicators (qualitative analysis instead of quantitative). Based on results of studies carried out, it is planned to restructure terminal operator from state enterprise to limited company.

Fair and equal access indicators are not collected, transport system is regulated by municipality and state legal acts to protect providers of public transport, however private operators are free to provide service that does not overlap with one provided by state operators.

Currently, there is no practice of regularly gathering indicators to evaluate overall transport system. The airport operator organised several surveys to identify transport problems passengers are facing, this information was shared to some extent but no actions involving all the stakeholders followed. This approach will not solve current problems with passenger transport use in the airport therefore encouragement to improve service should come for higher level (through transport policy).

## 4 Outputs and level of service

### 4.1 Interface and interconnection, related services

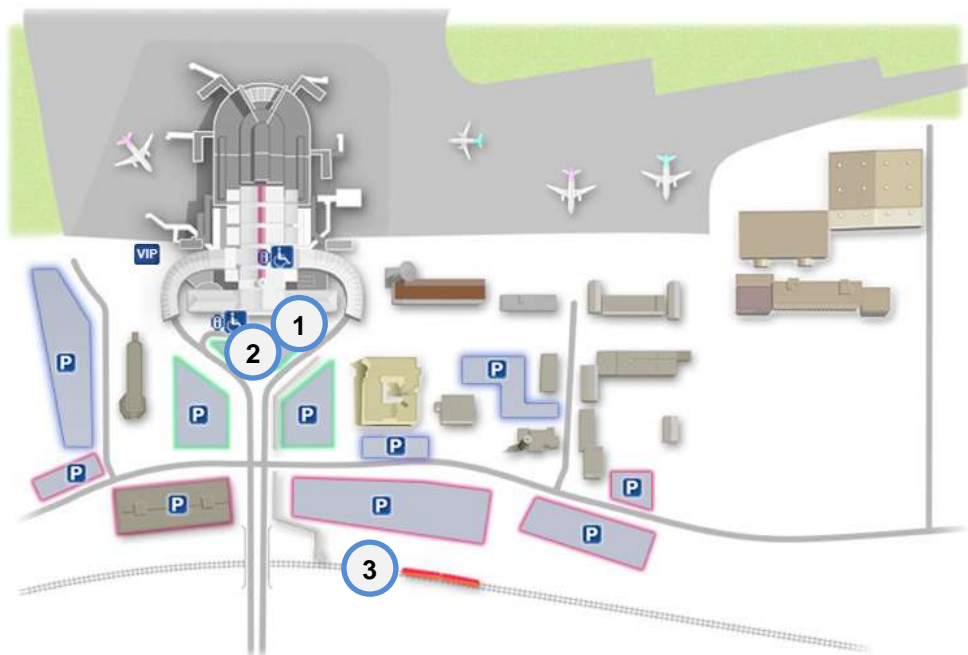
#### *Information provision*

Interface of the interconnection in Vilnius international airport is rather simple as it is small airport and all transport modes are within several minutes' walk from the terminal. Additional services are not necessary for most of passenger without special needs, however increased information service would contribute to better travel experience. Real time information on transport is not available in the airport, and operators agree that this is one of the major issues decreasing passenger experience, as passengers feel insecure if bus is late. Operators did express need for joint system, but there is no leader to actually put the idea into life. This lack of initiative leads to current state of information provision and poor results of public transport use.

A single system providing information on available transport modes using GPS based ICT would contribute to better passenger experience; however investments and level of collaboration required repels operators from trying to develop such system, even though operators agreed that current model of each operator taking care of their own information provision does is not beneficial and user-friendly.

