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Quaderni del Servizio Pianificazione dei Trasporti e Logistica

IMONODE

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PERISHABLE GOODS LOGISTICS

Feasibility analysis and ICT solutions

Regione Emilia-Romagna
Assessorato Mobilità e Trasporti

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PERISHABLE GOODS LOGISTICS

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PREFACE

Transport & logistics of perishable goods made significant progress in the last years, in terms of improvement of consolidated technologies and development of new solutions. The main drivers of this change are related to the new international economic scenario: markets and trade globalization, product quality requirements, new regulations.

Transport & logistics of perishable goods, the rationalization of their transport systems, the development of efficient and effective logistics services which can comply with the needs of the different industry's bodies (producers, distributors, transport and logistics operators) aim on one hand at reducing transport costs and at ensuring higher margins also for producers, and on the other hand at granting products quality, in terms of freshness and adequate ripening, and at reducing transport externalities, by choosing suitable transport modes and by organising fluent transport chains (multi-modality).

Emilia-Romagna Region is strongly engaged in actions to explore transport and logistics systems and in particular it has promoted innovative projects and tests in this fields.

This publication relies on the results of the pilot activities of the IMONODE and GILDANET projects which were promoted by Emilia-Romagna Region. It aims at focusing the problems and the perspectives of the perishable goods industry through the analysis of concrete contexts and at and assessing the state of the art of ICT technologies for perishable goods and their operational potential.

Alfredo Peri
Regional Minister of Transport
Emilia-Romagna Region

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FEASIBILITY ANALYSIS

INTRODUCTION

Rino Rosini and Alberto Preti

INTRODUCTION

This feasibility analysis aims at evaluating the opportunities of building a logistic infrastructure for perishable goods within a mature and developed context, such as the area of Ravenna seaport.
The knowledge of the local conditions and of their relations to the European context represents the basic approach to assess the project's feasibility. In particular the study focuses on two strictly related levels:

- Local & regional analyses of the supply and demand sides of logistics for perishable goods;
- Analysis of the European framework in which the platform would fit; more in detail the study is one of the demonstrators of the IMONODE project (Integration of Transport Modes and Nodes in Cargo Transport in Central and South-Eastern Europe), financed within the UE Initiative Interreg IIIB CADSES.

The study presents different steps to the final evaluation of the business idea of a perishable goods platform, which also represent a methodology which can be adopted in other geographic contexts:

- First of all it concentrates on the evaluation of the coherence of logistic flows, in particular checking if the actual volumes related to the potential demand are reasonable for a platform, also considering the services requested by the European demand. The volumes, the main characteristics and the structure of the industry and of the supply and distribution chains of specific products categories are analysed. Opportunities and key points are underlined.
- Concerning the potential development of the Ravenna Distripark, the nature and the impact of the logistic development on the supply structure is also evaluated in terms of development of transports, sea routes, railway services, air traffic, logistics and distribution strategies of global operators and connections with developing logistics networks at European level. In particular Annex 1 aims at identifying and evaluating the existing logistic infrastructures: the main distribution and logistic infrastructures for perishable goods are analysed within the Ravenna reference territory and in other Italian and foreign regions, in terms of activities and structures of terminals for perishable goods. Moreover the logistics characteristics of perishable goods and their consistency with different transport modes is analysed.
- Finally, with reference to the specific context, the project hypothesis has been evaluated on the base of interviews with operators and of the data and information gathered. A detailed SWOT analysis of the project platform for perishable goods in the Ravenna seaport area and of its market positioning has been developed in terms of specification of the business idea, in order to help the project implementation and development and its integration

within the wider logistics system in Emilia-Romagna and in the CADSES countries.

The fragmentation of logistic chains and the lack of intermodality are the first main reasons that lead to the possible creation of a platform for perishable goods at Ravenna seaport. Perishable goods are characterized by a high level of differentiation and by a high time and spatial dispersion of flows, first of all related to the variety of production areas and bodies. These traits result in extremely fragmented logistic chains. Moreover the need to decrease the "lead time" (in terms of time from production to consumption), which is fundamental to maximise the product value, implies the exasperate use of road transport in the perishable logistic systems (single modality), causing the lack of flows integration. In particular this situation results in the unbalance in vehicles' load factors between inbound and outbound journeys, in the lack of transport critical masses, in operators' scarse integration and in consequent environment and health negative effects.
Therefore it is necessary to evaluate the possibility to concentrate and integrate perishables flows to meet the needs of market demand/consumers (in particular rapidity, continuity, range completeness), trying to avoid diseconomies and negative impacts.
The project idea is based on the following main prerequisites:

A. Ravenna is in the centre of an agricultural and food production and distribution basin, with strong import and export relations in the Adriatic-Ionic Corridor and in the CADSES area;
B. In the Ravenna area there are logistic operators which are highly structured and specialised in the management of the fresh products chains;
C. In Ravenna the network of associations is able to meet and mediate the needs of the different types of operators potentially involved.
D. The seaport of Ravenna and the other infrastructures in the regional and inter-regional territory have high development potentials to be exploited for the strengthening of intermodal transport along the Adriatic-Ionic Corridor and for its integration with Corridor V (West – East connection).

Moreover the terminal/port operator approach, in terms of starting the feasibility analysis on the hypothesis that the terminal operator is the driving body for the creation and localisation of the perishable platform, was not the main driving ratio. This study tries a new and integrative approach which is mainly focused on the basin and supply chains ratio, aiming at the development of transport flows functional to production and distribution activities, in terms of link with production and distribution markets.
The localisation of the platform within the seaport is thus not considered as a constrain but as a chance, consistently with the basin/supply chain approach. In fact the real focus is the creation of a platform which can satisfy the specific needs of a production/distribution basin and which could be located within the seaport to exploit the advantages of intermodality and the related increase in the efficiency of logistic processes. In this sense potential overseas flows could represent a further opportunity to develop goods critical masses and increase revenues, for example through the integration with reefer containers flows.

Consequently the study approach relies on the evaluation of the interest and commitment of production and distribution operators in perishable goods industries to develop a platform. In particular in order to understand the interests of the operators it was necessary to evaluate the main characteristics of the supply and distribution chains (dimensions in terms of flows to and from each significant territory, level of complexity, analysis of logistic "knots" within the industry, needs of the industry operators, also focusing on the deficiencies in logistics and in its organisation and management, industry and supply chain trends, chances of multi-modal integration). This activity was developed through:

- analysis of statistical data and desk work;
- research/interviews with operators on the base of a bottom up approach, aimed at involving investors in the platform set up.

LOGISTICS FOR PERISHABLE GOODS SUPPLY CHAINS AND DEMAND SIDE

2.
LOGISTICS FOR PERISHABLE GOODS-SUPPLY CHAINS AND DEMAND SIDE

The research enabled the estimation of the composition of perishable goods flows in Italy and in particular in Emilia-Romagna. The following data and analyses aim at estimating the rough amount of movements of perishable goods, that is to say the critical mass to justify investments in a platform, and not at the definition of the exact volumes of traded goods; this choice was driven by the goal of finding geographic areas, logistic and distribution chains which can be addressed by the development of the logistic platform.

The following data sources have been analysed/re-elaborated together with direct interviews and meetings with logistic, production and distribution operators. (Table 2.1):

- ISTAT (Italian National Institute of Statistics): it provides detailed information with reference to the trade of perishable goods between Italy and other countries in the world;
- ICE (Italian National Institute for Foreign Trade): it provides information on exports of fruit, citrus fruit and vegetables in Emilia- Romagna;
- IMONODE Project (Interreg IIIB CADSES).

The perishable goods taken into consideration are fruit and vegetables, meat (white/red, fresh/frozen) and fish (fresh, frozen/refrigerated).

TABLE 2.1 INTERVIEWS TO OPERATORS

	FISH	MEAT	FRUIT & VEG	GENERAL	TOTAL
Production and processing operators	2	2	6	1	**11**
Whole salers and logistic operator	3	0	3	4	**10**
Distribution operators	3	1	4	2	**10**
Total	**8**	**3**	**13**	**7**	**31**

The import/export volumes of perishable goods, relating to the total amount at Italian national level and in Emilia-Romagna are represented in Figure 2.1 and 2.2 respectively.

Emilia Romagna imports from other regions mainly fruit (over 242,000 tons), vegetables (over 140,000 tons) and a small amounts of meat (only 900 tons).
As for outbound movements, Emilia-Romagna exports mainly fruit (around 486,000 tons) and a similar quantity of vegetables and meat (over 202,000 tons and over 187,000 tons respectively).

FIGURE 2.1 ITALY: IMPORT/EXPORT PER TYPES OF GOODS – YEAR 2003 (,000 TON)

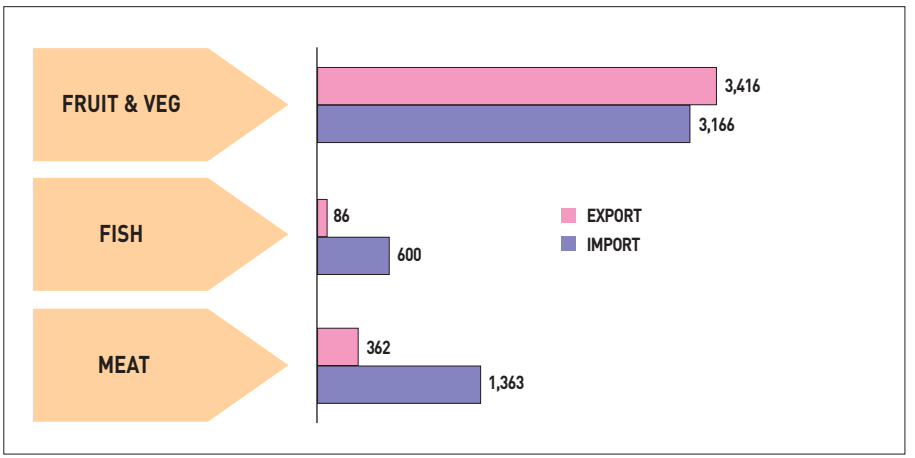
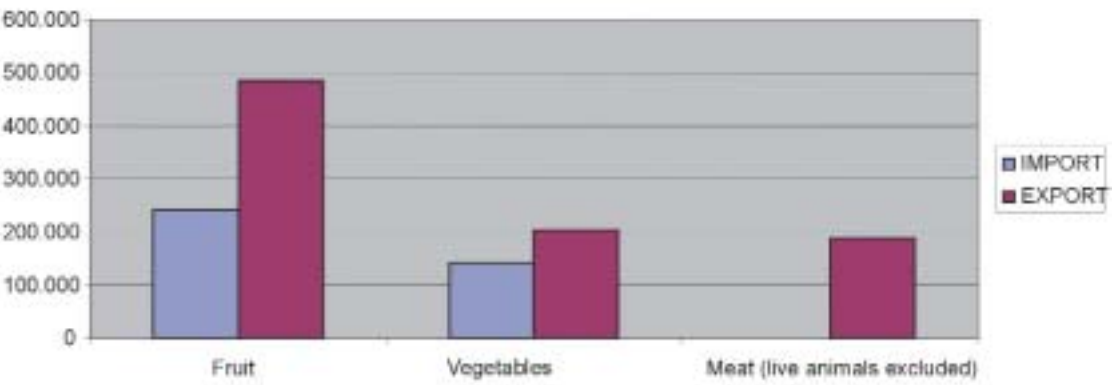


FIGURE 2.2 IMPORT/EXPORT EMILIA ROMAGNA - ITALY PER TYPES OF GOODS - YEAR 2003 (TON)



Source:
SCS analysis of ISTAT data
(Jan-Dec 2003, cumulative period)

2.1 Fresh fruit and vegetable industry

2.1.1 Main characteristics

The main characteristics of the fruit and vegetables industry can be summarised as follows:

- The import and export volumes for fruit and vegetables are significant; in Italy the biggest production market is the South part of the country.
- The need to meet delivery deadlines (generally speaking dispatch on day A and delivery on day B) causes the goods to be transported by road, although the shelf life of many of these goods is compatible with other transport modes.
- Despite the maturity of the industry, the logistic chain is quite complex and long. Nevertheless there are trends to shorten the chain.
- The Italian production (in particular in the South of Italy) is losing ground against the competition both in Italy and abroad, because of the higher amount of fragmentation which characterises the Italian production.

The following graphs show the import/export volumes in Italy and in Emilia-Romagna.

Source:
SCS analysis of ISTAT
data for Jan-Dec. 2003, cumulative period

2.1.2 Demand in Italy

In Italy the import/export flows are quite balanced.

Fruit has a higher export rate (around 0.7 in the year 2003, but the import/export ratio is more or less unchanged); on the contrary vegetables have a higher import ratio (1.5 in 2003).

The main trading partners are Germany, with almost 39% of the total exports of fruit and 50% of the total exports of vegetables and Latin and Central America and France for the import of fruit and vegetables.

There is significant trading also with the

FIGURE 2.3 FRUIT: IMPORT/EXPORT ITALY-OTHER COUNTRIES (000 TON)

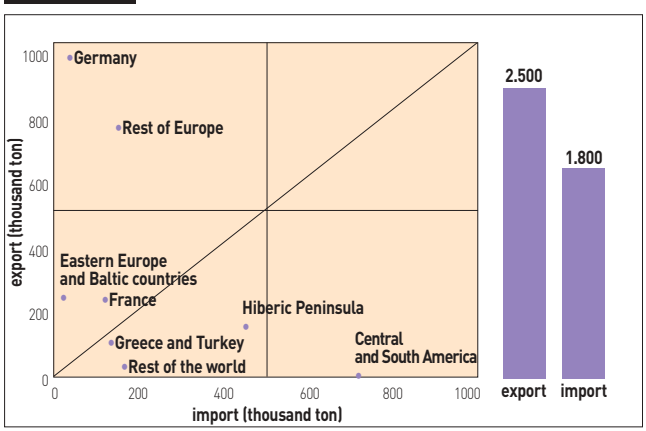
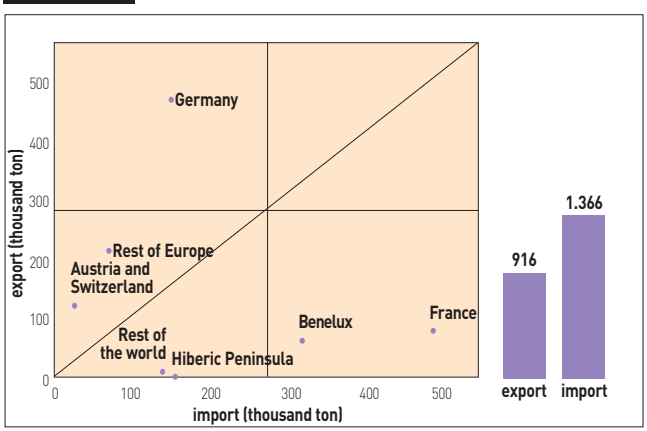


FIGURE 2.4 VEGETABLES: IMPORT/EXPORT ITALY-OTHER COUNTRIES (000 TON)



Hiberian Peninsula, Greece, Turkey, Eastern Europe and Baltic countries for fruit and significant trading with Benelux, Austria, Switzerland and North Africa for vegetables. Figures 2.3 and 2.4 show the main Italian import/export trade.

If we consider lead time constraints and the location of origin and destination countries, road transport is the main transport mode.

There are some exceptions such as sea transport of exotic products from South America (i.e. bananas) and air transport of out of season and early season products from North Africa.

The following figures show the distribution of import/export flows regarding fruit and vegetables. In particular for fruit there is a high import of bananas and a high export of apples and pears. Vegetables with high import/export volumes (potatoes, carrots, some fresh vegetables) have a high lead time.

FIGURE 2.5 ITALY: IMPORT/EXPORT VOLUMES OF FRUIT (.000 TONS)

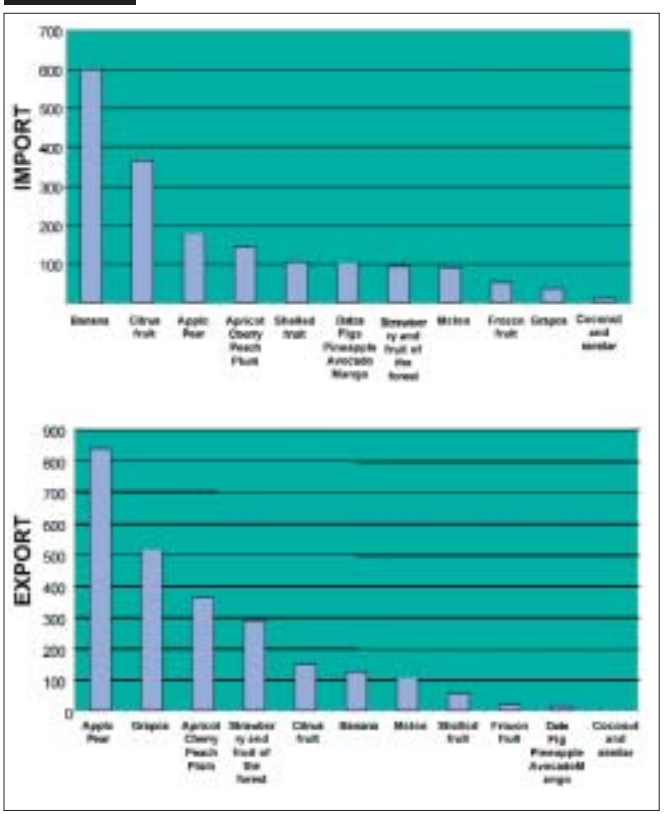
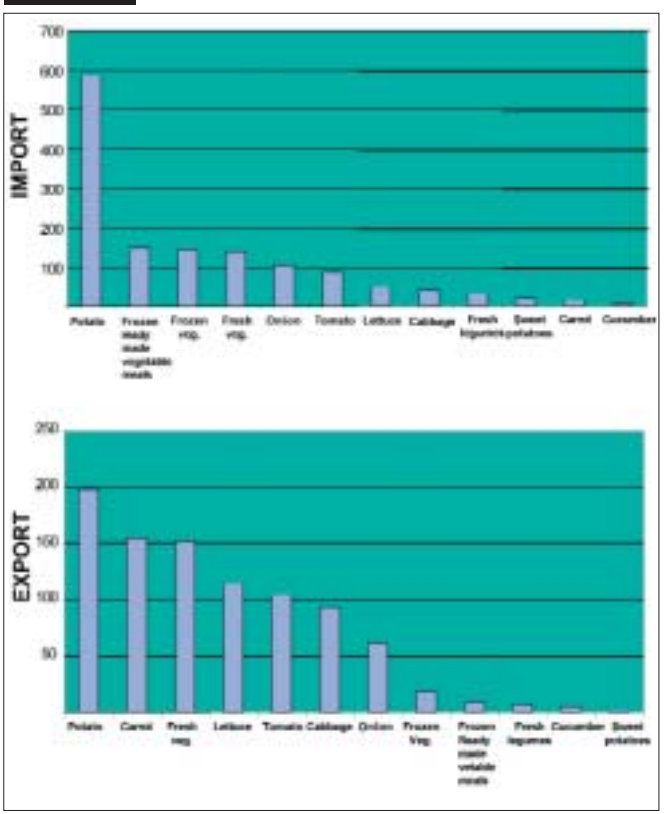


FIGURE 2.6 ITALY: IMPORT/EXPORT VOLUMES OF VEGETABLES (.000 TONS)



Source: SCS analysis of ISTAT data from Jan to Dec 2003, cumulative period

2.1.3 Demand in Emilia Romagna

Emilia-Romagna has significant imports from Southern Italy and exports to Lombardy.

The import/export flows with Southern and Adriatic regions are balanced (for fruit: Puglia, Calabria, Basilicata and Sicily, for vegetables: Sicily, Puglia, Calabria, Basilicata, Molise, Veneto) as shown in the following figures.

Road transport is the main transport means for trading with the South due to a lack in the competitive logistic supply for other transport methods.

FIGURE 2.7 EMILIA ROMAGNA: TRADE WITH OTHER ITALIAN REGIONS (.000 TON) - FRUIT

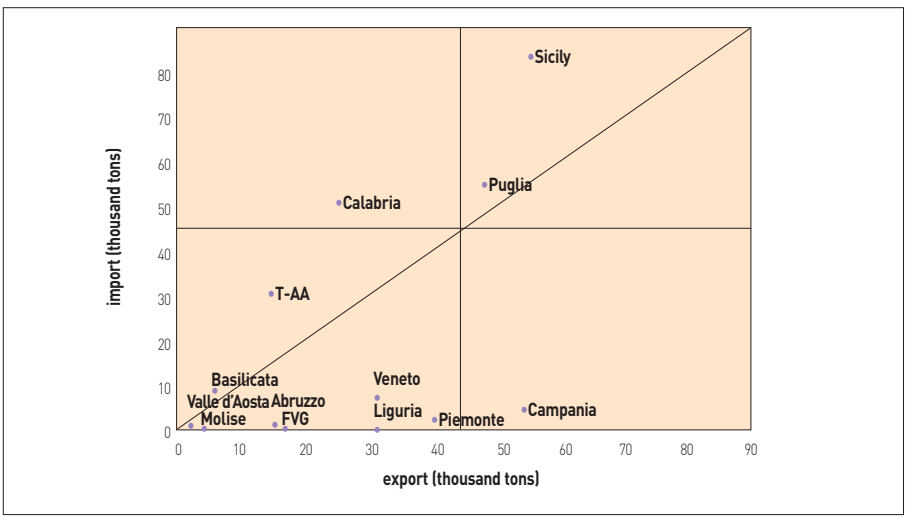


FIGURE 2.8 EMILIA ROMAGNA: TRADE WITH OTHER ITALIAN REGIONS (.000 TON) - VEGETABLES

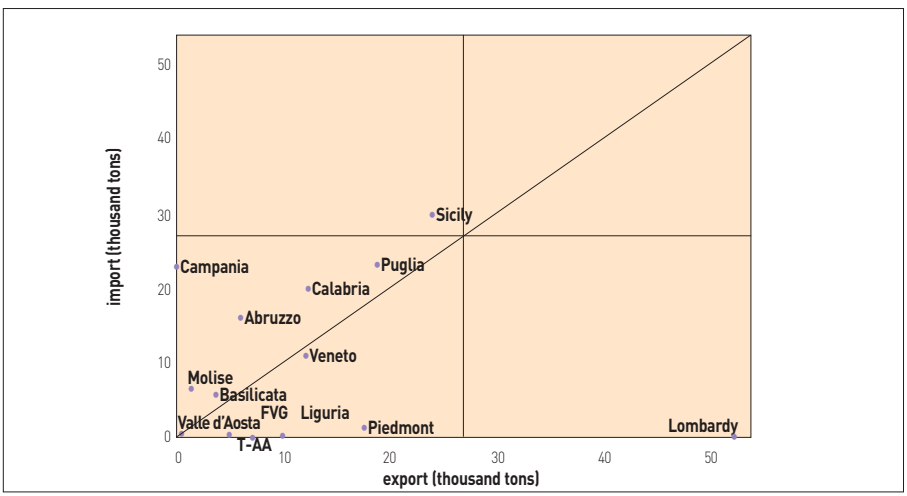
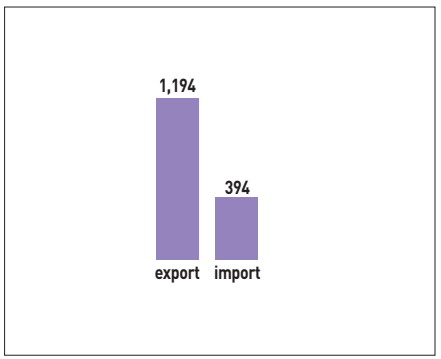


FIGURE 2.9 EMILIA ROMAGNA:
IMPORT/EXPORT TOTAL FIGURES
FOR FRUIT AND VEGETABLES (.000 TONS)



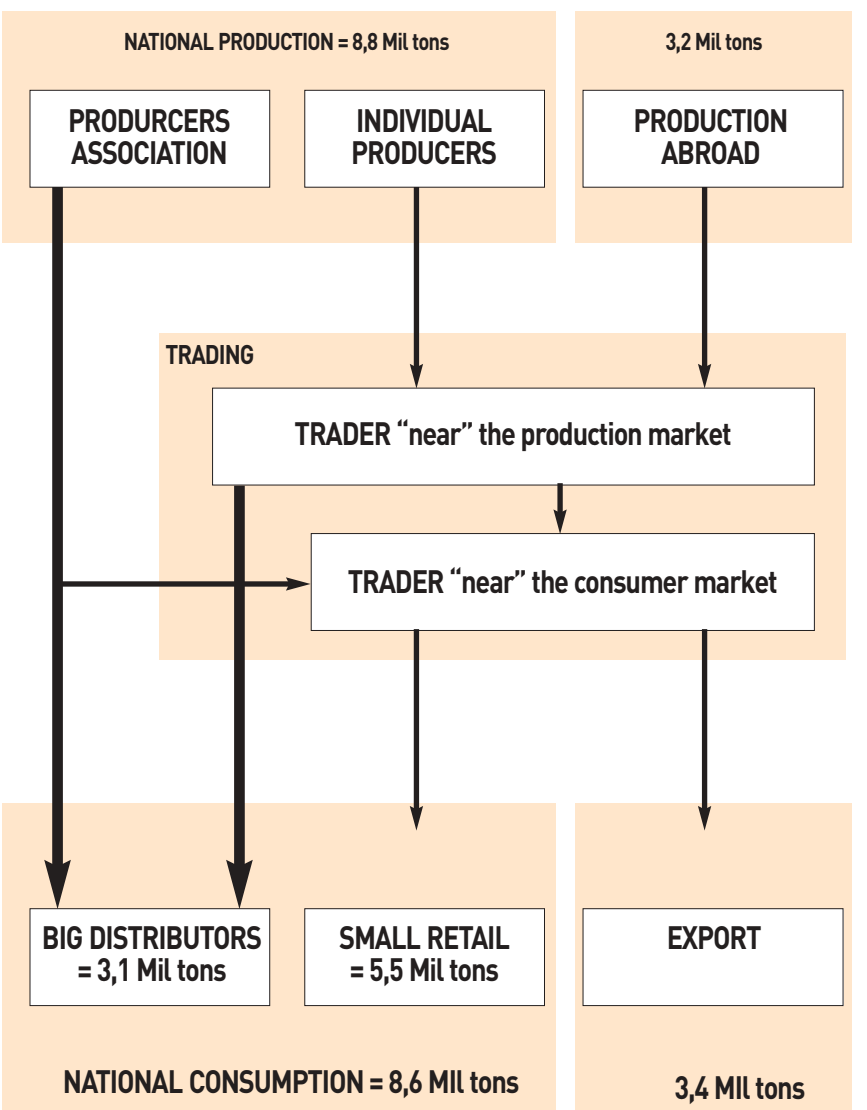
Source:
SCS analysis of ISTAT
data for Jan-Dec 2003, cumulative period

2.1.4 The supply & distribution chain organisation

The supply and distribution chain is high complex (Figure 2.10):
The complexity stems from the production geographic fragmentation: on the base of product types and seasonality origin areas significantly change.
Producers organizations and big organized distributors (GDO) are significantly increasing.
The lack of integration do not show to producers the margins for logistic costs reductions.

Nevertheless some space for logistics improvement may come the evolutionary trends of the chain.

FIGURE 2.10 FRESH FRUIT AND VEGETABLES



Source:
SCS elaborations of ISTAT statistics, Gfk-Iha Italy

2.1.5 Evolution Dynamics

OPPORTUNITIES	KEY POINTS
Some of the operators are trying to shorten the value chain • The producers' organisations are expanding in the supply chain, aiming at replacing traders (expansion of their companies presence abroad to integrate their production) and use logistics as a fundamental competitive lever. • Producers' organisations and organised big distribution (also foreign) are trying to shorten the industry chain: logistics is the main element of this integration. • However their logistic structure is not always organised enough.	**Less competitiveness of the farming sector in Emilia Romagna** • From the '60s up to the present day the supply to the main world markets (North America, Europe, Japan) has increased by 270%. The supply surplus is connected to the spreading of products coming from poor and emerging countries (South America, Africa, Far East, Australia). • These productions are controlled by global operators who export their production procedures and invest to have control of the logistic chain from the countries of origin to get the advantage of low cost production. • The quality of Italian products is no longer a distinctive advantage on the global market. • The Italian production is gradually losing competitiveness not only abroad but also in Italy, due to a lower level of service (lack of production agreements and planning) compared to other European producers (especially Spain). This trend is highlighted by the increase in the foreign Organised Big Distribution in Italy followed by foreign producers.

OPPORTUNITIES

For many products, lead time is compatible with various transport modes

- Although lead time is often compatible with alternative transport modes, goods are mainly transported on road
- Similar considerations count especially for the production from Southern to Northern Italy

Logistics is also a control factor for quality in the industry

- Big organised distributors (GDO) and big production organisations tend to develop control and traceability on all the industry chain

Logistics is a factor to increase the products availability

- Organised big distribution and organizations of producers tend to extend the products availability or widen its range and offer by importing exotic and out of season products.

KEY POINTS

- The fact that exports are mainly to Northern Europe influences the chosen transport mode

Exports are mainly North oriented

- The European market is generally structured for interregional trade.
- The developing exports of out of season products faces a potential competition from European countries which are now stronger (Spain).

Nowadays Italy's exports of out-of season products are not significant

2.2 Frozen fruit and vegetable industry

2.2.1 Main characteristics

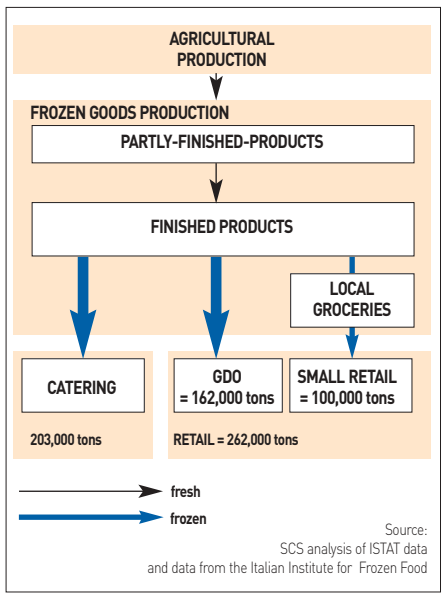
The main characteristics of the frozen fruit and vegetable industry can be summarised as follows:

- Emilia-Romagna has an important production market. Part of the products are consumed in Southern Italy.
- Processing plants must be near the production area (within 100 km) since the reaped products must be frozen in a short time.
- There is little import/export trading and it mainly occurs:
  -In nearby markets so by road transport;
  -From production to production, therefore with a high level of freight optimisation
- Lead time is high, the attention is drawn to the costs of the logistic service, therefore there is potential interest in intermodality.
- The industry is quite mature although there could be some improvements in the transport efficiency.

2.2.2 The Supply & distribution chain organisation

- Emilia-Romagna is an important production market. A share of the total production is transported to Southern Italy.
- Producers directly manage the trade relations with the GDO (big organized distributors).
- In some areas, especially Southern Italy, producers do not rey on an own organised logistics network, therefore they rely on local grocery to supply the GDO.

FIGURE 2.11 FROZEN FRUIT & VEGETABLES



Source:
SCS analysis of ISTAT data
and data from the Italian Institute for Frozen Food

2.2.3 Evolution Dynamics

OPPORTUNITIES

Sea transport could reduce logistic costs

- Lead time is high so this sub-industry is compatible with sea transport.
- Transport to Southern Italy could improve its efficiency by using better sea transport connections.

Some operators of the big distribution are improving their networks in the South

- The logistic structure of these operators is still under development

KEY POINTS

- The operators of organised big distribution seem able to solve problems relating to remote networks in a "short time"

The time of realisation is the key point

2.3 Canned fruit and vegetable industry

2.3.1 Main characteristics

The main characteristics of the canned fruit and vegetable industry are the following:

- The canned industry is not characterised by potential logistic activities for perishable goods.
- The processing canned industry has only incoming and not outgoing flows of perishables.
- For vegetables the production areas must be near the processing plants.
- Production plants exchange semi-finished products which are usually non perishable.
- For fruit juice production, only 40% of raw materials come from Italy while the remaining products come from abroad and they are in general perishable (fruit puree or frozen concentrated juice): for these products Northern European ports (Holland and Belgium) are the main production-processing/distribution areas.

2.4 Fresh fish industry

2.4.1 Main characteristics

The fresh fish industry presents the following main characteristics:

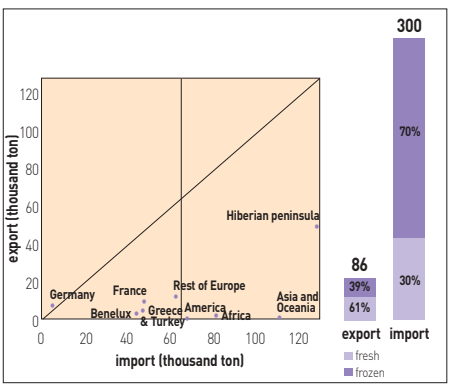
- Italy consumes a large amount of fresh fish, which is both national and imported;
- Lead time is a crucial element and it cannot be over 24 hours;
- The fish industry seems to be less organised: fresh fish "from the boat to the consumer" goes through different steps. However there can be some improvements as long as "competences" are developed together with infrastructures.
- There is a strong link between logistics and trading. Main traders have their own infrastructures located at the arrival centres (for example airports)

2.4.2 Demand in Italy

In Italy the fish import/export ratio is weighted towards import (data collected in 2003 but it has remained unchanged). Spain is the main trade partner for imports (more than 20% of the total) and for exports (around 57% of the total) – see Figure 2.12. Flows regarding Northern Europe (France, Germany and Benelux) are quite significant. From this area imports are around 16% (equal to around 99,000 tons) and exports around 22% (equivalent to about19,000 tons). Flows to the South of Europe (Greece and Turkey) represent around 8% of import. In the Meditarranean area there are significant flows from North Africa, equivalent to around 23,000 tons, that is 30% of total flows from Africa. As for geographically remote markets, East Asia has significant import flows: more than 88,000 tons of goods arrived in 2003, equivalent to 80% of the total coming from Asia and Oceania.Finally from Central and South America there are over 60,000 tons of imports, equivalent to 10% of the total imports.If we consider the shelf life, the following transport methods are the main ones for fresh fish:

- road transport for Europe
- air transport for routes outside Europe and for some items within Europe
- for frozen fish, sea transport is used for overseas routes, while road transport is used for continental flows.

FIGURE 2.12 FRESH FISH: IMPORT/EXPORT ITALY- OTHER COUNTRIES (.000 TON)



Source: SCS analysis of ISTAT data for Jan-Dec 2003, cumulative period

The following graphs (Figure 2.13 and Figure 2.14) show the distribution of Italian import/export flows with regard to fish products and preservation methods.

FIGURE 2.13 ITALY: IMPORT/EXPORT VOLUMES FOR FISH TYPES (000 TONS) AND PRESERVATION METHODS (000 TONS)

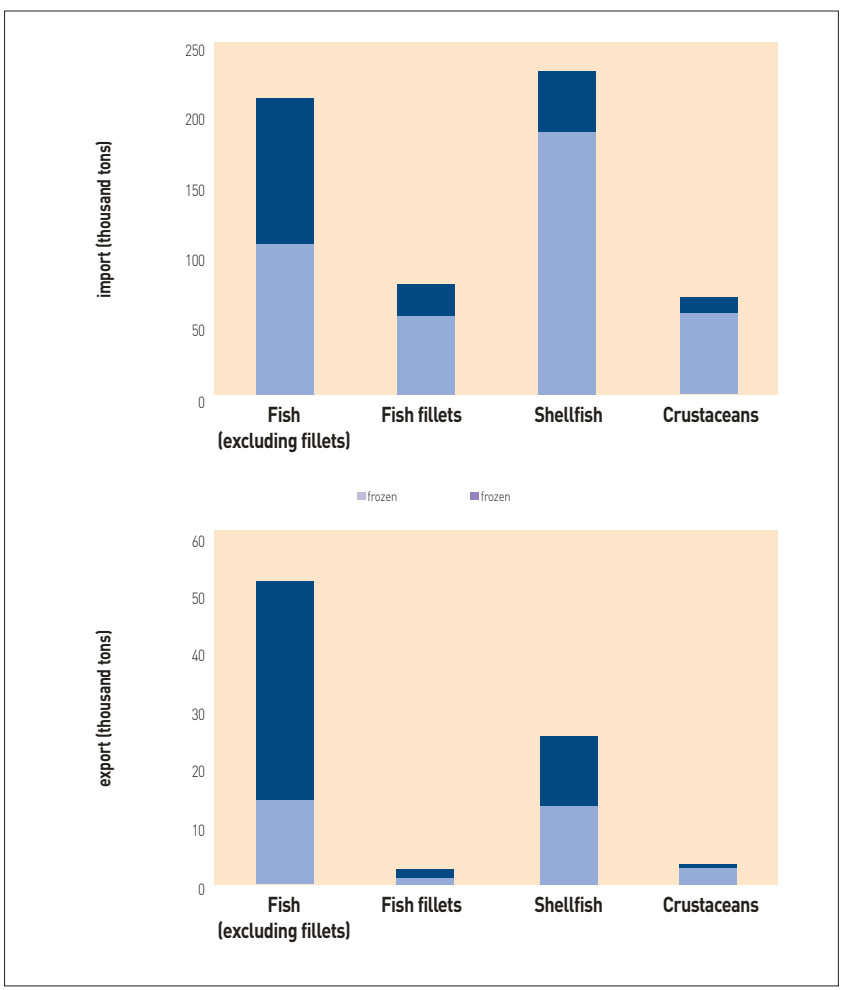
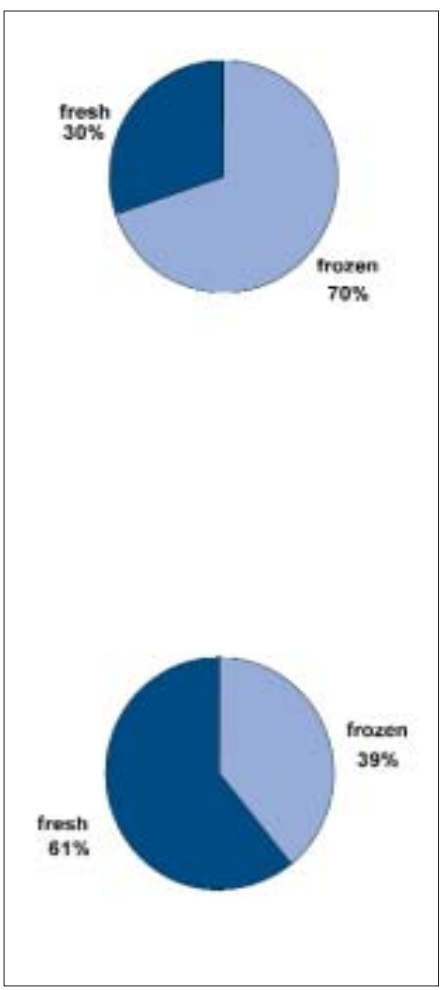


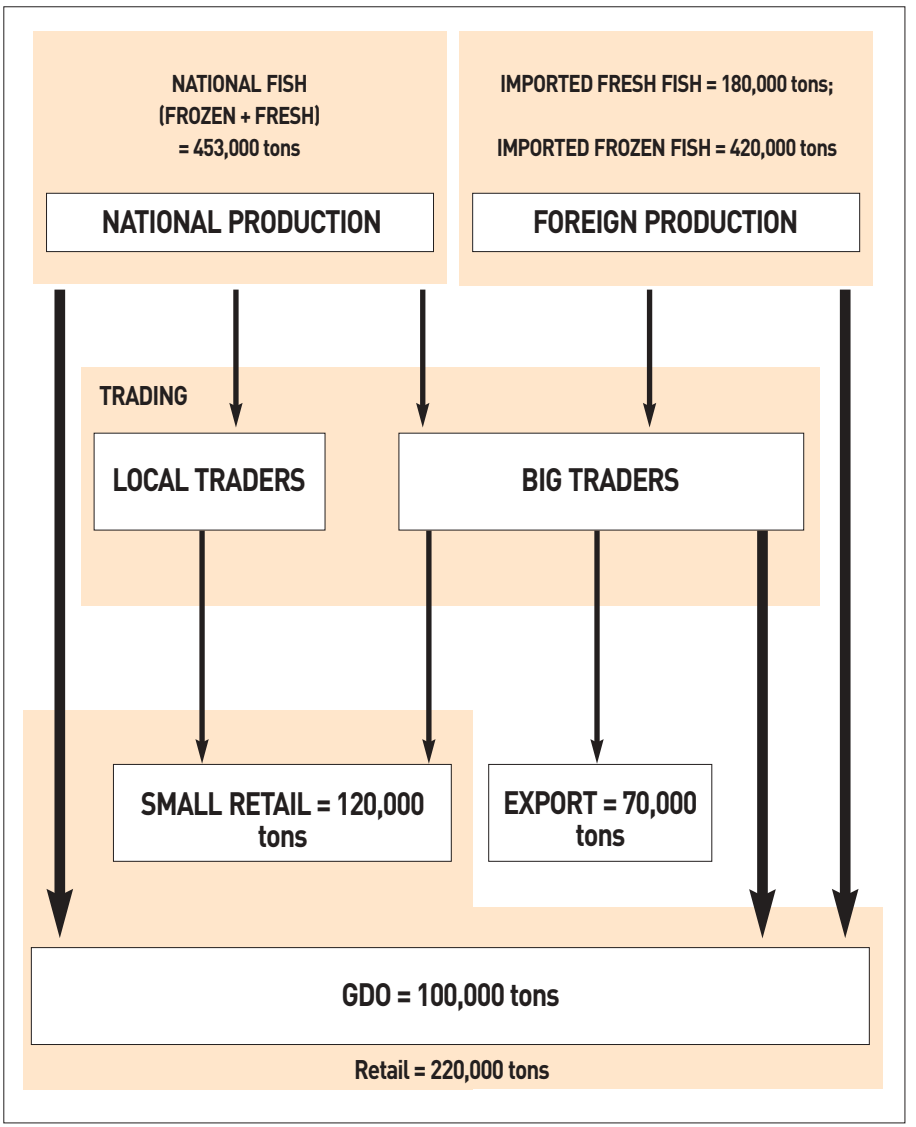
FIGURE 2.14 ITALY: FISH PRESERVATION METOHDS (%)



2.4.3 The supply & distrubution chain organisation

- In Italy fresh fish consumption is high (both national and imported products).
- Lead time is a crucial element (cannot be over 24h).
- The supply and distribution chains are very articulated and there are some actors which are trying to achieve logistics efficiency improvements.
- In order to be competitive in imports, big volumes of single items have to managed.
- National production markets have higher accessibility and they feed a high number of traders next to the consumers market.

FIGURE 2.15 FRESH FISH



2.4.4 Evolution Dynamics

OPPORTUNITIES		KEY POINTS	
Some of the operators involved are trying to shorten the chain	• Some operators of the organised big distribution and national productions have established direct contacts which are fairly recent but growing. • The organised big distribution (GDO) is trying to establish direct contacts with foreign producers.	• To "skip" wholesalers adequate competences and logistic structures are necessary. • Sometimes there are "constraint channels".	**"To skip" traditional wholesalers is a problem**
The industry is less organised but strongly dynamic	• As for other industries it is likely that the fish industry will consolidate and the logistic networks develop adequate infrastructures.	• Possible consolidating activities have to meet requisites connected to lead time.	**Lead time is a crucial element**
		• Regulations and certifications are particularly strict with regard to production and preservation.	**There are many regulations and certifications regarding fresh fish trade**

2.5 Frozen fish industry

2.5.1 Main characteristics

The frozen fish industry presents the following main characteristics:

- Most frozen fish comes from foreign production markets and fish is frozen at origin.
- Lead time is high and the focus is on the logistic cost.
- In general an operator imports directly only high volumes while other operators are contacted when small quantities are needed.
- The organised big distribution and catering usually buy directly from processing companies both in Italy and abroad.

2.5.2 The supply & distribution chain organisation

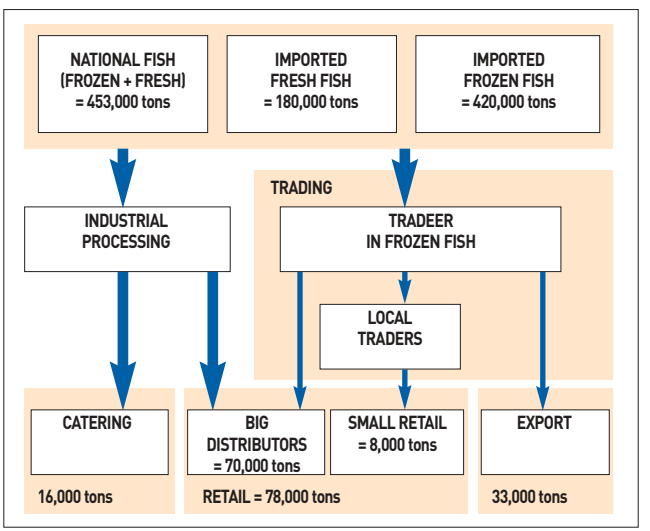
In the frozen fish industry costs are highly significant and the operators of the chain strongly aim at logistics costs reductions.

Each operator usually concentrates on specific products/items of which it manages high volumes.

The trading companies' roles are:
- supplying the processing operators on specific items;
- bring to market finished products.

Logistics efficiency is fundamental in this industry.

