

# CORELOG

COORDINATED REGIONAL LOGISTICS

**PROMOTING AND TESTING  
SMEs LOGISTICS COOPERATION  
IN EUROPEAN REGIONS:**

**THE CORELOG PILOT SOLUTIONS**



Project part-financed by the EU within the Interreg III B CAUSES NP (ERDF)



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## About the project

The CORELOG project (COordinated REgional LOGistics) was financed under the Interreg IIB CADSES NP (Central, Adriatic, Danubian and South-Eastern European Space) EU Initiative. It addressed the definition and operative testing of regional logistics policies and actions to be coordinated among institutional actors, responsible for policy making, financing and investment decisions and manufacturing companies, logistics providers, transport operators, transport and logistics nodes, whose supply chain strategies and decisions strongly affect the spatial pattern and the modal split of freight transport.

The main CORELOG objectives were:

- Understanding the “key driving forces” underlying the changes in the Supply Chain Management strategies of companies in the CADSES area and their territorial impacts on freight flows in EU regions;
- Understanding the role and the actions of the different institutional levels (national, regional, local) in the development of transport, industrial and spatial development policies;
- Promoting logistics cooperation and integration of operators and companies in local SME's systems, with an approach that considers transport decisions and the related territorial impacts as the final result of companies' industrial and distribution strategies at European level;
- Knowledge sharing on best logistics practices among manufacturers, transport operators and regional authorities;
- Developing operative, organizational, ICT and logistics solutions which are economically sustainable in the long term, by involving private operators cooperating at regional and at transnational level in logistics management.

CORELOG has worked for the following main beneficiaries:

- Regional and local authorities responsible for logistics policies;
- Manufacturing companies;
- Logistics operators and transport companies;
- Industry associations, organisations associating SME's.

This book presents the results of the CORELOG pilot tests. It wants to bring the CORELOG experiences to a wider audience in order to promote the replication and imitation of the solutions it tested. In particular this book:

- describes the pilot projects implemented in the different CORELOG regions;
- analyzes the qualitative and quantitative benefits achieved by companies and by regional systems through the pilot's projects implementation;
- describes the main lessons learned;
- identifies logistics best practices;
- presents how enterprises and public authorities can use the pilot's results to match economic competitiveness and environmental protection.

The pilot projects responsibilities were split among the partners on the base of the following structure:

- Pilot 1: JOINT LOGISTICS BUYING AND PLANNING – Regione Emilia-Romagna & PricewaterhouseCoopers (ITALY)
- Pilot 2: STRENGTHENING THE LOGISTICS SUPPLY – Regione Emilia-Romagna & PricewaterhouseCoopers (ITALY)
- Pilot 3: AUTOMOTIVE CLUSTER OF SLOVENIA (ACS) TRANSPORT COSTS OPTIMISATION – Maribor University (SLOVENIA)
- Pilot 4: IMPROVEMENT OF LOGISTICS EFFICIENCY – Aristotle University of Thessaloniki (GREECE)
- Pilot 5: COMMON LOGISTICS OPERATIONS – Heraklion Port Authority (GREECE)
- Pilot 6: SIMULATION TOOLS FOR MODAL SHIFT – Széchenyi István University (HUNGARY)
- Pilot 7: REVITALISING RAIL FREIGHT TRANSPORT IN WIELKOPOLSKA REGION – Institute of Logistics and Warehousing – ILIM (POLAND)

## 1. Pilot 1 - JOINT LOGISTICS BUYING AND PLANNING

### 1.1. Pilot's background

The pilot promoted the cooperation in logistics services management among manufacturing companies located in the Bologna metropolitan area, in order to increase the involved companies' competitiveness as well as the environmental sustainability of their transport and logistics activities.

In many cases small and medium sized companies do not activate logistics collaborations as they are traditionally managed as "family enterprises". This limits their ability to exploit the potential opportunities offered by logistics collaborations with other companies.

However the manufacturing companies involved in this pilot decided to test the logistics services joint purchasing and planning in order to improve their bargaining power and rationalize their transport and logistics activities.

Through the pilot the involved manufacturing and transport companies achieved significant cost savings as described in the following paragraphs. These excellent results are the starting point for the involvement of further companies and the implementation of other collaborative solutions among SME's in Emilia-Romagna region. The pilot was managed by Regione Emilia-Romagna in cooperation with the Institute for Transport and Logistics, with the technical support of Pricewaterhousecoopers Advisory and the organisational support of Confindustria Emilia-Romagna.

The following figure reports the pilot approach, in which companies cooperate in the outbound logistics buying and planning.