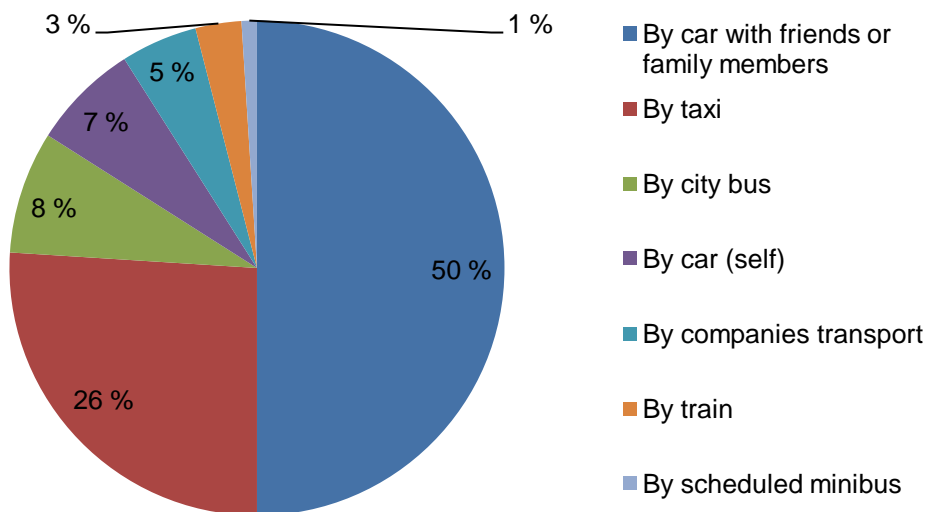
#### *Interconnection between short and long distance*

Vilnius international airport is accessible by trains, busses, minibuses and private cars.



**Picture 5.** Short and long distance transport interconnections in Vilnius international airport. 1 – bus stop (public transport); 2 – taxi parking lot; 3 – train stop; P – car parking lots

Vilnius International Airport passenger survey, carried out in 2009, has shown that exactly half of all passengers to Vilnius airport are coming / leaving by car with friends or family members (see Picture 6). This method is especially popular among the locals and charter flyers. 26% of travelers access/egress the airport by taxi. Among the foreigners, the most popular arrival and departure way is taxi – used by 49% of foreign respondents, and friends bring 26% of foreign passengers.



**Picture 6.** Airport access/egress modes

Passengers living abroad or in Vilnius city or district use taxi service more frequently than others. Only a small percentage of passengers who reside outside Vilnius, use a taxi.

11% of residents of Vilnius arrive at Vilnius airport by city bus while among people living not in Vilnius this rate is only 4%. Arrival at the airport by train is quite popular among the Lithuanian, whose residence is not in Vilnius – 7%, while only 1% of the residents of Vilnius arrive by train.

***Ticket integration***

There is no integrated ticket service neither for arriving, nor departing travellers. Each of the operators has their own, independent ticketing system which is not integrated with any other ticket systems, therefore there is no integrated ticketing system for passengers leaving or arriving to the airport.

**4.2 Productivity and effectiveness in terminal**

Currently, the terminal is not operating at full capacity but passenger numbers are steadily growing. Productivity indicators of the terminal related to passenger transport service are rather difficult to identify: efficiency and productivity of terminal does not significantly correlate to transport service offered but through the following indicators:

- Number of passengers served – larger numbers of passengers lead to increased demand for public transport services. In this case the more productive terminal is, the quicker passengers will be released or admitted

through security increasing passenger flows right after the flight or specific amount of time prior the flight. Vilnius airport is a small airport and passenger transport services are already adjusted to flight schedules apart from early and late hours;

- Flight schedule – the terminal has influence of flight schedule distributing the flights throughout the day, however this influence is limited as airlines purchase landing time late in the evening or early morning when public transport is not available, therefore this performance indicator is very limited in relation to transport services.

Vilnius airport is small airport and efficient services are possible to achieve. Some adjustments with public transport schedules are already made and initiatives to fill in service gaps with taxi services are made – the airport organised initiative of “fair taxi” providing clear information on fares and taxi companies available.

### 4.3 Level of service offered

Number of different services is available at the airport for passengers to use. Following table provides overview of available services. Explanation on gaps will follow in the paragraph below the table.

Table 9. Services available at the terminal

	Yes	No	Not relevant
Specific information to smart phones improving information about interchange terminals and public transportation		x	
Information boards in terminals	x		
Information about personal navigating systems in terminal	x		
Scheduling of routes on base of real time data		x	
Ticket control mechanisms for eTickets		x	
Computer equipment for payment services	x		
Coordination of schedules between transport operators	x		
Bicycle stands at terminals	x		
Sufficient, safe and affordable parking areas	x		
Possibility to charge batteries for electric vehicles in the parking area		x	
Recruitment of staff as guides		x	
Recruitment of staff as volunteer guides	x		

No information on scheduling of routes based on real time data is available, as no public transport vehicles are equipped with such system, nor there ICT for it in Vilnius city.