FIGURE 2.16 FROZEN FISH



Source: SCS analysis of ISTAT data and Italian Institute of Frozen Food, ISMEA

2.5.3 Evolution Dynamics

OPPORTUNITIES		KEY POINTS	
Some operators of the big distribution are improving their networks in the South of Italy	• The logistic structure of these operators is still developing	• Big distribution operators seems to be able to solve problems connected to remote networks in a short time.	**Realisation time is a critical element**
Most flows arrive by sea	• Overseas flows from the Far East and South America are transported by sea and they are already in containers	• Overseas flows are controlled by traders who are in contact with infrastructures to unload the goods (mainly on the Tyrrenian Sea)	**The flows arrival points are already consolidated**

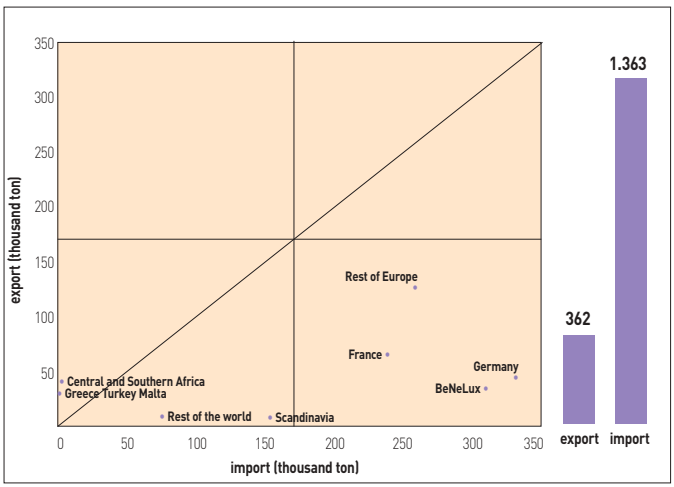
2.6 Meat industry

2.6.1 Main characteristics

The main characteristics of this industry are the following:

- In Italy high quality meat (national or imported) is consumed, while lower quality meat is exported;
- Lead time is less important than in other perishable chains (logistic costs count);
- Slaughtering is highly concentrated (both for beef and pork);
- For pork, the processing industry is controlled by few operators who manage 60% of butchery;
- For poultry, the production is controlled by few operators who also manage logistic services;
- Emilia-Romagna has various slaughterhouses which deliver meat all over Italy. The main transport mode is all road.

FIGURE 2.17 MEAT: IMPORT/EXPORT ITALY- OTHER COUNTRIES (.000 TONS)



Source: SCS analysis of ISTAT data for Jan-Dec 2003, cumulative period

2.6.2 Demand in Italy

In Italy the meat import/export ratio is weighted towards imports (import/export ratio per quantity equivalent to almost 4 to 1 in 2003, however these figures have not changed – Figure 2.17).
Germany is the main trading partner for imports (with over 24% of the total imports) and the second main one for exports (with over 12.5% of the total).

For imports, flows from other countries of Northern Europe (Benelux, France and Scandinavian countries) are significant since a further 51% of total imports come from those regions and over 30% of total exports are delivered there.
Imports from Central and South America are quite significant, with almost an equivalent 5% of the total.
For exports there are some flows to the South of Europe (Greece, Turkey and Malta) which make up 10% of the total (94% of this is contributed by Greece) and towards Central and Southern Africa (almost 11% of the total).
On the contrary, trade with Asia and America is insignificant in terms of quantity.

The following figures show the distribution of Italian import/export flows of different products and preservation methods

FIGURE 2.18 ITALY: IMPORT/EXPORT VOLUMES PER MEAT PRODUCTS (000 TONS)

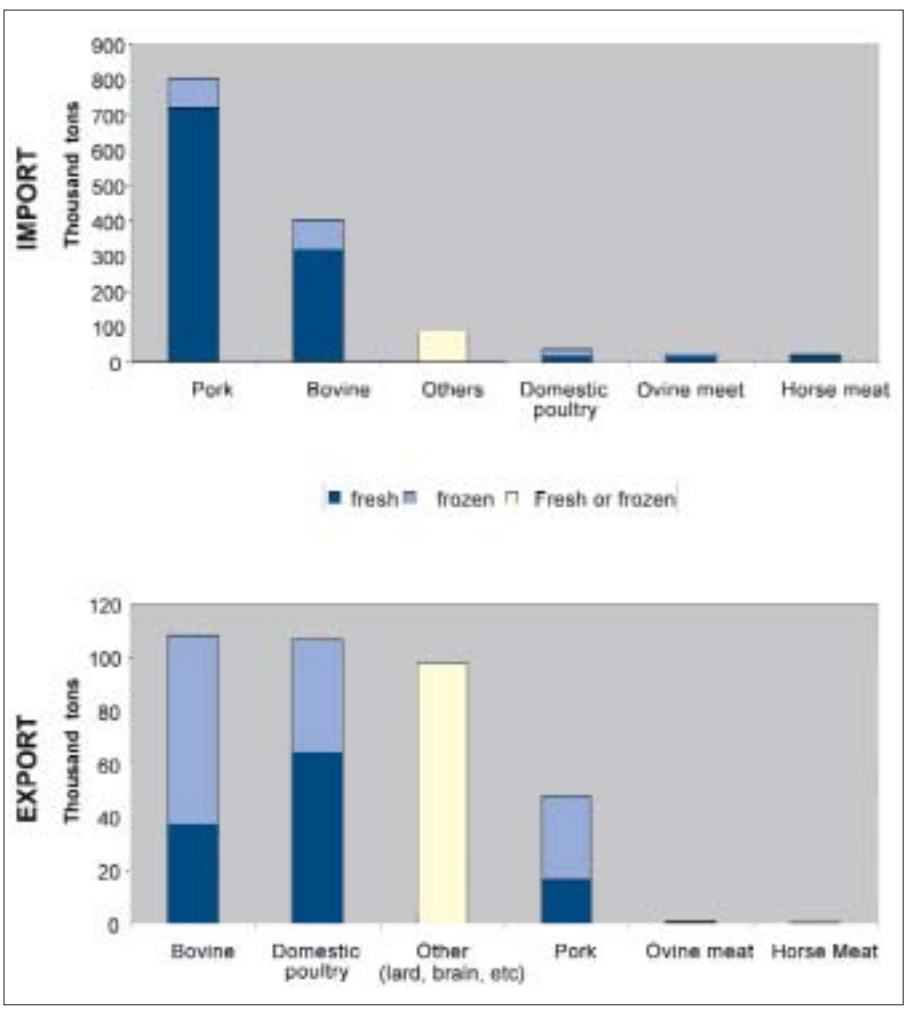
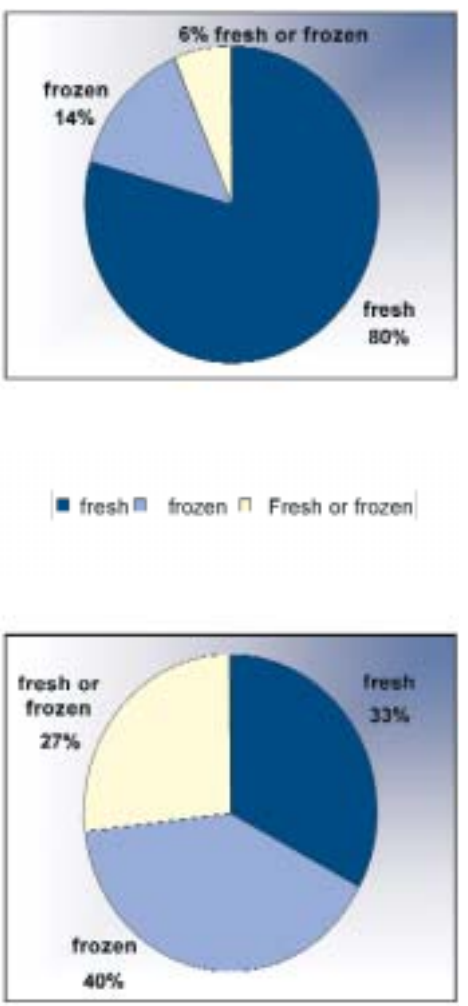


FIGURE 2.19 ITALY: MEAT PRESERVATION METHODS (%)



Source: SCS analysis of ISTAT data (Jan-Dec 2003, cumulative period)

2.6.3 Demand in Emilia Romagna

Trading between Emilia Romagna and other Italian regions is represented in figures 2.20, 2.21, 2.22, 2.23.
As far as imports are concerned, the flows from Nothern Italy to Emilia Romagna are very limited (just 11 tons overall) and these regard only horse meat from Veneto and Piedmont. Meat imports from 3 Southern regions (Puglia, Abruzzo and Basilicata) represent almost 80% of imports from Southern Italy (95% if also Calabria is considered).
Over 75% of meat imported from Southern Italy is made up by fresh, refrigerated or frozen ovine or goat meat (horse meat is the remaining 25%).
Concerning exports, Veneto and Liguria represent the main markets of Northern Italy, while Campania, Sicily and Puglia those of Southern Italy.
80% of total exports Northwards and almost 70% of direct exports concern pork, the rest (almost 18% for the North and 30% for the South) concerns almost exclusively beef.

FIGURE 2.20 IMPORT NORTHERN ITALY-ER: AVERAGE 2000-2001, CUMULATIVE PERIOD

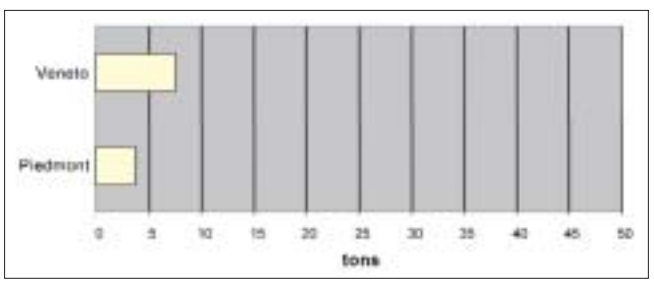
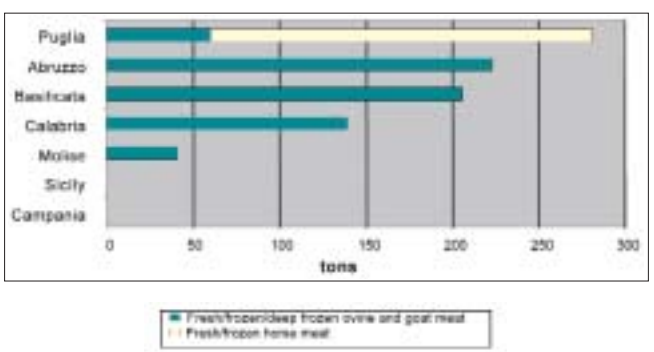


FIGURE 2.21 IMPORT SOUTHERN ITALY-ER: AVERAGE 2000-2001, CUMULATIVE PERIOD



Source: SCS analysis of the IMONODE Project data (Interreg IIIB CADSES)

FIGURE 2.22 EXPORT ER-NORTHERN ITALY: AVERAGE 2000-2001, CUMULATIVE PERIOD

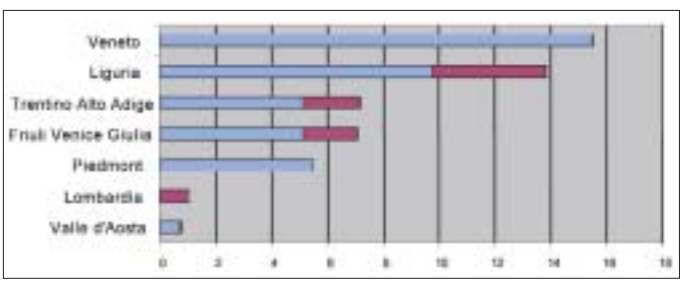
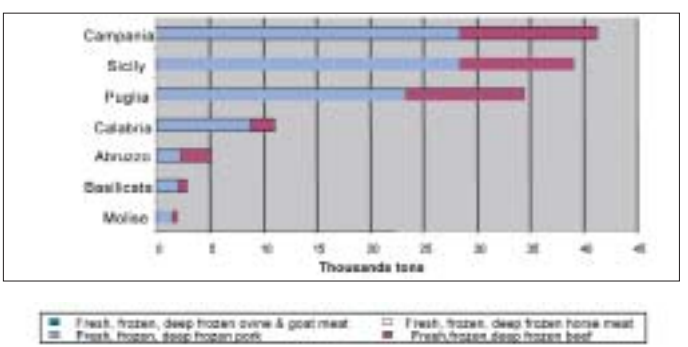


FIGURE 2.23 EXPORT ER-SOUTHERN ITALY: AVERAGE 2000-2001, CUMULATIVE PERIOD



Source: SCS analysis of the IMONODE project data (Interreg IIIB CADSES)

2.6.4 Demand in Emilia Romagna

Italy is mainly importing top quality meat and exporting medium quality meat. Many operators are trying to regain logistic efficiency:

OPPORTUNITIES		KEY POINTS	
For pork meat flows there are margins of consolidation optimisations	• Given the concentration of slaughtering and processing activities, the industry chain could regain efficiency by consolidating transport with a multi-client approach.	• Flows to processing industries use specific packaging.	**It is difficult to have standard packaging**
The bovine industry could have advantages from sea transport	• Product lead time is compatible with sea transport. • There is significant trade between Southern Italy and big operators in Northern Italy.	• There are different steps in processing after slaughtering. Some of these activities are carried out during the chain	**Problem of processing after slaughtering**
		• Regulations and certifications are very strict with regard to processing and preservation	**Meat is controlled by lots of regulations and certifications**

TRANSPORT AND LOGISTIC SYSTEMS FOR PERISHABLE GOODS: REQUIREMENTS, VARIABLES IN THE CHOICE OF TRANSPORT MODES AND SUPPLY STRUCTURE

3. TRANSPORT AND LOGISTIC SYSTEMS FOR PERISHABLE GOODS: REQUIREMENTS, VARIABLES IN THE CHOICE OF TRANSPORT MODES AND SUPPLY STRUCTURE

3.1 Analysis of logistic system for perishable goods

3.1.1 Functions of a logistic centre

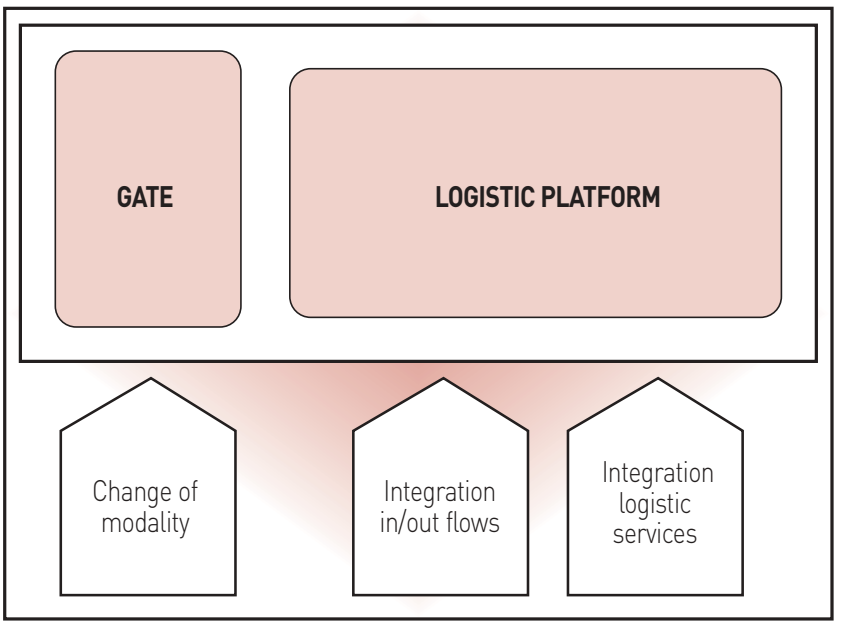
A logistic centre for perishable goods can have different functions which are considered here below and which correspond to different structural types.
The main functions regard: change of modality, integration of in/out flows, integration of logistic services.

The three functions are not alternative to one another and they jointly contribute to the increase in value of the product in terms of service content and market proximity.

Gate and logistic platform are types of structures corresponding to the functions examined (Figure 3.1). In both cases the aim is to increase the product value and optimise logistic costs.

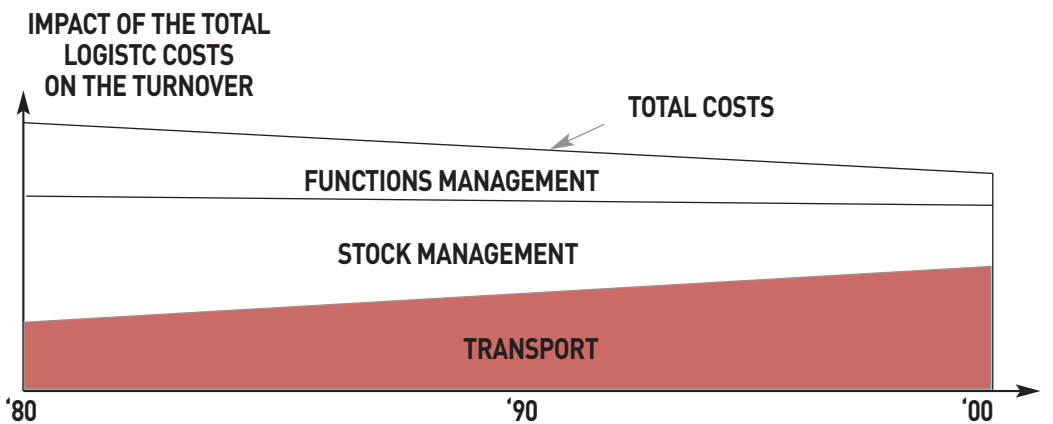
FUNCTION	DESCRIPTION
CHANGE OF MODALITY	Use of the infrastructure as "transit point" where the change of modality or of means of transport can take place without necessarily proceeding with storage (cross-docking)
INTEGRATION OF IN/OUT FLOWS	Use of the infrastructure as a "hub" for activities such as consolidating/de consolidating goods and optimisation of the freight near either production areas or destination markets.
INTEGRATION OF LOGISTIC SERVICES	Use of the infrastructure as a place to organise and carry out logistic activities or services such as: multipick, multidrop, flow integration for more companies and outsourcing to the third parties, outsourcing of the stock management, change of packaging, unitization and emptying containers, etc.

(FIGURE 3.1) TYPES OF STRUCTURES OF A LOGISTIC CENTRE AND ITS FUNCTIONS



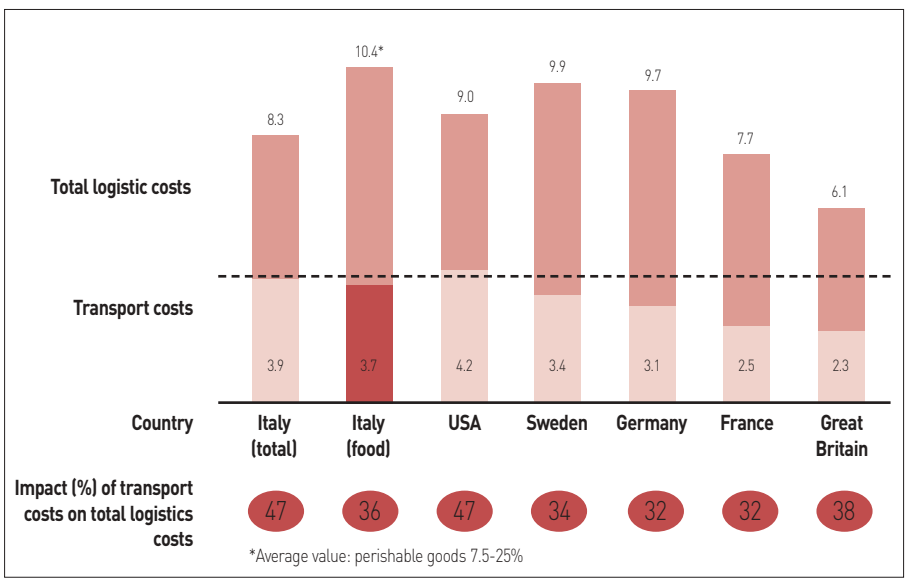
A logistic platform must help the activation of specific logistic solutions (cross-docking, multipick and multidrop and outsourcing with integration of flows from many companies on behalf of logistic third parties, etc.) to improve transport efficiency.
Most of the actions in the last 15 years (Just In Time, liberalisation of the EC market, centralisation of product distribution, etc.) led on one side to the reduction in total logistic costs and on the other side to an increase in transport costs which is a component of the total logistic costs (caused by further destinations, shipment of smaller lots, rising in the number of operators, little use of intermodality, etc). Figure 3.2 represents the variation regarding the impact of the total logistic costs on turnover in the years.

(FIGURE 3.2) IMPACT OF THE TOTAL LOGISTIC COSTS ON TURNOVER IN THE LAST 20 YEARS



Source: Logistica & Management 2004

(FIGURE 3.3) IMPACT (%) ON TRANSPORT COSTS ON THE TOTAL LOGISTIC COSTS



Source: Largo Consumo, 2004, Ailog Feb 2005

Figure 3.3 represents the Italian situation. By comparing the total logistic costs (transport, warehouse, administration and inventory) in some of the main Western countries, Italy has the highest ratio between transport costs and turnover in Europe.

3.1.2. Transport modalities

3.1.2.1 Intermodality

The target of intermodality is to promote the integration of various transport modes (in particular modes alternative to the road transport) and try to regain economic and environmental efficiency of transport.

At present intermodal solutions are not very diffused in the Italian and European transport markets because they are less competitive compared to road transport, which offers the best conditions in terms of operational costs plus performance.

The main reasons generating this unbalance in the market are for example the lack of internalisation of external costs arising from road transport, infrastructural and organisational inadequacies limiting the potential competitiveness of alternative modalities to the road.

This unbalance causes well known problems for road traffic:

- congestion of the road network;
- presence of a high number of small operators;
- considerable fragmentation of flows and the consequent empty journeys which count as 30% for the total movements.

The inclination towards road transport is even accentuated with regard to perishable goods as road transport is the only modality providing a "door to door" service and avoiding extension of time due to the change of modality.

To understand in which areas intermodality can be applied to perishable goods, it is necessary first of all to understand which modalities are used or could be potentially used for each type of good. For this reason the "criteria of choice for the transport modality" of perishable goods are analysed herewith.

3.1.2.2 Perishable goods: choice criteria of transport modes

Logistics and the choice of the transport modes for perishable goods are crucial elements because:

- they can enhance competition: logistic costs represent such a large share of the total cost of the product that operators' efforts are aimed at the streamlining of the logistic processes in order to be more competitive;

- they influence the quality of the products.

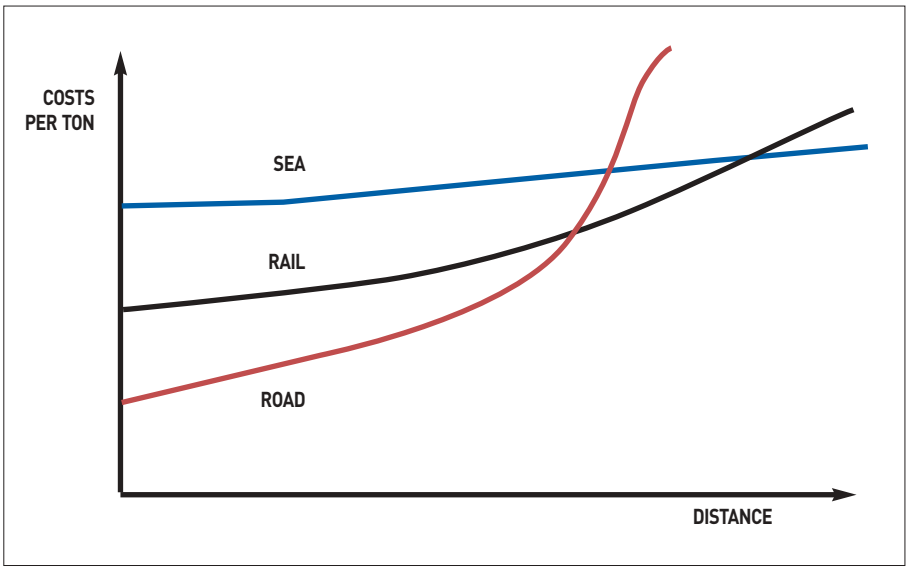
The peculiarity of such goods requires more complex criteria than those normally used for other goods categories logistics. The chosen criteria are:

- ORIGIN-DESTINATION DISTANCE
  It represents a fundamental issue. Some goods categories (e.g. Fruit &Vegetables and fish) are characterized by a high production fragmentation and by high variability rates.

- SHELF LIFE
  It represents the "product commercial life" and it is determined by the product perishable level. Shelf life can vary from 24-48 h ("Highly fresh") to some weeks ("Fresh"). This is a fundamental variable as it determines the maximum lead time to the consumption market.

- GOODS ADDED VALUE
  It is the less immediate criteria. It is related to the "weight" of transport and logistic costs that a product can absorb. High added value products present a low percentage incidence of transport and logistic cost on the product's final price.

(FIGURE 3.4) QUALITATIVE TREND OF COSTS PER TON AT THE VARIATION OF DISTANCE FOR SEA, RAIL AND ROAD TRANSPORT



The first significant variable for the choice of the transport mode is the origin and destination of products. Theoretically, on the base of the distance the transport mode is determined.

Figure 3.4 shows the cost qualitative trend versus the distance variation for the different transport modes; air transport has not been included, having higher costs than the other modes.

However, the graph is theoretical as it is based on the hypothesis that the routes covered through the different modes have the same length and that hypothesis is often confuted.

Shelf life and added value are key drivers in the transport choice for fresh goods. They are less important for frozen goods for which the mode choice is mainly based on the origin-destination distance criteria.

(FIGURE 3.5) POSITIONING MATRIX REGARDING THE INDUSTRIES OF PERISHABLE GOODS

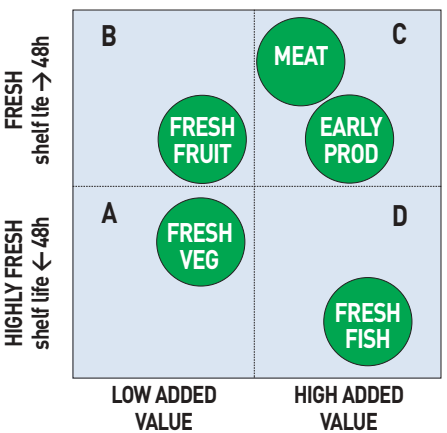


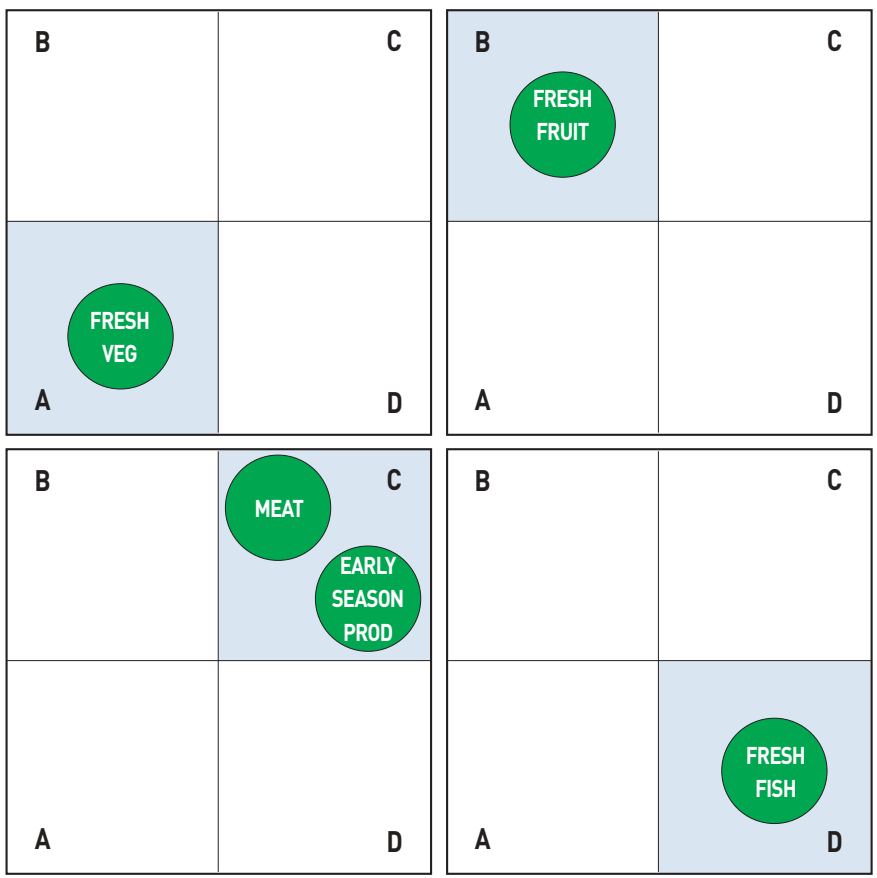
Figure 3.5 reports a matrix which positions perishable goods according to Shelf life and Added Value.

The matrix allows to make considerations on the transport modes:

Products A: Given the features of the products in quadrant "A", their consumption market (distribution ray) is to be found in a relatively restricted area which is compatible with their shelf-life.
Fresh leaf vegetables are an example of such products. Usually they have a very short shelf-life and a low and medium added value. However, also products such as potatoes can be found in the same category, having medium-long shelf-life and therefore a wider distribution ray.

Products B: This category includes those products that usually have a continental or cross-regional distribution ray. But there are also products whose shelf-life is not so short, and which can come from far away areas requiring different transport modalities. For example bananas or other exotic fruits, if preserved under suitable conditions (frosted), can reach a shelf-life of 2 or 3 weeks, and they are usually transported by sea from South America, the Far East or Central and Southern Africa.

Products C: Products with a quite long shelf-life, transported by sea or by ground, or, if necessary, by air. Quadrant



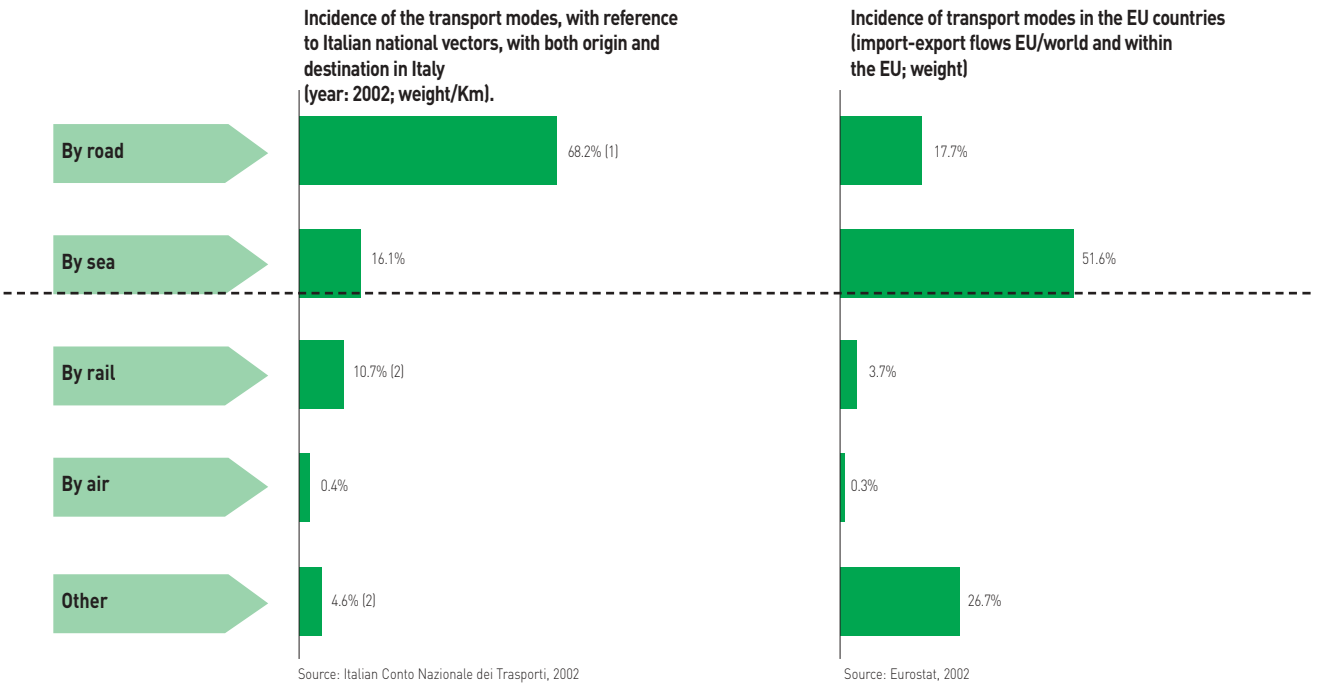
"C" contains the out-of-season products, such as the products known as the early fruit and vegetables that in some seasons can "afford" higher transport costs, given the lower production supply and a higher consumption demand.

Products D: This category includes products which are available in consumption markets "close" to production markets, or which are imported by means of transport compatible with their perishability. The main example for this category is fresh fish. There are some sorts of fish that are not available in production markets close to the Italian market (as the Persian fish, imported from Africa).

3.1.2.3 The most used transport modes

Figure 3.6 shows the percentage incidence of the different modes used in Italy and in the European Countries, which are analysed one by one in the following pages.

(FIGURE 3.6) PERCENTAGE INCIDENCE OF THE DIFFERENT FORMS IN ITALY AND IN EUROPEAN UNION



3.1.2.4 Road transport

Transport by road is the most used mode of transport within the European Union, especially as far as national transport is concerned. In 2000 it accounted for more than 67% of the whole goods trade (Italian National Transport Calculation 2000). The reasons for its success lie in the type of service it can guarantee, namely:

- the road and highway networks covering any point-to-point connection;
- the possibility to offer a "door to door" service, avoiding the need to change the transport mode;
- lower costs as compared to other modes of transport, both for short and long-distance transport.

Before analysing more in detail which perishable goods are transported by road, it is worthwhile considering the distance between the point of origin and destination, which, as stated before, is the first variable to be considered to determine the transport mode. Firstly, road transport can be used only for medium distances, that is to say for continental distances not longer than 1500-2000 km. For those kind of distances a distinction may be useful:

- for distances shorter than 50 km, road transport offers the best conditions both for delivery times and costs. Road transport is therefore the best mode to cover these kind of distances;

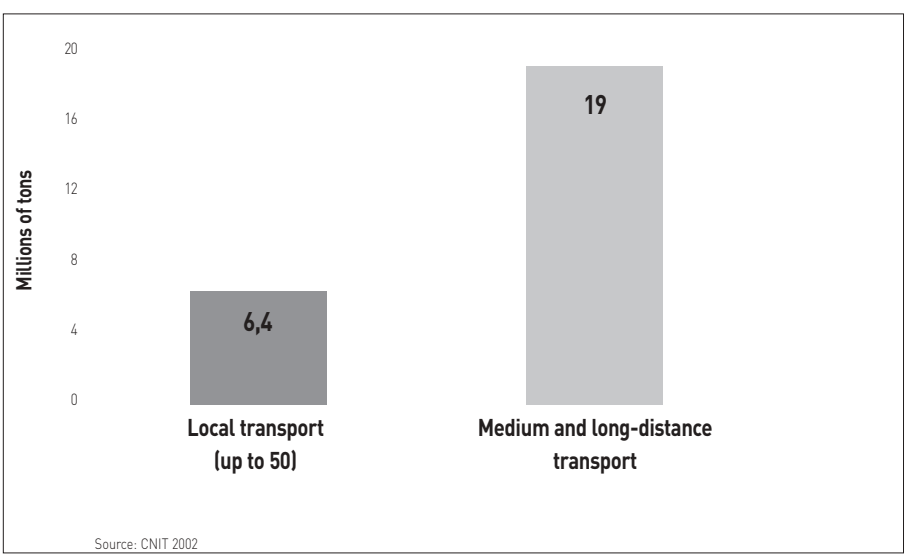
- for distances longer than 50 km, road transport is used very often, although in a way which is inversely proportional to distance (see Figure 3.7 for fruit and vegetables). Beyond certain distance ranges, road transport is sometimes "abused", as other potential forms of transports would be more cost effective and time efficient (especially rail and sea transport for distances longer than 500km).

3.1.2.5 Rail transport

Transport by rail could be more cost effective than by road, but the quality of the service is not competitive in terms of reliability and speed. That is confirmed by the fall of the European market shares from 21.1% in 1970 to 8% in 2001 (Transport White Paper 2001, European Commission).

The bad quality of the service gets even worse for perishable goods, especially fresh products: the average speed of the international transport of goods, being 18 km/h (lower that that of an icebreaker

(FIGURE 3.7) TONS OF FRUIT AND VEGETABLES TRANSPORTED BY ROAD ACCORDING TO DIFFERENT DISTANCES IN 2001



in the Baltic), is not competitive as compared to the quality of the service offered by the other transport modes.

It is worthwhile highlighting that barriers to the transport of perishable goods by rail are not technological, due mainly to the introduction of swap bodies and containers with passive refrigeration systems.

The main barriers are organizational and infrastructural ones. Some of the weak points of rail transport are:

- there is no availability of direct links between origin and destination. Hence the need for the introduction of many load breaks, making lead times longer and causing efficiency losses which have impacts on costs;

- freight trains are given lower priority than passenger trains;

- block trains could make transport more quick and cost-effective. Nevertheless economies of scale cannot be developed for perishables goods, at least at national and European level;

- there is a lack of preferential channels for perishable goods, which are actually treated in the same way as other goods categories.

3.1.2.6 Sea transport

When speaking of transport by sea it is necessary to make a distinction between long and medium-range transports:

1) Long-range sea transport (overseas flows) takes high times as compared to transport by air and it can be used for perishable goods only when their shelf life allows it (low perishable products), namely:

   - for imports of frozen or deep-frozen meat or fish;
   - for imports of exotic and counter-season fruit coming mainly form South America, Africa and the Far East.

2) Medium-range sea transport (Short Sea Shipping, SSS), is an alternative to road transport for perishable goods:

   - in those legs in which the sea distance is shorter than the road one (e.g. Greece-Italy), the SSS is competitive as compared to road transport (in terms of time and cost)

   - in those legs where the sea distance and the road one are the same, the SSS has competitive potential which is not thoroughly used: for distances above 500 km, due to the high congestion of the road network, SSS could offer the same speed and times of road transport with much lower costs, especially for non-accompanied goods

The following pages analyse both types of sea transport.

SHORT SEA SHIPPING (SSS)

Short sea shipping offers growth margins, especially with reference to the Motorways of the Sea (Figure 3.8 - Motorways of the Sea in Italy).
SSS is defined as an integrated system of services referring to road and sea transport, providing alternative links to the "all road transport", which are cost and time-efficient. SSS is therefore considered as a "parallel system" to the highway network to be used for flows of perishable goods over a certain distance.
An important prerequisite for the success of SSS is the Seaport to become a "highway tollgate", guaranteeing the same speed and flexibility as of road transport. Building strong transport relations with the territory is thus important to reach that goal. Particularly, the the Seaport has to:

- be integrated in the local transport system;
- interface with the logistics systems of production and distribution operators.

To implement those prerequisites, the Seaport system needs to face many infrastructural and service-related problems:

- the shortage of operational areas to serve wharfs;
- the shortcomings of wharfs and yards which would fail the technological innovations aimed at enhancing the boarding and landing procedures;
- the impossibility to separate freight vehicles from passengers and cars;
- the poor fluency of goods flows due to unsuitable links between the seaport, urban, suburban and highway systems;
- the heavy administrative procedures.

Those problems affect mainly loading and unloading times which take long time: currently an average of 25-30 freight vehicles per hour, with peaks of 60-70 vehicles. As for transport supply, in order to be competitive SSS has to fulfill some basic conditions:

- its speed has to compete with highway speed, which would be possible using 25-knot ships;

(FIGURE 3.8) MOTORWAYS OF THE SEA IN ITALY

- supply should match demand in order to guarantee the same flexibility as of the road transport. That means that transport must be time reliable and frequent;
- non-accompanied transport should be encouraged, as it would be more efficient than road transport. That requires an efficient land support organisation.

OVERSEAS FLOWS

Overseas flows concern mainly frosted or frozen meat, fish and exotic and counter-season fruit. Those flows come mostly from South America, Africa and the Far East.

The logistics management of these flows, included of the point of arrival, is in the hands of traders. The market is getting more and more concentrated, as the main competitive advantage relies on scale economies. There is a tendency to use larger and larger ships to maximise the efficiency of transport and move higher quantities.

Especially as far as deep-frozen food is concerned, the first five operators of the reefer containerized cargo supply a higher number of slots than the 15 following operators. The first containerized operator is the Maersk.Sea Land (AP Moeller Group), having twice the capacity

of the second operator, being P&O Nedlloyd, and almost three times as much that of the third one (Evergreen).

In this context, transport costs are the key decision-making drivers and operators can be attracted by Italian harbours only if they can provide effective seaport services. Currently, Italian seaports are smaller than Northern European ones: seaports such as Rotterdam, Antwerp and Bremen trade around 5 million tons in perishable goods, whereas no Mediterranean seaport reaches 1 million. The Italian seaports system could attract flows which today are managed by Northern European seaports. The growth margins for the Italian seaports are linked to the central position of the Mediterranean for goods coming from the Far East and Africa and passing through the Suez Canal.

In order to attract those flows infrastructural shortcomings must be eliminated and the supply of logistic services must be enhanced. That means:

- ENHANCED LINKING INFRASTRUCTURES: Interfacing seaports with an effective road and rail network to direct flows to the destination markets. There are many initiatives in this regards, such as the Corridor 3, the corridor between the two seas, aiming at effectively linking Genoa (the Tyrrhenian Sea) and Rotterdam (the North Sea);

- ENHANCED LOGISTIC SERVICES: Providing value-added logistics services besides the usual seaport activities (loading, landing and stocking of goods);

- CREATION OF COLD PLATFORMS: Building "Cold" Platforms to monitor and plan flows between seaports, logistic centres or other warehouses (such as the Direction Centres of large-scale distribution).

The development potentials are related mainly to the Tyrrenian area, given that the key traders (managing the logistics of flows) are already located in those seaorts, where they invest and have their own logistic infrastructures.

3.1.2.7 Perishable Industries and sea transport in Italy

FRESH FRUIT AND VEGETABLES

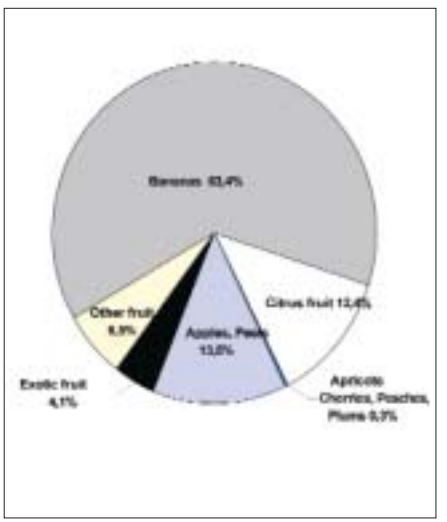
Sea transport is important for fruit and vegetables, particularly for those products that:
- have a shelf life compatible with transport by sea;
- have areas of origin and destination which can use this mode efficiently.

Figure 3.9 shows the % distribution of fruit import categories transported by sea. Sea transport is used for imports from the Southern hemisphere, both of exotic fruit which can not be produced in Europe and of counter-season products, satisfying the market demand during the winter.

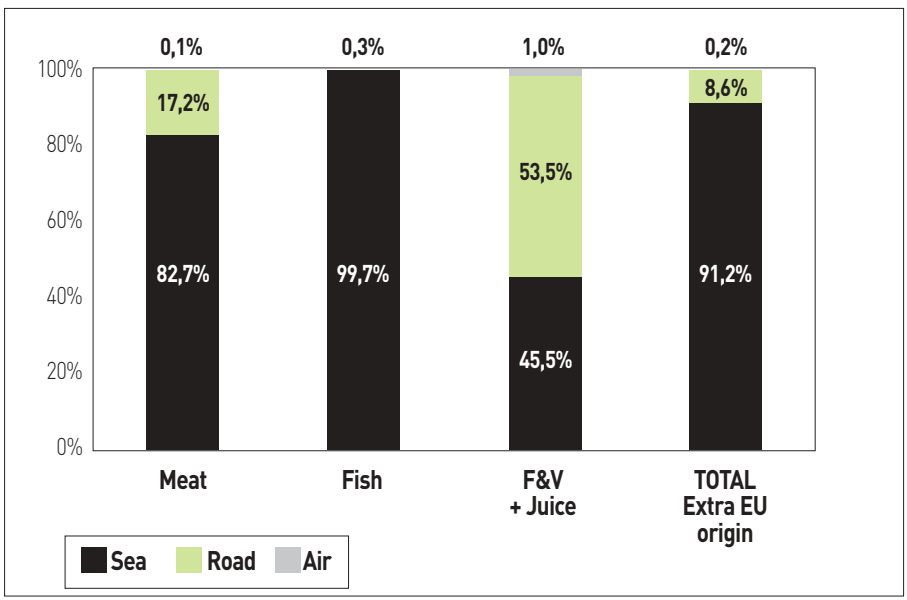
The main import origin areas are Latin America (providing 40% of imports), Southern Africa (4%), Spain, Greece and Turkey (30% altogether).

For imports, sea transport is therefore very important, while for exports road transport is preferred, given that Italy exports mainly to Northern Europe.

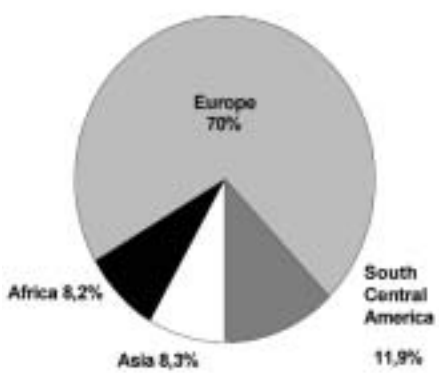
(FIGURE 3.9) ITALY: % DISTRIBUTION OF FRUIT IMPORT



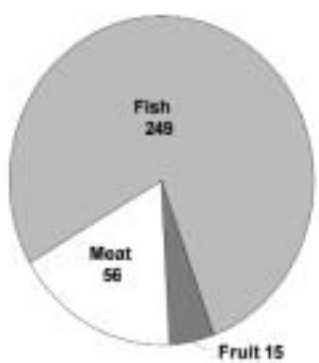
(FIGURE 3.10) TRANSPORT MODALITY FOR IMPORTS OF DEEP-FROZEN FOOD



(FIGURE 3.11) ORIGIN OF IMPORTS OF PERISHABLE GOODS (SOURCE: ISTAT, 2002)



(FIGURE 3.12) IMPORTS OF DEEP-FROZEN FOOD BY SEA (,000 TONS, 2002)



As for vegetables, sea transport is suitable for flows coming from Northern Africa, mainly potatoes and other vegetables which have a compatible shelf-life.