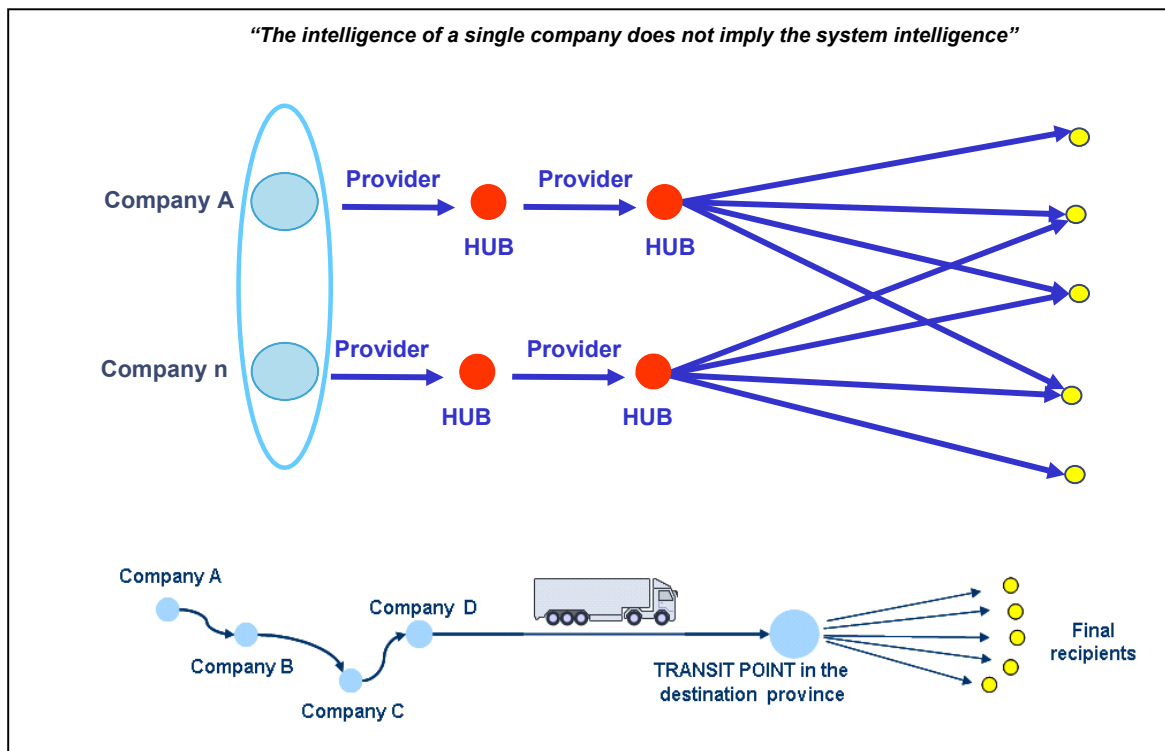


Figure 1 - The pilot project vision

### 1.2. Benefits for companies

The pilot first developed a **feasibility study** on the savings that can be achieved by companies in the joint purchasing of logistics services and in joint planning of outbound logistics (shipping to customers). This feasibility study was carried out in the I-Log project (Interreg III B CADSES NP). The CORELOG project tuned and integrated this feasibility study and it tested the studied solution.

The operative goals were to:

- Make proposals for outbound logistics cooperation among manufacturing companies in order to **increase their competitiveness** and **improve transport flows sustainability**.
- Check costs and benefits of a **strategy of joint logistics procurement** developed among companies located in the same geographic area.