E-tickets are available in city busses and available inside the airport, but not during late or early hours.

Electric cars are not yet popular enough in Lithuania to install charging station (there is total of 4 electric vehicles in Lithuania).

Terminal staff is not available as recruited guides, however usually they would help if some problems occur.

There are general complaints on public transport system in Vilnius that apply to the routes serving the airport as well. No complaints are received about safety of the terminal however following issues are raised by passengers:

- Train stop is within uncomfortable walking distance if you carry heavy luggage and if weather is bad. The path is well lighted and security camera is installed, but passengers are not satisfied.
- Information services are available in special stand inside the arrivals terminal, but not during the late and early hours. Free Wi-Fi internet services are available, but these measures might not be sufficient for late foreign passengers not familiar with the airport and city.
- No integrated tickets are available and ticketing system of public transport might be confusing for users not familiar with it;
- Delays of busses might occur during the rush hours.

There is generally little complaint about passenger transport service to and from the airport as most of the passengers use private cars or taxis.

#### 4.4 Indicators related to performance and level of service

##### Supply side performance indicators

Some information on these indicators is internal and not shared with public and the publicly available data does not present these indicators however calculations are possible.

Employee productivity has significantly increased from 2009 to 2011. In 2009 this number was 2,83 thousands of passengers for 1 employee and in 2011 this number is almost doubled and reach 5,55 thousands of passengers per employee. This change is affected by optimisation of costs in Vilnius International Airport which is implemented by reducing the number of employees and other actions

**Table 10.** Number of passengers and staff in Vilnius international airport

	2006	2007	2008	2009	2010	2011
Arriving and departing passengers in Vilnius airport (thousands)	1446.5	1713.7	2041.7	1305.6	1370.4	1709.4
Employees	N.d. <sup>13</sup>	N.d.	N.d.	462	329	308
Passengers per employee	N.d.	N.d.	N.d.	2.83	4.17	5.55

<sup>13</sup> No data available for the period

### Terminal properties indicators

Some of these indicators are gathered, but no specific reporting exists stating these particular indicators. Most of these are possible to calculate using statistic or information systems.

### Level of service indicators

These indicators or similar indicators sometimes are calculated by stakeholders to evaluate internal performance, but not general indicators reflecting performance of system as a whole.

## 5 Analysis of policy recommendation

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
Policy recommendations	
Integrate the administration of the public transport system	Administering public transport system as a whole does benefit to better coordination and reduced staff costs of administering personnel, however if administering body is not guaranteed decision making rights and sufficient influence to make a change, only a minor changes will occur.
Harmonize modal focused legislation and regulation as the first step before integration to a multimodal platform	Clearly understandable goals and corresponding legislation is extremely important to encourage operators to collaborate as their own initiatives are rarely considered seriously enough by other operators.
Policy and legal frameworks should facilitate intermodal cooperation	Additional support for intermodal cooperation would contribute to development of transport services as a system in a recommended direction, as absence of clear vision leads to chaotic development.
Planning recommendations	
Incorporate the transport planning process with land-use planning	Incorporating planning might lead to delays if stakeholders do not reach agreement. A very clear long-term strategy must be developed to ensure feasibility of such collaboration.
Financing recommendations	
Pursue Private-Public Partnerships (PPPs) model to solve complex local and regional problems and financing issues	PPP models are an option if development projects are attractive and feasible (e.g. sufficient flows of passengers, sufficient use of public transport) and transport services as public services might suffer in availability.
Integrate the pricing of the public transport system	A common ticketing system would be more beneficial from users points of view rather