FISH, MEAT OR DEEP-FROZEN FOOD

Regardless of the type of goods, deep-frozen food's features are compatible with the sea transport, because:

- reefer containers are used;
- shelf lives are long;
- attention is focused on the product's cost.

For these products, sea transport is the most used for long-range trade (outside Europe), and for some legs within Europe.

Italy is strongly import-oriented: in 2002 more than 1,000,000 tons of deep-frozen food were imported while only 360,000 tons were exported. The countries from which Italy imports are usually different form those to which it exports. It exports mainly to European countries while as far as import is concerned the situation is more complex (Figures 3.10, 3.11, 3.12)

OTHER PERISHABLE GOODS

As for the other perishable goods of this study, mainly fresh meat and fish, transport by sea is usually not compatible with the industry's features.

As for fresh fish (with the exception of the

deep-frozen fish), time is too short for sea transport. The same applies to fresh meat. Although its shelf life is longer, the industry's general features are not compatible with the sea transport.

3.1.2.8 Air transport

Transport by air is the most rapid and the most expensive. Air costs are justified when:

- it is necessary to "shorten" the distance from production to distribution, as for example when a product's shelf life is very short;

- the product's high added value justifies the higher transport costs;

Particularly, the necessity to "shorten" the distance from production to distribution means that the service must guarantee that:

- goods are carried "non-stop" from the producer to the distributor in order to meet the needs of a just-in-time delivery;

- high levels of reliability are provided in terms of availability of goods for distribution.

Further to these needs, also a modal shift and a load break are needed: in fact containers for air transport differ from normal containers, therefore a load break is needed on arrival and departure.

The use of air transport is constantly increasing and a 6.6% growth is expected in the forthcoming 20 years. That is due to the growth in the efficiency of air and airport services making air transport cost-efficient for an increasing number of goods. Moreover this growth is linked to an increase in the sector competitiveness at world and European level.

3.1.2.9 Perishable Industries and air transport

FRESH FISH

As for fresh fish air transport is the most used mode, being the lead time the key element which has to be reduced "at any cost". Usually the lapse of time between production and distribution is no longer that 24 hours; that lead time is guaranteed for the Italian and European production also by the traditional modes of transport, especially road transport.
For those products which are only found in production markets outside Europe (mainly Africa and South America) air transport is necessary due to the short shelf life of the products.
From the logistic point of view, transporting those products by air implies many problems. According to the law, fresh fish must be transported at an ice melting temperature and usually in ice. Attention should be given to some aspects:

- "re-freezing" is usually necessary, that means replacing some melt ice at the departure and arrival points;
- an efficiency loss occurs during transport due to the fact that part of the transported product is ice.

FRESH FRUIT AND VEGETABLES

The use of air transport for fruit and vegetables is currently limited to certain products to guarantee the supply at the beginning of the counter-season period. That is possible only for those products with a high added value able to absorb the transport cost, such as strawberries or plums from South Africa, or cherries from America.

FRESH MEAT

Usually air transport is not used for meat because:

- the distance between the slaughterhouses and the consumption areas is generally compatible with other modes of transport;
- there is a problem regarding sizes, specially as far as beef and pork are concerned: part of the meat coming from slaughterhouses is boned meat (in quarters or halves), therefore having sizes which are not compatible with air transport.

3.2 The supply structure

A detailed analysis of the main Italian and European logistic nodes and terminals has been carried out stressing the peculiarities of each of them and the planned forthcoming specializations, especially for perishable products.

For each of the analysed nodes, the study shows the following elements:

- general description of the structure and of its activities;
- localization;
- characteristics and management;
- sizes (total area, area occupied by intermodal terminals);
- transported volumes;
- provided services;
- main operators;
- main trade areas in Italy and abroad;
- structures (terminals, stores);
- main traffic patterns and connections to the infrastructure network;
- operational modalities (particularly intermodal logistic junctions);
- transported goods (focusing on perishable products);
- future developments (as regards trade, infrastructure and intermodality,...).

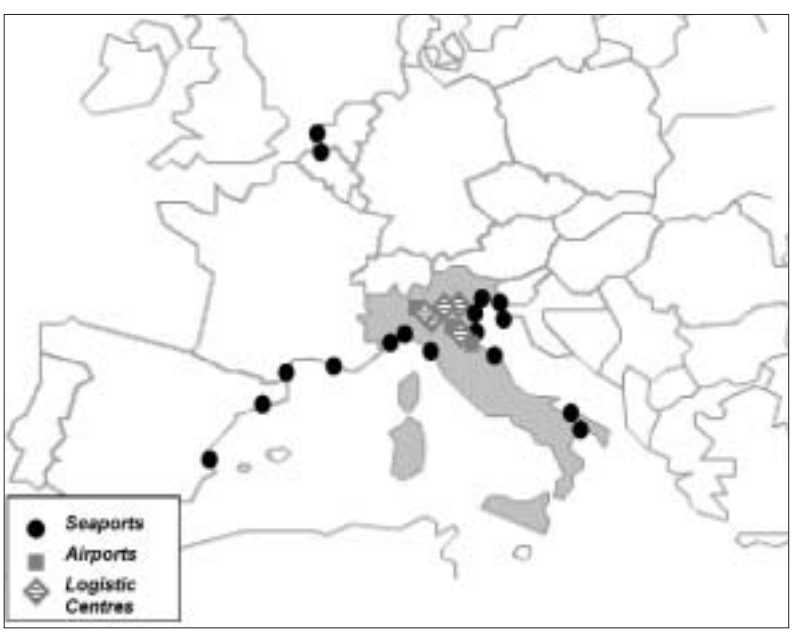
The aforementioned information is contained in the following pages and in Annex 1.

The study was based on desk work (e.g. The Transport White Paper, Istat, Eurostat, CNIT, etc.) and on interviews to the main players of the analysed infrastructures. The following note have been analysed.

INFRASTRUCTURES MANAGING PERISHABLE GOODS:

- Genoa Seaport
- Savona Seaport
- Livorno Seaport
- Ancona Seaport
- Trieste Seaport
- Taranto Seaport
- Koper Seaport (Slovenia)
- Vendres Seaport (Perpignan, France)
- Valencia Seaport
- Barcelona Seaort
- Rotterdam Seaort
- Marseilles Seaort
- Bologna Airport
- Forlì Airport
- Malpensa Airport
- Padua Freight Village
- Verona Freight Village
- Lugo Intermodal Terminal
- Parma Freight Village

(FIGURE 3.13) EXAMINED LOGISTICS NODES



INFRASTRUCTURES NOT MANAGING PERISHABLE GOODS

- Monfalcone Seaport
- Venice Seaport
- Bari Seaport
- Bologna Freight Village
- Piacenza Logistic Centre
- Dinazzano Intermodal Terminal
- Rovigo Freight Village
- Milan Melzo Intermodal Terminal

3.2.1. The Italian scenario: analysis of the seaports system

Italian Seaorts (see Figure 3.14) present many strong points, such as the volumes of the transported goods, which are larger than those transported by road and rail.
Moreover, unlike the airport sector, Italian seaports are able to match the whole national demand of sea transport and they have the potentials to attract more foreign demand.
Volumes are expected to grow thanks to the creation of the Corridors planned by the European Union (Figure 3.15).

(FIGURE 3.15) EUROPEAN CORRIDORS

(FIGURE 3.14) ITALIAN SEAPORTS

(T) = terminal operators

SOURCE: Uniontrasporti

(TABLE 3.1) SYNOPTIC TABLE OF THE MAIN ITALIAN SEAPORTS

	SURFACE	TOTAL VOLUMES (2003)	MAIN CONNECTIONS	PERISHABLE GOODS
GENUA	500 hectares of land area and 500 hectares of water area	52,923,528tons 1,605,946teus	Northern Europe West & North America, South America, Far East, Middle East, Eastern Europe, South Mediterranean/ North Africa	Fruit and vegetables and frozen and deep-frozen food
SAVONA VADO	SAVONA (operational areas) 590,000. VADO (operational areas) 407,100	SAVONA: various goods 1,986.000, containerised goods 410,000, agricultural goods 609,000. VADO: coal and minerals 3,191,000, liquid cargo in bulk 7,171,000, container 53.543 teus	Eastern of Southern coast of America, Venezuela, Costa Rica, Dominican Republic, West Africa, Cuba, Canada, Mexico, France (Paris/Lyons), Slovenia (Sezana)	Bananas and pineapples, citrus fruit and fruit coming from the Southern hemisphere
LIVORNO	1.600.000 mq specchi acquei, 2.500.000 mq terraferma	2002: 25.328.372 ton; 546.882 teus	Tuscany, Emilia Romagna, Umbria, Marche. North America, South America, Middle East, Far East	Bananas and exotic fruit, deep frozen products
ANCONA	Container transhipment, Ro-Ro, National coastal trade	solid goods: 1,563,592 tons; liquid goods: 5,162,718 tons; goods in lorries: 2,304,102 tons; goods in containers: 544,395	Greece, Croatia, Albania, Turkey, Montenegro	fresh fish and frozen products
TRIESTE	2,304,000 sq	45,700,000 tons, 117,000 teus	Northern Italy, Egypt, Northern Europe, Turkey, Greece, Albania, Austria, Germany, Switzerland, Hungary	fruit and vegetables. deep frozen products
RAVENNA	2,080 hectares of water area, 1,500 inhabited	24,910,621 tons, 160,360 teus	Emilia Romagna, Lombardia, Veneto, Coutrnies of former Yugoslavia, Mediterranean, Black Sea, North and South America, Northern Europe, Far East, Oceania	citrus fruit, fresh fruit, fresh vegetables, refrigerated products

STRUCTURES FOR PERISHABLE GOODS	OPERATORS	SERVICES	OPERATING MODALITIES
Genoa Fruit Termial, Container Terminal (VTE, SECH, Messina Terminal)	Campostano Group, Maersk Sealand, Voltri PSA, GIP, Grimaldi, UASC, NYK, CMA	Coastal trade, Ro-Ro, container transhipment	rail, road, sea, air
Vado Refeer Terminal	SAVONA: Sauto, Silos, Must, Monfer, Miramare, BuT, Metec, Mondo Marine, Azimut, Wservice. VADO: Forship, TRI, Erg, Esso, Petrolig, Sarpom, Vio, Multiterminal, Orsero Group (GF Group)	container, Ro-Ro, transport, logistic services	rail, road, sea
Dole Terminal , Giolfo Terminal & Calcagno	Contship, MSC, Dole, Giolfo & Calcagno	Container transhipment, Ro-Ro, National coastal trade	rail, road, sea
Fish market	Fast Ferries, Attica Line, Zim, Evergreen, Msc, Maersk-Sealand	Ro-Ro, Lo-Lo, containers	rail, road, sea, air
Ortofrutta Riva Sud Terminal pier 5, Ormeggio Frigomar Terminal for deep frozen goods, Container Terminal	Tict (Luka Koper-T.O.Delta, Siot, Zim, Maersk-Sealand, China shipping container, Evergreen-Lloyd, Triestino, Contship, MSC, Shenker, Clerici Group, Bruno Ravalico, pecorini, SAMER, ASTRO, T.T.C., TFT, TPS	transhipment container, feeder containers, Ro-Ro, rinfuse	rail, road, sea
Frigorifero Frigoterminal (Sapir) Terminal, Container Terminal	Sapir, Eurokai-Contship Italia Group, Setramar, Docks cereals, Eurodocks, I.F.A., Lloyd, Zim, Maersk, Sarlis, BSL Genoa, Sers Group, MSC, Marcegaglia, Martini, Incontinental, Riparbelli, Petra, Polimeri Europa, Enel, Pir, Na.Dep., Adriatank, Agip, Alma	loading/unloading, transport (land routes), logistic services (storaging, screening and minor manufacturing), filing up and emptying containers	rail, road, sea

(TABLE 3.2) SYNOPTIC TABLE OF THE MAIN FOREIGN SEAPORTS

	SURFACE	TOTAL VOLUMES (2003)	MAIN CONNECTIONS	PERISHABLE GOODS
KOPER	16,000,000 sq (4,737,000 sq used at present)	9,000,000 tons	Sea links: Northern and Western Europe, North America, Central America and the Caribbeans, South America, Mediterranean Sea, Black Sea, Africa, Middle East, Red Sea, Arabic Sea and Persian Gulf, India and Pakistan, Far East	Fruit, vegetables, frozen products
PORT VENDRES S.CHARLES MARKET	S.Charles: 33 hectares	Port Vendres: imports 147,252 tons, exports 18,708 tons S.Charles: 1,125,000 tons (900.000 from Spain, 100,000 from Morocco, 100,000 from Estern Pireneis)	Port Vendres: North Africa and Mediterranena countries, South America, West Africa, Southern Africa. S.Charles: Spain, Morocco, Argentina, Camerun, Cairo, Costa Rica, Burkina Faso, Cyprus, Italy, Portugal, Brasil, Cote d'Ivoire	Fruit (especially bananas, citrus fruit), fresh fish
ROTTERDAM	10,500 hectares	(figures in gross weight, *1 million tons per metre). Agricultural products 10,8; minerals and waste material 39,9; coal 24,7; dry goods 10,6; raw oil 99,8; mineral oil products 27,5; liquid material 25,2; containers 70,6	Trading ports: Antwerp, Hamburg, Marseille, Le Havre, Amsterdam, Genoa, London, Dunkirk, Bremen, Wilhelmshaven, Zeebrugge, Gand, Singapore, Shangai, Hong Kong, Ningbo, Guangzhou, Tinanjin, Nagoja, Quingdao. Trading container ports: Antwerp, Genoa	Patatoes, fresh fruit, fresh and deep frozen vegetables, refrigerated juices, wheat compounds, fruit and vegetables
VALENCIA	1.238.292 sq	Total volumes 666,395 (liquid 110,500, solid 555,895); total goods 2,151,871 (not containerised 386,701, containerised 1,765,170)	Madrid and central area of the Hiberian Peninsula, Morocco, Algeria, Tunisia, Lbya, Atlantic and Baltic Europe, Persian Gulf, Red Sea, Indian Ocean and Southern East Africa, Far East, Australia, New Zealand and Pacific, West Africa, Canada, USA, Gulf of Mexico,	Fish, meat, vegetables, fruit, refrigerated juices
ANTWERP	13.348 ha	General sea traffic (142,874,512 tons), container (5,445,437 TEU, 61,350,335 tons). Hinterland traffic: navigation (76,614,601)	USA,UK, South Africa, Canada, Russia, Brasil, Finland, Turkey, China, Singapore, Algeria, France, Spain, Norway, Germany, UAE, Israel, Estonia, Sweden. For other 17 countries the triffic is less than 2,000,000 tons	Fresh and frozen fruit, refeer containers
BARCELONA	828,9 ha	34,774,688 tons; 1,652,366 TEUS	Middle East, Black Sea, Caspian Sea, Italy, France, North Africa, Far East, North America (Atlantic Coast), Europe (Atlantic Coast), Central America and the Caribbeans, West Africa, South America (Atlantic Coast), Gulf of Mexico, Southern and Eastern Asia, Persian Gulf, Arabic Sea	Fresh and deep frozen fruit, fresh and deep fozen vegetables, fresh and deep frozen legumes, deep frozen legumes
MARSEILLE		Total traffic: 95,54 MT (various goods 14,90 MT, containers 8,08 MT, solid refuse 14,80 MT, liquid refuse 2,92 MT, hidrocarbons 62,92 MT)	Continental France, Corsica, Northern and Western Europe, Southern and Eastern Europe, North Africa, Libya, East Mediterranean, Black Sea, West Africa, Southern and Eastern Africa, Middle East, Israel, India, Far East, Southern and Eastern Asia, North America	Fruit and vegetables

STRUCTURES FOR PERISHABLE GOODS	OPERATORS	SERVICES	OPERATING MODALITIES
Fruit Terminal	Lula Koper d.d. (company managing all 11 terminals, basic port services and most of the additional services)	Basic/standard port services (movements and storage of goods,mooring, ships drawiing) additional services for goods (packaging, washing, labelling, etc.), supporting services to operators (logistics, marketing, financial assistance)	Rail, road, sea
	Port Vendres: Chamber of Commerce and Industries of Perpignan. S.Charles (co-owners of the market): importers (67%), CCI of Eastern Pireneis (21%), transporters, people and legal entities (12%)	Port Vendres and the S.Charles Market represent one of the most significant examples of sinergy between a port and a fruit&vegetable market worlwide.	Rail, road, sea, air
Container Terminals, Fruit Terminals,Juice Terminals	Large number of operators in the following sectors: transport operators, service and business operators, service operators for loading/unloading goods, operators for various types of services, suppliers, traders	Transport, services related to loading and unloading goods, business services, various services	Rail, road, sea
"Sur" Warehouse, "Frutero" Warehouse, refrigerated warehouse	Main ones: Contship, Dole, Evergreen, Grimaldi, K-Line, Lloyd Triestino, Maersk Sealand, MSC, Setramar, UASC, Zim and many others	Final manifacturing, labelling, movements, storage, distribution, containers	Rail, road, sea transport
Terminals fresh fruit right on the right side of the river Scheldt (Fruit Terminal-Quay 320, Fruit Terminals Albertdock & Leopolddock, Hansa Dock Terminal), logistic platforms for refrigerated and frozen goods, terminals fore refrigerated juices on the left side of the river Scheldt	Main ones: HNN (Hesse Nord Natie), Belgian New Fruit Wharf, Afru Log (in co-operation with Westerlund Corporation)	Several logistic services (the widest range among European ports), counting, filing, quality check, weighing, packaging, pallettisation, warehousing, etc.	Transhipment, road, rail, sea, pipelines
Barcelona Fruit Terminal, Refrigerated Goods Terminal	Main ones:Barcelona Fruit Terminal, Interlogistica del Frio S.A.,and many others	Storage and movements, pre-routing post-routing services	Rail, road, sea transport
Marseille Fruit Terminal	Large number of operators in the following sectors: shipping companies, shipping agencies, goods transport agencies, ship brokers, towing operators, container operators, warehouse operators, boat repairing operators	Storage and movements, pre-routing and post-routing services	Rail, road, sea (also inland), air transport, pipelines (gas and oil)

In particular, the most important Corridors for Italy will be:

- Corridor 8 along the West- East line in South-Eastern Europe, linking the Adriatic Sea with the Black Sea, and Italy with countries such as Greece, Turkey and Eastern countries;
- Corridor 5 (Lisboa-Kiev), natural channel for the transit of goods along the East-West line in Europe, whose strong point is the use of at least 5 seaorts (3 of which are Italian): Barcelona, Genoa, La Spezia, Trieste and Rijeka;
- Corridor 3, the two-sea corridor, a rail axis linking the seaports of Genoa and Rotterdam.

Therefore the Italian seaports are promoting integrated logistics services in order to generate and absorb transits along those large Corridors.

Tables 3.1 e 3.2 summarize the characteristics of the main Italian and foreign seaports.

As regards perishable goods, the single seaports are specialising in specific types of goods with reference to overseas transport:

TYPES OF GOODS	MAIN SEAPORTS
FRESH FRUIT	- **Vado Ligure** is the main seaport - **Genoa**
DEEP FROZEN MEAT	- **Genoa** is the first seaport in Italy and the main one for the market of Northern Italy which is the main consumption market in Italy
DEEP FROZEN FISH	- **Livorno** is the main reference for the Tyrrenian area, which is characterised by a high fish production and consumption - **Ancona** is the main reference for the Adriatic area

3.2.2. The Italian scenario: analysis of the airports system

The airport network is made of 47 airports for goods transport, of which almost 2/3 are located in Central and Northen Italy. In Italy more than 1,100,000 tons (40% imports, 60% exports) are traded by air, of which 74% are produced in Northen Italy (34% of which in Milan).

Currently, the Italian airport system is based on its two hubs, Milano Malpensa (more than 362,000 tons per year) and Roma Fiumicino (172,000 tons per year). The Milan hub is stronger, being located in a more indutrialized area, but its traded goods are inferior as compared to London, Amsterdam, Paris or Frankfurt.

Both the Italian airports are trying to enlarge their structures. In Milan, in the "Cargo City" area (see the following table), new systems for the managment and stocking of goods are being implemented. Besides the aforementioned hubs, Italy also has regional airports, playing an important role in the logistic management of mail transport (Bergamo Orio al Serio being the main one). Finally, there are also other airports (besides Linate e Ciampino, the two minor airports of Milan and Rome), where more than 10,000 tons are traded per year (Bologna, Venice, Turin, Treviso, catania, Verona, Pisa).

This sector is highly competitive at European level, but Italian airports show significant qualitative and quantitative shortcomings that they can be considered competitive neither for those goods traffics originated in Italy: currently, less than 1/3 of goods, whose origin or destination is Italy and which are transported by air, are traded by national airports. In fact a key role is played by the main European hubs (Zurich, Frankfurt, etc.).
The main shortcomings of the Italian airports are:

- the lack of their integration in a widerlogistic infrastructural system, which doesn't allow the creation of sinergies with other transport modes;
- handling times are not competitive as compared to those of the main European hubs

To bridge the competitiveness gap of the Italian airports a more balanced airport system should be created. This activity is on the way. The system should be based on a functioning hub & spoke model which would allow higher load ratios:

- one or more main hubs guaranteeing intercontinental links;
- more spokes serving local traffics.

Another prerequisite is the creation of logistic platforms guaranteeing efficcient land services. These services should reduce handling times and effectively manage modal shifts.

Tables 3.3 summarizes the characteristics of two main Italian airports.

(TABLE 3.3) SYNOPTIC TABLE OF SIGNIFICANT ITALIAN AIRPORTS

	SURFACE	TOTAL VOLUMES (2003)	MAIN CONNECTIONS	PERISHABLE GOODS	STRUCTURES FOR PERISHABLE GOODS	OPERATORS	SERVICES	OPERATING MODALITIES
MALPENSA		306.451 tons	Northern Italy (especially North West), North America, South America, Africa, Far East	Fruit (in particular first of the season), fish	13 cells with controlled temperature (506 sq), 1 area for perishable goods (545 sq). Cargo City under construction (near 1), area for the creation of a logistic platform for storage and transport of goods	MLE, ALHA Airport, Federal Express	Traditional warehousing of goods and mail, storage of special and dangerous goods, loading and unoloading of goods, trade services for operators	Road, air transport
BOLOGNA AND FORLI'		Bologna: 25.000 tons	Bologna: Emilia Romagna, Southern Lombardia, Tuscany, Marche, Triveneto, Africa, Far East, South America. Forlì: Ethiopia, Central and South America, Africa	Bologna: fish (in the past), fruit (first of the season). Forlì: fruit (early season), dwarf beans, bananas	Refrigerators, areas with controlled temperature	Bologna: Aviapartner, Bas, Euroalоa, Marconi Handling	Packaging, unpackaging, UdC movement, UdC storage	Rroad, air transport

3.2.3. The Italian scenario: analysis of the freight villages system

The "operating principle" of Freight Villages is intermodality.

According to the Italian law 240/90[1], a Freight Village is defined as "a geographical grouping of integrated structures and services which manage transport modes shifts, including at least a rail terminal able to bundle or receive full trains and linked with seaorts, airports and large-scale viability lines".

Tha key features of a Freight Village are:
- it rationalizes transport flows and support modal shift;
- it must rely on rail transport, and usually the rail to road modal shift.

The main services of a Freight Village are:
- transport and sorting of loads;
- stocking of goods;
- further services such as customs, maintenance of vehicles and containers, service areas, etc.

Currently Freight Villages are not very used for perishable goods, mainly because they are a land junctions for rail transport which is hardly used for perishable products. The flows of fresh goods passing through the Freight Villages are manly fruit and vegetables, as many wholesalers have located their platforms in the Feight Villages. As for frozen food, the pending issue limiting the managing of reefers by Freight Villages is due to the service and infrastructural shortcomings of the rail transport.

The prerequisites for development of Freight Villages for peishable goods can be summarized as follows:
- strong local relations, because as delivery times for some perishable goods are very short, a Freight Village could be an interesting platform for local production and distribution (unlike hubs that direct products to other platforms);
- suitable times and transport modes respecting the logistics features of the products;
- effective integration in the local logistic system with reference to the existing operators.

Italy has been the first European country to conceive and realize Freight Villages as infrastructural networks for intermodal transport. The Italian network is one of the most important at European level. In 2001 there were 26 Italian Freight Villages aknowledged at national level, in 2002 they were 40 (including logistic centres and intermodal centres), of which almost 60% were operational, more than 20% non operational yet and less than 20% still in progress. Northern, Eastern Italy and Emilia Romagna region are the areas with the highest number of intermodal platforms,

(1) Law 4 August 1990, n.240. State interventions for the development of freight villages and for developing intermodality - G.U. August 1990, n.192

but just few of them transport perishable goods, particularly the two large freight villages of Veneto region:

- **VERONA**
  The Verona Centre accounts for 30% of the combined international trade, and up to 50% if flows to foreign countries are taken into account (mainly Northern Europe, France, Spain and the EU Eastern countries). The centre has at its disposal about 7500 sqm of refrigerated warehouses for perishable goods.

- **PADUA**
  The Padua centre enjoys national leadership for the transit of containers and as for perishable food it manages only transits of refeer containers.

Of all the freight villages and the logistic centres of the Emilia Romagna region, as shown in Figure 3.16, the only one dealing with perishable goods is the Lugo Intermodal Centre, transporting only little quantities of refrigerated fruit and vegetables to Northern Europe (Germany and England).
Tables 3.4 summarizes the characteristics of the some Italian logistic centres and freight villages for perishable goods.

(FIGURE 3.16) THE MAIN LOGISTIC CENTRES AND FREIGHT VILLAGES IN EMILIA-ROMAGNA

(TABLE 3.4) SYNOPTIC TABLE OF THE MAIN LOGISTIC CENTRES FOR PERISHABLES

	SURFACE	TOTAL VOLUMES (2003)	MAIN CONNECTIONS	PERISHABLE GOODS
PADUA	2,000,000 sqm	2,450,000 tons rail transport, 252,000 TEU container transport, 290,598 UCI intermodal transport	Main Italian ports: Genoa (23%), La Spezia (23%), Livorno (17%), Gioia Tauro (5%), Trieste (4%), Catania, Palermo, Bari, France (Le Havre), Holland (Rotterdam), Germany (Hamburg, Brernerhaven), East Europe (Romania)	Product containers at controlled temperature
VERONA	2,500,000 sqm	Over 5 million tons rail transport, 21 million tons road transport	Germany, Sweden, Belgium, France, Spain, Greece, East European Countries (Romania and Czech Republic in particular), Denmark, Holland, Slovenia, Austria, Switzerland, Finland	Agricultural and food products at controlled temperature. In the near future: fruit&veg., fish products, meat
LUGO	Total area of 110,000 sq m, 35,000 of which for goods shed	70,000 tons, 8,300 TEUs	Tuscany (port of Livorno), Veneto, Marche, Emilia-Romagna, Puglia, Northern and Eastern Europe (Poland, Russia, Germany, Austria	Refrigerated agricultural and food products

STRUCTURES FOR PERISHABLE GOODS	OPERATORS	SERVICES	OPERATING MODALITIES
100,000 sq m goods shed with refrigerating cells, distripack (system for the complete logistic managing of goods)	Interporto di padova S.p.A., Interporto di Padova - Logistic Division, Trenitalia S.p.A., Nord-Est Terminal S.p.A. (managing of intermodal terminals)	Depot/storing, loading/unloading, unitisation, handling of empty containers, transport and distribution organisation, customs, distripark	Rail, road
420,000 sqm general warehouses (7,500 of which are refrigerated) for agricultural and food products	Autogerma, ZAI Consortium, Assointerporti, Hangarther Group, Nord-Est Terminal S.p.A.	Depot/storing, customs, loading/unloading, unitisation, handling of empty containers, transport and distribution organisation, Refeer containers services: handling of empty and full containers, internal cleaning, pre-trip inspection, power supply.	Rail, road
Intermodal terminal, infrastructures for refrigerated products, parking area for refrigerated containers	Lugo Terminal S.p.A.	Depot/storing, unitisation, transport and distribution	Rail, road

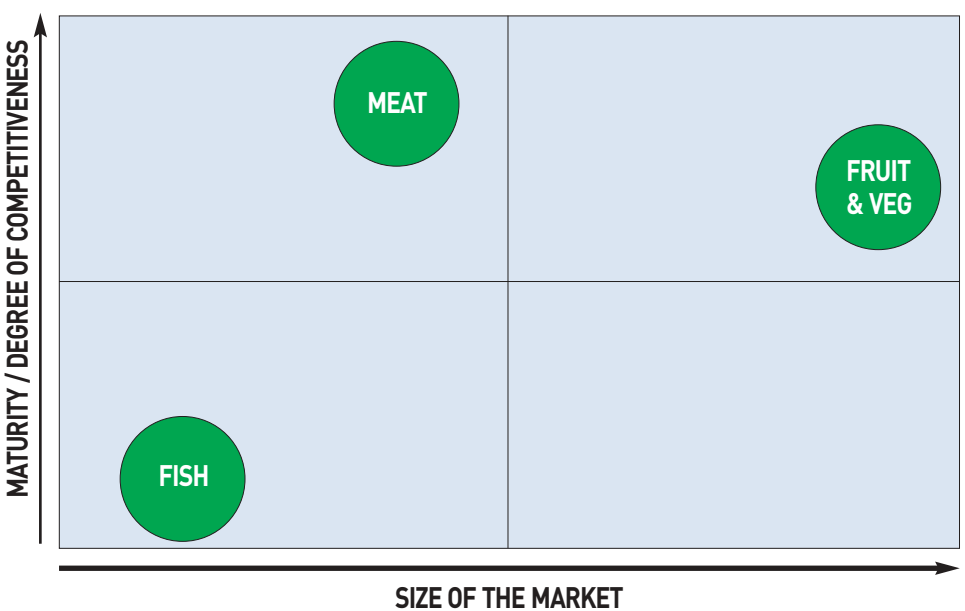
FEASIBILITY EVALUATION FOR THE CREATION OF RAVENNA DISTRIPARK

4. FEASIBILITY EVALUATION FOR THE CREATION OF RAVENNA DISTRIPARK

4.1 Results and open issues

The feasibility evaluation is based on meetings and interviews with operators. During these meetings the existence of a potential demand for new logistic services was highlighted. In particular operators highlighted the need for logistics centres and infrastructures for perishables.
Figure 4.1 shows the market positioning of the perishable goods.

FIGURE 4.1 MARKET POSITIONING OF PERISHABLE GOODS

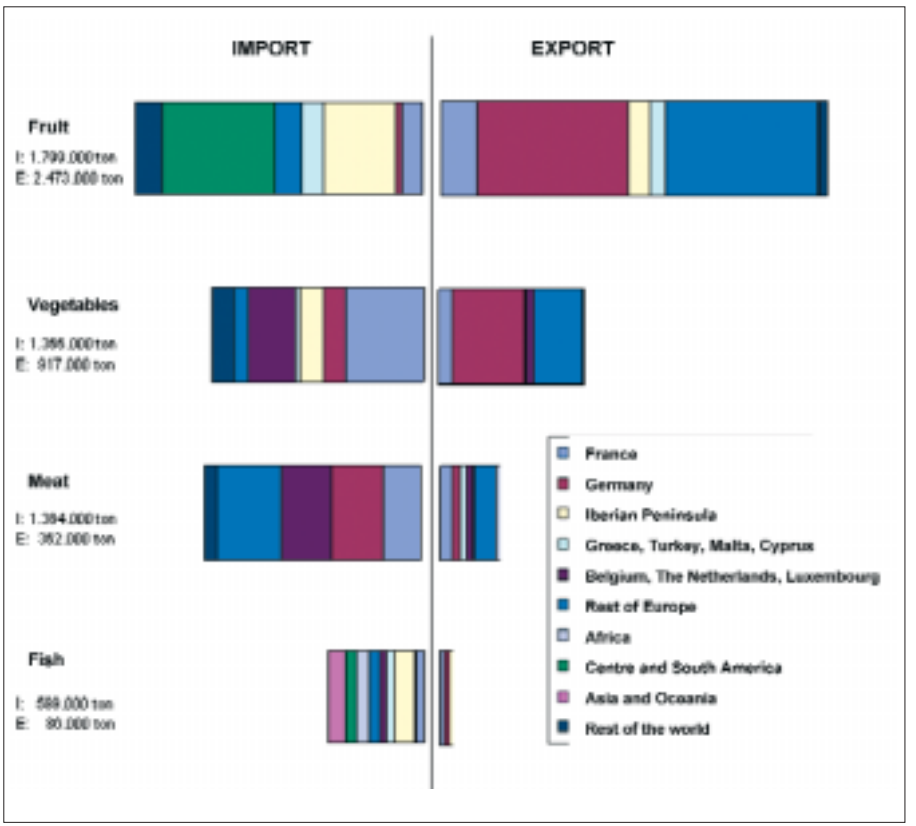


The main needs expressed by the operators are:

- For fresh Fruit & Vegetables, logistic needs are mainly related to the production bodies, which are trying to expand along the value chain;
- Even if Meats market for is not extremely dynamic, some operators perceive a growth in efficiency thanks to consolidation operations;
- The Fish market is very dynamic and it has the possibility "to find its place" alongside the large scale distribution, provided that it regains efficiency and assures the required services by the market.

Figure 4.2 shows an asymmetry between Italian import and export flows.
The flow macro-analysis pointed some important aspects:
Italy main import countries are: Central and Southern America, Spain, France, Germany and Benelux.
Main export countries are: Germany, France and the rest of Europe.
Often it is not possible to balance flows among different typology of goods.

FIGURE 4.2 MAIN ITALIAN IMPORT/EXPORT FLOWS FOR TYPE OF PRODUCT



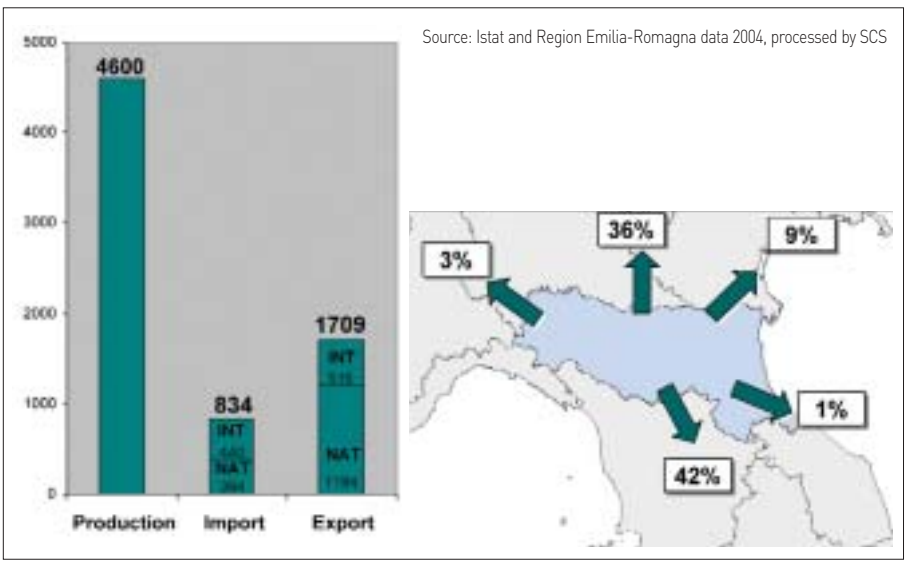
Source:
ISTAT (Jan-Dec. 2003, overall period), processed by SCS

Meat does not include live animals. Fish does not include crustaceans and mussels.

The analysis of import/export flows of fruit & vegetables in Emilia Romagna shows an asymmetry (Figure 4.3).
Emilia-Romagna main export destinations are Northern Europe and Southern Italy. Exports to CADSES countries (and the rest of the World) account for 9%.
Flows from Southern to Northern regions are significant and Ravenna could be a point of attraction.

The study shows that overall flow balance is possible by attracting the existing crossing flows from southern to northern regions to the logistic infrastructures of Emilia Romagna (about 1 million tons, as shown in table 4.1 and figure 4.4).

FIGURE 4.3 IMPORT/ EXPORT FLOWS IN EMILIA ROMAGNA (.000 TONS)



Source: Istat and Region Emilia-Romagna data 2004, processed by SCS

FIGURE 4.4 CROSSING FLOWS IN EMILIA ROMAGNA AND POTENTIAL ATTRACTABLE FLOWS

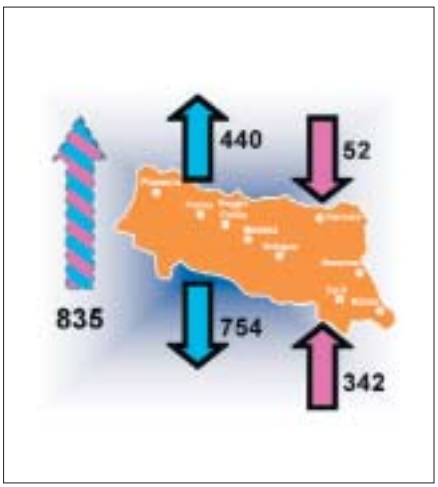


TABLE 4.1 CROSSING FLOWS IN EMILIA ROMAGNA AND POTENTIAL ATTRACTABLE FLOWS

ORIGIN \ DESTINATION	Piemonte	Valle d'Aosta	Liguria	Lombardia	Trentino AA	Veneto	Friuli VG
Abruzzo	24,788	817	10,796	63,325	5,334	18,357	7,903
Molise	7,601	275	2,418	15,576	2,094	4,417	2,496
Campania	47,289	1,893	26,081	152,107	12,738	32,324	17,728
Puglia	102,823	3,261	41,497	216,074	22,622	79,359	31,126
Basilicata	15,757	581	6,670	36,729	3,806	12,201	5,289
Calabria	82,805	2,589	32,168	187,392	19,767	76,426	25,100
Sicily	146,097	4,506	56,429	297,783	34,755	128,131	43,488

High Attractiveness Medium Attractiveness Low Attractiveness

Source: Imonode data (Interreg IIIB Cadses), processed by SCS

4.2 Supply-demand consistency

4.2.1 Flows consistency

RESULTS	OPEN ISSUES
Flow balancing can provide the basis for the creation of a competitive structure located in Ravenna that is strategically positioned in the Emilia-Romagna region and in Pianura Padana. The main linking directions are: • National, North-South • Continental to North • Nodal vs. far-East and Mediterranean countries The main transnational reference countries could be the South Mediterranean, Slovenia, Croatia and Greece.	The seaport of Ravenna is the only global infrastructure of Emilia Romagna and it can then play a strategic role in the development of a logistic chain provided that: The main linking directions are: • The obstacles and integration problems highlighted in this study will be overcome by supply operators; • More concerted actions will be put into place by the territories involved.

With a view to integrate production and distribution, Ravenna could be the right place to create a competitive structure, as the city is strategically located in Emilia Romagna and in the Padania Plain.

4.2.2 Logistic evolution consistency

RESULTS	OPEN ISSUES
ACTORS • The actors in global competition have changed: no more sector barriers (producers, distributors, logistic operators), only business barriers. • The other domestic seaports do have positioning advantages due to the presence of logistic operators and traders and due to the supply of connection services, but they do not have specific logistic/technological advantages.	• Competitive barriers are still represented by the great seaports of Northern Europe, which are irreplaceable nodes for certain commodities and for the traffic of products towards the Mediterranean seaports of Spain and France which are considerably investing to attract post panama ships and to create infrastructural integration towards European continental territory.

RESULTS	OPEN ISSUES
TECHNOLOGY • There are no more technological barriers to the intermodal transport of perishable goods: - Temperature regimes of main perishable products (HACCP: 0-5°C for meat, fish , salami, dairy products, 5-10°C for fresh fruit and vegetables, -23/-18°C for frozen products) are compatible with available transport (refrigerated vehicles and reefer containers) and storing technologies (cold stores and refrigerators) - Passive refrigerating technology allows swap bodies (and, in the near future, reefer containers) to economically manage the cold chain for 15-24 days, thus overcoming one of the main obstacles to the intermodal transport of perishable goods. The use of sealed isothermal packages allows, on the short distances, to transport different products with similar temperature regimes: (yes: meat and fish; no: fruit&vegetables and meat).	• Passive refrigerated swap bodies are technologically valid but there are neither producers on the market nor handlers of the empty containers (large volumes are necessary).

There are no technological barriers to intermodal transport, rather it is a matter business profits

RESULTS

TRANSPORT MODES

- In Italy the rail market was liberalized and it is growing (+2,1%1 – Jan/Sept 2004 - tons).
- The technological developments allows Trenitalia to evaluate activities in the transport of perishable goods.
- Sea transport is already used with reference to long range traffics and the Motorways of the Sea can represent a potential alternative to road transport on short and medium distances.
- Air transport present a niche transport market
- EU contributions to intermodality exist.

LOCAL SUPPLY

- In Emilia-Romagna (and in Ravenna area) there is a good supply of transport and logistics services, specialized in perishable goods logistics management. Local, national and international operators are located in Ravenna reference area.
- Within Ravenna seaport there are operators specialized in the intermodal transport of perishable goods.

OPEN ISSUES

- Rail transport is not competitive for supply deficiencies (slots availability, operators avilability: the new operators born after the liberalization have 5% of market share), services deficiencies (lead time), and it lacks the critical masses needed for block trains.
- The hire market is penalizing the Northern Adriatic seaports for reefer and cool ships: costs doubled and Adriatic seaports may represent "deviations" more than Mediterranean seaports; the overcost reaches 20$ per pallet for products coming from Argentina
- Air transport development is related to integration with other existing air nodes (which are not within the feasibility study area).

4.3 Identification of possible solutions and swot analysis

4.3.1 Industrial chains features and criteria of logistic platform localisation

The analysis model is represented in Figure 4.5.

FIGURE 4.5 SCHEME OF THE MODEL OF ANALYSIS

In particular for each industrial chain (Fruit & Vegetables, Fish, Meat) analyses were made on:

1. STRUCTURAL FEATURES OF THE INDUSTRIAL CHAINS:

a. Dimension
• Dimension of macro-flows related to the most important areas (split per typology of goods).

b. Complexity level
• Complexity of the involved operators and assessment of their added value to the chain.
• Logistic nodes on which the industrial chain is articulated.
• Importance of "time" vs "cost" factors.

c. Needs of the operators
• Logistic and organisational weaknesses.
• Tendencies of the industrial chain evolution.
• Possibility to have intermodal integrations.

2. SELECTION CRITERIA OF THE LOGISTIC PLATFORM LOCALISATION:

a. Logistic supply
• Features of logistc services required by operators in terms of: infrastructures, connections, at her services.

b. Central location of the area
• Taking into account the origin and destination markets, assessing:
- the importance of the production or distribution of a typology of good within the selected area;
- The infrastructural and geographic features facilitating the connections with consumption or production markets.

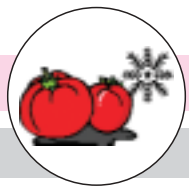
c. Presence of interested operators
• Presence in the area of operators potentially taking advantage from the use of such a logistic platform.

INDUSTRIAL CHAINS ANALYSIS: FRESH FRUIT & VEGETABLES

Chain characteristics	Description
Dimension	Significant import and export volumes (import: 440,000 tons, export: 515,000 tons). Emilia-Romagna produces about 16 million tons of fruit and 29.6 million tons of vegetables. It imports from Southern Italy, North Africa and overseas and it exports to Northern Europe (exports towards the CADSES area are rising).
Level of complexity	Well developed but complex chain with many steps: production is fragmented (in Italy) and geographically dispersed. Some national production organisations exist on the territory and they are interested in developing logistics as an additional competitive advantage on the global market and as an element of integration with the big organised distribution (GDO). In Emilia-Romagna GDO have not specific needs (the chain has already been outsourced) but it may be interested in the South of Italy and in the new CADSES countries (Slovenia and Croatia).
Logistic needs	Producers organisations and GDO are trying to shorten and monitor the chain in order to develop a profitable and fast connection with the new production partners (developing countries). More interest is shown for the use of intermodal transport (shipping in particular) to cut transport costs, the integration of flows and services (multipick, multidrop) and chain traceability.

Localisation factors	Description
Logisitics supply	The seaport of Ravenna provides for road-ship intermodal transport. In the Ravenna area many logistic operators are specialised in the transport of perishable goods. On the other hand, intermodal connections are not yet optimised and the offer of shipping connections shall be strengthened, with particular reference to the Short Sea Shipping (more and faster connections and lines)
Area location	The province of Ravenna and the Romagna area represent important production areas. Emilia-Romagna and the Padania Plain are the main consumers of their products. The seaport of Ravenna may become the main global logistic node for the whole Padania Plain.
Interested operators	The study reveals that producers and GDO are potentially interested in integrating their respective flows. Some producers are already developing their own logistic networks.

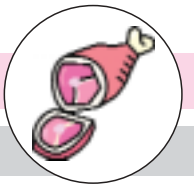
INDUSTRIAL CHAINS ANALYSIS: FROZEN FRUIT & VEGETABLES



Chain characteristics	Description
Dimension	Limited import/export flows (about 350,000 import tons and 50,000 export tons) but increasing internal flows between Northern and Southern Italy. Emilia-Romagna is one of the main Italian production areas and part of its products are consumed in Southern Italy.
Level of complexity	Fresh products must be frozen within 4-6 hours after harvesting: processing industries are located near production areas and goods are transported by road with optimised load. The industrial chain is well developed but more efficiency is still possible once products are in the fresh chain with a view to market such products in the South of Italy where intermodality can still be competitive vis-à-vis of road transport.
Logistic needs	GDO is developing distributing networks in Southern Italy, thus increasing the demand where logistic infrastructures are not yet sufficiently developed. Shipping could be used to diminish logistic costs: potential interest for intermodal transport.