PAG recommendation	What is the current situation and is the recommendation important? If so, how?
	than integrated pricing system.
Organizational recommendations	
Use of business models for cooperation that also publically owned terminals can use	Cooperation might be difficult for publicly owned terminal due to ownership structure and limitations rising from ownership model (state owned companies have to follow stricter rules and procedures)
Structure the information provision	Structured information on all modes of transport would highly increase chances of understanding information correctly and planning successful trip.
Infrastructure development recommendations	
Constitute transport infrastructure management body for all modes	A single body well experienced in development of transport infrastructure would be beneficial not only for specific terminal, but for all terminals in the country and would contribute to better use of best practice and more efficient planning.
Adopt or create standards for physical infrastructure interconnectivity	Standards are rather difficult to develop for passenger interchanges as there are limited development possibilities for terminals located within the cities or terminals built before implementation of the standards.
Operations recommendations	
Separate the owner from the operator	Operator has higher interest to increase efficiency and quality of service offered to increase profit than original owner, not paying rent for the infrastructure, however if same body owns and operates, decision making becomes less complicated.
Establish the cooperative framework between the terminal and the transportation operators	Cooperation is more necessary between operators rather than terminal, as terminal operator has limited possibilities of contributing to transport services.
Integrate the operations of the public transport interchanges	Difficult to implement due to complicated collaboration procedures.



## 6 Analysis of gaps

### 6.1 Wasted time

Main Problem	Caused by (inter alia)
Wasted time	<p>Poor links between transport modes</p> <p>Walk to the train stop from the airport takes about 3-5 minutes; the bus stop is right next to the exit of the arrival terminal; taxis are available right in front of the terminal, therefore very small amounts of time are wasted if waiting times for train/bus are not considered.</p>
	<p>Low speed links between airports/ferry ports and neighboring cities</p> <p>Direct busses to major cities are available from the airport or busses/train is available to the main train/bus station with wide choice of destinations is available. Train only takes 7 minutes; busses are slower than private transport.</p>
	<p>Missing links between airports/ferry ports and rural areas</p> <p>Rural areas are accessible by taking transport from main train/bus station of the city, connection to which was described in the beginning of this chapter.</p>
	<p>Road congestions around airports/ferry ports</p> <p>In the rush hours some congestion might occur, but it is not very significant.</p>
	<p>Long walking distances between modes of transport, bad signage</p> <p>Train stop is considered to be too far away (roughly 300 meters), but the directions are clearly indicated.</p>
	<p>Poor scheduling of arriving and departing services</p> <p>No public transport is available for very early flights (leaving before 6 a.m.) and late flights (after 11 p.m.). Additional bus service is considered, but it is doubted to be beneficial, as public transport only runs until half past 11 p.m. and from 5 a.m. in the morning, therefore change of schedule for single bus is not an option.</p>

## 6.2 Poor information

Main Problem	Caused by (inter alia)
Poor information	<p>Poor information about multi-modal options</p> <p>Clear information on trains and city busses is available; taxi services are also clearly marked and information booklets are available. Mini buses and busses of private operators are not indicated and might be confusing.</p> <p>Additional information boards are provided and renewed for more information; information on transport services is available on the airport website.</p>
	<p>Insufficient information exchange between different operators</p> <p>Currently operators only exchange information on schedules. Information to increase collaboration is exchanged vaguely.</p>
	<p>Single mode tickets</p> <p>All operators use their own ticketing systems. Electronic tickets are slowly spreading in the country, however there are no close future plans to use same electronic tickets for different modes of transport.</p>
	<p>Missing information about local tickets for the last mile during the late and early hours, when information service stand is not working.</p>
	<p>Complexity of fare structures</p> <p>Information of fares for travel services is available on the airport website for the public transport. Taxi fares depend whether you take taxi waiting in the airport or call you own cab from the city. This information is not provided.</p>
	<p>Unavailable or undetectable multi-modal planning services</p> <p>Information boards with routes of other transport modes are available, but information services should be more detailed.</p>