Localisation factors	Description
Logisitics supply	The presence of the seaport of Ravenna offers the possibility to integrate maritime and railway transport.
Area location	Emilia Romagna is an important production market
Interested operators	Private label producers that usually resort to external distribution networks are particularly interested

INDUSTRIAL CHAINS ANALYSIS: MEAT



Chain characteristics	Description
Dimension	Asymmetrical flows: imports account for 1,363,000 tons while exports total to 362,000 tons only. In Emilia Romagna there are many slaughtering houses which sell their meat all over Italy.
Level of complexity	Meat industrial chain is optimised (slaughtering and meat processing are centralised activities). After slaughtering, some meat processing is carried out along the industrial chain. Lead time is less critical than in the case of the other chains, yet product's specificity (very 'delicate' products) demands a door to door service that only road transport can provide, that is why road transport is the main mode of transport used for these products, especially for exports.
Logistic needs	Beef chain is compatible with maritime transport for North-South exchanges. Pork chain can improve its efficiency by optimising transport and responding to multiple clients needs. As to white meat, it is mainly produced by large producers who also offer logistic services.

Localisation factors	Description
Logisitics supply	Logistic services localised in the seaport of Ravenna can offer the possibility to integrate maritime and road transport modes.
Area location	Central enough for poultry and rabbit production. Presence of many slaughtering houses for pork and beef.
Interested operators	Some specific demands for a logistics platform from producers have been collected.

INDUSTRIAL CHAINS ANALYSIS: FRESH FISH

Chain characteristics	Description
Dimension	180,000 import tons and 50,000 export tons.
Level of complexity	Logistics is the area where GDO tries to get competitive advantages. Some large scale distributors and national producers have recently established direct relations in order to improve the chain control (also with international producers).
Logistic needs	Consolidation and fixing of volumes and products range in line with consumers' demand.

Localisation factors	Description
Logisitics supply	There are no airports close to the seaport of Ravenna (as Forlì and Rimini airports are not particularly focused on cargo transport) to facilitate long distance imports.
Area location	Emilia-Romagna is a great consumer of fresh fish but its production industry is not particularly structured (except for mussel farming).
Interested operators	GDO potential interest in the seaport of Ravenna is hindered by the competition of Ancona seaport and of its significant production area.

INDUSTRIAL CHAINS ANALYSIS: FROZEN FISH

Chain characteristics	Description
Dimension	420,000 import tons and 34,000 export tons
Level of complexity	Medium level of complexity: direct import from the producer to the processing and marketing industry. GDO is interested in directly importing frozen packed fish from abroad.
Logistic needs	Costs make the difference: road transport is used on short and medium distances while maritime transport is mainly used for some European (SSS) and overseas (Far East and South America) routes.

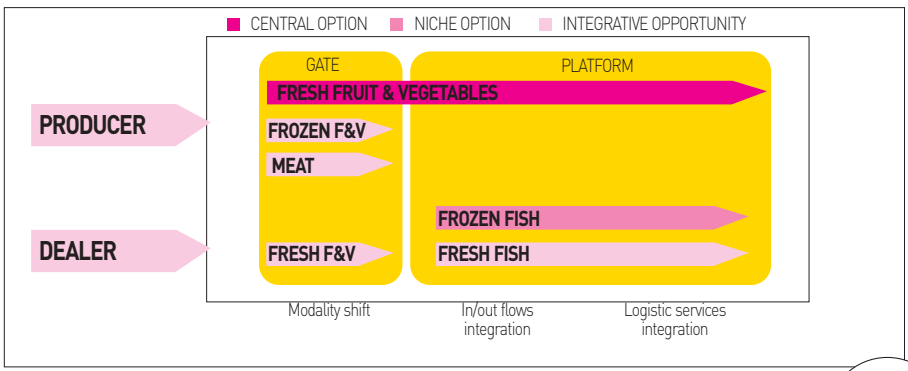
Localisation factors	Description
Logisitics supply	Ravenna must improve its offer of maritime routes with production countries, and compete with Tyrrhenian sea ports in terms of costs.
Area location	The area is central to the consumption market but the seaport is not a node for its flows.
Interested operators	GDO could be interested in optimising import and distribution flows in Northern and Central Italy.

4.3.2 The swot analysis

Figure 4.6 shows the hypotheses evaluated for Ravenna distripark in terms of: market positioning, involved bodies, functions.

Each hypothesis is then examined by means of a SWOT analysis.

FIGURE 4.6 CHOICES TO BE EVALUATED



SWOT ANALYSIS - HYPOTHESIS N. 1 - PRODUCERS PLATFORM FOR FRESH F&V

Managing:	- One body/pooling of producers
Goals:	- Link to origin markets (South Italy and emerging countries)
	- Integrated services to national, EU large scale distributors (GDO)
	- Added value services (e.g. Traceability and different items integration)
Functions:	- Flows and logistic services integration

Strengths	Weaknesses
- Existing volumes can assure sufficient critical mass - The costs of introducing shipping mode are lower if compared to road transport. - The seaport of Ravenna is close to the production area - In Ravenna the three main transport modes are already in use (SSS/overseas, road, rail). - Logistic services exist (operators) on the whole area.	- Producers have little experience in the use of intermodal transport and they are not integrated in the seaport system. - At present, motorways of the sea do not assure competitive services if compared to road transport in terms of level of service (not fast), frequency and destination.
Opportunities	**Threats**
- Producers have already decided to offer logistic services in order to reach some overseas markets, Southern Italy, the Mediterranean and Northern Europe. - New potential markets in the CADSES area. - Italian producers can regain competitiveness by using the shipping mode, thus decreasing logistic costs.	- The time needed to put in place the offer of logistic services in Ravenna could not be compatible with fast market developments. - At present Emilia-Romagna has 283 fruit & vegetable preserving plants for an overall capacity of 3,186,000 cu m.

SWOT ANALYSIS - HYPOTHESIS N. 2 - LARGE SCALE ORGANISED DISTRIBUTION GATE FOR REMOTE NETWORKS OF F&V

Managing: - One body of the large scale organised distribution
Goals: - Services to remote logistics networks (e.g. South Italy and CADSES countries networks) from Emilia-Romagna infrastructures
Functions: - Modal shift

Strengths	Weaknesses
- The cost of shipping are lower than road transport costs. - The location of the seaport of Ravenna is central to the inbound market (logistic networks).	- At present, motorways of the sea do not assure competitive services if compared to road transport in terms of level of service (not fast), frequency and destination.
Opportunities	**Threats**
- Large scale distributors are developing marketing networks in Southern Italy and in countries not yet reached by distribution centres (CEDI): a gate could be the right solution for these networks while the deliveries could be organised in Northern and Central Italy.	- The time needed to put in place the offer of logistic services in Ravenna could not be compatible with fast market developments.

SWOT ANALYSIS - HYPOTHESIS N. 3 - PRODUCERS GATE TO SOUTH ITALY MARKETS FOR FROZEN F&V

Managing: - Focus on producers and managing by logistics operators in a multi-client perspective
Goals: - Low cost intermodal transport to South Italy distribution points
Functions: - Modal shift

Strengths	Weaknesses
- The costs of introducing shipping mode are lower if compared to the costs of road transport.	- Producers volumes are low. - At present, motorways of the sea do not assure competitive services if compared to road transport in terms of level of service (not fast), frequency and destination. - Lack of specific logistic services.
Opportunities	**Threats**
- Emilia-Romagna is an important production centre, part of its products are marketed in the South of Italy. - Some large scale distributors are developing their networks in the South of Italy. - In the absence of networks, new opportunities for private label producers and Southern Italy producers. - There's space for a competitive logistic offer alternative to road transport. - Presence of logistic operators specialised in the management of the cold chain.	- In the absence of specific service demands, the existing asymmetry between outbound and inbound road trips results in very cheap services offered for return trips.

SWOT ANALYSIS - HYPOTHESIS N. 4 - GATE FOR BEEF PRODUCERS

Managing: - Focus on producers and managing to logistics operators in a multi-client perspective
Goals: - Competitive logistic services to Southern Italy markets in terms of integration and transport
Functions: - Modal shift

Strengths	Weaknesses
- The costs of introducing shipping mode are lower if compared to the costs of road transport.	- At present, motorways of the sea do not assure competitive services if compared to road transport in terms of level of service (not fast), frequency and destination. - Industry specific features, in particular as far as beef and pork are concerned, demand a door-to-door service. - Volumes are low.
Opportunities	**Threats**
- Some large scale distributors are developing their networks in the South of Italy. - Some logistic operators are interested in developing network services in the South of Italy.	- The time needed to put in place the offer of logistic services in Ravenna could not be compatible with fast market developments.

SWOT ANALYSIS - HYPOTHESIS N. 5 - FRESH FISH LARGE SCALE DISTRIBUTION PLATFORM

Managing: - Large scale organised distributors, the platform could be managed by logistic operators in a multi-client perspective (few volumes)
Goals: - Inbound flows integration (import/other national origins) to local distribution
Functions: - Flows integration, logistic service integration

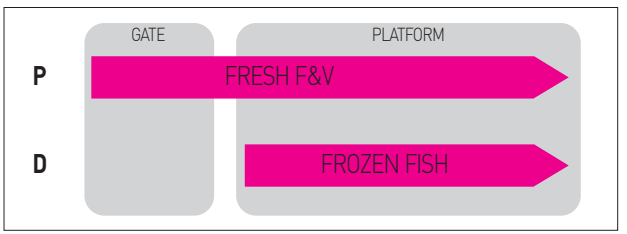
Strengths	Weaknesses
- The area is close to consumption markets. - Possible integration with other activities concerning perishable goods.	- Ravenna production volumes are limited. - Malpensa manages most of Northern Italy flows.
Opportunities	**Threats**
- The chain is extremely long: margins for improvement exist. - Local large scale distributors are interested in shortening the chain thanks to improved integration with producers and service providers. - Possible integration with isothermal containers.	- Ancona, which is a major producer, is very close.

SWOT ANALYSIS - HYPOTHESIS N. 6 - FROZEN FISH LARGE SCALE DISTRIBUTION PLATFORM

Managing: - National large scale distributors, managed by logistic operators for one client
Goals: - Distribution flows integration
- Unitization
Functions: - Flows integration, logistic service integration

Strengths	Weaknesses
- The costs of introducing shipping mode are lower if compared to the costs of road transport. - Container flows already exist.	- Overseas flows require the use of feeders. - At present there are no flows of reefers.
Opportunities	**Threats**
- The increasing interest shown by large scale distributors (private label development) does not match with an adequate logistic network. - The seaport of Ravenna can receive containers flows from other saturated ports (such as Ancona). - Operators exist in the area.	- At present there are stable flows in the Tyrrhenian sea.

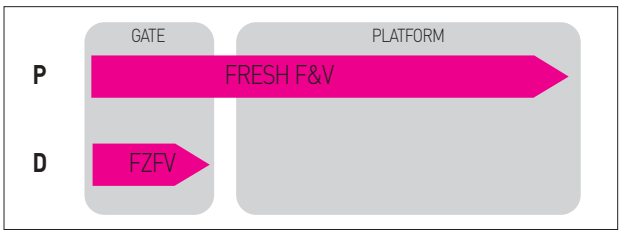
4.3.3 Possible integrations of evalued hipothesis



INTEGRATION LEVEL

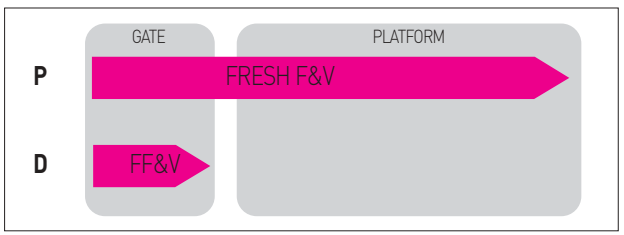
Managing: not in competition
Goals: similar
Functions: similar

L



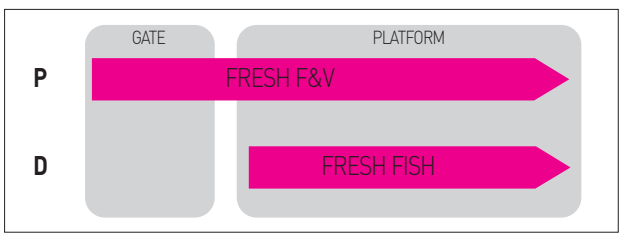
Managing: not in competition
Goals: not inconsistent products
Functions: synergies

M



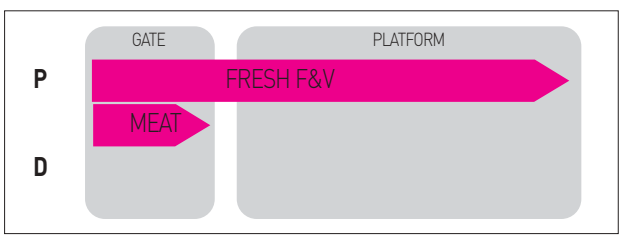
Managing: possible cooperations
Goals: same products
Functions: synergies

H



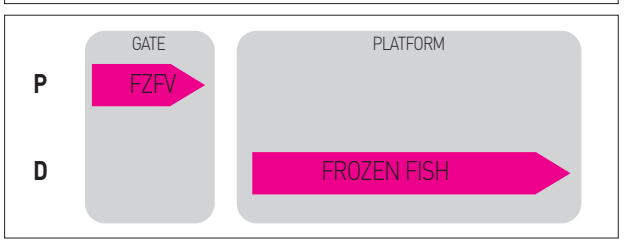
Managing: consistent bodies
Goals: incompatible
Functions: synergies

-



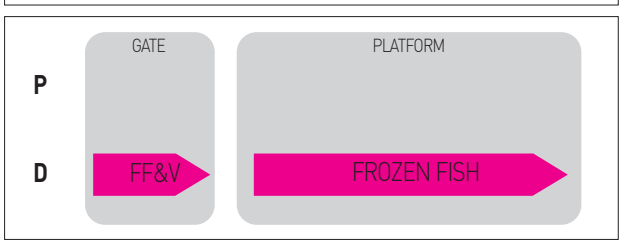
Managing: bodies cannot be integrated
Goals: compatible products only with high costs
Functions: compatible but difficult to integrate

-



Managing: possible cooperations
Goals: compatible products
Functions: synergies

H



Managing: same manager
Goals: limited goals
Functions: synergies

L

Low - Medium - High

4.4 Verification and priorization of the solutions: business idea definition

The study of Ravenna Distripark for perishable goods was not developed starting from the analysis of given hypothesis. On the contrary, it aimed at identifying possible opportunities for operators and at stimulating the operators business activation.
In the absence of specific entrepreneurial choices, the main goal is not only to devise a business plan for a specific logistic solution but also and foremost to define (starting from identified opportunities) which are technical, economic and managing resources needed to put that specific solution in place, in terms of:

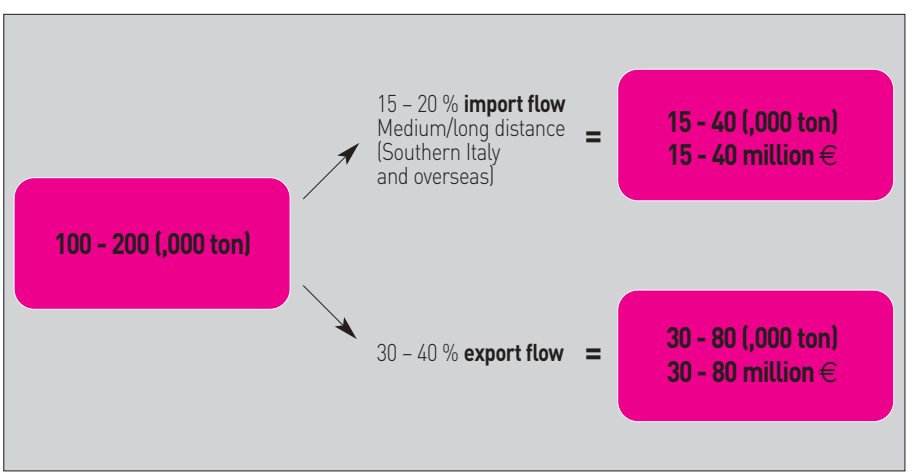
- Possible volumes of activity (for example volumes related to medium distance flows of an operator or of a group of operators in the production of fresh fruit & vegetables).
- Economic requirements, such as:
  - Reduction of logistic and transport costs to be implemented by consolidating and/or changing transport modes (in line with market requirements)
  - Consistency and sustainability of managing costs in the product value chain (loading phases, handling, mode change etc...)
- Technical and organisational requirements (infrastructures, managing, services, consistent models for integrating supply and demand).

In the following these requirements are examined with particular reference to hypothesis n. 1, which represents the main option.

4.4.1 Business idea definition: volume of expected activities

- The first 4 organizations of producers of Emilia-Romagna (and in particular those operating in the Romagna area) account for about 30 % of regional production of Fruit & Vegetables (480,000 tons per year).
- According to this hypothesis, the activity of the platform should refer to volumes of one or two organization of medium/large producers. As a consequence, the total volumes of production with reference to the logistic platform could total to 100,000 – 200,000 tons per year according to the following figure 4.7.
- The management of the sole import/export volumes coming from/directed to medium-long distance could be equal to 300 – 400 tons per day.
- Considering the hypothesis concerning the sole cross-dock operations, the previous evaluation could conduct to a need of 6,000 – 7,000 covered sq m, excluding further extended stocking/processing areas, linked to larger industrial and logistic-distributive requirements.

FIGURE 4.7 VOLUMES OF EXPECTED ACTIVITIES FOR THE LOGISTICS PLATFORM



4.4.2 Business idea definition: economic assumptions

At present logistics costs of the Fruit & Vegetables Italian industrial chains generally account for 10.4 % of the turnover; 3.7 % of the cost is related to transport.
The logistic benefits to be directly achieved on transport costs by means of an intermodal regional platform for one or more F&V producers are:

- Benefits connected to flows integration and loads consolidation: it can be made an hypothesis with a saving of 5-6 % of transport cost (better in/out saturation of transport means, reduction of empty trips).
- Benefits related to the modal shift:
  - 30% of transport costs, from road transport to SSS (distances > 400 km for not unaccompanied trailers);
  - 60% of transport costs, road transport to overseas;
  - 40% of transport costs, from road transport to combined transport (distances > 200Km)

These values represent the size of the incremental added value linked to the benefits of intermodality.
The possible incremental costs, linked to the possible location and to the management of the logistic platform within the area of Ravenna seaport, should be compared with these values (overcost of the platform).

Logistic benefits would thus lead to transport cost saving of about 850,00 € (maximum value). Considering the structure of the logistic and transport systems of the main fruit & vegetable producers of the Romagna area, possible cost saving could be as follows:

	AT PRESENT	IN THE FUTURE	TRANSPORT MODE VARIATION	% SAVING ON TRANSPORT COSTS (*)
IMPORT	97% road 3% overseas	70% SSS 20% road 10% overseas	**70%** road → SSS **7%** road → overseas	**26%**
EXPORT	97% road 3% combined (land)	80% road 20% combined (land)	**17%** Road → combined (land)	**7%**

(*): percentage on the turnover

Cost saving is as follows:

	CONSOLIDATION	IMPORT	EXPORT	TOTAL
LOWER TRANSPORT COSTS (€)	250,000	400,000	200,000	**850,000**

The figures above represent the size of the additional added value related to the benefits offered by intermodality
Such benefits shall be compared to possible additional costs for the positioning and management of the platform in the port of Ravenna (additional costs in comparison with those of a platform itself).

4.4.3 Final remarks: costs and benefits

The figures in the previous page merely represent a **cost differential** directly related to the cost of transport and the opportunities offered by intermodality.

As already mentioned, **in order to properly and completely assess costs and benefits, an existing logistic structure of one or more operators should be considered.** This would allow to devise a specific business plan as well as quantify and evaluate the additional industrial, logistic and distribution benefits generated by the platform for the operators considered. Such benefits include:

- Possible centralisation of dispersed stocks (financial and handling savings and reduction in product loss),
- Stabilisation of inbound flows from production markets (reduction in sales loss, more regular production planning etc...),
- More efficient transports (strategic location vis-à-vis of origin/destination markets, increased flow integration, etc...),
- More qualified service for different sale channels,
- Use of the infrastructure as a place where logistic activities and services can be planned and carried out, such as:
  - reorganisation of the industrial row according to multipick/multidrop systems
  - chain control
  - outsourcing and subsequent integration of separated flows
  - outsourcing of stock management by operators of other industrial chains (for example large scale distributors)
  - change in the size, unitisation and unloading of containers.

The considered choice includes a direction-board led by production operators.

These operators hold the critical flow masses and they can redefine their role within the value chain.

This means that:

- they should start up joint ventures (alliances) with other competitors in order to strengthen the critical mass, sharing the risks and the advantages of the solutions;
- they should engage in the project other operators belonging to the industrial chain (e.g., GDO) in order to focus the activities of the logistic platform and to share the related benefits;
- producers are not slightly expert in the development and management of logistic services, in particular intermodal services. The role of the specialized logistic operators as managers of the logistic platform and related services is crucial.
- Related benefits should be:
  - higher flexibility in the management;
  - higher specialization in intermodal logistics;
  - integration of different operators belonging to the industrial chain (transversal among production and distribution).

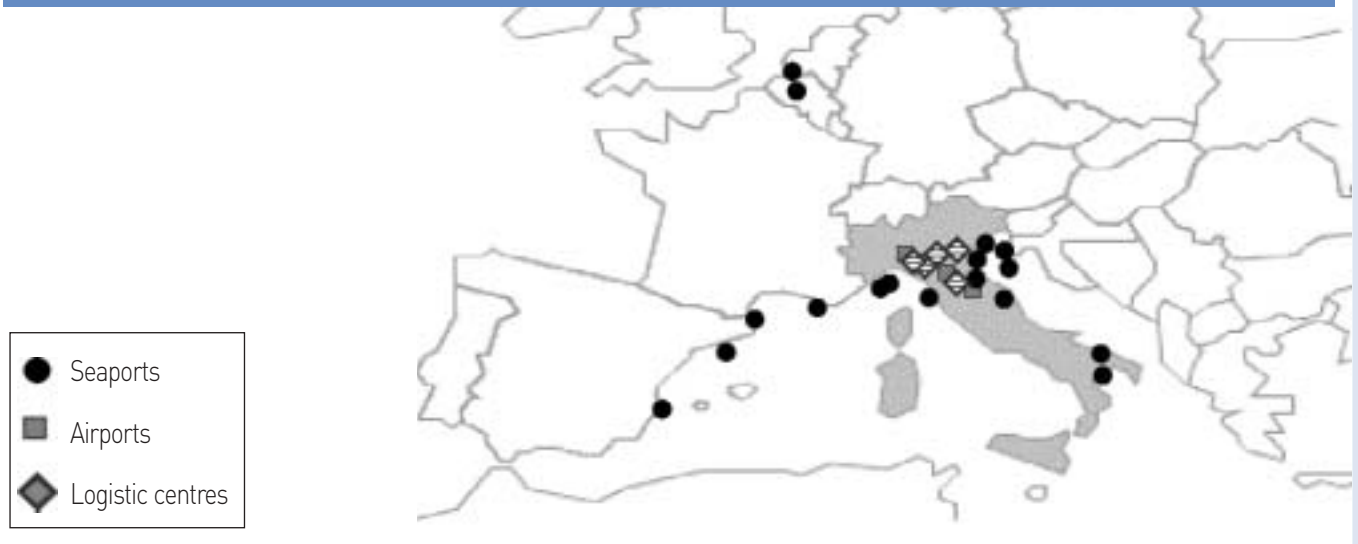
ANNEX 1 TRANSPORT AND LOGISTIC NETWORKS FOR PERISHABLE GOODS - REVIEW OF THE MAIN INFRASTRUCTURES FOR PERISHABLE GOODS IN EUROPE

A mapping of the main Italian and European logistic nodes was carried out and thanks to it the speciality features of each one of them and the future specialisation actions they have planned have been highlighted, paying special attention to perishable goods.

FILE SCHEME		
INFRASTRUCTURE NAME		
GENERAL INFORMATION		
LOCALISATION	Geographical position of the facilities	
MANAGING COMPANY	State or private bodies managing the activities of the facilities	
MAIN TYPES OF PRODUCTS	Main products for which different types of services within the facilities exist	
TOTAL FREIGHT VOLUMES	Total amounts of freight carried through the facility per year	
SERVICES PROVIDED	Types of services, basic or supporting ones, available in the facility for the different goods	
MAIN OPERATORS	Name of the main companies operating within the facility, and typologies of the activities they carry out for the various products	
MAIN ITALIAN EXCHANGE AREAS	Main Italian origins and destinations of the freight carried through the facility	
MAIN FOREIGN EXCHANGE AREAS	Main foreign origins and destinations of the freight carried through the facility	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	Infrastructures and equipment available within the facility to stock and to handle and other operations on freight	
AREAS	Total	Total infrastructure area
	Warehouses	Total area (open areas, covered warehouses, etc.) used to stock the goods
	Warehouses (% out of the total area)	Infrastructure stocking vocation index
	Intermodal terminal	Total area destined to the exchange of freight between different transport systems
	Intermodal terminal (% out of the total area)	Infrastructure intermodality vocation index
MAIN TRAFFIC ROUTES	Main sea, land or air routes crossed by the freight which are carried through the facility	
OPERATIONAL SYSTEMS		
SYSTEMS USED	Systems used to transport goods (train, ship, aircraft, truck)	
Truck	Amounts and equipment related to truck transport	
Train	Amounts and equipment related to train transport	
Ship	Amounts and equipment related to ship transport	
Aircraft	Amounts and equipment related to aircraft transport	
CONNECTIONS	Roads	Closest roads and motorways
	Railways	Closest railway terminals
	Seaports	Closest seaports
	Airports	Closest airports

GENERAL DEVELOPMENTS	
TRAFFICS	Traffic future development trends
INFRASTRUCTURES	Infrastructural future development trends
INTERMODALITY	Intermodality development future trends
OTHERS	Any other development
PERISHABLE GOODS	
TYPES OF PRODUCTS	Types and characteristics of the perishable goods processed
FREIGHT VOLUMES	Amounts of perishable goods handled through the facility per year
SERVICES PROVIDED	Types of services, basic or supporting ones, available in the facility for the different goods
TERMINALS, WAREHOUSES AND OTHER FACILITIES	Infrastructures and equipment available within the facility to stock and to handle and other operations on perishable goods
SERVICES PROVIDED	Types of services, basic or support ones, available in the facility for perishable goods
MAIN ITALIAN EXCHANGE AREAS	Main Italian origins and destinations of the perishable goods passing through the facility
MAIN FOREIGN EXCHANGE AREAS	Main foreign origins and destinations of the perishable goods passing through the facility
MAIN TRAFFIC ROUTES	Main sea, land or air routes crossed by the freight which are carried in the facility
DEVELOPMENTS	Traffic, infrastructural, intermodality, etc. future development trends as regards perishable goods

THE ANALYSED NODES



SEAPORTS HANDLING PERISHABLE GOODS

GENOA SEAPORT

GENERAL INFORMATION		
LOCALISATION	The seaport of Genoa uninterruptedly covers 20 km along the coastal area which develops from the Ancient Port Basin (corresponding to the historical centre of the city), up to its western extremity.	
TOTAL AREA	500 hectares of land surface and same area for the water surface	
MANAGING COMPANY	Genoa Port Authority (which took the place of the Autonomous Consortium of the Port of Genoa).	
MAIN TYPES OF PRODUCTS	• Petroleum products • Dangerous goods • Iron and steel products • Forest products • Non-ferrous materials	• Coal • Food and other liquid bulk cargo • General cargoes • Frozen or quick-frozen fruit, vegetables and food (Genoa is the main Italian port for the reception of frozen meat)
PERISHABLE GOODS TERMINAL	Terminal Frutta Genova – Genoa Fruit Terminal Containers terminals • VTE Voltri Terminal Europa • SECH (Southern European Container Hub) • Messina Terminal	

OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	• Ship • Aircraft
CONNECTIONS	Roads	Genoa is the junction and switching hub of three motorway traffic routes which link the city to the French coast to the West (A10), to the Po valley to the North (A7 and A26) and to the Tyrrhenian coast of central Italy (A12) to the East. The West Genoa motorway exit is used by the truck traffic to reach the 11 freight terminals in the Sampierdarena zone. The Petroleum Port terminal is reached through the Genoa-Pegli exit, the VTE terminal of Voltri has a direct connection with the Genoa-Voltri toll-house.
	Railways	All the seaport terminals are provided with railway connections which allow to easily shunt block trains and single carriages towards the nearby freight terminal, linked to the national and European networks.

OPERATIONAL SYSTEMS		
CONNECTIONS	Seaports	The Seaport is next to the Cristoforo Colombo airport, located in an artificial peninsula, created by filling a sea area in the neighbourhood of the Petroleum Port. It can be reached through a special A10 motorway exit.
MAIN OPERATORS	• PSA (T) • EVERGREEN • MAERSK • MSC	• COSCO • ZIM Israel • HYUNDAI
NON-PERISHABLE GOODS		
MAIN OPERATORS	• Gruppo Campostano • Maersk-Sealand • Voltri-PSA • GIP • Grimaldi • UASC • NYK • CMA	
TOTAL VOLUMES HANDLED	2001	49,507,061 tons; 1,526,526 teus
	2002	50,983,404 tons; 1,531,254 teus
	2003	52,923,528 tons; 1,605,946 teus
SERVICES PROVIDED	• Coastal trade • Ro-Ro • Liquid/solid bulk cargoes	• Container Feeding • Container transhipment • Cruises
TERMINALS FOR OTHER GOODS	General Cargoes • Multipurpose Terminal • Genoa Metal Terminal • Genoa Port Terminal Industrie Rebora • CSM • Genoa Fruit Terminal • FO.RE.ST. Ro-Ro • Grimaldi Group Solid bulk cargo • Terminal Rinfuse Italia	Liquid bulk cargo • SAAR Depositi Portuali • SILOMAR • Tirreno Silos • Transacomar Petroleum products • Genoa Petroleum Port Passengers Terminal • Dock Stations • Cruise terminal • Ferryboat terminal
GENERAL DEVELOPMENTS		
TRAFFICS	• containers: increase to 2,200,000 in 2004 (considering only traffics which have been already verified in the seaport and without considering the possible arrival of large international companies);	

GENERAL DEVELOPMENTS	
TRAFFICS	• ro-ro traffic: increase up to 7,400,000 tons, still in 2004, with an 1,000,000 ton increase comparing to 2001. • liquid bulk cargo: steady traffics; • solid bulk cargo: increase by approximately 20%; • development of a greater effectiveness and efficiency of the intermodal networks to gradually enlarge the group of clients towards the industrial areas which are economically more accessible (central and southern Europe).
INFRASTRUCTURES	There are new structure plans for the dismissed areas of the Multedo Petroleum Port, for which the Genoa Port Authority will allocate 130 million euro: three wharfs with five berths and a large quay for the preparation of the new food pole; to the East, towards Fincantieri, a new wharf will be built, "Epsilon", for emergency situation; work completion at the end of 2005 is foreseen.

PERISHABLE GOODS TERMINAL

GENOA FRUIT TERMINAL		
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2001	133,323 tons (loading: 1,132; unloading: 132,191)
	2002	160,615 tons (loading: 1,137; unloading: 159,478)
	2003	160,567 tons (loading: 2,845; unloading: 157,722)
MAIN PERISHABLE GOODS	• Fresh and frozen leguminous vegetables • Fresh fruit (bananas,...)	
SERVICES PROVIDED	• Loading • Unloading • Storing	• Sorting • Redispatch • Handling
MAIN OPERATORS	Terminal Frutta Genova (TFG) – Genoa Fruit Terminal, company founded in 1989 and belonging to the Clerici S.p.A. Logistic Group holding (headquarters in Ponte Somalia)	
MAIN EXCHANGE AREAS	Its specialised facilities and its strategic position within the seaport make this terminal an ideal distribution centre for the traffic towards Northern Italy and the European countries.	
MAIN TRAFFIC ROUTES	• Northern Western Europe • North America • South America • Far East	• Middle East/Eastern Europe • Southern Mediterranean/Northern Africa

INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• QUAYS - Overall length: 600 m - Berths: 4 - Waters depth: 9 m • AREAS - Covered: 23,500 sqm; - Open: 37,000 sqm; - Total: 60,500 sqm • REFRIGERATING CAPACITY - Refrigerating rooms: 8; - Stocking capacity: 11,000 pallets from -2°C to 14°C - Other rooms: 10,700 sqm; - Refrigerated volume: 65,000 sqm • EQUIPMENT - 6 ton capacity cranes: 5; - Container cranes (80 ton): 1; - Contstackers: 1; - Trucks: 26; - Transpallet: 23; - Refrigerating containers plug sockets: 20; - Truck loading stations: 17; - Average unloading yields: 400/600 tons/sq/shift Over the years, through significant investments in facilities and organisation, TFG has become a real logistic platform (distripark).
DEVELOPMENTS	
INFRASTRUCTURES	The long term expansion plan designed by the Port Authority has envisaged the revitalisation of the Terminal, envisaging the enlargement of the Ro/Ro and the containers handling operations and the building of a new refrigerating facility.

VTE VOLTRI TERMINAL EUROPA		
DESCRIPTION	Voltri Terminal Europa (VTE) is the largest container terminal of the Seaport of Genoa and it handles also a certain quantity of refrigerator containers, having a 530 TEUs capacity over a total 500,000 sqm container capacity.	
TOTAL VOLUMES OF CONTAINERS HANDLED	2001	818,235 TEUs (refeer and others)
	2002	875,573 TEUs (refeer and others)
	2003	868,319 TEUs (refeer and others)
MAIN OPERATORS	The VTE terminal is controlled by PSA Corporation through 60% of the capital of the affiliated company Sinport. VTE is used by more than 30 shipping companies (including Evergreen, Maersk-Sealand, etc.).	
MAIN EXCHANGE AREAS	• Far East (22%); • North America (28%); • Central - South America (14%); • Mediterranean/Middle East (27%);	• Central – Southern Africa (3%); • Indian continent (2%); • Other destinations (4%)
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• QUAYS - Overall length: 1,400 m - Waters Depth: 15 m - Total area (excluding distripark): 1,000,000 sqm • STOCKING AREAS - 5 yard modules: 500,000 sqm; - Ground slots: 9,600 - Refeer plugs: 530; - IMDG slots: 500 • MAIN EQUIPMENT - Quay cranex: 8; - RTG: 19; - RMG: 3; - RS:20; - Prime movers: 50 • PDE Prà Distripark Europa (integrated logistic platform centre)	
DEVELOPMENTS		
INFRASTRUCTURES	An expansion of the terminal by 350 m in quays and 400,000 sqm of open spaces has been planned, together with the purchase of other 4 post panamax cranes and 6 pneumatic-tyred transtainer; that will allow an increase of the overall capacity by 2 million TEUs per year.	

NINO RONCO TERMINAL (MESSINA TERMINAL)		
DESCRIPTION	The Messina Terminal is the leader in the Seaport of Genoa in multipurpose terminal handling and it also provides a 24 TEU capacity for refrigerator containers (out of a total capacity of 167,877 sqm and 8,051 TEUs).	
TOTAL VOLUMES OF CONTAINERS HANDLED	2001	264,099 TEUs; 212,761 tons; 129,067 lm
	2002	252,456 TEUs; 200,669 tons; 129,551 lm
	2003	249,051 TEUs; 164,650 tons; 141,852 lm
MAIN OPERATORS	The Terminal is managed by Ignazio Messina & Co. SpA	
SERVICES PROVIDED	• Receipt • Stocking • Consolidation • Loading • Unloading	
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• QUAYS - Overall length: 1,215 m; - Berths: 4 (2 for container vessels, 2 equipped with Ro/Ro facilities) - Water depth (maximum): 12 m - Turning basin (Rocco Lavante – Canapa Pon.): 152 m; - Turning basin (Rocco Testata – Diga Foranea): 164 m; • TERMINAL - Total area: 167,877 sqm; - Vehicles area: 6,500; - Rolling stock area: 8,000 sqm; - Covered warehouses area: 18,000 sqm; - Refrigerator plug sockets: 24 • STOCKING AREAS - Container Capacity: 8,051 TEU; - IMDG container area (planned maximum): 305 TEU; • MAIN EQUIPMENT - Ship – shore container gantries (STS): No.3; - Rail mounted yard Gantry crane (RMG): No.4; - Reach Stackers (RS): No.9; - Trucks: 26; - Fork lifts: No. 29; - Dock fifth wheel couplings: No. 21; - Trailers: No. 30; - Low bed trailers: No. 7;	

INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• RAILWAY LINES - Operational lines: No.3; - Emergency lines: No.2; - Single line length: 480 m

S.E.C.H. TERMINAL (SOUTHERN EUROPEAN CONTAINER HUB)		
DESCRIPTION	The SECH terminal is the third container terminal in the Seaport of Genoa, it is also provided with refrigerated stocking areas (261 TEUs refrigerator storage capacity) out of a total container capacity of 13,000 sqm.	
TOTAL VOLUMES OF CONTAINERS HANDLED	2001	260,249 TEUs (refeer and others)
	2002	213,460 TEUs (refeer and others)
	2003	363,628 TEUs (refeer and others)
MAIN OPERATORS	The SECH terminal is managed by one of the most experienced Italian terminal companies, the Terminal Contenitori Porto di Genova SpA.	
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILIITIES	• QUAYS - Overall length: 526 m; - Total area: 182,000 sqm; - Waters depth: 16 m; - Container berths: No.2/3 sqm; - Turning basin: 500 m; • STOCKING AREAS - Container capacity: 13,000 sqm; - IMDG container stations: No.120; - Refrigerator capacity: 261 TEU • MAIN EQUIPMENT - Quay cranes: 5; - RTG: 8; - RMG: 6; - RS: 16; • RAILWAY LINES - Operational lines: 3*370 m; - Emergency lines: 2*370 m	
DEVELOPMENTS		
INFRASTRUCTURES	Development plan through 2 phases which will provide a 1,000,000 TEUs overall capacity and a 540,000 sqm terminal area.	

SAVONA – VADO SEAPORT

GENERAL INFORMATION		
LOCALISATION	• Savona: Area to the east of the city at 44° 18' 36" longitude East • Vado: Western area of the district at coordinates 44° 16' latitude North e 8° 26' longitude East	
MANAGING COMPANY	Port Authority of Savona	
AREAS	Savona • Covered operational area: 532,400 sqm; • Open operational area: 58,500 sqm; • Quays length: 3,950 m	Vado • Covered operational area: 351,500 sqm; • Open operational area: 55,600sqm; • Quays length: 3,660 m
MAIN TYPES OF PRODUCTS	Savona • New cars • Steel • Forest products • Food solid bulk cargo • Industrial bulk cargo • Fertilisers • Cements	Vado • Fruit • Coal • Cereals • Coke • Petroleum Products • Soft commodities • Coffee
PERISHABLE GOODS TERMINAL	Vado • Refeer Terminal - Leader in the Mediterranean area for the traffics of fruit distributed throughout Europe by train and by truck - container - Ro – Ro trucks, trailers, new cars	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	

OPERATIONAL SYSTEMS			
CONNECTIONS	Roads		<u>Motorways</u> Savona – Turin (A6), Savona – Ventimiglia (A10), Savona – Genoa (A10) <u>National roads</u> Aurelia (SS1), Savona – Cairo – Piana Crixia (SS29)
	Railways		• The railway line crossing the whole Liguria Gulf arc • 2 railways which reach Turin, through Ceva and Milan, passing through the Milan district
NON PERISHABLE GOODS			
MAIN OPERATORS	<u>Savona</u> • Savona Terminal auto (new cars) • Must (steel) • Savona Terminals (forest products) • Savona silos (food bulk cargoes) • Monfer (food bulk cargoes) • Miramare (industrial bulk cargoes) • BuT (fertilisers) • Metec (cements) • Costa Cruises (Cruises in the Mediterranean Sea) • Mondo Marine (sailing and engine yacht production and services) • Azimut (sailing and engine yacht production and services) • W Service (sailing and engine yacht production and services)		<u>Vado</u> • Forship (passengers, short sea shipping) • TRI (bulk cargoes: coal, cereals, coke) • Erg (petroleum products) • Esso (petroleum products) • Petrolig (petroleum products) • Sarpom (petroleum products) • Vio (soft commodities, coffee) • Multiterminal (soft commodities, coffee)
TOTAL VOLUMES HANDLED	2001	• General cargo: 1,789,000 • Containerised cargo: 336,000 • Agricultural bulk cargo:609,000	• Coal and minerals: 2,870,000 • Liquid bulk cargo: 7,663,000 • Containers (TEU): 50,092,000
	2002	• General cargo: 1,875,000 • Containerised cargo: 369,000 • Agricultural bulk cargo:772,000	• Coal and minerals: 2,519,000 • Liquid bulk cargo: 7,613,000 • Containers (TEU): 54,796
	2003	• General cargo: 1,986,000 • Containerised cargo: 410,000 • Agricultural bulk cargo:653,000	• Coal and minerals: 3,191,000 • Liquid bulk cargo: 7,171,000 • Containers (TEU): 53,543

NON PERISHABLE GOODS		
OTHER PRODUCTS TERMINALS	Savona • New cars terminal • Steel terminal • Forest products terminal • Food products silo • Monfer food bulk cargo facility • Miramare industrial bulk cargo facility • BuT fertiliser terminal • Metec cement terminal • Passenger terminal	Vado • Ro – Ro Forship Terminal - Linked to passenger ferryboats to Corsica and Sardinia - Short sea shipping services • Terminal rinfuse Italia (TRI) - Coal - Cereals - Coke • Petroleum products unloading wharfs (Erg, Esso, Petrolig, Sarpom) Soft commodities intermodal centre, hosting the most important Italian centre processing coffee, which is distributed from here throughout Northern Italy and Southern Europe (Vio, Multiterminal)
GENERAL DEVELOPMENTS		
INFRASTRUCTURES	• Innovative management system of the seaport railway shunting service, extended also to the network to improve the effectiveness of the links towards Southern Europe. • Multipurpose platform in the Vado roadstead to develop the containerised traffic (new terminal with 200,000 sqm operational area, 600 m rectilinear quay, draught beyond 15 m with a 500,000 TEU/year potential). • Solid bulk cargo terminal Darsena Alti Fondali (deep waters wet dock), 350 m quay, more than 18 m draught, which will allow the reception of ships with any tonnage. Through a continuous unloader with a 2,000 t/h potential, the facility will be able to handle solid and dusty bulk cargoes. • To better take advantage of the privileged position of Vado, there is a plan to build new facilities destined to coastal trading, with an extension of the wet dock in the Capo Vado area and the realisation of a second Ro – Ro berth. • Building of a new connection system between the port areas and the road system.	

PERISHABLE GOODS TERMINALS

REFEER TERMINAL VADO		
DESCRIPTION	The Refeer Terminal, controlled by Orsero Group (GF Group), has a 45,000 sqm area (50% covered) and it is the Mediterranean leader in the fruit sector. (This terminal also carries out activities for Ro – Ro traffics, thanks to a special berth which is undergoing an enhancement process).	
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2002	496,000 tons; 52,400 TEUs
MAIN PERISHABLE GOODS	• Bananas and pineapples (68%) • Citrus fruit and other fruits from the Southern hemisphere (in the opposite season)	
MAIN OPERATORS	Managed by Refeer Terminal, controlled by GF Group	
MAIN EXCHANGE AREAS	• Southern Eastern American coast • Venezuela • Costa Rica • Dominican Republic • Western Africa	• Cuba • Canada • Mexico • France (Paris/Lyon) • Slovenia (Sezana)
CONNECTIONS	Roads Railways	Direct link to the Genoa-Ventimiglia motorway Railway junction in the quay
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• Refrigerating depot provided with 12 independent room (overall capacity 7,500 plts) • Air-conditioned warehouse (3,500 plts), provided with: - Automatic equipment for vehicles horizontal loading. - Railway tracks to load carriages in temperature-controlled environments • Container terminal provided with potentially 10,000 TEUs, 2 portainers, 2 transtainers, railway junction and plug sockets for refrigerating containers (the recent acquisition of the terminal allows Refeer Terminal to directly handle the increasing traffics of fruit in refeer containers). This terminal handles also general cargo containers.	

LIVORNO SEAPORT (LEGHORN)

GENERAL INFORMATION		
LOCALISATION	Coordinates 43° 32' .6 latitude North and 10°17',8 longitude	
MANAGING COMPANY	Port Authority of Livorno (Leghorn)	
MAIN TYPES OF PRODUCTS	• Container (export: marble, tiles, Florence handicrafts, wines, etc.; import: technological, computer, electronic products and fabrics, paper/paperboard wastes destined to the factories in the Prato and Lucca districts) • Raw minerals • Solid bulk cargo • Liquid bulk cargo • Vehicles • Timber and cellulose • Dangerous goods • Petroleum products • Foodstuff (including fresh fruit and frozen products) • Fish (receipt port of the inputs which feed the productive processes of Panapesca, the largest Italian catch importer)	
TOTAL AREA	1,600,000 sqm of waters and 2,500,000 sqm of dry land area (800,000 sqm in customs procedures)	
PERISHABLE GOODS TERMINALS	• Dole Terminal • Giolfo & Calcagno Terminal	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	
CONNECTIONS	Roads	Its features are not very different from those of the competitor seaports, as regards the north/north-east routes, as it can count on a rapid penetration axis to the north (Leghorn-Genoa motorway, which has a junction to the La Spezia-Parma motorway) and to the east/north-east through the A1 link road to Florence. There are less efficient links to the centre-south of Italy (the completion of the A12 up to Civitavecchia is needed instead of SS1 Aurelia).

OPERATIONAL SYSTEMS		
CONNECTIONS	Railways	The various quays and dock areas are provided with connected railway tracks. The operations to handle goods and containers are carried out through the facilities of the Leghorn Calambrone Station which is linked to the Tyrrhenian route Rome-Pisa-Genoa-Turin and, through it, to the Florence-Bologna line and the Pontremolese line.
	Ports	The Leghorn Seaport is linked to the most important seaports of the world via 5,000 ships (per year) and 200 regular traffic shipping companies.
MAIN OPERATORS	• TDT (T) (Contship Italia) • EVERGREEN • P&O	• ZIM Israel • MAERSK • SEA LAND
NON-PERISHABLE GOODS		
MAIN OPERATORS	• Contship • MSC	
TOTAL VOLUMES HANDLED	2001	24,664,953 tons; 531,814 teus
	2002	25,328,372 tons; 546,882 teus
SERVICES PROVIDED	• Container transhipment • Container feeding • Ro-Ro • National coastal trade • Cruises	
NON-PERISHABLE GOODS TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Gas terminal • 2 container terminals • 2 solid bulk cargo terminals • 7 paper/forest products terminals • 2 railway stations equipped with 60-km-long tracks • 11 operational quays • 90 berths • 2 350,000 ton dry docks, among the largest in the Mediterranean Sea • 2 floating docks • 3,000 sqm dock station, equipped with waiting rooms, banks, restaurant, bar, day nursery, first aid station and 1,500 sqm parking area	
MAIN ITALIAN EXCHANGE AREAS	Traditional hinterland: • Tuscany • Emilia-Romagna • Umbria • Marche	

NON-PERISHABLE GOODS	
MAIN ITALIAN EXCHANGE AREAS	• Others New exchange areas: other regions in the Po valley and Emilia-Romagna areas, which are particularly rich in entrepreneurial initiatives involving international traffics
MAIN FOREIGN EXCHANGE AREAS	• North America • Southern America • Middle East • Far East
MAIN TRAFFIC ROUTES	• North America • Southern America • Middle East/Eastern Europe • Far East • Tyrrhenian railway route: Rome-Pisa-Genoa-Turin-Florence-Bologna • Roads: northbound and northeastbound
GENERAL DEVELOPMENTS	
INFRASTRUCTURES	• New buildings and various infrastructural renovations (28 billion € expenses) • Building a parking area and road transport service facilities • Building the new Italia pier, with a 13 m depth, 1,000 sqm quays and more than 45,000 sqm open areas. Moreover, the funds will be used to restore the water depths of the Petroleum wet dock, of the Eastern shore of the Toscana wet dock and of the new dry dock.

PERISHABLE GOODS TERMINALS

DOLE TERMINAL	
DESCRIPTION	The Dole Terminal is a terminal specialised in handling and stocking fresh fruit
MAIN PERISHABLE GOODS	Bananas and exotic fruit
SERVICES PROVIDED	Preservation, containerisation and distribution of exotic fruit
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• Temperature-controlled warehouses with a 35,000 m3 capacity • 3 capacious refrigerating rooms capable to contain up to 200,000 tons per year • 100 plug sockets for refeer containers

GIOLFO & CALCAGNO TERMINAL	
DESCRIPTION	The Giolfo & Calcagno Terminal is a facility specialised in frozen products traffic
MAIN PERISHABLE GOODS	Frozen fish products
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• 80 m quay • 23,812 sqm total area (13,359 sqm are covered) • refrigerating rooms with a total 4,700 m3 capacity

ANCONA SEAPORT

GENERAL INFORMATION		
LOCALISATION	Latitude East: 13, 29' 69''; Latitude North: 43, 37' 39''	
MANAGING COMPANY	Ancona Port Authority	
TOTAL VOLUMES HANDLED (LOADING AND UNLOADING TOTAL)	2001	• Solid freight: 1,810,021 • Liquid freight: 5,123,199 • Freight in trucks: 6,092,415 • Freight in containers: 691,655
	2002	• Solid freight: 1,707,897 • Liquid freight: 5,056,399 • Freight in trucks: 5,044,499 • Freight in containers: 705,180
	2003	• Solid freight: 1,563,592 • Liquid freight: 5,162,718 • Freight in trucks: 2,304,102 • Freight in containers: 544,395
MAIN TYPES OF PRODUCTS	The Seaport of Ancona handles all the main types of goods, solid and liquid ones, both in bulk and in units. In particular: • Mineral oils • Coal (destined to the Ancona – Falconara refinery) • Oil seeds • Cereals • Food (sugar, oil, flour) • Kaolin • Cement/Clinker • Coils • Timber • Cellulose • Metals and iron ore • Components supply/Finished products	

GENERAL INFORMATION		
MAIN TYPES OF PRODUCTS	• Clay-bound gravel/Marble • Leguminous vegetables • Frozen products (the Ancona Port follows the Leghorn and Genoa ones in the amounts of loaded and unloaded frozen products)	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship • Aircraft	
CONNECTIONS	Roads	Links with the national road network (SS16 'Adriatica' to and from Milan and Bari, SS76 to and from Rome and Central Italy) and with the motorway network A14 to and from Milan and Bari
	Railways	All the main berths are linked to a seaport internal railway network which is linked to the national and international one. Important railway junction of the Milan/Bari and Ancona/Rome lines.
	Airports	Direct link to the Ancona - Falconara airport
MAIN OPERATORS	• MAERSK	
NON-PERISHABLE GOODS		
SERVICES PROVIDED	• Ro-Ro • Lo-Lo • Container	
MAIN OPERATORS	• Fast Ferries • Attica Line • Zim	• Evergreen • Msc. • Maersk-Sealand
MAIN EXCHANGE AREAS	• Greece • Croatia • Albania	• Turkey • Montenegro
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 5,400 metres of quay • 12,5 m draught • 370,000 sqm of equipped areas • 25 berths • Ro-Ro/Ferries berths equipped with Ro-Ro ramps and operational and parking areas covering 40,000 sqm • Equipment to handle the freight • Dock cranes and general cargo cranes	

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 2 45 tons Paceco ship-to-shore portainers • Equipment to load/unload and to handle bulk cargoes, such as pneumatic lifts, pumps, and suction fans for wheat, coal and cement, fork lifts, trailers, etc. • Api Refinery	
AREA	Total	700,000 sqm of waters
GENERAL DEVELOPMENTS		
INFRASTRUCTURES	• Building of a 990-metre-long dam and creation of new open spaces (additional 990-metre-long quay and a wide operational area to park and stock the freight will be available) • Improvement of the road links to and from the seaport (to by-pass the urban road system and to directly link the northern part of the port to the motorway and the Ancona/Rome railway line) • Building an equipped junction to link the port with the South Ancona motorway exit	
TRAFFICS	The Seaport of Ancona has developed the freight traffic very much in the past decade. The movement has recorded a general increase in all the types of goods, with particular peaks in the dry bulk cargoes (a 50% increase), liquid cargoes (an increase by more than 40%) and for the traffic of container unit cargoes (a 170% increase in the tonnage). A remarkable development was recorded also in the coal traffic which, in a few years, has increased considerably (50%), generating a number of industrial and environmental investments. Very recently, a strong increase in the freight flow by truck and by trailer (an increase by more than 700%) has also been recorded. Thanks to the improvement of the facilities and to the enhancement of the services provided, the port of Ancona has become the real Greek door of the European Union.	
PERISHABLE GOODS		
TYPES	• Leguminous vegetables • Quick-frozen products (the Seaport of Ancona follows the Leghorn and Genoa ones in the amounts of loaded and unloaded quick-frozen products)	
FISHERY	Ancona is the first fishing seaport of the Adriatic sea with 130 fishing boats for trawling and fly fishing, 50 boats for clam fishing and 30 boats for offshore fishing. Besides, more than 1,000 pleasure boaters moor their boats in the new tourist port "La Marina Dorica", located beside the commercial port. To support the fishing activities, Ancona is provided with the most modern fish market in Europe and with an effective land services network: large depots and warehouses, repair shops, ice-making plants, food and on-board equipment supplies.	
TOTAL VOLUMES HANDLED (LOADING AND UNLOADING TOTAL)	2001 2002 2003	Leguminous vegetables: 248,878 Leguminous vegetables: 195,870 Leguminous vegetables: 209,394

TRIESTE SEAPORT

GENERAL INFORMATION		
DESCRIPTION	The Seaport of Trieste is divided into the following two large sectors: • Commercial Seaport (including the old free point – with the Customs Port and the Dock Station – the new free point and the timber port); • Industrial sectors (including the Servola ironworks, the S.I.O.T. oil pipeline, the Mineral Oils free point and the industrial port).	
LOCALISATION	Latitude: 45º 39' North; Longitude: 13º 47' East	
MANAGING COMPANY	Port Authority of Trieste (corresponding to the pre-existing Autonomous Agency of the Port of Trieste)	
MAIN TYPES OF PRODUCTS	• Cereals • Coffee • Rubber • Cotton • Wool • Non-ferrous Metals	• Textiles • Timber • Mineral Oils (large amounts) • Living animals • Liquid/solid bulk cargo • Perishable goods (frozen products, fruit and vegetables)
PERISHABLE GOODS TERMINAL	• FRUIT AND VEGETABLES There is a fruit terminal located in the Riva Sud – Southern Shore of the Molo V wharf • FROZEN PRODUCTS There is a terminal to unload frozen products (Frigomar mooring).	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	
CONNECTIONS	Roads	The Seaport benefits from a flyover allowing to effectively route the heavy goods vehicles towards the A4 motorway Trieste-Udine-Venice, the routes to Austria and Germany and consequently to the most important European road and railway systems.

OPERATIONAL SYSTEMS		
CONNECTIONS	Railways	Trieste is the most important railway seaport of Southern Europe, provided with 70 km of tracks which serve all the quays and make the trains composition possible already in the terminals; this internal network is linked in a useful way to the Italian and European ones.
	Ports	The Seaport of Trieste has a unique geographical localisation (meeting point between the Mediterranean Basin and the Central and Eastern European developing areas). The Trieste Port Authority is committed to developing 2 traffic routes: • Connection between Far East and Central-Eastern European markets through shipping lines for containerised transport and intermodal networks • Coastal trade among Central Europe, Greece, Turkey, Middle East and Northern Africa, through sea motorways.
MAIN OPERATORS	• EVERGREEN (T) • SEA LAND • MAERSK	• ZIM Israel • MSC
NON-PERISHABLE GOODS		
TOTAL VOLUMES HANDLED	2001	49,324,006 tons, 200,623 teus
	2002	47,326,041 tons, 185,000 teus
	2003	45,700,000 tons, 117,000 teus
SERVICES PROVIDED	• Container transhipment • Container feeding	• Ro – Ro • Bulk cargoes
MAIN OPERATORS	• Container transhipment, container feeding: Tict (Luka Koper- T.O.Delta), Siot, Zim, Maersk- Sealand, China shipping container, Evergreen- Lloyd, Triestino, Contship, MSC, Shenker, Clerici Group, Bruno Ravalico, Pacorini • Ro – Ro: SAMER SRL, ASTRO SRL • Bulk cargoes: T.T.C. SRL, TFT srl, TPS srl	
NON-PERISHABLE GOODS TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Molo VII Container terminal • Adria multipurpose terminal • Transalpine oil pipeline terminal • Timber terminal • Riva Traiana Ferry terminal • Freight terminal: fruit: cereals, living animals, timber (aside from frozen fruit and products) • Molo III terminal • Molo IV terminal	
AREAS	Total	2,304,000 sqm
	Warehouses	925,000 sqm (500,000 sqm covered)

NON-PERISHABLE GOODS		
AREAS	warehouses % out of the total	40%
	Warehouses#	28
	Stocking capacity	• Containers terminal: 3,400 containers (2,700 empty ones) • Handling capacity: 400,000 teus • Refrigerating containers capacity: 184 • Ro-Ro (stocking open area): 35,000 sqm • Bulk cargoes (covered depots): 25,000 sqm (refrigerated air facilities for fruit)
	Free points	1,765,000
	Quays	12.128 Km
	Operational moorings	47
	Waters depth	up to 18 m
MAIN ITALIAN EXCHANGE AREAS	Northern Italy	
MAIN FOREIGN EXCHANGE AREAS	• Bulk cargoes (perishable goods, living animals, liquid/solid bulk cargoes): Egypt, Northern Europe • Ro – Ro: Turkey, Greece, Albania • Container transhipment, container feeding (coffee, rubber, cotton, wool, timber, petroleum products, non-ferrous materials, textiles): Austria, Germany, Switzerland, Hungary	
MAIN TRAFFIC ROUTES	• Bulk cargoes (perishable foodstuff, living animals, liquid/solid bulk cargoes): Southern Mediterranean/Northern Africa • Ro – Ro: Southern Mediterranean/Northern Africa, Middle East/Eastern Europe, Northern Europe • Container transhipment, container feeding (coffee, rubber, cotton, wool, timber, petroleum products, non-ferrous materials, textiles): North America, South America, Southern Mediterranean/Northern Africa, Middle East/Eastern Europe, Far East	
GENERAL DEVELOPMENTS		
TRAFFICS	Containers to Far East, cruises, ferryboats	
INFRASTRUCTURES	• Realisation of passenger/goods terminals at the old free point • Enhancement and enlargement of the timber seaport including the building of a Ro-Ro/goods terminal and of a coal and minerals terminal • Creation of an open area in the former Aquila area for a ferry line and Ro-Ro terminal and creation of a nearby distripark to support port activities • Motorway system completion	

GENERAL DEVELOPMENTS	
INTERMODALITY	Logistic platform to be built between the timber seaport and the former Italsider area. Main features of the work: • Total area involved in the intervention: 247,000 sqm • New open area: 223,000 sqm • New covered port warehouses area: 24,000 sqm • Suspended quay area on piles and slabs: 140,000 sqm • Excavation sludge volume to be located under the quay: 800,000 m^3 • New quay length: 1,300 m • New berth for Ro-Ro vessels, and possible building of a second one • Suspended quays with 6t/sqm operational capacity • Piles with load-bearing capacities allowing to position warehouses and beacon towers • Quays equipped with cranes with 35-ton capacity and 35-metre-long straddle • Railway links allowing to form 350-metre-long block trains • About 500-metre-long new road junction between the present entrance to the timber port – which will maintain the traffic through it – and the border of the logistic platform, near the present access to the Servola ironworks • Railway link envisaging an access through the area of the present timber seaport exploiting one of the existing railway diverted from it not to compromise its functionality.
PERISHABLE GOODS	Development of fruit and vegetables exchanges in the Mediterranean area
ENTREPRENEURIAL/ ADMINISTRATIVE STRUCTURES	• Better incisive promotion of the seaport at national and international level, strict control of the costs and of the port and intermodal yields • The Leghorn T.O. Delta logistic company entered the share capital of Tict, Italian-Slovenian company dealing with the management of the container Molo VII terminal. T.O. Delta bought 30% and should take complete control in 2008. Its first requests to the Port Authority are the enhancement of the quays to allow the use of 4,000-5,000 teu vessels instead of the 2,000-2,500 ones (Il Sole 24ore Trasporti, February 2004)
OTHERS	Old port area reutilisation

PERISHABLE GOODS TERMINALS

FRUIT AND VEGETABLES TERMINAL		
DESCRIPTION	The Molo V terminal is a specialised facility for general cargoes traffics. It is provided with 25,000-sqm-wide covered depots and stocking areas, liquid bulk cargoes silos, container storage, processing and feeding open spaces. In the Riva Sud "Southern Shore" of the Molo V terminal there is the fresh fruit terminal.	
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2002	Fresh fruit and vegetables: 17,717 unloadings
	2003	Fresh fruit and vegetables: 13,315 unloadings
MAIN PERISHABLE GOODS	Fresh fruit and vegetables	
MAIN EXCHANGE AREAS	• Egypt • Northern Europe	
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• Refrigerated air facilities for fruit preservation, covering a total 25,000 sqm area	

FROZEN PRODUCTS TERMINAL		
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2002	Fishery products: 940 unloadings
	2003	Fishery products: 1,186 unloadings
MAIN PERISHABLE GOODS	• Fresh fish • Frozen fish • Seafood	
MAIN OPERATORS	Frigomar	
MAIN EXCHANGE AREAS	• Holland • Scotland • France • Denmark • Spain • Greece	• Sicily • Adriatic Sea • Tyrrhenian Sea
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• Quay length 145 m, Draught 7.62 m	
DEVELOPMENTS		
INFRASTRUCTURES	• Expansion PFN in the Molo V and Molo VI terminals and building quays in the basin included between them to build an open area for container handling and stocking.	

CONTAINER TERMINAL			
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2001	200,623 TEUs	
	2002	185,301 TEUs	
	2003	120,438 TEUs	
MAIN TYPES OF PRODUCTS	• coffee • rubber • cotton • wool		• timber • petroleum products • non-ferrous materials • textiles
TOTAL AREA	400,000 sqm		
SERVICES PROVIDED	• Container transhipment		• Container feeding
MAIN OPERATORS	• T.O. Delta • Lula Koper		
MAIN EXCHANGE AREAS	• Far East • Southern Asia • South-East • Greece		• Egypt • Israel • Northern Italy
INFRASTRUCTURAL CHARACTERISTICS			
WAREHOUSES AND OTHER FACILITIES	• Quays: 2,000 sqm • Draught: up to 18 m • 4 Paceco portainers • 3 portainer posts – Panamax • Mooring - mooring 49, quay length 177 m, draught 12.77 m - mooring 50, quay length 200 m, draught 15.85 m - mooring 51, quay length 273 m, draught 16.76 m - mooring 52, quay length 111 m, draught 17.98 m - mooring 53, quay length 190 m, draught 12.77 m - mooring 54, quay length 190 m, draught 12.77 m - mooring 55, quay length 163 m, draught 12.77 m		
DEVELOPMENTS			
INFRASTRUCTURES	T.O. Delta, the company which entered Tict in 2004 to manage the container traffic in the Molo VII terminal (joining the main shareholder Lula Koper), acquired 100% of the shares four years earlier than the agreed date. So, the relaunching plan for the seaport has been accelerated: in the first nine months of 2004 the volume of containers handled increased by 35% (from 98,039 to 149,159 teus) comparing to 2003 and the number of weekly block trains increased from about a dozen to more than sixty.		

	DEVELOPMENTS
INFRASTRUCTURES	An important investment plan was defined (5-6 million euro) to buy new portainer cranes, the extension of the crane track in order to operate on an entire block train, the replacement of the old cranes able to reach only second level heights with more modern equipment, and the rehabilitation of the transtrainer cranes which have never been used so far. T.O. Delta is a company of the Maneschi family, which is completely separate from Evergreen, but the fact that Pier Luigi Maneschi is also the Evergreen general agent and representative in Italy (aside from being the Lloyd Triestino president), has surely favoured an operational synergy with the Taiwan ship-owner. Much of the Molo VII terminal growth is due also to Evergreen which at the end of 2003 opened a new direct system from China to the Adriatic Sea. The confidence placed in the Trieste seaport system has also favoured the interest by other operators, such as Msc, Maersk, Cma, all of which have growing traffics. (Il Sole 24ore-08-20/11/04)

RAVENNA SEAPORT

GENERAL INFORMATION			
DESCRIPTION	The Seaport of Ravenna is one of the main Italian seaport and it is provided with facilities able to offer a great quantity of services for any type of goods. It is a 14-kilometre-long canal seaport and it is the Italian leader in volume of cereals, weatings and fertilisers handled; it is also an important commercial seaport for general cargoes and containers		
LOCALISATION	Latitude 44° 29' North, Longitude 12° 17' East, located on the Adriatic coast		
MANAGING COMPANY	Ravenna Port Authority, established by a law of January 28, 2004		
MAIN TYPES OF PRODUCTS	• Petroleum products • Liquid chemical products • Other liquid bulk cargoes • Timber • Solid mineral fuels • Minerals • Agricultural products • Foodstuff	• Metallurgic products • Raw minerals, building handiworks and materials • Solid fertilisers • Solid chemical products • Other dry goods • General cargoes containers • General cargoes on trailers/rolling stock	
AREAS	Total	2,080 hectares of waters, 1,500 of which are already urbanised or are being urbanised	
	Warehouses	Internal area: 269,550 sqm; capacity: 2,082,150 sqm	
	Open spaces	788,300 sqm	
	Silos	303,500 m^3	
	Storing tanks	• Petroleum: n. 125, capacity 676,000 m3 • Chemical: n. 129, capacity 215,000 m3 • Food: n. 48, capacity 69,400 m3 • Others: n. 47, capacity 79,000 m3	
PERISHABLE GOODS TERMINAL	Refrigerator terminal (Sapir – Frigoterminal)		
OPERATIONAL SYSTEMS			
SYSTEMS USED	• Train • Truck • Ship		

OPERATIONAL SYSTEMS		
CONNECTIONS	Roads	• Link to the A14 motorway and through it to the A1 and A22 motorways to reach Northern Italy and the transalpine countries • E45 and A14 to reach Southern Italy
	Railways	The road system substantially overlaps the railways which allow analogous links. The main terminals are connected by various track lines to the national railway network, and in particular the container terminals are real intermodal nodes. Presently, the proportion of railway transport implemented is low (5% of the total volume handled).
	Ports	• Connection through the line hauls and tramp vessels to the whole world (in particular, Mediterranean Sea, Black Sea, South and North America, Southern Europe, Far East, Oceania) • Ravenna is a primary centre for the national coastal trading services and, being related to Catania, it is the main Adriatic Port in the routes of the Sea Motorways
MAIN OPERATORS	• TCR (T) (Contship-Sapir) • MSC	• ZIM Israel • SEA LAND
NON-PERISHABLE GOODS		
TOTAL VOLUMES HANDLED	2001	23,812,397 tons; 158,353 teus
	2002	23,931,873 tons; 160,613 teus
	2003	24,910,621 tons; 160,360 teus
SERVICES PROVIDED	The Seaport of Ravenna hosts activities by terminal managers, shipping and forwarding agents, which offer transport (land traffic) and logistic (stocking, screening and manufacturing operations) services	
NON-PERISHABLE GOODS TERMINALS, WAREHOUSES AND OTHER FACILITIES	Main terminals: • Sapir container terminal • Setramar container terminal • Sapir terminal (solid and liquid bulk cargoes, general cargoes, temperature-controlled cargoes) • Setramar terminal (general cargoes and bulk cargoes) • Lloyd Ravenna terminal (solid bulk cargoes) • Eurodocks terminal (soya bean flour, cereals, minerals for glass and backed clay, fertilisers) • Docks Cereali terminal • Refrigerator terminal • Ferry and passengers terminal	

NON-PERISHABLE GOODS		
MAIN OPERATORS	• Sapir • Setramar • Docks cereali • Eurodocks • I.F.A. • Lloyd • Contship Italia • Zim • Maersk • Sarlis • BSL Genova • Gruppo Sers • MSC • Marcegaglia • Martini • Intercontinental • Riparbelli	• Petra • Polimeri Europa • Enel • Pir • Na.Dep. • Costa Cruises • Pullmantur • Adriatank • Agip Petroli • Alma Petroli • Consorzio Agrario di Ravenna • De.co.ra. • Eridania • Fassa • Fosfitalia • Hydro Agri Italia
MAIN ITALIAN EXCHANGE AREAS	• Emilia (especially Bologna, Modena, Dinazzano Po, Reggio Emilia) • Lombardy (especially Milan – Melzo) • Veneto	
MAIN FOREIGN EXCHANGE AREAS	• Mediterranean • Black Sea • South and North America • Northern Europe • Far East • Oceania	
MAIN TRAFFIC ROUTES	• Southern Mediterranean/Northern Africa • Middle East/Eastern Europe • Northern Europe East • Northern Europe West • North America • Far East	
GENERAL DEVELOPMENTS		
TRAFFICS	• Supporting the sea system enhancement policy, in particular developing feeder actions with Gioia Tauro, Pireo, Damietta • Sea motorways, short sea shipping cruise traffic • Unloading Fiat vehicles produced in Turkey for the regional market	

GENERAL DEVELOPMENTS	
INFRASTRUCTURES	• Creation of useful facility for Ro-Ro activities, ferries, short sea shipping • About 60 million investments over three years to develop intermodality • Evaluation of the need to build new terminals in sectors which are not present in the port • Enhancement of the road system in the surroundings of the port and connections to the national and railway networks • 162 million euro investments to build new quays, to deepen the waters, to maintain the port areas and transport system, to install security and control systems, to enhance the ferry and passenger terminal
SERVICES PROVIDED	• Purchase of the Passenger Terminal Ravenna Company, owner of the ferry and passenger terminal of Largo Trattaroli • Purchase of the land to build a 24,000 sqm service and parking area for vehicles
ENTREPRENEURIAL/ ADMINISTRATIVE STRUCTURE	• Incentives to try to establish relations among the different bodies and operators of the transport, logistic and intermodal sectors to provide a wider supply of services • Development of a medium-term comprehensive supply design, to be implemented giving priority to concessions to activities maximising the use of the quays
OTHERS	• Alliances with other ports to increase the flow in the Adriatic: Venice, Croatia, Slovenia • Completion of the port planning scheme implementation

PERISHABLE GOODS TERMINALS

REFEER TERMINAL	
DESCRIPTION	It is the refeer terminal of the Seaport of Ravenna, managed by the Frigoterminal company, totally owned by the Sapir group (100%)
MAIN PERISHABLE GOODS	• Citrus fruit • Fresh fruit • Fresh vegetables • Leguminous vegetables
SERVICES PROVIDED	• Loading • Unloading • Freight stocking
MAIN OPERATORS	Sapir
MAIN EXCHANGE AREAS	• Mediterranean • Eastern Europe • South and North America • Central and Northern Europe • Far East

INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• Quay equipped with conveyor belts for boxes and cartons directly linking the holds to the refrigerating rooms and to the pallet-handling cranes (belt equipment to unload the fruit in loose cartons) • 7 refrigerating rooms to stock goods, with temperature ranging from -28 °C to +14 °C and a 2,700 pallet capacity which is about to be doubled or more

TERMINAL CONTAINER RAVENNA		
TOTAL AREA	300,000 sqm	
TOTAL VOLUMES OF GOODS HANDLED	2003	148,000 TEUs CONTSHIP: sea container terminal (total handlings): 4.9 million TEUs); intermodal transport: 202,000 TEUs
	2002	CONTSHIP: sea container terminal (total handlings): 4.3 million TEUs); intermodal transport: 200,000 TEUs
MAIN PERISHABLE GOODS	Container (also refrigerated goods)	
SERVICES PROVIDED	• Filling/emptying • Stocking	
MAIN OPERATORS	• Sapir • Contship Italia (the Eurokai –Contship Italia Group is the first European container terminal operator)	
MAIN ITALIAN EXCHANGE AREAS	• Emilia-Romagna • Veneto • Tuscany	• Marche • Umbria
MAIN FOREIGN EXCHANGE AREAS	• Countries of the former Yugoslavia (Rijeka, Koper)	
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• Quays: 640 m (LO – LO), 4*20 m (RO – RO) • Capacity: 285,000 TEUs • Reefer plug sockets #: 68 • Tracks: 5*420 m • 4 quay cranes • 4 RMG • 18 RS (42tons)	

INFRASTRUCTURAL CHARACTERISTICS			
CONNECTIONS	National intermodal connections	• Ravenna – Melzo: 4 trains/week, 6-hour-long transit (Sogemar, Contship Italia Group) • Ravenna – Dinazzano: 4 trains/week, 12-hour-long transit (Italcontainer)	
	International intermodal connections	Ravenna is linked to all the main markets of Central-Northern Europe. The connections are provided by Hannibal (Contship Italia Group) through the Milan Melzo hub they own. There are many connections also to Austrian cities.	
	Hinterland road system connections	Within 200 km it is possible to reach 26 Italian cities which altogether generate more than one fourth of the national added value (2001 ISTAT-Italian Institute of Statistics data)	
	Sea (Eastern Mediterranean orientation)	• Cyprus • Egypt • Georgia • Greece • Israel • Italy (Gioia Tauro, Taranto, Trieste) • Lebanon • Libya • Rumania • Russia • Slovenia • Syria	• Turkey • Ukraine Other linked areas: • Central-Northern America • Southern Africa – Red Sea • Far East • Indian Sub-Continent • Western Africa • Northern Africa • South America • Oceania
DEVELOPMENTS			
INFRASTRUCTURES	• Dredging – 11.5 m • Anchorage LO – LO: +40 m (demolition of the RO – RO module) • Crane tracks: 25 m extention		

TARANTO SEAPORT

GENERAL INFORMATION		
DESCRIPTION	It is the third national seaport as regards the goods handled	
LOCALISATION	Located in the northern coast of the Taranto Gulf	
MANAGING COMPANY	Taranto Port Authority	
TOTAL VOLUMES HANDLED	2003	37.5 million tons of which: • Goods in containers: 700,000 TEUs • Iron and steel traffic: about 25/26 million tons in raw materials and finished products (8 million tons handled) • Petroleum products: 5/5.5 million tons
MAIN TYPES OF PRODUCTS	• Iron minerals • Fuels • Tar • Iron and steel material • Scrap iron	• Cement • Bitumen • Refined petroleum products • Crude oil • Containers
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	
CONNECTIONS	Roads	• A14 Bologna-Taranto motorway
	Railways	• Links to the national network
	Airports	• 90 km away from the Bari airport and 75 km away from the Brindisi airport
MAIN OPERATORS	• Evergreen	

NON-PERISHABLE GOODS	
MAIN OPERATORS	Ship-owners • Taranto Container Terminal S.p.A , Evergreen (containers) Carriers • AG.PIENNE SPEDIZIONI SAS • BARION SRL • CAFFIO S.R.L. • CARMED ITALIA S.R.L. • DE VITIS S.R.L. • NAVIMER S.R.L. • STEA & STEA • TEAM • TEAM S.R.L. SHIPPING & FORWARDING AGENCY Industries • ILVA S.p.A (iron and steel terminal) • Cementir S.p.A • AGIP Petroli S.p.a Shipbuilders and maintenance companies • Cantiere navalmeccanico e. Stanisci s.r.l. • Subtecno ltd.
SERVICES	• Loading/unloading • Stocking • Train-truck and truck-train systems • Train-ship and ship-train systems • Truck-ship and ship-truck systems • Containers • Ro-Ro • Ro-Pax • Monitoring
NON-PERISHABLE GOODS TERMINALS, WAREHOUSES AND OTHER FACILITIES	Total area: 3,319,280 sqm (including a 1,000,000 sqm container area and a 1,249,413 sqm public use area) 9,386 metres of quays

NON-PERISHABLE GOODS	
NON-PERISHABLE GOODS TERMINALS, WAREHOUSES AND OTHER FACILITIES	Container terminal - TCT has a concession to use 1,500 metres of quays and 14.5 m water depths with a 2 million TEUs/year handling capacity 2 ultra post-panamax pedestal cranes + 8 super post-panamax cranes - total container stocking capacity: 35,310 TEUs, empty containers: 45,000 TEUs, 900 plug sockets for refeer containers - container quay depth: 16.5 m; draught: 16.0 m (container carrier with capacity up to 12,500 TEUs) - 5 tracks linked to the national railway system (in 2003 more than one thousand trains arrived/left) - Motorway junction 15 kilometres away Iron and steel terminal - ILVA S.p.A has a concession to use 4,589 metres of quays and 931,000 sqm of operational areas - A relevant equipment is the pushing tug, made up of a tractor which is solidly linked to a hull laden with raw materials/iron and steel products to be hooked/unhooked in the arrival/departure port. Oil terminal ENI Spa has a concession to use a 560-metre-long wharf having 1,120 metres at disposal for the vessels to be hooked Vessels up to 300,000 GRT can be moored. Cement terminal Cementir S.p.A has a concession to use a 467-metre-long stretch with a 12.5 m draught. Mobile deck with a 2,400 sacks/h or 400t/h of clinker and conveyor belt. Commercial quays They are provided with mobile equipment to handle aluminium, frozen fish, cement, metal carpentry/machines, clinker, fertilisers and general cargoes
MAIN ITALIAN EXCHANGE AREAS	• Industrial area within the seaport (the iron and steel industry plays a relevant role)
MAIN FOREIGN EXCHANGE AREAS	• It enjoys a strategic position in the Mediterranean Sea which is central in the main routes between East and West and is an ideal centre for the sea traffic between Europe and the rest of the world as well as for the national and European short-sea traffic.
GENERAL DEVELOPMENTS (objective 2015)	
TRAFFICS	• Container receipt up to 12,500 TEUs
INFRASTRUCTURES	• New areas and logistic infrastructures
PERISHABLE GOODS	
MAIN PERISHABLE GOODS	• Frozen fish
SERVICES PROVIDED	• Container terminal provided with 900 plug sockets for refeer containers

KOPER SEAPORT

GENERAL INFORMATION		
LOCALISATION	Luka Koper - Slovenia	
MANAGING COMPANY	Luka Koper d.d. (joint stock company managing all the 11 terminals, the basic port services and the majority of the additional services available)	
MAIN TYPES OF PRODUCTS	• Containers • Liquid cargoes (petroleum products and others) • Vehicles • Solid bulk cargo • Timber • Living animals • Fruit, vegetables and frozen foodstuff	
AREAS	Total	16,000,000 sqm (4,737,000 sqm presently used)
	Warehouses	• Covered warehouses: 313,000 sqm, with 13,000 sqm of specialised warehouses • Open stocking areas: 966,000 sqm
PERISHABLE GOODS TERMINALS	Fruit terminal (perishable goods such as fruit, vegetables and frozen food)	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	
CONNECTIONS	Railways	The seaport has a direct connection to the Slovenian railway network, which is particularly useful to container traffic (block trains to Austria, Germany, Czech Republic, Hungary). All the terminals are directly linked to the national and international railway network.
OTHER TYPES OF GOODS		
TOTAL VOLUMES HANDLED	2003	Over 9,000,000 tons

OTHER TYPES OF GOODS		
SERVICES PROVIDED	Basic port services (within 11 specialised terminals): • Freight handling and stocking • Mooring • Vessel towing Additional goods services Services to improve goods quality, to prepare them to be subsequently sold, to guarantee the suitable safety conditions in the transport by truck or by train: • Labelling • Packing • Loading and unloading • Weighing • Washing • Maintenance • Disinfestations • Bagging Supporting services for operators • Logistics (just in time and door-to-door freight delivery services) • Marketing • Financial assistance	
MAIN FOREIGN EXCHANGE AREAS	Links available, through various shipping lines, to the following areas (in which the goods arrive after being processed in a transhipment seaport): • Northern and Western Europe; • North America; • Central America and Caribbean states; • South America; • Mediterranean Sea; • Black Sea; • Western Africa; • Eastern and Southern Africa; • Middle East; • Red Sea and Gulf of Aden; • Arabian Sea and Persian Gulf; • India and Pakistan; • Far East, Australia and New Zealand	The commercial hinterland reaches the entire Central and Eastern Europe: • Austria • Hungary • Czech Republic • Southern Germany • Italy • Switzerland • Croatia • Bosnia and Herzegovina • Yugoslavia • Macedonia • Albania • Bulgaria • Ukraine • Russia

OTHER TYPES OF GOODS	
NON-PERISHABLE GOODS TERMINALS, WAREHOUSES AND OTHER FACILITIES	11 terminals specialised in freight handling and stocking: - Container and Ro-Ro terminalo Car terminal - Solid bulk cargoes terminal (soya beans, wheat, sugar, salt, phosphates) - General Cargo terminal (sugar, coffee, iron and steel products and others, cotton, rice, paper and cellulose) - Silo terminal (cereals and oilseeds) - Alumina terminal (aluminium) - Timber terminal - Liquid bulk cargo terminal (chemical products, natural oils, palm oil, wine and fruit juices, petrol by-products, phosphoric acid) - Coal and iron ore terminal
GENERAL DEVELOPMENTS	
INFRASTRUCTURES	• Building quay No. 3 hosting the new multimodal terminal for cars, containers, ro-ro cargoes • SAP/R3 introduction to update the computer network • New iron products terminal • Building another garage containing 3,000 vehicles • Enhancement liquid bulk cargo terminal • New joiner's workshop to process timber • Extension of the carbon and mineral terminal quay • Direct railway connection to Hungary • Building a Slovenian motorway network • Building a second railway line along the Divaga – Koper route

PERISHABLE GOODS TERMINALS

FRUIT TERMINAL	
MAIN PERISHABLE GOODS	• Fruit • Vegetables • Frozen food
SERVICES PROVIDED	• Perishable goods stocking and subsequent transport
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• 427 quays • 8 to 10 m water depth • 3 berths • 13,000 sqm of refrigerated warehouses (temperatures between 0 °C and +20 °C) • 2,000 sqm of refrigerated warehouses (temperatures up to -20 °C) • Covered warehouses • Open stocking areas • Liquid cargo tanks: 53,000 m^3; • Maximum draught: 18 m; • Quay length: 2.5 Km; • 23 moorings

PORT-VENDRES AND S.CHARLES MARKET

DESCRIPTION

The Port Vendres – S.Charles Market pair is one of the most successful examples at global level of a synergy between a seaport and a fruit and vegetable market.

Obviously, that synergy owes much of its success to the geographical position of those facilities. Indeed, Port-Vendres is the closest French continental port to Northern Africa, and it is also the best located port for the entry in the European Union of fruit and leguminous vegetables from the Mediterranean basin and from the main producer countries (Western and Southern Africa, Latin America...). The Saint-Charles market in Perpignan, on the other hand, is the fixed course for all the land flows to the European Union of fruit and leguminous vegetables from Spain and Morocco.

That synergy has therefore made the Saint-Charles market the first French distribution market (it markets more than a half of the flows coming from the South and it guarantees their distribution throughout the European continent, including Eastern European countries) and surely it is the strongest seaport as regards the fruit and vegetable traffics from the Mediterranean Sea.

PORT – VENDRES

GENERAL INFORMATION	
LOCALISATION	Latitude: 42° 31' N; Longitude: 3° 07' E
MANAGING COMPANY	The Perpignan Chamber of Commerce and Industry is the concessionaire of the commercial and tourism seaport.
TOTAL VOLUMES HANDLED	• Total import: 147,252 tons • Bananas: 115,737 tons • Citrus fruit from Argentina: 4,121 tons • Citrus fruit from Southern Africa: 5,954 tons • Total export: 18,708 tons
MAIN TYPES OF PRODUCTS	• Fruit • Leguminous vegetables
SERVICES PROVIDED	• Cruises • Passenger transport • Freight handling and stocking

GENERAL INFORMATION		
MAIN FOREIGN EXCHANGE AREAS	• Northern Africa and countries of the Mediterranean basin (Morocco, Egypt, Cyprus) • South America • Western Africa • Southern Africa	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Seaport facilities suitable to process freight in (small and large) sacks, pallets and materials transported by horizontal maintenance vessels • Areas interlocked with railways, allowing direct wagon and on-board maintenance • Large capacity communication ways and wagon loading pavements • 7,000 pallet storage capacity • 14,000 sqm of hangars with a 11,850 sqm temperature-controlled area • Top equipment (15 ton self-propelled crane, 28 and 42 ton lift trucks) • 6 areas with pavements accessible to 155-metre-long vessels, 2 access ramps for Roll on – Roll off vessels	
OPERATIONAL SYSTEMS CONNECTIONS	Roads	Motorway in the proximity
	Railways	Link to the Perpignan-Roussillon station by a "fruits et légumes" high speed train able to transport the goods to the consumption centres in the shortest time possible

SAINT-CHARLES MARKET

GENERAL INFORMATION		
DESCRIPTION	Saint – Charles is primarily: • The first economic centre of the region: 7 billion franks • The first private employer of the province counting about 2,500 workers • The largest specialised firm concentration (210 firms) in a private location • The first physical market with 1,500,000 tons marketed • The first European fruit and leguminous vegetables dispatching centre	
LOCALISATION	Perpignan	
VOLUMES HANDLED	• From 850,000 to 900,000 tons of fruit and leguminous vegetables from Spain • From 80,000 to 100,000 tons of fruit and leguminous vegetables from Morocco • From 80,000 to 100,000 tons of fruit and leguminous vegetables from Eastern Pyrenees • From 15,000 to 25,000 tons from different origins: Cyprus, Italy, Southern Africa, Portugal, Ivory Coast, New Zealand, Australia, Turkey, Argentina, Holland, Guinea, Belgium, Germany, Tunisia, Chile, Canary Islands, Brazil	
MAIN TYPES OF PRODUCTS	Fruit and leguminous vegetables	
MARKET COOWNERS	• Importers (67%) • Eastern Pyrenees ICCs (21%) • Brokers, carriers, natural or legal persons (12%)	
MAIN EXCHANGE AREAS	• Spain • Morocco • Argentina • Cameroon • Cairo • Costa Rica • Burkina Faso • Cyprus • Italy • Portugal • Brazil	• Ivory Coast • New Zealand • Australia • Turkey • Holland • Guinea • Belgium • Germany • Tunisia • Chile • Canary Islands
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 100,000 sqm of warehouses or covered areas • Trade unions administrative centre • CCI building • CCI-managed parking area • buildings for other purposes (transit, transaction, shipment) • Public weighing machine	

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Service station • Restaurants • Over 1,500 mail coaches per day in campaign periods • A road centre	
TOTAL AREA	33 hectares	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship • Aircraft	
CONNECTIONS	Railways	Near the market there is the Perpignan train station which handles 92% of the French fruit and leguminous vegetable railway flow
	Ports	Twenty-five kilometres away is the third fruit French port, Port – Vendres, which receives the sea flows from Morocco, Southern Africa, Argentina, Cameroon, etc.
	Airports	Five kilometres away is the Perpignan – Rivesaltes international airport, provided with a freight air terminal which allows to receive freight aircrafts from Cairo, Costa Rica, Burkina Faso

ROTTERDAM SEAPORT

GENERAL INFORMATION			
DESCRIPTION	The seaport of Rotterdam (together with the industrial area) performs primarily the following functions: • It is a hub of international goods flows • It is a logistic service provider • It functions as turntable for the international production networks • It is an important energy source for the regional and national economy The central activities of the Port of Rotterdam are: • Development, building, management and functioning of the port and of the industrial area • Effective, safe and efficient management of the sea traffic		
LOCALISATION	Havenbedrijf Rotterdam		
MANAGING COMPANY	Port of Rotterdam		
TOTAL VOLUMES HANDLED (gross weight * 1 million metric tons)	2001	• Agricultural products: 11.3 • Minerals and rejects: 37.9 • Coal: 24.7 • Dry bulk cargoes: 10.5	• Crude oil: 97.9 • Mineral oil products: 27.9 • Other liquid cargoes: 25. 1 • Containers: 62.2
	2002	• Agricultural products: 9.4 • Minerals and rejects: 40.6 • Coal: 23.8 • Dry bulk cargoes: 9.7	• Crude oil: 96.0 • Mineral oil products: 35.0 • Other liquid cargoes: 24.6 • Containers: 65.8
	2003	• Agricultural products: 10.8 • Minerals and rejects: 39.9 • Coal: 24.7 • Dry bulk cargoes: 10.6	• Crude oil: 99.8 • Mineral oil products: 27.5 • Liquid bulk cargoes: 25.2 • Containers: 70.6
MAIN TYPES OF PRODUCTS	• Agricultural products • Minerals and rejects • Coal • Dry bulk cargoes		• Crude oil • Mineral oil products • Other liquid cargoes • Containers

GENERAL INFORMATION		
MAIN EXCHANGE AREAS	Main exchange ports in Europe • Antwerp • Hamburg • Marseille • Le Havre • Amsterdam • Genoa • London • Dunkirk • Bremen • Wilhelmshaven • Zeebrugge • Gand Main exchange ports in the world • Singapore • Shanghai • Hong Kong • Ningbo • Guangzhou • Tinanjin • Nagoja • Antwerp • Quingdao	Main exchange container ports in Europe • Rotterdam • Antwerp • Genoa • Felixstowe • Algesiras • Valencia • Le Havre • Barcelona • Piraeus Main exchange container ports in the world • Hong Kong • Singapore • Shanghai • Shenzhen • Bussan • Kaohsiung • Los Angeles • Hamburg • Antwerp
SERVICES PROVIDED	• Transport • Loading/unloading-related services	• Business services • Various services
MAIN OPERATORS	There are many operators and they are divided into the following categories: • Transport operators • Business service operators	• Loading/unloading-related service operators • Various service operators • Suppliers, traders
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	Terminals • Container terminals (deep-sea, short sea and inland shipping): 8 • Fruit terminals: 2 • Juice terminals: 3 • Multipurpose terminals: 17 • All weather terminals: 1 • Roll-on/roll-off terminals:7 • Car terminals: 1 • Bulk terminals: 20	

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	Equipment • Container gantry cranes: 93 • Multipurpose cranes: 147 • Bulk container gantry cranes: 58 • Floating cranes: 25 • Towboats: 40 • Pilot boats: 3 • Wharfs: 122 • Buoy moorings: 28 • Shipyards: 6 • Graving docks: 13 • Floating graving docks: 2	
AREAS	Total seaport area	10,500 ha
	Industrial area	5,040 ha
	Water area	3,500 ha
	Total port length	40 Km
	Piping	1,500 Km
	Quay length	77 Km
	Watershed length	185 Km
	Silos	1,813 m3
	Stocking capacity	• Crude oil, mineral oil product, chemical product, vegetable oil and fat tanks: 33,300,000 m3 • Covered warehouse capacity: - Canopies: 4,452,505 - Chemical products stocking canopies: 310,700 - Refrigerated warehouses: 3,056,400
PERISHABLE GOODS		
MAIN TYPES OF PRODUCTS	• Potatoes • Fresh fruit • Fresh and frozen vegetables • Refrigerated juices • Wheat, fruit and vegetable preparations	

PERISHABLE GOODS				
VOLUMES HANDLED (2003) (gross weight * 1 million metric tons)	Potatoes	TOTAL 631	ARRIVING 430	LEAVING 201
	Fresh fruit, fresh and frozen vegetables	878,995	862,770	16,225
	Refrigerated juices	3,740	-	3,740
	Wheat, fruit and vegetable preparations	423,395	305,594	117,801
CONTAINER VOLUMES	TOTAL TEUs	7,142,987		
	LOADED TEUs	5,865,390		
	Net weight	55,498,095		

VALENCIA SEAPORT

GENERAL INFORMATION		
MANAGING COMPANY	Valencia Port Authority (APV, Autoridad Portuaria de Valencia), in charge of the management, aside from the Port of Valencia, of the ports of Sagunto and Gandia (those three ports extend for 80 km along the Mediterraneas coast in Eastern Spain)	
MAIN TYPES OF PRODUCTS	• Asphalt • Oil • Cement • Chemical products • Soya beans	• Liquid and solid bulk cargo • Cereals • Oily sludge • Containers • Perishable goods (catch, meat, vegetables, fruit, refrigerated juices)
STORAGE AREAS	• Port Authority total: 1,930,742 sqm • Port Authority and private enterprises total: 2,113,737 sqm	• Port of Valencia total: 1,238,292 sqm • Port of Gandia total: 112,787 sqm • Port of Sagunto total: 235,213 sqm
PERISHABLE GOODS TERMINALS AND WAREHOUSES	• "Sur" warehouse • "Frutero" warehouse • Refrigerator warehouse	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	
CONNECTIONS	Roads	The seaport of Valencia is accessible through the following roads: • the A7 or the Mediterranean motorways directly linking Valencia through the European motorway network to Junquera – Le Perthus at the border between Spain and France. • Valencia is linked to the rest of the country by the national road network (medium and long distances) and by the local and autonomous network for short transport routes.