### 6.3 Poor quality

Main Problem	Caused by (inter alia)
Poor quality	<p>Insufficient additional services (e.g. shops)</p> <p>Customer survey (2011) reported that more services are required. The airport is currently working on attracting new retail and food service.</p>
	<p>Unavailable multilingual information</p> <p>Information in several languages is available on most travelling aspects.</p>
	<p>Few members of staff providing assistance and security</p> <p>Very few of airport staff is available late at night and early in the mornings, however no complaints were received on lack of assistance.</p>
	<p>Low frequency of services</p> <p>Public transport frequency is quite low, but higher frequency is highly unprofitable for transport operators. There are currently discussions on the issue, however due to limited funding solutions are still limited.</p>
	<p>Poor reliability of services (delays)</p> <p>Delays happen during rush hours. Expansion of connecting roads is planned in the future, however traffic problems in the city itself, also affecting transport to the airport, are still to be solved.</p>
	<p>When arriving in a foreign city people often call a taxi, as they were not able to find reliable information of the available transportation system beforehand. Similarly, citizens who rarely use public transportation tend to take their private car (equipped with a navigation system) in order to move through their hometown – despite having to accept high parking fees – as they feel insecure when it comes to going by bus or tram.</p>

## 7 Emerging mobility schemes and future changes

### 7.1 Emerging mobility schemes

Simplifying the payment	<ul style="list-style-type: none"><li>- computer equipment for payment services</li><li>- hardware for registration in terminals</li><li>- ticket control mechanisms for eTickets</li></ul>
Real time information	<ul style="list-style-type: none"><li>- information boards in terminals</li><li>- scheduling of routes on base of real time data</li></ul>
Cooperation of transport operators	<ul style="list-style-type: none"><li>- shared terminals</li><li>- coordination of schedules</li></ul>
Individual Access and Egress	<ul style="list-style-type: none"><li>- sufficient, safe and affordable parking areas/stands for private vehicles</li><li>- appropriate equipment in terminal area</li><li>- release of barriers for private access/egress (bicycle lanes,...)</li></ul>
Electro mobility	<ul style="list-style-type: none"><li>- possibility to charge batteries in the parking area</li></ul>

### 7.2 Simplifying the payment

Computer equipment is available for payment services inside the airport terminal. One may also pay by card in taxi.

Hardware for registration in terminals or ticket control mechanisms for eTickets is not available. There are no close future plans to install this equipment from the side of the terminal operator.

### 7.3 Real time information

Real time information is provided on information boards for air traffic. Information on city busses traffic is not real time; information boards display schedules, relevant information and estimated time until arrival of next bus. Plans to install such system are being prepared for several years, but there is no clear vision of funding scheme and the project is delayed again and again.

### 7.4 Cooperation of transport operators

Operators provide transport services from the airport, so technically, they use the same terminal however stops are located in different places nearby the terminal.

Operators of public transport cooperate to adjust their schedules to air traffic schedules and to schedules of intercity busses and trains, leaving from the main station, as several transport routes take passengers directly to main station of Vilnius (same place for busses and trains, as well as city transport).

## 7.5 Individual Access and Egress

Individual access is very well developed. Long term, medium term and short term (5-15 minutes) parking zones are available at the airport. Most of the parking lots have security. Quantity of parking spots is sufficient. Terminal access by car is declared most comfortable way to arrive to the airport by the travelers (data of survey carried out in 2011). Bicycle is very unpopular way to reach the airport and investing in bike lanes would be unfeasible.

## 7.6 Electro mobility

Means of electricity powered transport are not yet offered at the airport, as well as charging stations or other similar commodities. Electro mobile perspectives are being researched but currently the initiative is not strong enough to be followed by actions requiring significant investment, however electro mobile charging station in the terminal is also planned in near future.

## 7.7 Future perspectives

Currently, strategic planning is oriented to promote use of public transport instead of arriving by private car and these tendencies will affect habits of terminal users as well.