OPERATIONAL SYSTEMS		
CONNECTIONS	Roads	The main routes are: • The North-South corridor made up of the N-340 (Barcelona-Cadiz) and the N-332 (Cartagena-Valencia) roads • The East-West corridor supported essentially by the Madrid – Valencia motorway • The N-340 road which is linked to N234 in Sagunto (Sagunto-Burgos) provides the access to the regions of Aragon, Castile and Leon and other communities of the North of Spain The roads which follow the course of the Turia river (V30) give access to the seaport avoiding the city centre. The traffics from the central and southern areas of the peninsula have a direct access to V30, whereas the traffics from the North reach the V30 road through a bypass linking through various accesses to the roads and which is an extension of the A7 motorway. The access roads from the South (A7, N340 and N332) either are linked to high capacity motorways or access to the seaport through the V15 road or the Saler motorway.
	Rail ways	The railway connections from Valencia guarantee the access to every productive area of the Iberian Peninsula and of Europe. Those connections are achieved through the following lines: • Valencia – Barcelona – Port Bou • Valencia – Zaragoza – Basque Countries • Valencia – Cuenca – Madrid • Valencia – Albacete – Madrid • Valencia – La Uncina – Alicante Those lines allow the freight to continue their journey towards other destinations from Alcazar de San Juan (Andalusia), Alicante (Murcia), Madrid (North – North West, Extremadura)
NON-PERISHABLE GOODS		
TOTAL VOLUMES HANDLED	2003	• Total mass: 666,395 tons - Liquid: 110,500 - Solid: 555,895 • Total freight: 2,151,871 - Non-containerised: 386,701 - Containerised: 1,765,170 • Vessel #: 491

NON-PERISHABLE GOODS			
TOTAL VOLUMES HANDLED	2003	• Coastal trade traffic: 341,086 - Loadings: 236,924 - Unloadings: 104,162 • Foreign traffic: 2,477,180 - Loadings: 1,035,615 - Unloadings: 1,441,565 • Containers (TEU): 163,723 - Loadings: 76,655 - Unloadings: 87,068 - Transit: 47,313	
SERVICES PROVIDED	• finishing manufacturing operations • labelling • handling • stocking	• distribution • containers • passengers	
MAIN OPERATORS	• Andrei Weir Shipping • Armement Marittime Cotier • Balearia • Black Med Line • Blu Container Line • Bulcon • Caltram • Canada Marittime • CCNI • CMA – CGM • Comanav • Compagnie Marittime Marfret • Compania Libra de Navigaçao • Conscritium Hispania Lines • Contenemar • Contship • Coral Container • Cosco • Costa Container Line • CSAV • Delmas • Dole • Evergreen	• Likes Lines • Maersk Sea Land • Marguisa • Maruba • Medex • Meds Container • Mitsui O.S.K.Lines • MSC • Navicom • Naviera del Odel • Naviera Pinillos • Nisa Navegacion • Neptune Lines • Niver • Nordana • Northern Shipping Company • P & O Nedlloyd • POL – Levant • Safmarine • Sarlis • Senator • Setramar • Shiama	

NON-PERISHABLE GOODS		
MAIN OPERATORS	• Flota Suardiaz • Grimaldi Lines • Grimaldi Napoles • Hanuin • Holland Maas Shipping • Hual • Hyundai Merchant • Ignacio Messina • Islamic Rep. Of Iran Shipping • Iscomar • Italia di Navigazione • K – Line • Laso container Line • Lloyd Triestino	• Solniver • Sudcargos • Tarros • TMM Lines • Transportes Maritimos Alcudia • Transatlantica Espanola • Transmediterranea • UASC • Wallenius Wilhelmsen Lines • WEC • Yang Ming • Ybarra CGM Sud • X – Pres Container Line • Zim
MAIN FOREIGN EXCHANGE AREAS	• Madrid and central areas of the Iberian Peninsula • Morocco • Algeria • Tunisia • Libya • Atlantic and Baltic Europe • Persian Gulf, Red Sea, Indian Ocean and Southern-Eastern Africa	• Far East, Australia, New Zealand and Pacific • Western Africa • Canada • USA • Gulf of Mexico, Caribbeans and Central America • South America
TERMINALS, WAREHOUSES AND OTHER FACILITIES FOR PERISHABLE GOODS AND OTHERS	• Public container terminal (containers) – Marittima Valenciana S.A. – Operators: Marittima Valenciana • Multipurpose terminals (containers) - TVC Operadores Portuarios – Operators: Terport – Terpoval – Combiterminal – Cesa STV S.A. - • Terminales del Turia (container) – Terminales del Turia S.A. – Operators: Terminales del Turia S.A. • Turia and Espigon Turia (mineral fertilisers, timber) – Various operators • Vehicle and Ro – Ro Terminal (transiting vehicles, vehicles transported, Ro –Ro traffics) – Operators: Europark Express Valencia S.A. – Ford Espana S.A. – Valencia Terminal Europa S.L. • Trasmediterranea (transiting vehicles, vehicles transported, Ro –Ro traffics) – Operator: Compania Trasmediterranea S.A. • Balearia (transiting vehicles) – Operator: Eurolineas Maritimas S.A.L. • Passenger terminal (regular lines passengers, cruises, transiting vehicles) Operators: Compania Trasmediterranea – Grimaldi • Cemex Espana (cement) – Operator: Cemex Espana	

NON-PERISHABLE GOODS	
TERMINALS, WAREHOUSES AND OTHER FACILITIES FOR PERISHABLE GOODS AND OTHERS	• Holcim Espana (cement) – Operator: Olcim Espana • Silos Y Almacenaies de Valencia S.A. (cement) – Operator: Silos Y Almacenaies de Valencia S.A. • Maritima Cervicesa Terminal (coal) – Operator: Terminal Maritima Servicesa • Borax (minerals) – Operator: Borax Espana S.A. • Temagra (soya beans) – Operator: Temagra • Esedecasa (soya beans) – Operator: Estacion de Descarga y Carga S.A. • Ptroval (petrol products) – Operator: Petroleos de Valencia S.A. • CLH (petrol products) – Operator: Compania Logistica de Hidrocarburos S.A.) • Proas (asphalt) – Operator: Productos Asfalticos S.A. • Tepsa (chemical and petroleum products) – Operator: Terminales Portuarias S.A. • Demagrisa (molasses, fertilisers, olive oil, diesel) – Operator: Demagrisa S.A. • Teva Tank (molasses) – Operator: Teva Tank S.L. • Consolidation warehouses • Canopies • Asphalt depot • Oil depot • Cement silos • Chemical product terminal • Soya bean silos • Liquid and solid bulk cargo containers • Cereal silos • Storage vessels • Logistic Activity Zone (ZAL) (service platform located near the Port of Valencia in which to carry out finishing manufacturing operations, labelling, stocking and distribution primarily of containerised freight, etc.)

ANTWERP SEAPORT

GENERAL INFORMATION		
LOCALISATION	Latitude: 51 14 N; Longitude: 04 25 E	
MANAGING COMPANY	Antwerp Port Authority	
MAIN TYPES OF PRODUCTS	• Containers • Coffee • Plastic granulates • Wheat • Fertilisers and chemical products • Packed tobacco • Kaolin • Crude oil • Minerals • Petrol by-products • LPG	• Iron and steel • Wood • Paper and cellulose • Transport equipment • Flour • Machines, vehicles and the likes • Sugar • Coal • Sand • Fruit • Foodstuff
AREAS	Total port area	13,348 ha
	Industrial area	3,674 ha
	Warehouse area	498 ha
	Total quay length	150, 2 Km
	Total hooking length	120, 6 Km (3.1 Km container terminal)
	Road system length	276,5 Km
	Railway system length	960 Km
PERISHABLE GOODS TERMINALS	The perishable goods terminals on the right shore of the Scheldt river handle fresh fruit (over 2 million tons of fruit handled in 2003, leading position in Europe) whereas on the left shore, very close to the container terminal of the Deurganck basin, a logistic platform provides handling, stocking and logistic services for all types of refrigerated and frozen foodstuff (the left shore terminals manage the fruit juice traffics instead)	

OPERATIONAL SYSTEMS		
DIVISION BY TRAFFIC SYSTEM (2002)	Transhipment • container traffic: 16% ; global traffic: 4% Roads • container traffic: 50%; global traffic: 31% Sea traffic • container traffic: 26%; global traffic: 32% Railways • container traffic: 8%; global traffic: 12% Piping • global traffic: 21%;	
NON-PERISHABLE GOODS		
TOTAL VOLUMES HANDLED	2001	Sea traffic • General traffic: 130,050,413 tons • Container traffic: 4,218,176; 46,409,921 tons Hinterland traffic • Shipping: 72,295,356 • Railways: 22,170,151
	2002	Sea traffic • General traffic: 131,628,816 tons • Container traffic: 4,777,151 TEUs; 53,016,582 tons Hinterland traffic • Shipping: 74,275,948 • Railways: 21,627,298
	2003	Sea traffic • General traffic: 142,874,512 tons • Container traffic: 5,445,437 TEUs; 61,350,335 tons Hinterland traffic • Shipping: 76,614,601
SERVICES PROVIDED	Without any doubt the seaport of Antwerp provides the widest range of logistic services within all the European ports	
MAIN FOREIGN EXCHANGE AREAS	• USA • UK • South Africa • Canada • Russia • Brazil • Finland	The traffic to other 17 countries is inferior to 2,000,000 tons: • Egypt • Nigeria • Hong Kong • Italy • Ireland • Greece

NON-PERISHABLE GOODS		
	• Turkey • China • Singapore • Algeria • France • Spain • Norway • Germany • United Arab Emirates • Israel • Estonia • Sweden	• Mauritania • Saudi Arabia • India • Argentina • Mexico • Poland • Iran • Latvia • Pakistan • Portugal • Morocco
MAIN TRAFFIC ROUTES	The seaport of Antwerp may be conceived as a multimodal platform placed in the middle of the trans-European corridors and networks. Moreover, the vast number of sea destinations reached from Antwerp makes the development of worldwide distribution operations possible	
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Container terminal • Coffee silos • Plastic granulate silos • Wheat silos • Dangerous goods warehouses • Fertiliser, grain and mineral warehouses • Refrigerating warehouses	• Packed tobacco warehouses • Kaolin warehouse • Timber canopies • Oil refineries • LPG warehouses • Towers and cranes • Lift trucks

PERISHABLE GOODS TERMINALS

FRUIT TERMINAL – QUAY 320	
MAIN PERISHABLE GOODS	Fresh and frozen fruit
SERVICES PROVIDED	• Counting • Bundling • Quality control • Weighing • Packing • Palletisation • Stocking • Logistic services
MAIN OPERATORS	HNN (Hesse Noord Natie)
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• Area: 24 ha; • Quay length: 1,200; • Fresh product storing capacity: 40,000 pallets; • Storing capacity under normal circumstances: 20,000 pallets; • Controlled temperature: -2 °C/ +30°C • Water depth beside refeer quays: 11,5 m; • Water depth beside Ro – Ro quays: 7 m; • Conventional cranes (6.3 tons): 7; • Heavy load container cranes (42 tons): 1; • Forklift trucks (3.5 – 28 tons): 100

FRUIT TERMINALS – ALBERTDOCK & LEOPOLDDOCK	
MAIN PERISHABLE GOODS	Fresh and frozen fruit
SERVICES PROVIDED	• Counting • Bundling • Quality control • Weighing • Packing • Palletisation • Stocking • Logistic services
MAIN OPERATORS	Belgian New Fruit Wharf
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• Area: 330,000 sqm; • Quay length: 1,750 m; • Refrigerating rooms number: 26; • Temperature-controlled zones number: 16; • Controlled temperature: - 20 °C / + 15 °C • Refeer container plug socket number: 600; • Water depth beside refeer quays: 11m; • 10 cranes (from 6 to 100 tons); • Forklift trucks: 3 – 32 tons; • Reachstackers: 40 tons;

HANSA DOCK TERMINAL	
MAIN PERISHABLE GOODS	Fresh and frozen fruit
SERVICES PROVIDED	• Counting • Bundling • Quality control • Weighing • Packing • Palletisation • Stocking • Logistic services
MAIN OPERATORS	HNN (Hesse Noord Natie)
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• Area: 34 ha; • Quay length: 500 m; • Refeer plug socket: 140; • Covered areas (+14 °C): 7,000 pallets; • Fresh product storage: 30,000 pallets; • Controlled temperature: -2 °C / +30 °C • Quay depth: 11.5 m; • Temperature-controlled area for freight transfer to railway wagons • Heavy load crane (42 tons) • 2 spiral conveyors completely protected from atmospheric factors, with a 25,000 boxes/shift productivity • 1 panpallethoist completely protected from atmospheric factors, with a 12,000 pallets/shift productivity • 2 mobile cranes (8 ton lifting capacity); • 3 conventional cranes (10 – 35 ton lifting capacity); • 41 ton capacity reachstackers; • 80 forklift trucks (3,5 – 28 tons) • Fruit packing equipment: 25,000 tons/year productivity

SCHELDT RIVER LEFT SHORE LOGISTIC PLATFORM	
SERVICES PROVIDED	• Counting • Bundling • Quality control • Weighing • Packing • Palletisation • Stocking • Logistic services

VRASENE DOCK TERMINAL	
MAIN PERISHABLE GOODS	Refeer container
SERVICES PROVIDED	• Logistics • Distribution • Customs clearance services
MAIN OPERATORS	Afru Log (in cooperation with Westerlund Corporation)
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• Quay length: 1,500 m with two Ro – Ro berth • Slewing jib crane: 100 ton SWL 350 metres away from the terminal: <u>Fresh products warehouses</u> • Total area: 7,200 sqm; • 3 refrigerating rooms • Temperatures comprised between -2 °C and +18 °C <u>Refrigerating warehouses</u> • Total area: 7,400 sqm; • 7 refrigerating rooms • Temperatures comprised between -25 °C and +10 °C <u>Other services and equipment</u> • Warehouses for general cargoes, including IMDG • Road, air, sea and river transport: - Containers and general cargoes, controlled temperature - Dangerous goods – ADR, specialisation Class 1, explosives

BARCELONA SEAPORT

GENERAL INFORMATION		
DESCRIPTION	The equipment and the services of the seaport of Barcelona essentially mirror their clients' characteristics: heavy industrialisation and distribution capacity to the Iberian Peninsula, to the South of France and to the rest of the world. The Port is provided with specialised terminals to handle freight. It is, thanks to its multimodality, an extended transport and freight distribution platform.	
LOCALISATION	Latitude: 41° 20' N; Longitude: 2° 10' E	
MANAGING COMPANY	Port Authority of Barcelona	
TOTAL VOLUMES HANDLED	2002	Total traffic: 32,608,195 tons; 1,461,232 TEUS
	2003	Total traffic: 34,774,688 tons; 1,652,366 TEUS
MAIN TYPES OF PRODUCTS	• Containers • Vehicles • Coffee and cocoa • Non-ferrous metals	• Liquid bulk cargo • Solid bulk cargo • Fruit • Refrigerated goods
MAIN OPERATORS	• ABX Logistics • Aldeasa • Amer Sports • Andrea Merzario S.A. • Banco de Sabadell • Bax Global S.A. • Bofill & Arnann • CAPSA • Catalgroup S.A. • Clasquin Espana S.L. • Condeminas S.A. • Daewoo S.L. • Danzas S.A. • Decoexsa S.A. • Embamar S.A.	• Hermes Logistica S.A. • GV Sea Freight • Honda Logistics • IFS • J.Gilbert S.L. • JasForwarding Spain S.A. • Josè Salvat S.L. • Just Logistica Barcelona S.L. • Kuhne & Nagel S.A. • Lauson S.A. • Logistics Activities S.A. • Lo – Trans S.A. • Nippon Express S.A. • Press Cargo S.A. • Qualotrans Group S.L.

GENERAL INFORMATION		
MAIN OPERATORS	• Exel Logistics S.A. • Fahrner Iberia S.A. • Fritz Companies Spain • Fundacion Cares • General Transport • Geologistics • Grupo Marmedsa • Gruppo Transcoma • Guilbert Espana • GV Express S.As.A.	• Red Car S.A. • Space Cargo • Transnatur S.A. • Whirlpool Iberia • Logipoint, s.l. • Oliver Getransa s.a. • Explotaciones turisticas Gaditanas S.A. • Control Financiero e Informatico S.L. • Integral de Negocios S.A. • Transportes y Consignaciones Maritimas
MAIN EXCHANGE AREAS	Main destinations • Middle East, Black Sea, Caspian Sea • Italy • France • Northern Africa • Far East • North America (Atlantic) • Europe (Atlantic) • Central America and Caribbeans • Western Africa • South America (Atlantic) • Gulf of Mexico	Main origins • Northern Africa • Italy • France • South America (Atlantic) • Far East • Middle East, Black Sea, Caspian Sea • South East Asia • Gulf of Mexico • Europe (Atlantic) • North America (Atlantic) • Persian Gulf, Arabian Sea
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Entry ways: - Southern entry way: width 370 m, draught 16 m - Northern entry way: width 370 m, draught 16 m • Quays and berths: 20 Km • Ro – Ro ramps: 31 • Draught: over 16 m • Towboats: 9 (1,389 kW /2,942 kW) • Logistic Activities Area (ZAL): it is a privileged distribution centre for the supplying and the markets of the Iberian Peninsula, Southern Europe and the Mediterranean area. Thanks to its strategic position, which is part of the port of Barcelona, and to its complete intermodality, it has become an international model of intermodal platform.	
AREAS	Land area 828.9 ha	
	Stocking capacity	• Covered area: 134,404 sqm • Uncovered area: 2,913,524 sqm

PERISHABLE GOODS TERMINALS

BARCELONA FRUIT TERMINAL		
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2002	363,255 tm (fruit, vegetables and leguminous vegetables, including frozen ones)
	2003	367,847 tm (fruit, vegetables and leguminous vegetables, including frozen ones)
MAIN PERISHABLE GOODS	• Fresh fruit • Fresh vegetables • Fresh leguminous vegetables	
MAIN OPERATORS	Barcelona Fruit Terminal	
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• Refrigerating warehouses: 5,556 sqm (in three rooms with independent temperatures) • Stocking capacity: over 6,000 pallets • Computerised system with bar-code control • Loading platform with a capacity of over 150 trucks per day • Basins with lifting cranes: 45 (20 container cranes) • Dry basin: 215 m length, 35 m width, capacity over 50,000 tons • Floating basins: 120 m length, 19 m width, lifting capacity: over 4,500 tons	

REFRIGERATED GOODS TERMINAL		
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2002	• fruit, vegetables and leguminous vegetables, including fresh ones: 363,255 mt • frozen fish: 89,436 mt
	2003	• fruit, vegetables and leguminous vegetables, including fresh ones: 367,847 mt • frozen fish: 84,653 mt
MAIN PERISHABLE GOODS	• Fresh and frozen fruit • Fresh and frozen vegetables • Fresh and frozen leguminous vegetables • Frozen fish	
MAIN OPERATORS	Interlogistica del Frio S.A.	
INFRASTRUCTURAL CHARACTERISTICS		
WAREHOUSES AND OTHER FACILITIES	• Stocking capacity: 75,000 m3; • Frozen tunnel	

MARSEILLE SEAPORT

GENERAL INFORMATION		
LOCALISATION	The facilities of the Port of Marseille are divided into two locations: • Eastern Docks (Marseille) • Western Docks (Lavora, Caront, Port de Bouc and Port Saint Louis du Rhone)	
MANAGING COMPANY	Port of Marseille Authority	
TOTAL VOLUMES HANDLED	2001	Global traffic: 93.8 mt
	2002	Global traffic: 93.6 mt
	2003	Global traffic: 95. 54 mt. In particular: • General cargoes: 14.90 mt • Containers: 8.08 mt • Solid bulk cargo: 14.0 mt • Liquid bulk cargo: 2.92 mt • Hydrocarbons: 62.92 mt
MAIN TYPES OF PRODUCTS	• Containers • General cargoes • Solid bulk cargo • Liquid bulk cargo • Fruit and vegetables	
MAIN OPERATORS	There is a large number of operators of the seaport of Marseille and they are divided into the following categories: • Shipping companies • Shipping agents • Cargo agents • Ship broker • Towboat operators • Container operators • Warehouse operators • Ship repair operators	

GENERAL INFORMATION	
MAIN EXCHANGE AREAS (volumes in 1000 tons)	• Continental France, Corsica: 2,923 • Corsica: North West Europe: 119 • South Western Europe: 2,430 • Northern Africa – Libya: 4,003 • Eastern Mediterranean – Black Sea: 1,878 • Western Africa: 504 • South Eastern Africa: 690 • Middle East: 572 • Indian sub continent: 853 • Far East: 907 • South Eastern Asia: 818 • North America: 953 • Central America – Caribbeans: 378 • French Antilles – Guyana: 106 • South America: 509 • Australia – Oceania: 539
INFRASTRUCTURAL CHARACTERISTICS	
TERMINALS, WAREHOUSES AND OTHER FACILITIES	Containers • Graveleau Terminal (Western Harbour Area) – 5.3 million tons or 532,600 TEUs sea traffic (2003) • A and B Terminals (project) (Western Harbour Area) – 1,500,000 container annual capacity • Mourepiane Terminal (Eastern Harbour Area, Marseille) – present annual capacity: over 250,000 containers (350,000 TEUs) General cargoes • Brule – Tabac Quay (Western Harbour Area) • Gloria Quay (Western Harbour Area) • North Pinede Marseille Terminal (Eastern Harbour Area) • South Pinede Marseille Terminal (Eastern Harbour Area) • Ro – Ro South Terminal (Eastern Harbour Area) • Vehicle storage terminal (Eastern Harbour Area) Liquid bulk cargo • Liquefied Natural Gas (LNG) Terminal (Western Harbour Area) • Crude Oil Terminal (Western Harbour Area) • Refined Products Terminal (Western Harbour Area) • Liquefied Petroleum Gas (LPG) Terminal • Chemical Liquid Bulk Terminal (Western Harbour Area) • Marseille Liquid Bulk Terminal

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	Solid bulk cargo • Tellines Dock (Agri Food Western Harbour Area) • Ore Terminal (Western Harbour Area) • Marseille Aluminium Bulk Terminal (Eastern Harbour Area) • Marseille Sugar Terminal (Eastern Harbour Area) • Marseille Grain Terminal (Eastern Harbour Area) Distriport • 180 ha • 500,000 sqm of logistic warehouses	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Truck • Train • Aircraft	• Ship (sea and inland water transport) • Piping (oil and gas)
CONNECTIONS	Roads	Marseille is linked to the rest of Europe by the motorway and the completion of the new A54 motorway (between Arles and Salon) has completed the Italian – Spain high speed connection placing Marseille at the heart of that axis. The current motorway road yards (A56 Fos – Salon and A51 to Grenoble) are to reinforce this already extraordinary service
	Rail ways	There are 250 regular connections to France and to the rest of Europe
	Ports	200 regular service lines link the seaport of Marseille to over 300 ports in almost 120 countries worldwide. There are high frequency shipping lines through the Mediterranean Sea and Western Africa, together with services towards all the most industrialised areas worldwide, including Far, Middle and Near East, Australia and North/Central/South America. The annual average traffic is 90 million tons, accounting for 26% of the French shipping traffic handling (and to 27% of container exports)
	Inland water ways	Container river shuttles link Fos to Chalon, Macon and Lyon
	Airports	The nearby "Marseille – Provence's International Airport" is the second largest French freight airport and the third passenger airport. It is linked to all the most important airports worldwide.
	Piping	Gas pipelines and petroleum pipelines: linking Marseille and Fos to Lyon, to Eastern France, to Switzerland and Germany

PERISHABLE GOODS TERMINALS

MARSEILLE FRUIT TERMINAL	
LOCALISATION	Northern part of the Port of Marseille
TOTAL VOLUMES OF PERISHABLE GOODS HANDLED	2003 • Fruit and vegetables: 185,000 tons • Other goods: 145,000 tons • Basic capacity: 500,000 tons/year (containers excluded)
MAIN PERISHABLE GOODS	All the types of fruit and vegetables, also in containers
SERVICES PROVIDED	• Perishable goods stocking and handling • Pre – routing and post – routing dual mode services
MAIN OPERATORS	Sté Marseille Manutention
MAIN EXCHANGE AREAS	• Israel • Africa
INFRASTRUCTURAL CHARACTERISTICS	
WAREHOUSES AND OTHER FACILITIES	• 685 m of quays • 6 berths • Maximum draught allowed: 14 m • Quay and support area: 7 hectares • 2 self-propelled cranes (40 tons), 2 self-propelled cranes (100 tons), 4 self-propelled cranes (15 tons) • Platform provided with equipment for perishable goods handling and stocking: refrigerated warehouses (capacity 59,000 m^3), automatic belt conveyors, automatic loader equipment

AIRPORTS HANDLING PERISHABLE GOODS

MALPENSA AIRPORT

GENERAL INFORMATION		
DESCRIPTION	Milan Malpensa is the main Italian airport regarding freight traffic (currently 362,000 tons/year), being located in one of the most industrialised areas of Southern Europe. The Malpensa cargo section currently involves both the airport terminals, and it can count on a 27,000 sqm covered area, and provides different services. In the area referred to as Cargo City, new facilities to handle and to stock air freight are being built. The Cargo City is to integrate the airport infrastructures with an intermodal terminal and an added value logistics centre.	
LOCALISATION	Malpensa (Varese)	
MANAGING COMPANY	Sea S.p.A.	
TOTAL VOLUMES HANDLED	2002	• Aircraft movements: 212,210 • Freight: 280,420 tons • All Cargo handling: 4,273 • Goods: 142,617 tons
	2003	Goods: 306.451 ton
MAIN TYPES OF PRODUCTS	• Animals • Animal by-products not destined to human consumption • Perishable goods (fruit, fish but also pharmaceutical products) • Valuable goods	
SERVICES PROVIDED	• Traditional stocking in customs procedures for freight and mail, special and dangerous goods stocking in accordance with the IATA provisions, perishable goods refrigerating rooms available and areas to host animals • Completion of all the formalities needed for the traditional management of air shipping, payment of customs duties and other due taxes • Veterinary and phytosanitary service • Freight aircraft loading and unloading • Express courier • Commercial services for operators	

GENERAL INFORMATION		
MAIN OPERATORS	Presently, all the goods arriving in and leaving from Malpensa, are managed by three main operators: • MLE (goods handling and stocking by air transport contract) manages the relations with all the air companies except Alitalia and all the SKY Team lines) • ALHA Airport (goods handling and stocking by air transport contract) manages the relations with Alitalia and the SKY Team lines • Federal Express (self-production cargo company) Goods handlers are aided by ramp handlers in goods transport operations from the warehouses to the aircrafts on which they are loaded	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 45 vehicles loading and unloading mechanised equipments • 3 ULD stocking facilities, 20 palletisation stations, 21 weighing machines • 5 living animals rooms • 1 134-sqm-wide area to preserve animal by-products not destined to human consumption • 13 temperature-controlled rooms, 506 sqm • 1 perishable goods area, 545 sqm • 5 valuable goods areas, 583 sqm • 4 safe deposit vaults, 82 sqm • 1 2,000-sqm-wide mail area	
OPERATIONAL SYSTEMS		
SYSTEMS USED	Truck – Aircraft	
CONNECTIONS	Roads	• A8 motorway "of the Lakes", Busto Arsizio – Malpensa exit throughway No. 336 • A4 motorway Milan – Turin, Novara exit, SS32 national road bound to Oleggio • A26 motorway, Sesto Calende exit, bound to Somma Lombardo
	Railways	Used by passengers
PERISHABLE GOODS		
TYPES OF PRODUCTS	• Fruit (especially early fruit) • Fish (the airport includes also living animals and pharmaceutical products among perishable goods)	
VOLUMES HANDLED	• IMPORTS: 1,484 shipments, 1,400,000 Kg in 2004 • EXPORTS: 6,600 Kg in 2004	
MAIN ITALIAN EXCHANGE AREAS	• Northern Italy (especially North-West)	
MAIN FOREIGN EXCHANGE AREAS	• North America • South America • Africa • Far East	

	DEVELOPMENTS
INFRASTRUCTURES	SEA is building Cargo City (new freight building located near the terminal 1). It is a real cargo city which SEA is building to provide the airport with a logistic platform totally devoted to goods storage and integrated transport. Once the work is finished, the total goods processing capacity will exceed 500,000 tons/year. In particular, the following facilities are being built: • 2 new warehouses covering 45,000 sqm globally • New offices with a 8,000 sqm area • Spaces for commercial services Both warehouses will be highly mechanised, being provided with: • Stacker to stock 600 load units • Staging area with 400 load unit stations • 48 operational platforms • 12 lines to handle aircraft-truck traffic

BOLOGNA AND FORLÌ AIRPORTS

G. MARCONI BOLOGNA AIRPORT

GENERAL INFORMATION	
LOCALISATION	Via Altabella - Bologna
MANAGING COMPANY	Aeroporto G.Marconi S.p.A. (52% Chamber of Commerce of Bologna, 20% Municipality of Bologna, 10% Province of Bologna, 9% Emilia-Romagna Regional Authority, 1% CCIA (Chambers of Commerce Industry Handicraft)Regional Union, 8% other partners)
TOTAL VOLUMES HANDLED	2003 | 25,000 tons
MAIN TYPES OF PRODUCTS	• Mechanical spare parts • Electronic equipment • Fashion products • Shoes • Fish • Sausages • Chemical products (especially medicinal products) • Living animals
SERVICES PROVIDED	• Wrapping • Unwrapping • Load units handling • Load units stocking
MAIN OPERATORS	Handler: • Aviapartner • Bas • Euroaloa • Marconi Handling
INFRASTRUCTURAL CHARACTERISTICS	
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Area available for stocking: 4,400 sqm, covered 2,700 sqm destined to exports and 1,700 sqm destined to imports • Wrapping, unwrapping, load units handling and stocking equipment

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 2 automatic platforms (10 and 20 feet) with electronic weighing machines to handle and to load/unload load units on/off trucks • Lift-up drawer with 4 hooks to load/unload general cargo trucks • Cargo radiogenic control area • Customs temporary store warehouse for non-EU goods import (TCM) of about 1,000 sqm • Incoming national and EU goods warehouses • Export warehouse to stock the outgoing goods of the various companies • Spaces to keep living animals, to stock dangerous goods (IATA regulations) and to control and to handle dangerous goods	
OPERATIONAL SYSTEMS		
SYSTEMS USED	Truck - aircraft	
CONNECTIONS	Roads	The airport is 6 kilometres away from the city centre and it is reachable in 5 minutes from the motorway exit (A14 Bologna – S.Lazzaro exit, A13 Bologna – Arcoveggio exit, A1 Bologna – Casalecchio exit)
	Railways	Destined to passengers (the airport is 6 kilometres away from the Bologna train station but the railway system is not generally compatible with the air system)
PERISHABLE GOODS		
TYPES OF PRODUCTS	• Fish (in the past) • Fruit (early fruit) • Pharmaceutical products are included in perishable goods	
MAIN ITALIAN EXCHANGE AREAS	• The Airport of Bologna does not perform a hub function as the airport of Milan Malpensa, so the exchange areas belong to a limited area. In particular: • Emilia-Romagna • South Lombardy • Tuscany • Marche • North-East Italy	
MAIN FOREIGN EXCHANGE AREAS	• Africa (some air freight experiences) • Far East • South America	

L. RIDOLFI FORLÌ AIRPORT

GENERAL INFORMATION		
LOCALISATION	44° 11' 47"; 12° 04' 14"	
MANAGING COMPANY	SEAF SpA (Share division: 60% Aeroporto G.Marconi di Bologna SpA; 35% Municipality of Forlì; the remaining part is divided among the Provincial Administration of Forlì – Cesena, Municipality of Cesena, Forlì – Cesena Industrialists Association)	
MAIN TYPES OF GOODS	• Fruit • Early fruit (French beans, etc) • Bananas	
MAIN FOREIGN EXCHANGE AREAS	• Ethiopia • Central and Southern America • Africa	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 1,200 sqm covered area (possible extension to 1,600 sqm in case of special needs) • Load units processing line • Customs temporary store warehouse (80 sqm) • Refrigerating room (20 mc) • Humidified and temperature-controlled zootechnical zone destined to the small animals load units parking, preparation and handling operations (120 mc) • Lift trucks • Transport trucks • Load units transport trucks • Lifting platforms • Tractors • Generators • Air starters • Stairs • Car defrosting	
OPERATIONAL SYSTEMS		
SYSTEMS USED	Truck – aircraft (the air system is not generally compatible with the sea and railway systems)	
CONNECTIONS	Roads	5 kilometres away from the motorway junction
	Railways	6 kilometres away from the train station

LOGISTICS CENTRES HANDLING PERISHABLE GOODS

PADUA FREIGHT VILLAGE

GENERAL INFORMATION		
DESCRIPTION	The freight village of Padua is one of the largest industrial-commercial and advanced services centres in North-East Italy. It hosts 80 companies, which employ 1,200 people, with an induced activity involving 3,000 staff	
LOCALISATION	Industrial district of the city (North-East quarter)	
MANAGING COMPANY	"Interporto di Padova S.p.A.", company managed by a Board of Directors in accordance with the articles of association and the laws in force (the company was born from the pre-existing Interporto Merci Padova S.p.A., founded by the Municipality, the Provincial Administration, the Chamber of Commerce and "Ferrovie dello Stato" – State Railways)	
TOTAL VOLUMES HANDLED	2001	Railway traffic: 2,495,000 tons (2,350,000 intermodal tons) Container traffic: 289,000 TEUs Intermodal traffic: 319,720 ILUs
	2002	Railway traffic: 2,374,000 tons (2,282,000 intermodal tons) Container traffic: 269,000 TEUs Intermodal traffic: 302,532 ILUs
	2003	Railway traffic: 2,450,000 tons (2,302,000 intermodal tons) Container traffic: 252,000 TEUs Intermodal traffic: 290,598 ILUs
MAIN TYPES OF GOODS	Containers	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck The train-truck system is the most frequently used	
CONNECTIONS	Roads	• A4, East Padua motorway exit (Km 4) • A13, Industrial Area motorway exit (Km 2)
	Railways	Trieste – Venice – Verona – Milan – Turin and Padua – Bologna – Rome lines Padova Interporto goods station (Km 0)

OPERATIONAL SYSTEMS	
SERVICES PROVIDED	• Warehousing/Stocking • Filling/Emptying • Consolidation • Empty containers management • Transport/distribution organisation • Customs activities • Distripark: 97,000 sqm of facilities for the complete cycle of goods logistic management (incoming logistics, warehousing, exit logistics and packaging; moreover, temperature-controlled goods management, container filling and emptying, bonded warehouses)
MAIN OPERATORS	• Interporto di Padova S.p.A. • Interporto di Padova – Divisione Logistica • Trenitalia S.p.A. • Nord-Est Terminal S.p.A. (intermodal terminal management)
MAIN ITALIAN EXCHANGE AREAS	• Main Italian ports: Genoa (23%), La Spezia (23%), Leghorn (17%), Gioia Tauro (5%), Trieste (4%), Catania, Palermo, Bari • North-East Italy
MAIN FOREIGN EXCHANGE AREAS	• France (le Havre) • Holland (Rotterdam) • Germany (Hamburg, Bremerhaven) • Eastern Europe (especially Rumania)
PERISHABLE GOODS	
TYPES OF PRODUCTS	Temperature-controlled products containers
SERVICES PROVIDED	• Warehousing/Stocking • Filling/Emptying • Consolidation • Empty containers management • Transport/distribution organisation • Customs activities
WAREHOUSES AND OTHER FACILITIES	100,000 sqm of covered area with refrigerating rooms warehouses
CONTAINER TRAFFIC	
TRAFFIC MANAGEMENT	The container traffic is handled by a company controlled by the Interporto di Padova Company, named Padova Container Service S.r.l. (50,5% Interporto di Padova S.p.A., 34,50% Cemat S.p.A., 15% Ente Autonomo Magazzini Generali di Padova – Padua Autonomous Body for General Warehouses).

CONTAINER TRAFFIC	
RAILWAY AND TERMINAL INFRASTRUCTURES	• Railway Container Terminal: facility available to all the operators to form block trains. It covers 70,000 sqm, 19,500 of which are destined to container stocking. It is provided with two railway lines with 3 tracks each, respectively 420 and 400 metres long, aside from other two tracks respectively 500 and 370 metres long. The Terminal is owned by FS S.p.A. (Italian State Railways). • New Large Container Terminal: the first functional facility set (June 1998) covers an area of about 65,000 sqm and it is provided with two lines with three tracks each one having a linear development of 450 metres (extensible to 705 metres, according to the European standards). The facility is owned by the Interporto of Padua Company. The second functional facility set covers an area of 36,000 sqm, with a two-track line with a linear development respectively of 375 and 277 metres. The open space is provided with a container repair and maintenance workshop. (The Intermodal Terminal hosts traffic operations involving transport swap bodies and semitrailers)
SERVICES PROVIDED	• Load unit handling (both full and empty ones) aided by a special workshop to repair and to maintain containers and swap bodies • Container washing (also special washing procedures) • Container fumigation, consolidation and deconsolidation services • Tank container pre-heating and temperature maintenance and products exercise temperature maintenance • Load units deposit service and other particular services required by the operators

VERONA FREIGHT VILLAGE

GENERAL INFORMATION		
DESCRIPTION	The "Quadrante Europa" logistics centre of Verona may be conceived as a single logistics infrastructure supporting the production from the three main categories of operators: the productive activities (loaders), the shipping companies and the logistic operators. The Quadrante Europa is an organic and integrated system of effective and economic logistic services, joined by intermodality (swap bodies, semitrailers, containers). The logistics centre of Verona handles about 30% of all the Italian combined traffic and more than 50% of the international combined traffic from Italy with a service based on complete train-loads.	
LOCALISATION	Via Sommacampagna, 61 – 37137 Verona. It is located at the junction of the Brennero (North-South route) and Serenissima (East-West route) motorways, as well as at the junction of the corresponding railway lines.	
MANAGING COMPANY	Interporto Quadrante Europa di Verona – Consorzio Zai	
TOTAL VOLUMES HANDLED	2001	45,565.25 containers (TEUS); 45,354 35 tons semitrailers (TEUS) ; 262,363.75 15 tons of swap bodies (TEUS)
	2003	Over 5 million tons of goods by train and 21 million goods by truck
MAIN TYPES OF PRODUCTS	• Dry foodstuff • Temperature-controlled perishable foodstuff • Footwear • Books – paper • Spare parts • Hanging clothes • Lying clothes • Electric material • Chemical products	• Wines and spirits • Marbles and the likes • Furniture – timber • Household appliances • Pharmaceutical – cosmetic products • House cleaning products • Electronic and high-tech products • Automotive • Motorcycle
AREAS	Total	2,500,000 sqm
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	

OPERATIONAL SYSTEMS		
CONNECTIONS	Roads	A4 and A22 motorways, North Verona motorway exit (Km 2)
	Railways	Brennero railway line, Verona Interporto (Logistics centre) goods station (Km 0)
	Airports	Direct connection with Verona-Villafranca airport
NON-PERISHABLE GOODS		
MAIN OPERATORS	• Autogerma • Consorzio Zai • Assointerporti	• Europlatforms • Gruppo Hangartner • Nord Est Terminal S.p.A.
MAIN ITALIAN EXCHANGE AREAS	• Central and Southern Italy	
MAIN FOREIGN EXCHANGE AREAS	• Germany • Sweden • Belgium • France • Spain • Greece • Eastern European countries (especially Rumania and Czech Republic)	• Denmark • Sweden • Holland • Slovenia • Austria • Switzerland • Finland
MAIN TRAFFIC ROUTES	• Northern Europe East, Northern Europe West (cabotage) • Central Europe, Southern Europe West, Northern Europe West, Middle East/Eastern Europe (warehousing/stocking, customs activities, filling/emptying, consolidation, empty containers management, transport/distribution organisation) • Northern Europe West (warehousing/stocking)	
SERVICES PROVIDED	• Cabotage (vehicles) • Warehousing/stocking (paper, steel)	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Combined transport terminal: area 160,000 sqm, 17 tracks • Office district: 30,000 sqm • Customs: buildings 4,000 sqm, open spaces 65,000 sqm, load/unload platform: 120 m • Vehicles assistance centre: area 14,000 sqm, TIR truck parking area 30,000 sqm, container warehouse covering 14,000 sqm • Carriers centre: 40,000 sqm with parking spaces for 450 vehicles and a 4,000 sqm facility serving temperature-controlled vehicles • Shippers centre • Logistics centres: 220,000 sqm (150,000 sqm are occupied by Autogerma S.p.A.) • General warehouses: 385,000 sqm area (58,000 sqm covered) • Motor vehicles - 150,000 sqm within the general warehouses - 60,000 sqm warehouses	

DEVELOPMENTS	
TRAFFICS	Connection to the Hangartner terminal in Domodossola with traditional combined transport wagons
INFRASTRUCTURES	• Forthcoming connection of the logistics centre to the Milan - Cremona – Mantova – Legnago – Rovigo - Po di Levante inland waterway • Building of an agricultural and food centre (600,000 sqm) • Building of 2 industrial warehouses • Building of a viaduct to link future expansion areas • Creation of an internal logistics centre
OTHERS	The general warehouses management of the logistics centre of Verona has been taken over by the Swiss company Hangartner. The project aims at the creation of a Hangartner logistics centre within the logistics centre in order to increase the traffics bound to Northern Europe
PERISHABLE GOODS	
TYPES OF GOODS	• Temperature-controlled agricultural and food products Forthcoming: • Fruit and vegetables • Fishery products • Meat
INFRASTRUCTURAL CHARACTERISTICS	
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Agricultural and food products (with paper and steel): - 420,000 sqm general warehouses (7,500 sqm refrigerated) • Agricultural and food products: - general warehouses - office district - railway area - customs - carriers centre - logistics centres - services to the vehicles - city park
SERVICES PROVIDED	• Warehousing/Stocking • Customs activities • Filling/Emptying • Consolidation • Empty containers management • Transport/distribution organisation

	INFRASTRUCTURAL CHARACTERISTICS
REFEER CONTAINER SERVICES	• Stocking • Full and empty containers handling • Internal washing • Pre-trip inspection • Electric line connection
SERVICES	Enhancement of the agricultural and food sector activities destined to large foreign chains. Areas to be completed: Agricultural and Food Centre (600,000 sqm), logistic platform (24,000 sqm will be available shortly, 55,000 sqm available at medium term)

LUGO INTERMODAL TERMINAL

GENERAL INFORMATION		
LOCALISATION	Via della Dogana, 5 – 48022 Lugo (RA)	
MANAGING COMPANY	Intermodal centre with specialised features, managed by Lugo Terminal S.p.A.	
TOTAL VOLUMES HANDLED	2003	380,000 tons; 8,300 teus
MAIN TYPES OF PRODUCTS	• Timber • Paper • Coils • Perishable foodstuff (refrigerated agricultural and food products)	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	
CONNECTIONS	Roads	• A14, Lugo/Cotignola motorway exit (3 Km) • Provincial road 95 Cotignola (0,1 Km)
	Railways	Ravenna-Lugo-Bologna line, Lugo di Romagna goods station (0,7 Km)
LUGO TERMINAL		
SERVICES PROVIDED	• Cabotage • Warehousing/stocking • Transport/distribution organisation • Consolidation	
MAIN OPERATORS	Lugo Terminal S.p.A.	
INFRASTRUCTURAL CHARACTERISTICS		
NON-PERISHABLE GOODS WAREHOUSES AND OTHER FACILITIES	• 4 kilometres of tracks to receive 4 block trains (4 tracks in the main line, 2 terminal tracks) • Covered warehouses • Asphalted open spaces	
AREAS	Total	Area: 150,000 sqm, with 35,000 sqm suitable to build covered warehouses
	Warehouses	12,500 sqm of covered warehouses, 60,000 sqm of asphalted open spaces (stocking capacity: 3,000 teus in the open spaces)
	Intermodal terminal area	38,000 sqm

GENERAL DEVELOPMENTS	
TRAFFICS	Development of the interaction of the centre with the local productive areas
INFRASTRUCTURES	Extension of the productive zones in the nearby area
PERISHABLE GOODS	
TYPES OF PRODUCTS	Refrigerated agricultural and food products
PERISHABLE GOODS WAREHOUSES AND OTHER FACILITIES	• Infrastructures for refrigerated products • Parking area for refrigerating containers
MAIN ITALIAN EXCHANGE AREAS	• Tuscany (Port of Leghorn) • Veneto • Marche • Emilia-Romagna • Apulia
MAIN FOREIGN EXCHANGE AREAS	• Northern Europe • Eastern Europe (Poland, Russia) • Germany • Austria
PERISHABLE GOODS SERVICES	• Warehousing/stocking • Transport/distribution organisation