## 8 Policy goals

Policy goals	Comment on achievement
Developing and deploying new and sustainable fuels and propulsion systems	
<p>1. Halve the use of 'conventionally fuelled' cars in urban transport by 2030 and phase them out in cities by 2050 to achieve essentially CO2-free city logistics in major urban centers by 2030</p>	<p>Relevance: up to 90 % of travellers arrive/leave the terminal by private car. Absolute most of the cars are 'conventionally fuelled' and the terminal is within limits of the city, thus this goal is highly relevant for the terminal.</p> <p>Initiatives: the terminal 1) is well connected to the city by several modes of public transport 2) regular surveys are carried out to identify user need, problems and increase attractiveness of public transport 3) number of initiatives to increase provision of information on available public transport is steadily increasing and operators are starting to collaborate for better information solutions.</p>
Optimizing the performance of multimodal logistic chains, including by making greater use of more energy-efficient modes	
<p>5. A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050 and a corresponding set of information services.</p>	<p>Relevance: airport is connected to TEN-T network, however sufficient information services are not yet provided.</p> <p>Initiatives: reconstruction, expansion and capacity increase of TEN-T roads leading to the airport is planned in near future.</p>
<p>6. Connect all core network airports to the rail network by 2050, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.</p>	<p>Relevance: Vilnius airport is the main international airport of Lithuania, therefore this goal applies. There is no inland waterway system as there are only segments of rivers suitable for water traffic; therefore this part of the goal is not relevant.</p> <p>Initiatives: The terminal is already connected by railway line to the rail network by railway line airport-Vilnius train station, however it is not high speed line since the distance to the main train station</p>

Policy goals	Comment on achievement
	is only 5 kilometres.
Increasing the efficiency of transport and of infrastructure use with information systems and market-based incentives	
8. Establish the framework for a European multimodal transport information, management and payment system by 2020.	<p>Relevance: the airport is provider of transport services and interchange point between different modes of transport.</p> <p>Initiatives: multimodality possibilities are researched (R&amp;D, feasibility studies, etc.).</p>
10. Move towards full application of 'user pays' and 'polluter pays' principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.	<p>Relevance: this goal is already achieved by the airport, as the same institution manages uses and maintains airport infrastructure. Same applies for the railway operator. System is not yet fully applied in road transport.</p> <p>Initiatives: research projects are carried out for funding solutions of better road network maintenance system.</p>

## 9 Concluding remarks

### 9.1 Main conclusions

Vilnius international airport is rather interesting object for a case study: terminal is close to the city and well connected with different means of transport, however passengers arrive and leave by private cars or taxis in 9 cases out of 10. Terminal offers satisfactory public transport services, but such level is not sufficient to attract passengers used to comfort of private cars. Situation of the terminal reflects overall situation of public transport on a smaller scale: chaotic planning through the years led to rapid auto mobilisation and dramatic decrease in use of public transport. Public transport services are considered to be slow, difficult to use and with poor access to desired destination. State or municipality public transport operators providing unfeasible services are not used to competing in the market and private passenger transport operators cannot offer adequate coverage, as they seek to serve profitable routes. Collaboration between the two is a rare happening, and lack of good practice in the field further discourages operators from trying to collaborate and achieve significant improvements. This is the point where transport policy and regulations could have positive impact: interviewed stakeholders agreed, that independent governmental body responsible for passenger transport development and integration would encourage them to collaborate through or guided by the mentioned governmental body. Main conclusion of the interviewees and researchers who contributed to this case study is that a strong leader is required to inspire or even force change to achieve sufficient results and visible change in public transport system.

### 9.2 Good practices

Passenger transport operators serving the airport as well as airport operator react well to complaints of passengers: operators collaborate to adjust time table to each other if the passengers express need for changes. Passengers are the driving force to improve service they are receiving and bottom-up initiatives should keep being welcomed.

Operators also are familiar with transport policy and understand importance of achieving both national and EU level goals and are willing to start cooperating and adopt new practices.

### 9.3 Bad practices

Interviewed operators were highly sceptical about other operators, considering them either competitors, or impossible to collaborate with. Sometimes such points of view were based on previous experiences of joint initiatives, but in number of cases concern are not based on any experiences but rather reluctance to try unknown and possibly risky initiatives without clear understanding of possible results. Stakeholders agreed, that if transport policy regarding integration would be mandatory, better results would be achieved indicating lack of willingness to improve quality of service and change status quo without strong external influence.



## 9.4 Suggested improvements?

Encouragement from government could have a positive impact on collaboration of operators: setting up several initiatives would familiarize operators with collaboration procedures and using best practice cooperation framework could be established for project of greater scale.

## 9.5 Evaluation of PAG recommendations

The recommendations are usable and were positively evaluated by interviewees however some of them were considered too laconic to give a clear idea if they were a part of a toolkit.