PARMA FREIGHT VILLAGE

GENERAL INFORMATION		
LOCALISATION	P.le Europa 1 Interporto, 43010 Fontevivo (PR)	
MANAGING COMPANY	Direct management by the State Railways since 1995, previously managed by CE.P.I.M S.P.A (35% Praoil oleodotti italiani s.p.a, 29% local authorities, 24% bank corporations)	
TOTAL VOLUMES HANDLED	2003	4,000,000 tons (1,000,000 by train)
MAIN TYPES OF PRODUCTS	• Chemical non-carbochemical products, cellulose • Cements, limes, building materials • Timber, cork, textiles • Foodstuff but also: shoes, agricultural tractors, steel sheets, vehicles Specialisation in swap bodies, containers and semitrailers	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	
CONNECTIONS	Roads	(A15) Parma-La Spezia e (A1) Milan-Rome motorways through the national road "via Emilia"
	Railways	Bologna-Milan (with railway junction within the logistics centre), Parma-La Spezia and Parma-Mantova-Verona lines
	Airports	Connection to the Parma airport through the national road "via Emilia"
PARMA LOGISTICS CENTRE		
SERVICES PROVIDED	• Warehousing (including the functions of warehouses on which tax has been deferred; bonded warehouses and "temporary store" customs warehouses). • Handling • Orders management and dispatch by using radiofrequencies • Distribution-transport • Ancillary activities (rewrapping, labelling)	

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	345,000 sqm of asphalted open spaces	
AREAS	Total	2,391,700 sqm
	Warehouses	177,000 sqm (57,000 sqm at room temperature, 120 sqm at controlled temperature (-28°)
GENERAL DEVELOPMENTS		
TRAFFICS	3 million tons/year by train (max. 5 million tons)	
INFRASTRUCTURES	Planned enlargement up to 150 sqm of collective area	

INFRASTRUCTURES NOT HANDLING PERISHABLE GOODS

MONFALCONE SEAPORT

GENERAL INFORMATION		
DESCRIPTION	The Port of Monfalcone is the second seaport of Friuli Venezia Giulia in importance and traffics only to the Port of Trieste	
LOCALISATION	Latitude: 45° 47' 30" ; Longitude: 13° 33' 26"	
MANAGING COMPANY	ASPM Azienda Speciale per il Porto di Monfalcone (Special Company for the Port of Monfalcone) of the Chamber of Commerce I.A.A. (Industry Handicraft and Agriculture) of Gorizia	
TOTAL VOLUMES HANDLED	2002	Over 3 million tons
	2003	3.8 million tons The seaport of Monfalcone currently ranks among the most impor tant centres handling forest products at national level. The growth of the freight traffic was pushed especially by the liquid bulk cargo and container traffic sectors.
MAIN TYPES OF PRODUCTS	The Port is equipped to operate on different products and traffics: solid and liquid bulk cargoes, general cargoes, containers, Ro - Ro. In particular: • Coal • Timber • Scrap iron • Irons and steel products • Cereals • Cellulose • Kaolin • Plant engineering products • Stony products • Various minerals in bulk • Cement	
SERVICES PROVIDED	• Goods handling and warehousing • Services provided by shipping agents and brokers • Services provided by transport carriers and by customs brokers • Services provided by road haulage contractors	

GENERAL INFORMATION	
MAIN OPERATORS	• Warehouses and terminals: ASPM, Consorzio per lo sviluppo del porto di Monfalcone (Consortium for the development of the Port of Monfalcone), De Franceschi S.p.A., Car Terminal Monfalcone, Ocean Speed S.r.l., Mar/Ter Spedizioni S.p.A. • Shipping agents and brokers: Samer & Co. Shipping S.r.l., Francesco Parisi S.p.A., Marlines S.r.l., ... • Road haulage contractors: C.I.T.A. S.r.l., Friulgiulia Trasporti S.r.l., Mar/Ter Spedizioni S.p.A., ... • Transport carriers and customs brokers: Friuldocks S.r.l., Ocean Speed S.r.l., Marlines S.r.l., ... • Various operators: Compagnia Portuale S.r.l., Trenitalia S.p.A., Cargo Department, Capitaneria di Porto (Harbour Office), ...
MAIN ITALIAN EXCHANGE AREAS	• Udine • Trieste • Gorizia • Venice • Bari
MAIN FOREIGN EXCHANGE AREAS	• Central Europe • Greece
INFRASTRUCTURAL CHARACTERISTICS	
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Water depth between 7.5 and 12.5 m • Access canal length: 4,500 m and depth: 9.5 m; • Quay length: 1,500 m; Port facilities made available by single operators: **ASPM** • 1 self-propelled crane with 100 ton maximum capacity; • 1 self-propelled hopper for pulverulent goods • Warehouses: 150,000 sqm area, as well as 16,000 sqm of bonded warehouses and 12,000 sqm of canopies located near the quay **Compagnia Portuale S.r.l.** • 6 multi-purpose cranes on rails with capacity up to 45 tons; • 3 special pliers to unload logs; • 20 to 40 feet spreader; • 7 self-propelled cranes with different tonnage (8 to 60 tons); • 41 lift trucks with different tonnage (2.5 to 42 tons); • 6 tractor loaders; • 7 stacking machines; • 8 digging machines; • 16 tractors; • 18 semitrailers:

INFRASTRUCTURAL CHARACTERISTICS	
TERMINALS, WAREHOUSES AND OTHER FACILITIES	**Compagnia Portuale S.r.l.** • 1 locomotive; • 4 trucks **C.I.T.A. S.r.l.** • 3 lift trucks **De Franceschi S.p.A.** • 8 tractor loaders; • 5 lift trucks; • 2 pneumatic towers to load and to unload cereals and pulverised goods with a 250 tons/hour capacity each; • Grain silos with a 70,000 tons capacity which can also perform a private bonded warehouse function **Mar/Ter Spedizioni S.p.A.** • 8 lift trucks • 2 tractor loaders • 45,000 sqm of bonded warehouses and open spaces covering 40,000 sqm **Ocean Speed S.r.l.** • 2 tractor loaders • 1 lift truck • 2 belt conveyors to handle bulk cargoes • Bonded warehouse connected to railways and open spaces covering 28,000 sqm totally **Friuldocks S.r.l.** • 3 lift trucks with different capacities (12 to 40 tons) • 4,700 sqm warehouse **Consorzio per lo Sviluppo Industriale del Comune di Monfalcone:** • Multi-purpose open space for the temporary customs store of goods of 75,000 sqm and open space to stock goods of 106,000 sqm
AREAS	The seaport can use three water surfaces: the Panzano basin of 650,000 sqm, the Portosega basin of 250,000 sqm and the Valentinis basin of 100,000 sqm
MAIN TRAFFIC ROUTES	Shipping lines: every Wednesdays and Saturdays the seaport of Monfalcone is the departure point of a ferry service linking the Friuli port to Bari and Greece
OPERATIONAL SYSTEMS	
SYSTEMS USED	• Train • Truck • Ship • Aircraft

OPERATIONAL SYSTEMS		
CONNECTIONS	Roads	The seaport of Monfalcone is reachable through the A4 (Venice-Trieste) and A23 (Monfalcone – Udine – Austria) motorways and the national roads to and from Venice, Udine, Gorizia and Trieste
	Railways	The railway line Trieste – Venezia / Udine – Tarvisio, with all the possible branch lines, is very close to the seaport of Monfalcone, and a modern railway link to a simple non-electrified track line guarantees the connection to the railway goods station.
	Ports	The seaport is accessible through a canal with a 4,500 metres length, a 9.5 metres depth and a 166 metres width in the lined ditch
INTERMODALITY	The seaport of Monfalcone is the centre of an intermodal area which, in a 25 km range, includes the Ronchi dei Legionari airport (only five kilometres away) from which national and international flights depart, the traffic centre and the customs station of Gorizia (15 kilometres away) and the Cervignano railway goods station (25 kilometres away from the port area). Therefore the seaport can count, although within a limited distance, on a wide range of transport services by ship, aircraft, truck and train	
DEVELOPMENTS		
INFRASTRUCTURES	• Creation of a modernly equipped area devoted to the Ro – Ro and cabotage services • Deepening, by draining the waters depths, of the access lined canal and extending the turning basin from 9.5 m to 12.5 m • Creation of the first side of the wet dock, extending the existing quay (and at medium-long term, completing it with a further development of the quay up to 2,400 metres) • Creation of an intermodal open space truck/train/ship and creation of cabotage infrastructures • Creation of specialised open spaces for Roll on – Roll off and for containers for an overall area of about 225,000 sqm • Creation of an external quay, extending the wet dock and of the port service infrastructures • Completion of the port areas creating multi-purpose open spaces for an overall area of about 500,000 sqm	

VENICE SEAPORT

GENERAL INFORMATION		
DESCRIPTION	The seaport of Venice may be divided into commercial port (goods and passenger traffic), industrial port and oil port	
LOCALISATION	Venezia Marittima and Marghera	
MANAGING COMPANY	Venice Port Authority (corresponding to the pre-existing Superintendency of the Port of Venice)	
MAIN TYPES OF PRODUCTS	• Hydrocarbons/petrochemicals • Other liquid bulk cargoes • Chemical products • Feedstuff • Cereals • Coal • Other solid bulk cargoes	
TOTAL VOLUMES HANDLED	2001	• Hydrocarbons/petrochemicals, liquid bulk cargo: 28,791,210 tons; Containers: 246,000 teus
	2002	• Hydrocarbons/petrochemicals, liquid bulk cargo: 29,548,542 tons • Chemical products, feedstuff, cereals, coal, solid bulk cargoes: 9,718,610 tons • Containers: 262,337 teus (85,937 empty ones, 176,400 full ones)
	2003	• Hydrocarbons/petrochemicals, liquid bulk cargo: 30,022,485 tons • Chemical products, feedstuff, cereals, coal, solid bulk cargoes: 10,296,970 tons • Containers: 283,667 teus (77,207 empty ones, 206,460 full ones)
SERVICES PROVIDED	• Bulk cargoes • Ro – Ro • Containers • Passengers	
MAIN OPERATORS	• Bulk cargoes, Ro - Ro: Venice Port Authority, Centro Intermodale Adriatico S.p.A., Multiservice srl • Containers: Vecon – PSA, Nuova CLP, Contship, Norasia, MSC, Zim, Maersk – Sealand, Grimaldi, Borchard, Adriatica, UASC, NYK, CMA	

GENERAL INFORMATION		
MAIN ITALIAN EXCHANGE AREAS	Northern Italy	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Hydrocarbons/petrochemicals, liquid bulk cargo: intermodal terminals, dual Ro - Ro hauling quays, warehouses, open spaces • Chemical products, feedstuff, cereals, coal, solid bulk cargoes: intermodal terminals, dual Ro Ro hauling quays, warehouses, open spaces, cereal silos, pulverised goods warehouses • Containers: container terminal, 4 container cranes, 1 Ro - Ro berth The operating terminal-managing companies are: • Centro Intermodale Adriatico S.p.A. (it operates in a State-owned area of 10,408 sqm with 468 metre-long quays) • Multiservice srl (it operates in Marghera within a 94,000 sqm area and a 656-metre-long quay)	
AREAS	Total	• Commercial port: 2,030,000 sqm (of which 530,000 sqm in Marittima and 1,500,000 sqm in Marghera) • Industrial port: 16,700,000,000 sqm • Oil port: 1,720,000 sqm
	Warehouses	177,000 sqm (commercial port)
	Cereal silos	135,000 m^3 (commercial port)
	Warehouse % out of the total area	about 50% (commercial port)
	Pulverised goods warehouses	100,000 sqm
MAIN TRAFFIC ROUTES	• Hydrocarbons/petrochemicals, liquid bulk cargo, chemical products, feedstuff, cereals, coal, solid bulk cargoes: Middle East/Eastern Europe • Containers: Southern Mediterranean/Northern Africa	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Ship • Train • Truck	
CONNECTIONS	Roads	70 Km of internal motorway network
	Railways	205 Km of internal railway network connected to the national network by two train stations specialised for freight traffic
	Ports	30 Km of berths

	DEVELOPMENTS
TRAFFICS	• Enhancement of internal navigation • Cabotage development
INFRASTRUCTURES	• Enhancement of the port facilities connection to national transport networks • Port facilities revitalisation
ENTREPRENEURIAL/ ADMINISTRATIVE STRUCTURES	• Reaching agreements between public and private bodies • Favouring the settlement of the third sector and of logistic companies near the port • Promotion of port activities in the productive districts

BARI SEAPORT

GENERAL INFORMATION		
DESCRIPTION	Latitude 41° 08' 17" N; Longitude 16° 50' 40" E; the seaport of Bari is located North-West to the old town and its borders are, to the west, the S. Cataldo dock and, to the East, the new Foraneo dock	
MANAGING COMPANY	Bari Port Authority, guiding, scheduling and controlling seaport operations and commercial act vities, and being in charge of infrastructures and maintenance and managing the sea State property	
TOTAL VOLUMES HANDLED	2001	Freight: 3,503,911 tons; containers: 24,341 teus
	2002	Freight: 3,608,480 tons; containers: 11,997 teus
	2003	Freight: 3,927,662 tons; containers: 1,579 teus
MAIN TYPES OF PRODUCTS	• Wheat • Iron • Cement • Chemical products	
SERVICES PROVIDED	• Goods handling • Pilotage • Towing • Mooring • Single or dual-track railway junction for all the quays • Water supply in all the operational quays • Bunkering • Ship repair • Bilge waters treatment	
MAIN OPERATORS (CORPORTATE NAMES)	**Shipping agencies** • Aermar • Agema • D.G.Cargo • Longo Shipbrokers • P.Santelia	**Customs brokers** • Bressani • Damiano • Danzas • Di Palo • Ellesse

GENERAL INFORMATION		
MAIN OPERATORS (CORPORTATE NAMES)	**Shipping agencies** • Spamat • Stea e Stea **Shipping agencies and customs brokers** • A.I.S. • A. Morfini e Figli • Agestea • Asco • Bamas • Barion • Blumar • Morfimare • N. Girone • P. Lorusso & C. • Portrans • Santamato • Team • Totorizzo & Sons	**Customs brokers** • Milella & CSRL • Balena **Port companies** • B.C.T. • I.P.M. • Import Levante • Intermodal • Istop Spamat • Le Cinque Biotrans **Associations** • AnaSped • Raccomar **Other operators** • Cristoforo Colombo Soc. Coop. • Gruppo Portabagagli • Lavoport • Multiservizi portuali • Nazario Sauro
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Free warehouse with 5,000 sqm of covered area • Container terminal • Cereal silos with a 25,000 tons capacity • Customs temporary storage stable, with a capacity of about 1,000 horses/cattle • 80 tons weighing machine • 3 to 24 tons quay electrical cranes • 30 to 150 tons mobile cranes • Bulk cargo tractor loaders • Clam-type and cactus-type buckets • Passenger dock station • Cruising ships dock station	
DEVELOPMENTS		
TRAFFICS	• Acquiring new and larger cruising and passenger traffics • Activating the Sea Motorways project • Development of the fedeer container traffic	
INFRASTRUCTURES	Enlargement of areas to handle and to stock goods. 350,000 sqm are being created in the South West area of the basin, the Marisabella fill	

	DEVELOPMENTS
SERVICES PROVIDED	Enhancement of personal services destined to cruisers, to passengers in general and to people having access to the port services
ENTREPRENEURIAL/ ADMINISTRATIVE STRUCTURES	Establishment of a mixed capital company, with majority shareholding by the Bari Port Authority, destined to the management of the 2 passenger terminals

BOLOGNA FREIGHT VILLAGE

GENERAL INFORMATION		
LOCALISATION	Via Altabella, 15 - Bologna	
MANAGING COMPANY	The company which owns and manages the logistics centre (Interporto Bologna S.p.A.) is mainly state-controlled (the Municipality of Bologna, the Province of Bologna and the Chamber of Commerce own altogether about 58% of the capital stock)	
MAIN TYPES OF PRODUCTS	• Earth (gravel, clay) • Dry foodstuff (limited quantities) • Instrument engineering and industrial products • Paper • Baked clay • Textiles and clothes	
TOTAL VOLUMES HANDLED	2002	• total 3,906,000 tons by train and by truck
	2003	• Earth:120,000 teus • Dry foodstuff: 80/90 semitrailers (to be shipped in the Tyrrhenian and Liguria ports)
SERVICES PROVIDED	• Filling/Emptying • Consolidation • Transport/distribution organisation (containers, general cargo, earth, others) • Customs activities (containers, general cargo, others)	
MAIN OPERATORS	CORPORATE NAME	Shenker
	TYPE	• Overseas transport service operator (intermodal or road freight positioning in the port) • Continental and regional all-road transport services (consolidation and complete load) • Distribution logistics and contract logistics services operators
MAIN ITALIAN EXCHANGE AREAS	• Main Italian ports: Genoa, La Spezia, Cagliari, Sassari, Leghorn, Trieste, Gioia Tauro. • Northern Italy: Emilia-Romagna (the logistics centre serves a large local productive area, that is 8.16 sqKm within 15'), Milan • Southern Italy: Marcianise Logistics centre	

GENERAL INFORMATION		
MAIN FOREIGN EXCHANGE AREAS	• Denmark and Scandinavian countries (Sweden, Norway) • Western Europe (Belgium, Germany, Luxemburg, Holland) • Poland	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	
Roads	Limited quantities, the flows towards Tyrrhenian and the sea motorways are not managed. The logistics centre is provided with 13 truck-to-truck flaps	
Railways	Limited quantities to France (stops to change the bogies for the transport to Spain). Railway volume: 1,380,000 tons/year. Trains/day: 15	
Railways - Roads	The logistics centre performs handling operations only. It is provided with 4 train-to-truck flaps	
CONNECTIONS	Roads	"Bologna Interporto" is the motorway exit on the A13 Bologna - Padua
	Railways	"Bologna Interporto" is the railway station of the Bologna logistics cen tre, on the Bologna-Padua-Venice railway line
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 5 warehouses for large dimension logistics • General storage warehouses • State railways (Ferrovie dello Stato) terminals • Bulk cargo terminal • Customs centre • Fuel supplying and vehicle washing station, banks, post office, catering services	
AREAS	Total	2,000,000 sqm (650,000 of which destined to TRENITALIA S.p.a. facilities). A further gradual 2,270,000 sqm expansion is currently under way.
	Warehouses	216,000 sqm
	Warehouses %	0.108
	Intermodal terminal	277,000 sqm (combined transport terminal: 130,000 sqm - 10 tracks; container terminal: 147,000 sqm - 5 tracks)
	Intermodal terminal %	0.1385
MAIN TRAFFIC ROUTES	The logistics centre is located on a North-South traffic route which sees the passage of 75% of the freight crossing our peninsula. Limited quantities of goods are bound to France by train (they stop to change the bogies for the transport into Spain)	

	DEVELOPMENTS
TRAFFICS	The present efficiency of the connection network is conditioned by the saturation level of the node of Bologna (both the road and railway systems); a growth of the impact on the local road system is foreseen, with an exchange increase in all the area of influence. A circular 8-shaped transport system is being studied to link the Emilia-Romagna and Tuscany infrastructures and the related industrial districts, favouring also the link to the port facilities of Ravenna-Leghorn. A logistics centre promotion and development plan is being implemented involving international operators and the subsequent enhancement of interregional routes linking the centre to other logistic infrastructures.
INFRASTRUCTURES	The building of a 350,000 sqm gravel warehouse is currently being studied
INTERMODALITY	The development of the truck-train intermodality through the alliance with foreign railway companies is being studied
OTHERS	There are plans to co-ordinate the rebirth of the Imola freight village promoting the integration-partnership with the Bologna centre. Local terminals promotion to avoid surrendering everything to foreign railways competitors

PIACENZA LOGISTIC CENTRE

GENERAL INFORMATION		
LOCALISATION	Logistics platform integrated into the "Le Mose" industrial area	
MANAGING COMPANY	"Piacenza Intermodale" controlled by a number of transport operators	
MAIN TYPES OF PRODUCTS	Specialisation in dangerous goods	
TOTAL VOLUMES HANDLED	2003	1,700,000 tons/year (700,000 by train)
SERVICES PROVIDED	• Stocking • Goods handling and distribution • Complete load transport (except perishable goods) by the operators established in the centre • Flows management and quality control by Piacenza Intermodale	
MAIN ITALIAN EXCHANGE AREAS	Currently the primary demand area is the South Milan area (potentially extensible to the Liguria ports)	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	
	Roads	A1 (Milan- Bologna) and A21 (Turin-Piacenza-Brescia) motorways and the national roads No. 9 (Piacenza-Bologna) and No. 10 (Piacenza-Cremona)
	Railways	Milan-Bologna and the high capacity/high velocity interconnection Piacenza-Castelvetro-Cremona
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• 50,000 sqm open space • 5 km of tracks with a linear length of 750 metres available to intermodality	
AREAS	Total	600,000 sqm
	Warehouses	25,000 sqm (belonging to Piacenza Intermodale) 80,000 sqm (belonging to Prologis)
DEVELOPMENTS		
OTHERS	1.7 sqkm expansion planned	

DINAZZANO INTERMODAL TERMINAL

GENERAL INFORMATION		
LOCALISATION	Dinazzano (Reggio Emilia)	
MANAGING COMPANY	Dinazzano - Po, state-owned body (Municipality of Reggio Emilia)	
TOTAL VOLUMES HANDLED	2003	1,222,074 tons/year; 7 trains/day departures; 9 trains/day arrivals
MAIN TYPES OF PRODUCTS	• Ceramic industry raw materials • Industrial finished products/tiles	
SERVICES PROVIDED	The goods station provides traditional and intermodal railway transport specialised in ceramic industry raw materials and finished products. • Arrival of wagons carrying raw materials for the production of ceramics/tiles • Filling/emptying of trains-trucks to and from the production factories • Wagons departure	
MAIN OPERATORS	• Dinazzano-Po (constituted by FER e Sapir) • Castelletti • Assocargo	
MAIN ITALIAN EXCHANGE AREAS	The supplied area is the ceramics district which extends in the foothill and hill strip to the South of Modena and Reggio Emilia. There are relevant synergies with the Marzaglia terminal (to which it will be linked by a special connection railway track) and in the next future with the logistics centre of Borretto and with the Port of Ravenna (as a consequence of the establishment of the mixed com pany FER-ACT for the clay transport from Ravenna), and those synergies will estimatedly affect the road traffics with a 15,000 trucks/year impact.	
MAIN FOREIGN EXCHANGE AREAS	• Germany • France	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Presently there are not warehouses and stocking areas (currently under construction) • 3 tracks main line (7 planned) • 4 terminal tracks	
TOTAL AREA	100,000 sqm	

OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck	
Train - Truck	Containers handled with the railway-road system	
CONNECTIONS	Roads	Link to Reggio Emilia through the ACT line
	Railways	The goods station is located 12 kilometres away from the Reggio Emilia station (on the Bologna-Milan line)
DEVELOPMENTS		
TRAFFICS	Possible demand of 4 million tons/year by train	
INFRASTRUCTURES	• The area of the goods station is going to be doubled • Building warehouses and stocking areas for incoming and outgoing materials/products (presently loadings/unloadings of trains/trucks are carried out without intermediate storages)	

ROVIGO FREIGHT VILLAGE

GENERAL INFORMATION		
LOCALISATION	The logistics centre is located South-East to the city of Rovigo, in the surroundings of the industrial district, and near the Fisero - Tartaro - Canalbiaco - Po di Levante waterway.	
MANAGING COMPANY	Interporto di Rovigo S.p.A.	
TOTAL VOLUMES HANDLED	2003	108,000 tons
MAIN TYPES OF PRODUCTS	Different types of goods handled (cereals and pulverised goods are particularly relevant). Specialisation in the transport of bulk goods but not of containers • Agricultural and food products (cereals and pulverised goods) • Fertilisers and chemical products • Fuels • Mechanical products • Building and glass industry products • Solid minerals, iron and steel and metallurgic products	
SERVICES PROVIDED	• Specialisation in the management of the intermodal traffic between roads - railways - inland waterways • Public weighing machine • Customs • Port Inspectorate • Goods stocking and handling, both of raw materials and finished products to be shipped • Industrial area already urbanised and ready for the settlement of businesses (available areas provided with services useful to the implementation of productive activities and of broadband networks)	
MAIN ITALIAN EXCHANGE AREAS	• North-East Italy	
MAIN FOREIGN EXCHANGE AREAS	• Austria • Eastern Europe	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Intermodal terminal provided with 500-metre-long tracks and a 20,000 sqm open space destined to empty and full containers • River hauling quay with a length of 620 metres, which will be extended of further 160 metres • Goods handling open spaces with an overall area of 50,000 sqm	

INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Warehouses and shippers offices provided with flaps • Building destined to customs offices; • Building destined to the offices of the Interporto di Rovigo S.p.A. company, of COVNI and of the Port Inspectorate; • Public weighing machine qualified for heavy transport.	
AREAS	Total	1,600,000 sqm
	Warehouses	30,000 sqm
	Intermodal terminal	36,000 sqm
MAIN TRAFFIC ROUTES	The markets supplied by the logistics centre include the Adriatic corridor along the North-South axis, the Po Valley and the Po-Veneto waterway system and North-East Italy in general.	
OPERATIONAL SYSTEMS		
SYSTEMS USED	• Train • Truck • Ship	
CONNECTIONS	Roads	The logistics centre is 6 kilometres away from the A13 motorway (Padua - Bologna) and about 3 kilometres away from the SS434 Transpolesana national road
	Railways	The railway connections between the logistics centre and the Venice - Bologna lines are guaranteed by the Rovigo train station.
	Ports	The logistics centre is linked, through waterways, to the Fissero - Tartaro - Canalbianco - Po di Levante waterway, as well as to the main ports located along the shores of the Adriatic and Tyrrhenian Seas
DEVELOPMENTS		
TRAFFICS	Given the vocation to the management of the intermodal traffic roads - railways - inland waterways, the next future may see an introduction in the trade with the Southern Mediterranean basin (aside from Austria and Central-Eastern Europe). In 2005 the intermodal traffic should reach 2.5 million tons, the traditional railway traffic should reach 500,000 tons and the road traffic should reach 2.5 million tons (the total traffic should reach about 6 million tons per year).	
INFRASTRUCTURES	• The access to the logistics centre should be improved thanks to the interconnection among the different road routes once the logistics centre area is accessed, aside from the implementation of the 1850-metre-long special junction on the Rovigo - Adria - Chioggia railway line • Creation of a green area around the logistics area facilities in order to safeguard the surrounding urban areas • Creation of a sort of "inland water motorway" from the Adriatic Sea up to Milan (still pending is the issue related to the way to find the needed financial resources to implement the link to Cremona and the building of a river port in Milan)	

	DEVELOPMENTS
INTERMODALITY	Implementation of an integrated system of intermodal transport and logistic services, promotion of the inland waterway network and of intermodality in general, through higher levels of integration and synergy among the different transport system. Thus, the activities of the Logistics Centre would not overlap or compete with the routes supplied by other logistics centres, in particular in Padua and Verona

MILAN MELZO INTERMODAL TERMINAL

GENERAL INFORMATION		
DESCRIPTION	It is the main container terminal in Lombardy with international connections	
TOTAL VOLUMES HANDLED	2001	60,000 TEUS
MAIN TYPES OF PRODUCTS	• Cars • Chemical products • Electronic products	
SERVICES PROVIDED	• Filling/emptying • Consolidation • Transport/distribution organisation (containers, general cargoes) • Customs activities (containers, general cargoes)	
MAIN OPERATORS	• Sogemar (Contship) • Trenitalia Cargo • C.O.M. (Centro Operativo Melzo)	
MAIN FOREIGN EXCHANGE AREAS	• Belgium • Germany • Holland • Switzerland	
INFRASTRUCTURAL CHARACTERISTICS		
TERMINALS, WAREHOUSES AND OTHER FACILITIES	• Customs • Warehouses (3,000 sqm) • Open spaces (45,000 sqm) • Stocking capacity: 129,000 TEUS/year	
MAIN TRAFFIC ROUTES	North Europe West	
DEVELOPMENTS		
TRAFFICS	A new partnership, named Hannibal, was created between Sogemar (Contship) and Trenitalia Cargo, offering a service of 3 connections per week from Melzo to Manheim, Zurich, Basel, to subsequently increase them to 5. The main characteristic of the initiative is the direct railway link of the "Contship system" seaports, Gioia Tauro, Leghorn, Ravenna and La Spezia, to central Europe. The system should be capable of saving 5-6 days of shiping over unloading in a Northern European seaport.	

PART 2

ICT SOLUTIONS FOR SUPPLY CHAIN MANAGEMENT

INTRODUCTION

Rino Rosini and
Maurizio Campanai

5. INTRODUCTION

5.1. The essence of Gildanet project

Time, speed and accuracy of transactions, information flow and distribution processes are essential for industries that deal with short shelf-life and product life cycles, particularly consumer packaged goods, food and beverage and high-tech markets.
The transport sector has surely witnessed the recent development of ICT solutions. Although built using the state-of-the-art technology, the available ICT systems and services attempting to support planning, operational and controlling activities within the context of intermodal transport chains seems not able to support the demanding requirements of transnational intermodal transport chains, nor are they – restricted in scope and reach as they are - providing attractive business propositions for the ICT services suppliers and (potential) users.
The GILDANET project defined an approach and proposed some solutions for managing all the logistics capabilities for dealing with the complexities involved in the business processes.

Gildanet's mission is to support companies to bridge the gap in the e-logistics area. The essence of e_logistics in the project is related to the concepts of a global business community where enterprises of any size, anywhere can
- Find each other electronically
- Conduct business through the exchange of electronic based messages using standard message structures
- According to standard business process sequences with clear business semantics
- According to standard or mutually agreed trading partner agreements
- Using commercial off-the-shelf purchased business applications

The e-logistics approach is still related to large companies that can create an "ad hoc" environment in which all the business partners are included. In this case, a SME (Small Medium Enterprise) can only adopt the system provided by the chain leader and have to accept the business process supported.
To enable SMEs to be partner in multimodal transport chains, it is necessary to work at level of standards, open architectures, best practices and full adoption of the WEB as the environment to have low costs and easy access to services (Figure 5.1).

GILDANET was moreover defined according to the European evolving context, trying to contribute to the European vision of the Sevilla submit (2002) that endorsed two important political initiatives:
- the "e-Europe 2005 initiative" aiming at providing a favourable environment to boost productivity, modernise public services, create jobs, in order to make Europe the most competitive and dyna-

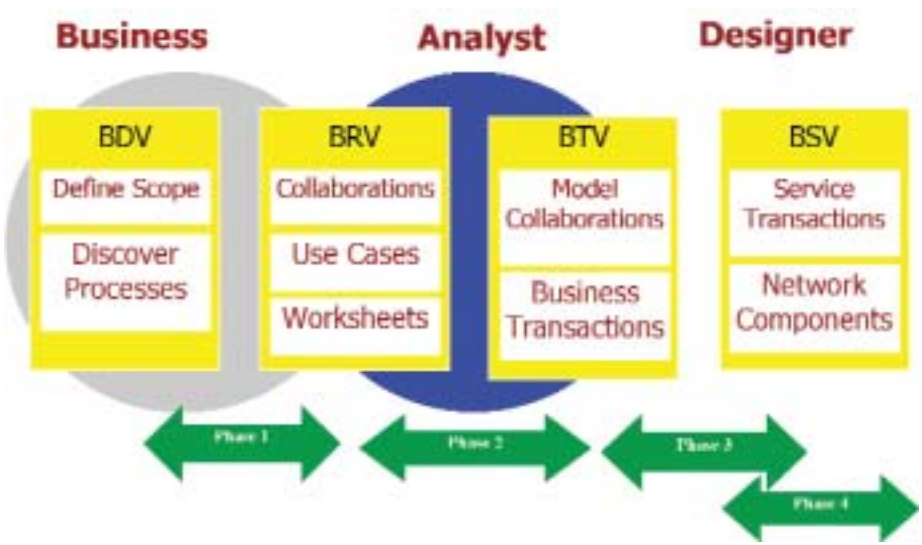
mic knowledge based economy. Within this approach, GILDANET focused the interactive public services (e-government), the concept of accessible for all, and the idea of interoperability and multiple platforms.
- The "better regulation"; GILDANET tried to give technical answers to a process that need a strong effort fro reviewing the legislation affecting e-business both at European level, as well as at international level.

SME's involved in multimodal transport supply chain and their adoption of e-logistics through:
- support to international business by enabling interoperability in ICT systems (booking, tracking and tracing, invoicing, etc.) and definition of standard cooperation processes;
- reduction of costs and times connected to communication flows and data interchange (with the adoption of international standards);
- reduction of the technological gap between SME's and the main operators
- efficient and effective cooperation between all the actors involved along the Supply Chain
- strong cultural change toward information sharing and cooperation through the use of state of the art technologies.

(FIGURE 5.1) THE ATTENTION TO BUSINESS PROCESSES IN GILDANET

The approach for designing the business collaboration among companies has been conducted according to a well defined methodology based on UMM (Unified Modelling Method) in which four main tasks are identified (BDV – Business Domain View, BRV – Business Requirement View, BTV – Business Transaction View, BSV – Business Service View). In the figure 5.2, the role and competencies involved in the process.

(FIGURE 5.2) THE APPROACH FOR THE DEFINITION OF BUSINESS COLLABORATION PROTOCOLS



5.2. The results of Gildanet

The project has been developed involving two main perspectives: *the business perspective:* to enhance the capability of the companies to model the business cooperation processes, based on the need of creating a common understanding of electronic business messages and workflow. The focus of the project was to deal with the definition of appropriate business models and how to establish a level playing field for SME's and global players can work together using state of the art technology; the technological perspective: to adopt and enhance existing ICT-solutions with capabilities to cooperatively support transnational and multimodal transport chains. Specifically, to build solutions upon the recommendations of international standardization bodies such as UN/CEFACT, OASIS and ebXML and with all the functionalities capable to support well defined business models.
Upon the two main perspective, GILDANET developed pilot projects, interconnecting ICT-solutions among themselves and with legacy applications of other public/private actors to support specific transport chain, such as perishable goods, automotive and reversed logistics of container.
As for many project GILDANET has tangible results:

- a proven method for defining new business process collaboration agreement, based on standard approaches such as ebXML
- an ICT communication platform enabling transnational chains to adopt e_documents (GIPO)
- an ICT application platform providing services to transnational chains (GIAP)
- pilot applications: chain planning, chain monitoring, fleet management, tracking and tracing modules, e_document applications.
- a validation of the Gildanet approach in real transnational chains.

GILDANET deals with some relevant topics of international multi-modal transport, which relate to both material flow and information flow:

- the needs for tracking and tracing are different for trading companies compared to transport companies (delivery batch vs. transport equipment, means of transport)
- key reference numbers used by trading companies are different from those used in transport companies (goods identification numbers vs. container/truck/trailer/wagon numbers)
- there are gaps in information flows (e.g. when railway mode of transport ends the party that prepares road waybill does not have any previous documents such as railway consignment note. Therefore it is not possible to pass on key reference numbers.)
- the more players there are during the delivery chain the more difficult it is to pass on key references (goods identification numbers, means of transport identification) through entire delivery chain
- there is no international or multimodal tracking and tracing system available
- there is a need for better tools for better delivery planning (i.e. estimated time of delivery)
- there is a need for better tools for exception reporting.

The project has other "intangible and promising results":

- the interest of private companies in the technical solutions
- the interest of public bodies for the adoption of standard languages and format
- the interest of operators and stakeholders of logistics for accessing real-time data
- the interest of large companies for having an infrastructure for e_logistic.

5.3. The ICT context in the Gildanet pilots

Information Management and Electronic Data Transmission systems in freight transport is an outstanding issue for the efficiency of transport intermodality at transnational level. Technology innovation enables new opportunities, but the logistic chains should define and adopt new efficient business models.
The e_logistics is the silver bullet for companies and public administration because it offers key advantages if it is the result of an integration of a business processes reengineering. The companies should be ready to change the organisation and follow the growth of IT capabilities and e_business applications could have a positive impact on SMEs adopting the new EDI technologies.

In Gildanet three types of pilots using ICT solutions have been analysed:

An Automotive Chain
With the support of global operators, a business process model for car imports, from Asia via the Suez Canal and an Italian port to Central European destinations, is offered to be used as a reference model for importers and freight forwarders in the Automobile sector.

A Perishable Chains
With the support of a global logistic provider and an important European retail company, a bottom up supply chain for perishable goods was modelled and validated and specifications for a software implementation have been developed.
The GILDANET team designed such a complex chain, characterized by daily orders from a major retailer to different producers. Commissioning the orders is performed right after harvesting in the fields. Produce is collected from cooperatives and shipped to a warehouse. Cross docking operation and bundling ensures a high utilization of available truck/container capacity. The viability of the supply chain has been proven during a pilot run of several weeks.

An "Empties" management system
With the support of a world operator, this pilot demonstrates a process management tool for empty container repositioning and maintenance, including three transportation modes (ship, rail, truck)

and geographically connecting Greek and Italian ports (Figure 5.3).

5.4. The Gildanet architecture

The GILDANET architecture is an attempt to address the demands of international multimodal supply chains, whose critical areas are described in the preceding chapter.

The Gildanet platform can be used by a user and/or by an ICT external system.

The GIPo platform provides the basic services, the GIAP platform provides basic functionalities and access to external services through the internal "registry". An e-business registry is a software product that acts as an organizing focal point for the wealth of information and interactions that conducting e-business requires.

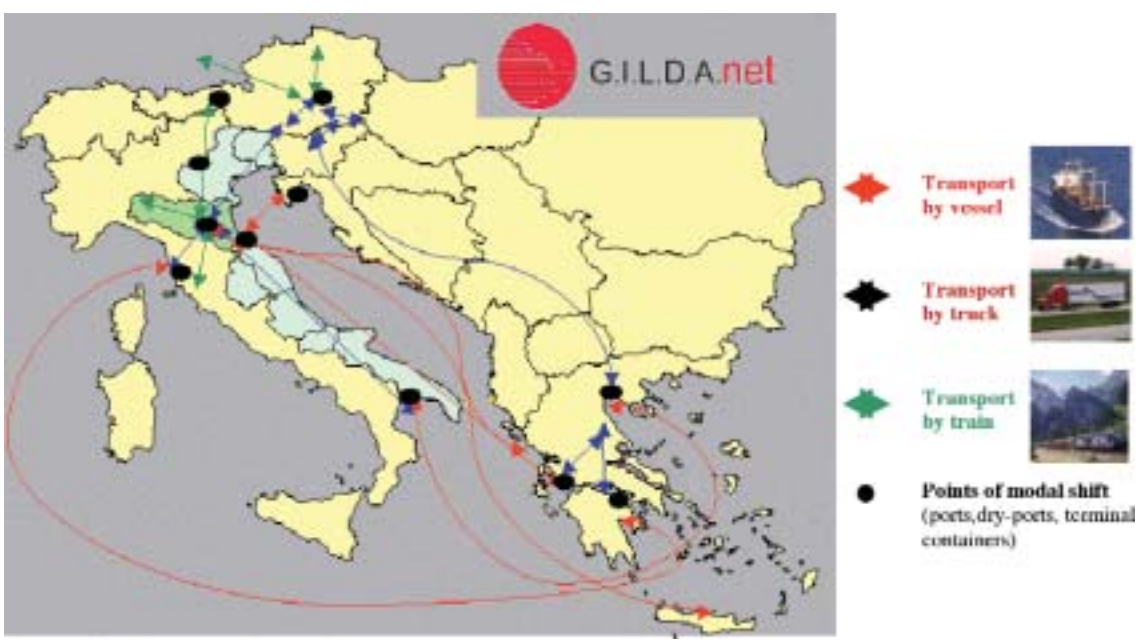
E-business registries serve various purposes, including:

- Enabling the discovery of trading partners and their various capabilities
- Classification, association of e-business artifacts such as XML schemas, Document Type Definitions (DTDs), and trading partner profiles
- Registration and discovery of Web service descriptions, such as Web Services
- Description Language (WSDL) documents

E-business registries are central to the execution of e-business because they allow for the registration, management, and discovery of those critical items that are crucial for the conduct of e-business.

The UDDI and ebXML (www.ebxml.org)

(FIGURE 5.3) THE TRANSPORT MODES AND NODES INVOLVED IN THE PILOTS.



registries are considered e-business registries, each with a different primary focus (Figure 5.4).

The GILDANET architecture adheres to the principles layed out in the ebXML framework, and is consequently predicated on the concept of interoperability between otherwise heterogenous and incompatible information systems.
Interoperability is achieved through the consistent deployment of the following technologies and methods.

Collaboration-Protocol Profile and Agreement Specification (CPP & CPA)

The CPP - in essence a structured standardized XML document - describes the specific capabilities that a Trading Partner supports as well as the Service Interface requirements that need to be met in order to exchange business documents with that Trading Partner.
The CPP contains essential information about the Trading Partner including, but not limited to: contact information, industry classification, supported Business Processes, Interface requirements and Messaging Service requirements. CPP's may also contain security and other implementation specific details. CPP's may be registered in a registry but need not be.

Two trading partners prepared to enter a business relationship (i.e. e freight forwarder with a transporter) negotiate a CPA using their respective CPP's. The resulting CPA will be the intersection of the CPP's.

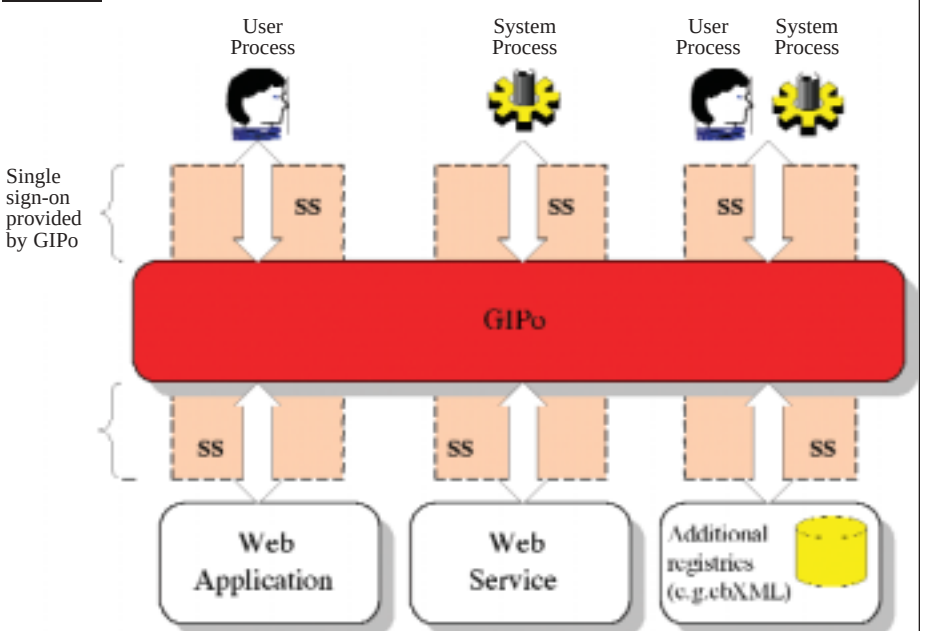
Based on the CPA (a copy of which will be stored in each trading partners system) the trading partners modify their MSI software layer.

Business Process Specification Schema (BPSS)

To be understood by an application, a Business Process has to be expressible in XML syntax. A means to be followed by GILDANET is the expression of the characteristics of these business processes using the ebXML Business Process Specification Schema (BPSS). Using the BPSS user may thus create a Business Process Specification that contains only the information required to configure ebXML compliant software.

A Business Process Specification is in essence the machine interpretable run

(FIGURE 5.4) THE GILDANET ARCHITECTURE.



time business process specification needed for an ebXML Business Service Interface. The Business Process Specification is therefore incorporated with or referenced by ebXML trading partner Collaboration Protocol Profiles (CPP) and Collaboration Protocol Agreements (CPA). Each CPP declares its support for one or more Roles within the Business Process Specification.

Within these CPP profiles and CPA agreements are then added further technical parameters resulting in a full specification of the run-time software at each trading partner.

Business process models describe interoperable business processes that allow business partners to collaborate. Business process models for e-business must be turned into software components that collaborate on behalf of the business partners. The objective of this specification is to ensure interoperability between two Parties even though they may procure application software and run-time support software from different vendors.

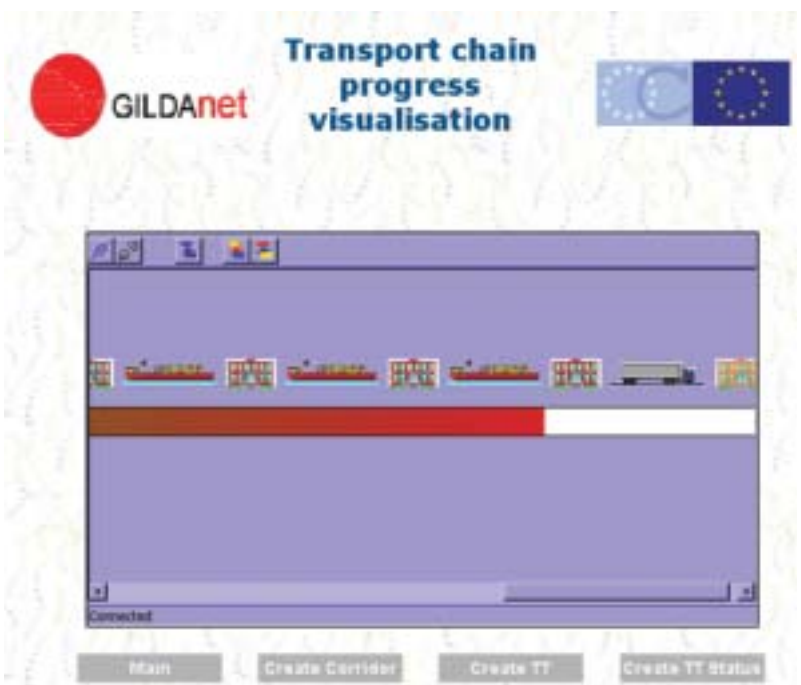
The exchange of information between two Parties requires each Party to know the other Party's supported Business Collaborations, the other Party's role in the Business Collaboration, and the technology details about how the other Party sends and receives Messages. In some cases, it is necessary for the two Parties to reach agreement on some of the details.

5.4.1. The example of tracking and tracing

Although many operators in transport and logistics have had tracking and tracing systems in place, these only cover the individual needs of the operator; now, with supply chains becoming more and more complex, involving many carriers and multiple transport modes, there is a much higher demand for an across the board system.

Gildanet focuses on interoperability, open interfaces, and standardization in order to allow seamless tracking and tracing across the entire logistics and transportation chain. With its open and scalable system architecture, a small trucking company could adopt the Gildanet services just

(FIGURE 5.5) THE MONITORING OF A MULTIMODAL CHAIN



as easily as a large national or international carrier.
This approach permitted to deliver a first attempt to manage an international and multi-modal tracking and tracing system.
Figure 5.5 shows the monitoring of a multimodal chain.

5.5 Conclusions

The Gildanet project delivered methods, studies and available WEB services for transnational transport chain management. In the following chapters, two example of deployment of the results in two chains for perishable goods will be presented: the first from the point of view of the business modelling and analysis of the cooperation processes among different actors of the chain; the second one will be presented in the perspective of the adoption of the Gildanet technology and solutions in order to plan, operate, monitor a complex chain.

THE FRESH-EUROPE CASE

6. THE FRESH-EUROPE CASE

The retail sector in Central Europe is characterized by low margins and fierce competition between the major players. As a consequence the sector is very innovative and predisposed to deploy organizational and technological advances. A recent strategy to increase their competitiveness and to increase customer frequencies in their outlets consists in offering a wide variety of fresh produce procured from all over the world. This strategy requires a slim and highly efficient procurement and logistics process.

A major retailer in Austria in cooperation with EXEL, a European logistics service provider designed and built a supply chain disinter mediating the wholesale layer, in an attempt to gain better control over the daily deliverables of fresh produce. To operationalize the concept, the chain was tailored to the exigencies of procuring and transporting fruit and vegetables from Spain to the Austrian retail outlets.

EXEL offered GILDANET an environment for the application of interoperable standards and methods to address the requirements specific to the transport of perishable goods. These particulars include the requirement to

- Maintain the temperature of the transported goods within a product category dependent temperature range;
- Ensure that produce ordered retailer in Spain would arrive at the distribution warehouses of the receiving retailer within 36 hours;
- Maximize the utilization of transport capacity in order to keep transportation costs at a minimum.

GILDANET used the UN/CEFACT' s Modeling Methodology (UMM), its preferred business-modeling paradigm to design the necessary business processes. UMM is a part of UN/CEFACT' s interoperable architecture (ebXML) and focuses on the numerous collaborations that occur between the various actors in a given supply chain. UMM views these collaborations as a choreographed sequence of transactions. Each transaction that occurs between any two actors is specified beforehand in sufficient detail and under all foreseeable circumstances.

Thus it ensures that the complexity resulting from the involvement of a large number of businesses in a given supply chain is manageable and affordable. Particularly disruptions as a consequence of not defined responsibilities, unclear specifications of who has to do what, how and when are held at a minimum.

Planning supply chains using UMM proceeded in several stages addressing different aspects. The first stage was an

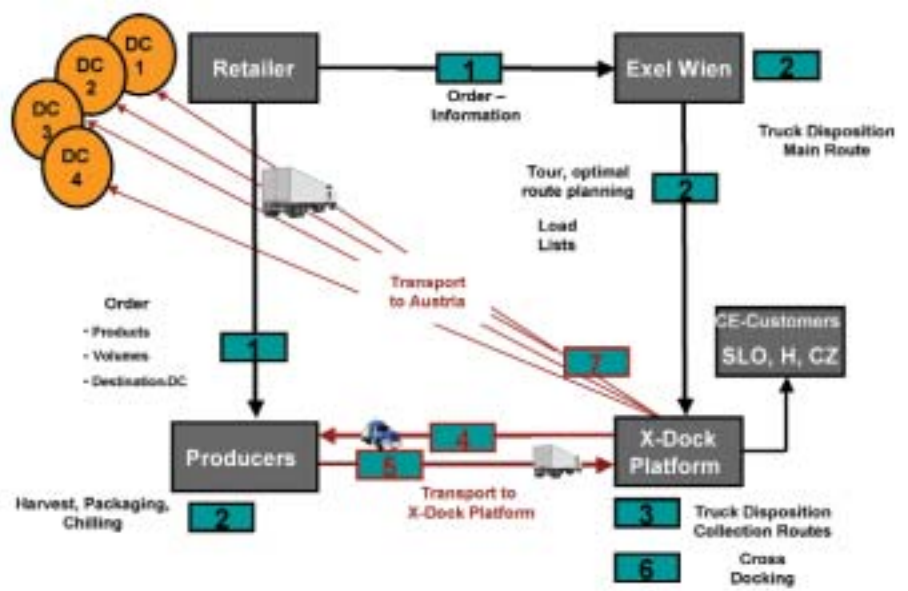
attempt to delimit the scope of the chain, to identify the actors involved and to obtain a bird's eye view of the whole process (Figure 6.1).

Central to the new supply chain designed envisioned by the retail chain and EXEL was the use of a single cross-docking platform in Valencia. This location would serve as a single node to collect produce harvested and pre-commissioned by the individual producers; the point, where the produce would be chilled and allocated to a given truck.

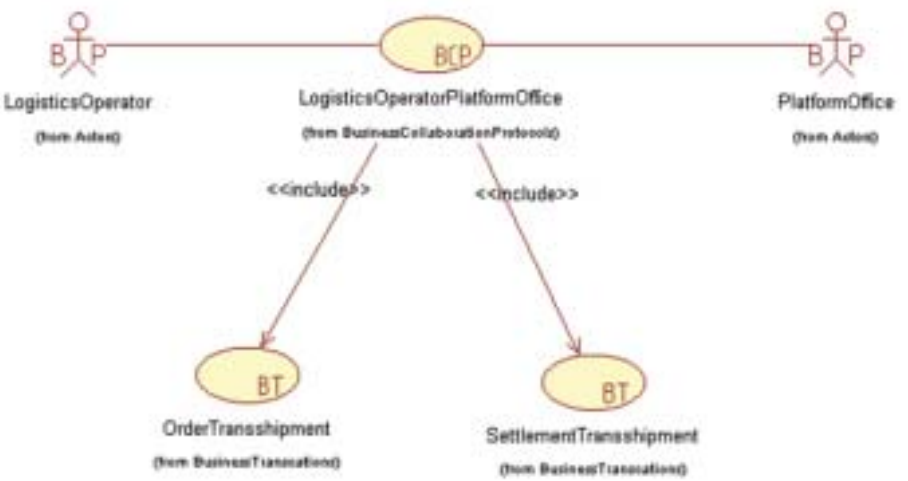
Deviating from traditional supply chains for fresh produce, the wholesale layer is eliminated as the retailer orders fruits and vegetables directly from his producers in Spain. The contractual relationship between producers and the retail chain stipulates, that the produce would be harvested only after the order was received and shipped to the cross-docking warehouse in Valencia within a given time limit. This arrangement would ensure the quality of the produce in terms of freshness.

The second stage of the planning focused on the information flows required to operate and monitor the supply chain. It proceeded by identifying collaborations between actors, the exchanges of information required between them and their sequence. (Figure 6.2).

(FIGURE 6.1) THE BUSINESS DOMAIN - ORDERING AND SHIPPING FRESH PRODUCE



(FIGURE 6.2) COLLABORATIONS BETWEEN EXEL AND THE VALENCIA PLATFORM



In a last step, the details of the information exchanges, the transactions between any two actors, where worked out. A major advantage of UMM, a set of predefined transaction patterns, was deployed to the benefit of the supply chain manager, as the use of these patterns would allow him to reuse existing business processes as a starting point.

Information exchanged was defined bottom-up, using another set of building blocks - core components - that are recurring and often used fragments of business information and represent internationally used standards. By making use of these standards, the requirements of international transparency and transnational trade are addressed.

A particular requirement of transporting perishable produce consists in keeping the temperature of the produce within predefined ranges. Thus specific care has to be taken to monitor and record the temperature of different areas of the container used to ship perishables. Although the deployment of RFID technology using temperature sensors has been investigated and its feasibility established, the promoters of the chain decided that it was sufficient to monitor and record temperature readings at given transition points only.

The resulting supply chain, the business processes and the associated transports were put to the test in a real setting. For a period of 6 weeks - defined by the retailer as a trial period before entering a longer-term relationship with the logistics provider - fruits and vegetables were successfully shipped from Spain to the retailer in this manner. A review of the experiences and observations performed after the conclusion of this trial run, provided the following insights and benefits that would accrue to the various actors in the supply chain:

- Bundling allows the producer to have one delivery for multiple retailers at the same time, reducing transport costs and enhancing his market access through new business contacts with multiple retailers.

- Retailers benefit from the reduction of the number of unloading operations at the docking ramp, as a result of the previous bundling of different orders to different suppliers performed by the logistics operator. This reduction of unload operations is expected to translate into a reduction of workload.

- Reduction of the order-delivery cycle has a positive impact on the freshness of the produce on the shelves. A corollary to these effects is the reduction of disposable waste, as the lot size of the orders is expected to decrease. Current estimates of waste amounts to15%. Increase of turn in the warehouse by virtue of the increase of the order cycle will result in an improvement of the retailer's cash flow in this product category.

- Albeit point-to-point delivery remains the fastest delivery mode, bundling of orders likewise has the potential to reduce the delivery time at least by one day. Assuming an average freshness period of 10 days (5 days for ultra-fresh produce) a one-day reduction of transport time will extend the shelf time by 10% and 20% for ultra-fresh produce respectively.

- The availability of an information pool (market place) with listings of expected product availabilities by producer (quality, volumes, prices) is expected to alleviate the retailer from the burden to check availabilities in advance; in today's environment 3-4 people on average in the procurement offices of the retail chain are engaged. A 50%-75% reduction seems possible.

The practical experiences gained with the help of the trial period were subsequently used to design an application for the logistics service provider in support

for his role as the supply chain leader. The service-oriented architecture of the application ensures the interoperability with existing applications of partners as well as with those of the organization itself. To guarantee the applicability in a global market place, particular attention was given to the use of international standards. As in this particular environment not all the actors involved in the supply chain either had existing applications nor planned the deployment of IT systems to support their role in the chain, a web-client prototype was built to ensure that all the required actors were included. (Figure 6.3)

(FIGURE 6.3) SCREENSHOT – TRUCK DETAIL

GILDANET ON THE GREECE–ITALY–GERMANY CHAIN

7. GILDANET ON THE GREECE–ITALY–GERMANY CHAIN

The FRESHLOG pilot deals with the movement of primarily sensitive or subject to decay goods, along a pre-selected transport Corridor. While there may be tolerance to extend the scope of this exercise to include any kind of goods, the main idea here is that the transport of fresh goods has special demands. Moreover, the trends observed in the fresh food market across Europe and the Mediterranean call for a unified approach to the way information flows among the relevant parties of the transport chain.

There are indications that Western European countries with a higher disposable income than those of Southern and Eastern Europe tend to import greater quantities of agro-food perishables. Market data has shown that the demand for such products in Western Europe is more segmented than elsewhere, leading to a greater necessity to import goods from abroad (as regards, for example, tropical products and out-of-season products).

At the same time, developing Eastern European countries show a general trend of solid growth in their consumer markets, while the Maghreb area (North West Africa) is gaining momentum as regards the production of agro-food perishables. Moreover Central European countries, like Germany, Austria, Hungary etc. have always been important exporters of meat and dairy products towards South Europe.

In terms of transport, the above observations point to a possible increase of traffic in the Mediterranean area, in particular along the North-East/South-West routes (for example Corridor X and its sea branch Adriatic-Ionic sea Corridor in integration with Corridor V). Thus, as a pilot scenario, FRESHLOG will provide a multimodal link between the port of Heraklion (Crete) and distribution centres in Germany. The nodal sequence is going to be from Crete to mainland Greece, then to Southern Italy and on to Germany.

7.1 Problem to be addressed

Currently there is no common point of communication between wholesalers/distributors, producers and transport agents. Consequently the success of the necessary transactions is solely based on interpersonal relationships while the choice of a new supplier or transport partner is largely affected by word-of-mouth knowledge. Whereas some players in this market find comfort in operating with a legacy supply chain they have known so well and for so long, many businesses suffer the direct impacts from the absence of new technology.

To begin with, the lack of new technology

results in information arriving late or incomplete, or not arriving at all. For instance, wholesalers have no means of knowing where the goods they ordered are, until they have been delivered to them. By the time the order is delivered, the recipient may well discover mistakes in it, in which case they have to place a new one. Often orders are shipped late because of the volume of paperwork that needs to be physically exchanged from one office to another. The legacy control and security systems operating at some ports add to these delays.

Even before reaching a deal with a supplier, wholesalers have difficulty in obtaining remotely a sufficient number of offers from different suppliers, for comparison. Equally, producers have no powerful means of promoting their goods abroad. In many cases producers and wholesalers find themselves stuck in a non-profitable deal because they cannot find a more optimum alternative to do business with.

Essentially, the majority of problems are caused by the lack of: a) a common point of reference, where information can be exchanged, stored and accessed promptly and securely by all parties involved in the supply chain and b) new generation electronic controls at the physical check-points along the transport chain, where the control processes can be accelerated.

7.2 Objectives of the pilot

The objective of the Fresh Log pilot within GILDANET is to apply state-of-the-art information technology and applicable standards in e-commerce to the organization of a multimodal transport chain of perishable goods. As such, the exercise will aim to achieve the following:

- Establish a multimodal transport chain for fresh products from Crete to Munich, using the GILDANET platform. This transport path will be allowed to operate either in standard flows, with fixed transport and standard quantities and type of products or according to the demand or the stocks of the respective importer.
- Develop an e-commerce portal to be used as a common access point for sharing and storing up-to-date information regarding the handling of orders and offers, scheduling and execution of transport orders, truck slot reservation and port access control, truck loading, progress monitoring/tracking, confirmation of delivery from the client and transporter.
- Thus prove the necessity and benefits of the GILDANET platform in the particular market and geographic area examined by the FRESHLOG pilot, by establishing suitable measures of comparison prior to and after the pilot.

7.3. Business model overview

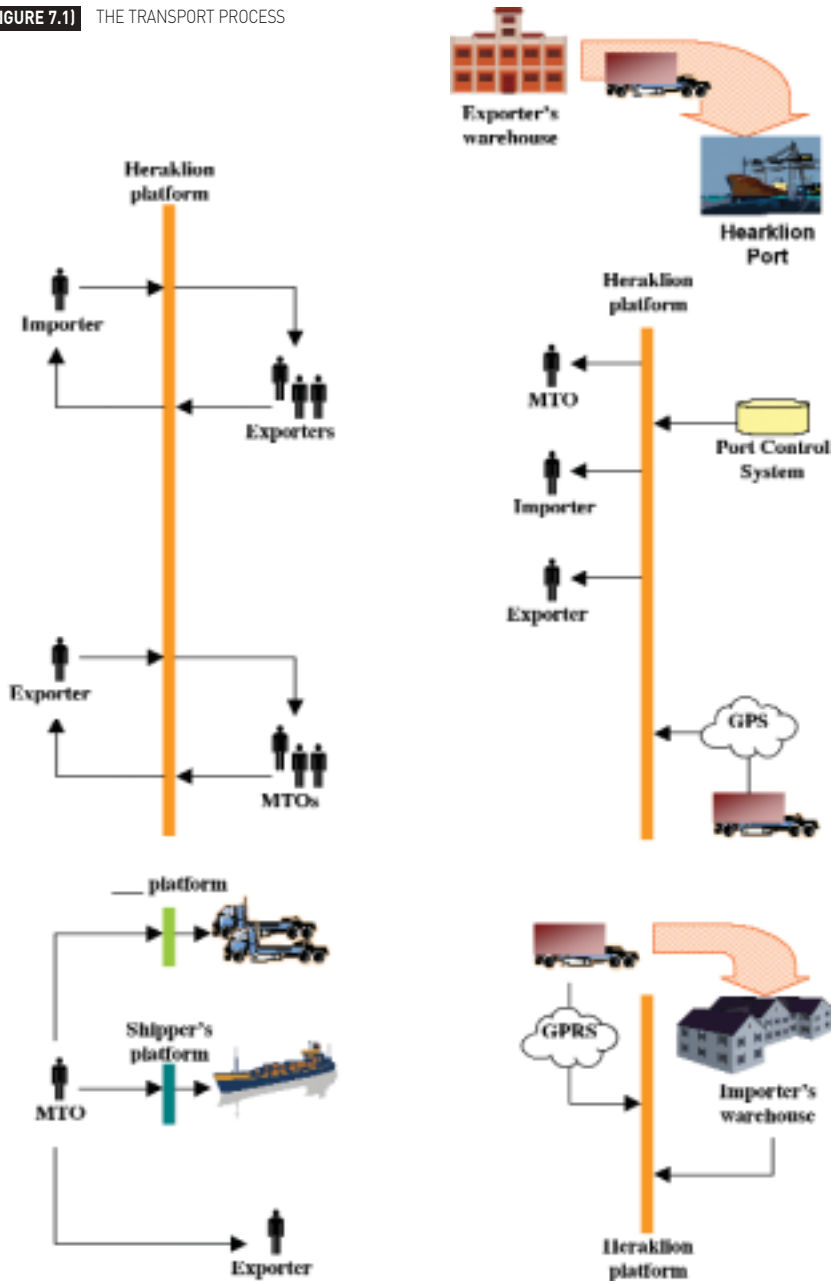
The transport process starts with the importer (distribution center) contacting the exporters, through the platform of the port of Heraklion, where he orders a quantity of fresh products. The exporters reply with detailed offers, containing all the necessary information about the transportation of the products as well as the pricing of the order. This can be an iterative process, until the two parties eventually agree a deal.

The one exporter that wins the deal places a transport order on the platform, for the attention of transport agents. A similar negotiation process then begins until the exporter picks a transport operator (MTO).

The chosen MTO is then responsible for executing the transport order. This involves searching for available trucks, reserving truck slots with the shipping companies and making arrangements with the exporter for the loading of the truck. Most of this process is transparent to the exporter and his client (the importer), in that they are only interested in the collection and delivery of the goods, not what happens in-between.

The route plan, including the collection and delivery addresses, is made by the MTO on the Heraklion platform and

(FIGURE 7.1) THE TRANSPORT PROCESS



downloaded to the truck via GPRS. The lorry driver therefore knows where the next stop along route is.

On arrival at the port, an automated control system performs the necessary checks before the lorry and its contents are given permission to board the ship. An interface between the port control system and the GILDANET platform enables all involved parties to view the progress of the control procedure and intervene where appropriate.

Throughout the journey, GPS tracking is used to monitor the position of the lorry. The lorry's geographic spot is projected in real-time on the platform's GIS.

When arriving at the final destination, a double confirmation of delivery is performed, by the consignee (importer) directly onto the Heraklion platform and by the lorry driver through the GPRS network. This double action helps check that the details of the order (quantity/ condition of items, time of delivery etc.) are in agreement with the initial deal between the exporter and the importer.
The whole business model is represented in Figure 7.1.

7.4. Logical architecture

The logical architecture is shown in

Figure 7.2, below. All transactions will be carried out through the web interface of the GILDANET platform, with the exception of communicating with trucks, where inevitably wireless networking protocols will be deployed.

Where interaction with existing systems is necessary, the web client will provide the interface. For instance, truck slots are booked on the shippers' legacy system through a link provided by the web client. Similarly, upstream data from the truck is passed on by the MTO's legacy system to the client, for the attention of other parties. And information obtained by the port's control system is available to third parties through the web client.

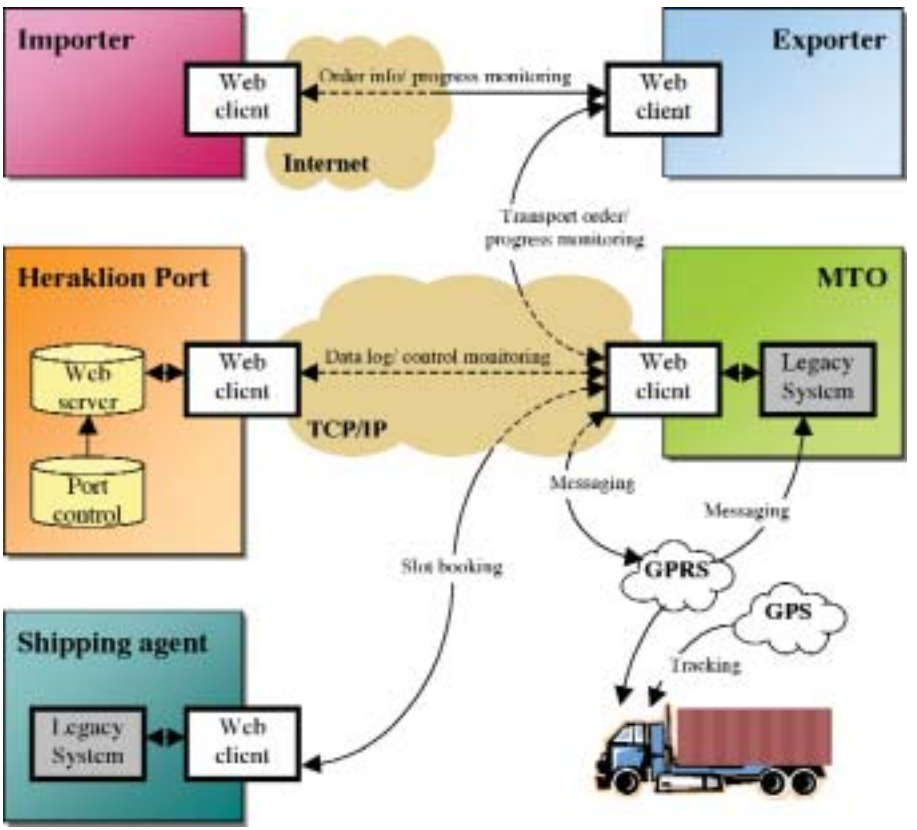
7.5. Implementation

In order to reach its objectives, the Fresh Log pilot of GILDANET comprises the development of a business process model and the development of the associated necessary electronic business documents needed to support the transport of perishable goods.

7.5.1 Ordering

On the basis of the stock and future prospects of demand, the distribution center in Germany is looking for a supplier of fresh products in Crete, to proceed with the negotiations. The process begins with the distributor placing an *order request* to a number of Greek suppliers. In that request, there is specific information about the type/ volume of products needed and the delivery dates. As this is a case of an international commercial agreement, further information such as customs regulations, or stats handling may be needed. It should also be possible to require information about the transportation and destination, delivery plan, pricing etc.

(FIGURE 7.2) LOGICAL ARCHITECTURE OF THE FRESH LOG PILOT



The interested exporters respond with their *offers*, essentially matching as closely as possible the distributor's requirements. The distributor has the ability to send in response a *change order request*, to a narrower selection of suppliers whose initial offers were more appealing, and receive in turn the suppliers' revised offers. This exchange of messages provides the ground to negotiate the various aspects of each offer.

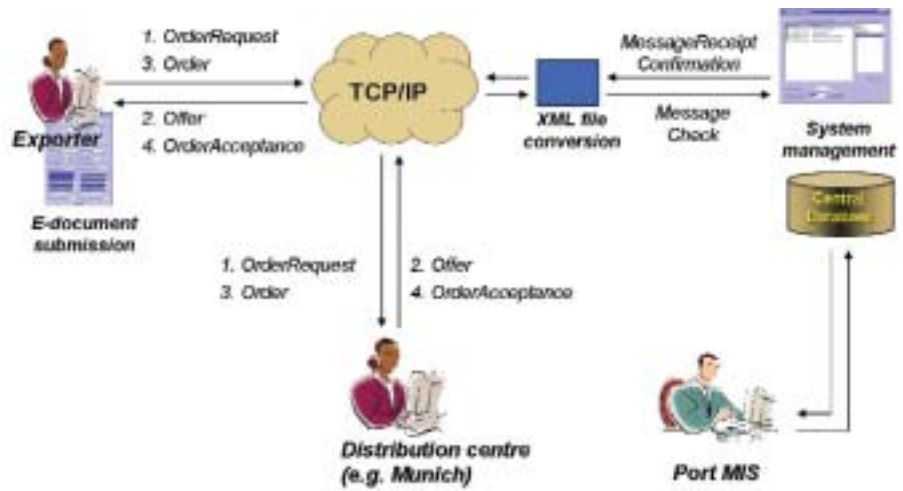
Eventually the importer comes to agreement with one supplier, in which case an *order* message is raised. To confirm that the order has gone through, the exporter returns an *order acceptance* message.
Figure 7.3 shows schematically how the ordering produce will be implemented.

7.5.2 Generating a transport order

It is standard practice for the MTO to close a deal with the exporter before the routing sequence is resolved. The purpose of this stage is therefore for the exporter to simply attract the transport operators and get a quote from each one.

Through the e-business platform of the Port of Heraklion, the exporter completes a *notification of distribution* form. The form includes generic information concerning the transportation (shipment, date of distribution, place of delivery, etc.) and specific information relevant to the products, which are going to be transported (product description, quantity, gross weight, unitization). All electronic documents are stored in a central database at the Port of Heraklion MIS (Management Information System).
The interested transport agents respond to the exporter with their *transport offers*, which again should be as close a match to the client's requirements as possible. Having found the most optimum offer, the exporter submits to that particular MTO a *transport order* and the MTO confirms the deal by returning his *transport order acceptance*.
The procedure is shown schematically in Figure 7.4.

(FIGURE 7.3) IMPLEMENTATION OF ORDERING



7.5.3 Planning a route from a transport order

Transport planning is a very important operation for any company that aims to reduce cost and improve its services. By improving the efficiency of such processes as freight grouping, choice of transport mode or choice of carrier and route, transport agencies can offer more robust, reliable and cost effective services to their clients.

The route planning sequence is as follows:

- The transport operator begins with entering on the platform the details (address of origin, collection date, destination address & date etc.) of the route they aim to establish. The user has the ability to specify a preferred

path, or other criteria which the system will use for generating the route plan. When all the necessary data is filled and the electronic form submitted, the system searches the available paths stored in its database and returns a draft route.

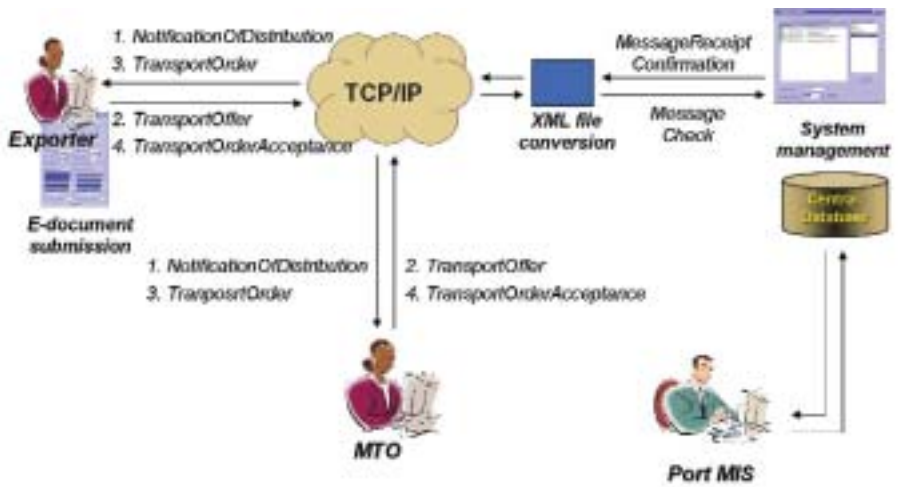
- The operator then has the option to retrieve other pending orders and ask the system to match – if possible – some of them to the same trip, or part of it.
- The orders are then grouped and allocated to trucks, using an algorithmic model of distribution optimization.
- The results from this process are stored in the distribution database and used later to download individual distribution plans to trucks.
- The MTO can the use their own legacy system to check availability of trucks.

A summary of the above implementation is given in Figure 7.5.

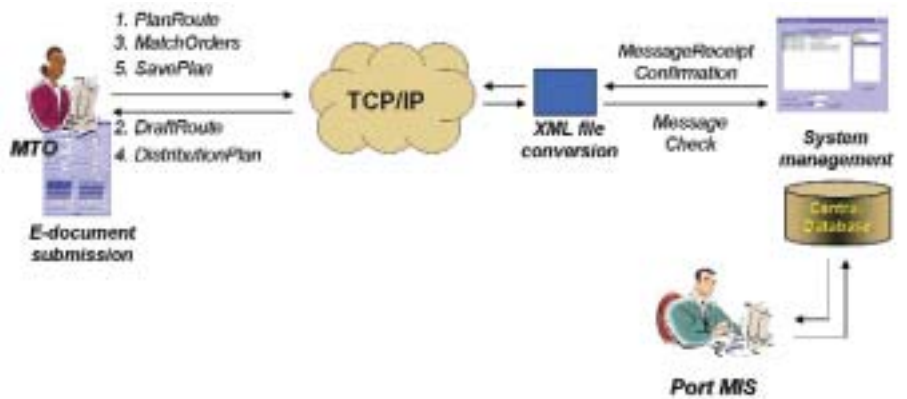
7.5.4 Truck slot reservation on to the ship

The project does not accommodate a ship booking function, for the transport of trucks from Heraklion to Piraeus. The platform of Heraklion port provides a link to the individual shipping line's booking system. Through the platform, the carrier is connects up to the shipper's online booking application and enters the required infor-

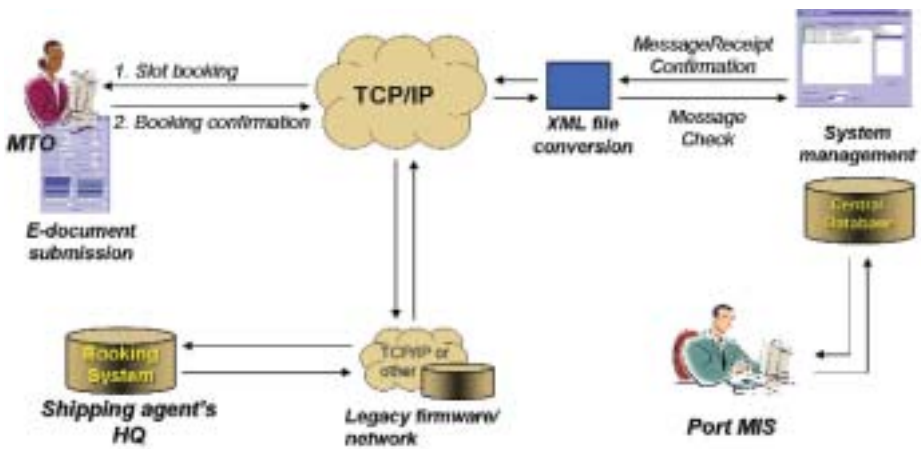
(FIGURE 7.4) GENERATION OF TRANSPORT ORDERS.



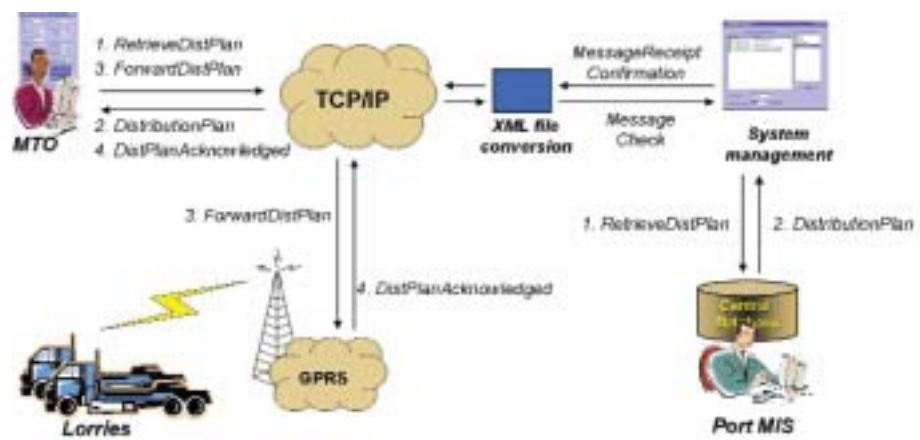
(FIGURE 7.5) IMPLEMENTATION OF ROUTE PLANNING



(FIGURE 7.6) IMPLEMENTATION OF TRUCK SLOT RESERVATION



(FIGURE 7.7) DOWNLOADING DISTRIBUTION PLANS TO THE DRIVERS' PDAs



mation, in order to perform the booking. This is shown schematically in Figure 7.6.

7.5.5 Forwarding the distribuition plan

As shown in Figure 7.7, forwarding a distribution plan to the truck driver's PDA is a straightforward procedure. The MTO employee who operates the platform interface simply recalls the stored distribution plan from the platform's database and forwards it to the corresponding truck. A link between the port's TCP/IP network and the partner mobile operator's GPRS network enable any MTO to communicate wirelessly with the carriers, even those who previously did not have that technology.

7.5.6 Collection and loading

This is the point where the physical flow of goods begins, with the truck(s) arriving at the exporter's premises for collection. The information that has been previously exchanged enables the exporter to schedule the picking and loading of goods in time. From a message-flow point of view, a process of electronic updates and checks is required in order to:

a) ensure the terms of the agreement regarding the order are met by all parties involved, and
b) provide real-time or close to real-time information about the status and progress of the order.

On arrival at the exporter's premises, a *truck arrival* message is submitted to the platform's central database. The recorded time, date and place of the message are proof that the MTO has fulfilled/ missed their obligations regarding collection.

If the exporter is ready, loading can commence immediately. A *start loading* message is submitted when loading begins, to transfer liability for any delay – caused by to the lack of preparation – to the exporter. In other words, the carrier should carry no responsibility e.g. for missing a ship, if the exporter has delayed the loading of the truck.

As the loading procedure gets under way, the goods are scanned or manually recorded. When loading is completed, an *order listing* is submitted to the central database. The Heraklion platform's MIS then performs a check against the previously stored agreement and returns an *order check* message, which effectively highlights any possible errors. If there are indeed errors in the order listing, the exporter and carrier have the choice to either investigate those errors and retransmit a new order listing or proceed with the current errors (there may be good reason why e.g. the exporter eventually could not supply a certain product). In either case, the system keeps the latest order listing that has been submitted and uses it to inform the importer in Germany of the contents of the order.

When all the necessary physical, electronic and paper transactions are carried out, an *order dispatch* message is submitted to mark the time and date of departure from the exporter's premises.

A summary of the message flows involved in this process is shown schematically in Figure 7.8.

7.5.7 Access control at the port

The access control platform at the port of Heraklion runs independently of the GILDANET platform. It aims to accelerate and secure the port control process, especially with regards to entry/ exit permissions. Implementation of the access platform is seen as a two-stage approach, whereby Stage 1 covers:

- Automatic identification of the driver
- Combination of automated and manual control of access rights at the terminal
- Automatic provision of information about the next available vehicle position inside the terminal
- Automatic registration of access onto the system

Stage 2 will cover:

- Automatic identification of the vehicle and (where possible) container
- Automatic control of access rights at the terminal

(FIGURE 7.8) MESSAGING AND NETWORK IMPLEMENTATION OF THE LOADING PROCESS

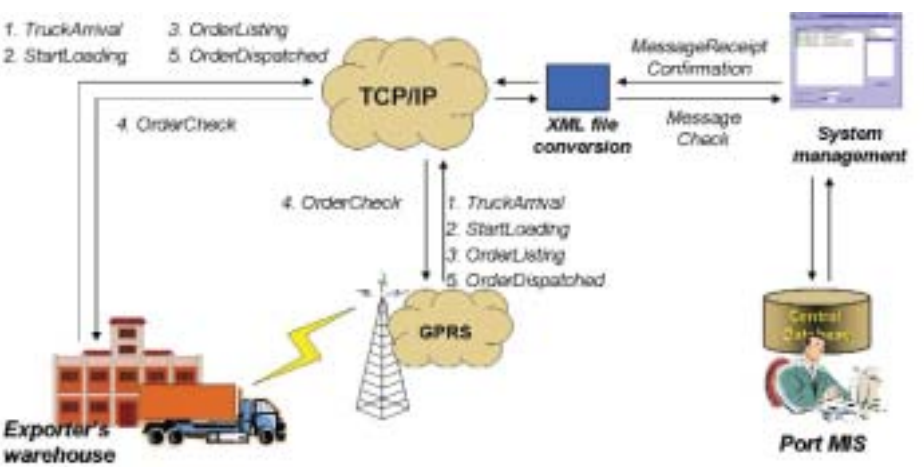


Figure 7.9 shows how the access control platform will be implemented.

In Stage 1 the vehicle and container registration numbers are typed in manually by the port's staff at the gate, while the driver's details are obtained electronically with the use of smart cards.

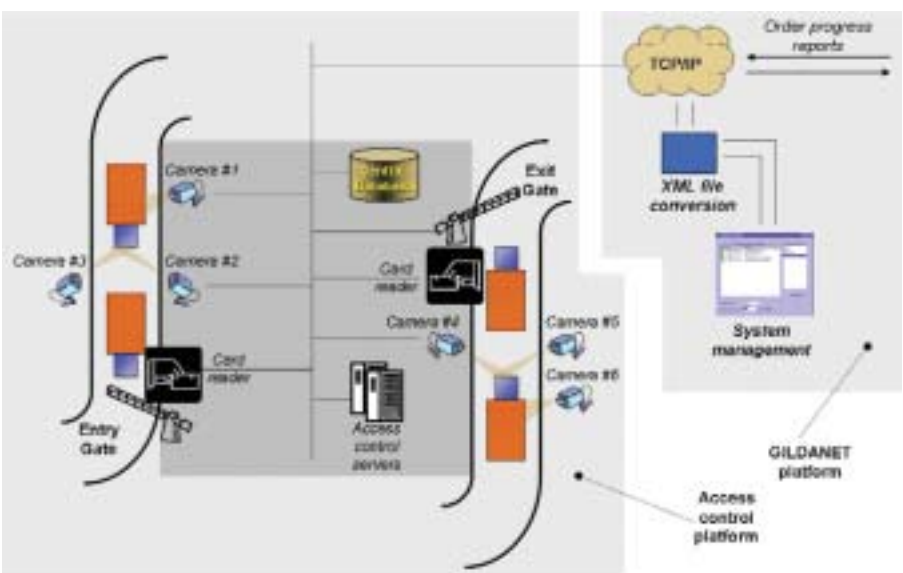
The future implementation of Stage 2 will comprise a number of cameras that take photographic images of approaching trucks and on board containers. The cameras will be triggered by a set of optic sensors, whose line of sight is cut by the approaching vehicle. Using Optical Recognition Character (OCR) software the registration number of the vehicle and – where possible – the container will be read, thus eliminating the need to type in the details manually.

The driver submits his ID to the system by swapping his magnetic access card over a card reader. The driver and vehicle details are then checked against the system's database and if the two are in agreement, the driver can be given permission to enter the terminal. This can only be so if the corresponding transport and shipping agents have submitted the necessary paperwork prior to the lorry arriving at the terminal. In other words, the access system takes manual feeds from the port's staff. If the data cross-check is successful, the system searches for an appropriate parking position and prints it out. The driver collects the printout and the gate opens; access has been granted.

This procedure can be integrated with the GILDANET platform in a number of ways:

1) The lorry driver submits a confirmation of access from his PDA.
2) The GILDANET platform picks up the lorry's GPS spot and checks whether it lies within the terminal's boundaries, in which case it has been given access.
3) The port's access control system sends to GILDANET an automated feed every time and application for access to the terminal has been accepted or denied.

(FIGURE 7.9) NETWORK AND HARDWARE ARRANGEMENT OF THE PORT OF HERAKLION ACCESS CONTROL PLATFORM



7.5.8 Route monitoring

During the course of transport, continuous tracking of the lorry will be possible using GPS/ EGNOS technology. The on board GPS receiver will obtain the truck's geographic spot from the nearest satellite. The coordinates are then transferred to the Heraklion platform via the GPRS link and the Internet. When a user (the importer, exporter or transport agency HQ) searches for the truck's geographic position, a Geographic Information System (GIS) projects the spot dynamically on an electronic map, similar to that shown in Figure 7.10.

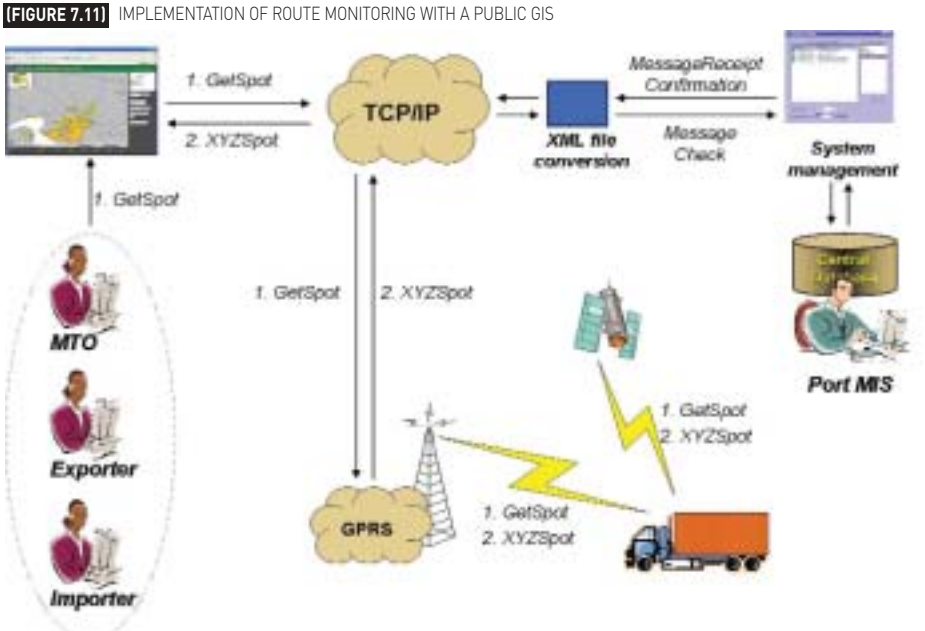
(FIGURE 7.10) EXAMPLE OF A GIS

It will also be possible to transmit information such as average speed of the vehicle and expected time/ date of arrival. All of that information is obtained from the GPS facility on the driver's handheld PDA and transmitted through the device's GPRS connection to the control database.

A more comprehensive solution also includes the use of sensors on board the vehicle, for collecting data regarding the temperature conditions of the load, air-proof control etc. The data is gathered at the truck's PDA and sent to the tracking centre via the GPRS link.

A summary of how this solution is going to be implemented is shown in Figure 7.11.

(FIGURE 7.11) IMPLEMENTATION OF ROUTE MONITORING WITH A PUBLIC GIS



7.5.9 Shipment delivery

On arrival at the distributor's premises, the process followed is similar to that applied for collection, in reverse order. Again, the main objectives are:

a) To ensure the terms of the agreement regarding the order are met by all parties involved. This requires, among other things, that the order is delivered in time and intact, as requested by the importer and as collected from the exporter.

b) To provide real-time or close to real-time information about the status and progress of the order, which in this case involves recording promptly all the

events that take place and provide updates to the exporter.

On arrival at the importer's premises, a *destination reached* message is submitted to the platform's central database, as evidence that the MTO has fulfilled or missed their obligations regarding delivery.

As soon as the unloading of the goods begins, a *start unloading* message is submitted to the platform. The importance of this message is that if, for any reason the distributor delays the unloading procedure to the degree that causes avoidable damage to the products and losses to the MTO (due to the late return of the trucks), there should be a clear allocation of responsibility.

As the truck is being unloaded the items are scanned or manually recorded. On completion, a *delivery listing* is submitted to the central database. The listing is compared against the latest *order listing*, generated on collection, to check that the load has been transferred intact. Another comparison is also carried out against the initially agreed *order*, to highlight any possible differences. The system returns a *delivery check* containing the results from the two comparisons.

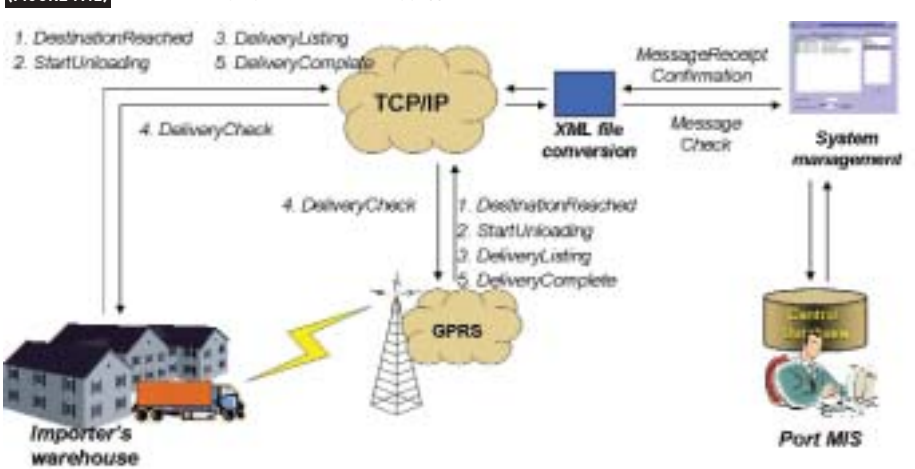
Besides whatever errors are found by the system, the importer may also have his own objections about other issues not highlighted by the delivery check. For instance, some goods may be of the wrong variety or decayed, important documentation may be missing etc. If the importer wishes to resolve these issues with the MTO or the exporter, e.g. by returning some goods back or raising a complaint, the final message of the process can be used to mark any corrective action required or taken. The *delivery complete* message marks that the order has been delivered and unloaded to the distributor's premises and contains all required further actions such as comments, complaints, goods returned, pending actions etc.

Similarly to the collection process, there are three possible ways in which the Port of Heraklion platform can be updated with the above messages:

1) All messages from the warehouse area to the database are initiated by the importer and automatic updates are sent to the carrier's PDA.
2) All messages from the warehouse area to the database are initiated by the carrier through the platform GPRS client and the GPRS link between the truck and the Heraklion platform, with the importer having access to the uploaded data from his own web client.
3) Both parties type in their own views of the actions taking place.

A summary of the message flows involved in this process is shown schematically in Figur 7.12.

(FIGURE 7.12) IMPLEMENTATION OF THE DELIVERY PROCESS



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