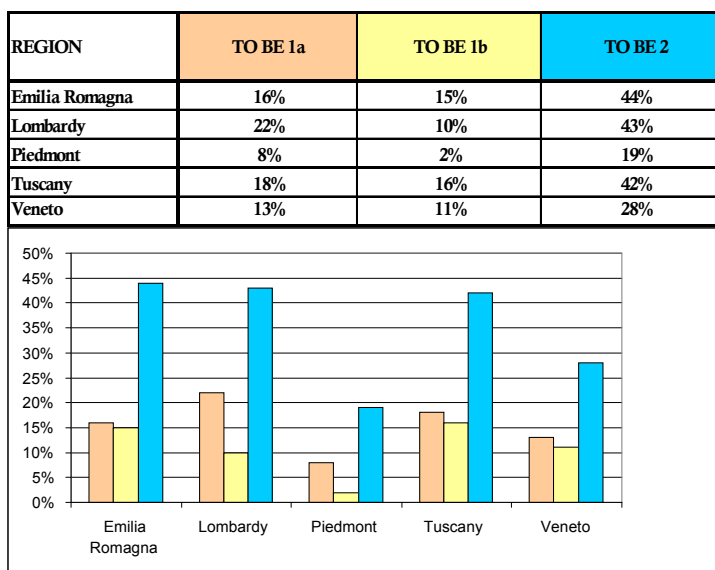


## PILOT 1 in Emilia-Romagna

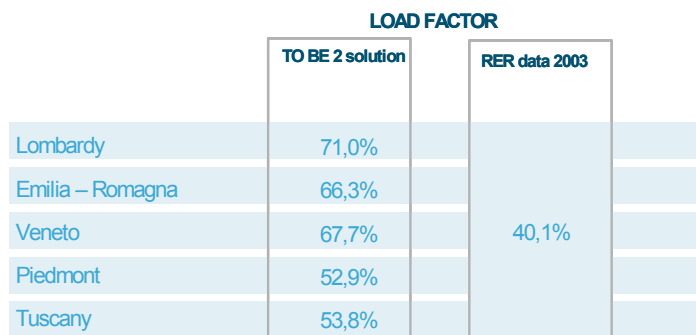
The project approach relied on 3 **incremental scenarios**, in which the level of cooperation and networking among companies is increasing. It started with making companies cooperate in the benchmarking logistics costs (find cheapest providers – scenario TO BE 1) and then it proposed a scenario in which companies cooperate in shipping (scenario TO BE 2). The presence of 2 different scenarios allowed companies to **trust the project and see “quick wins” in the initiative**.

- **Solution TO BE 1a** – Benchmark analysis for selecting the cheapest provider on each weight class, on the basis of the actual contractual tariff lists of the current transport service providers of the companies.
- **Solution TO BE 1b** – Benchmark analysis for selecting the cheapest provider in terms of average weighted tariff taking into account the % of shipments on each weight class, on the basis of actual contractual tariff lists. The selected provider is active on all provinces of each region and it is suitable for moving shipments of any weight class.
- **Solution TO BE 2** – Aggregation of the outbound flows on weekly basis, by coordinated planning of the pickings and departures to destination provinces. The number of departures/week and the size of the vehicle is determined by the total quantity of outbound freight (kg) per province.

The results of the feasibility were assessed on different geographic routes (possible companies' joint shipments to overlapping geographic destinations): Emilia-Romagna, Lombardy, Piedmont, Tuscany and Veneto. The savings assessment was made both in terms of **economic savings** for the companies and in terms of vehicles load factor increase - **traffic reductions**. The following figures report the results.



**Figure 2 - % economic savings for the companies on the AS IS cost**



**Figure 3 - Load factor increase**

On the base of the feasibility study results a **pilot test** was activated on the Bologna/Milan route (Emilia-Romagna / Lombardy).

The test results are reported concerning the savings which were achieved by one of the pilot companies (Company A). As shown in the next Figure, Company A obtained **savings from 50% to 61% of the “as is” costs** through the common purchasing of transport services on the Bologna-Milano route in the period October 2006 – March 2007.

## PILOT 1 in Emilia-Romagna

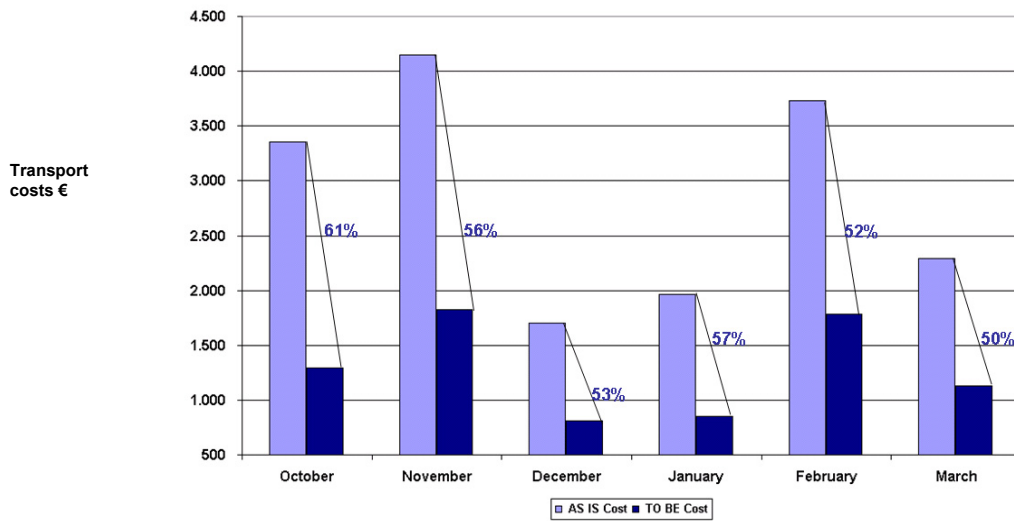


Figure 4 - Company A's saving

The pilot benefits were also assessed with reference to the transport provider's activities and in particular with reference to the % of empty routes before and after the CORELOG test on the Bologna-Milan route. The empty routes indicator is significant both in terms of monetary efficiency for the transport provider and of environmental protection, in terms of reduced running vehicles. As showed in the following table, thanks to the CORELOG test the **empty routes reduced from 42% to 16%**.

Bologna - Milan	With CORELOG cooperation	Without CORELOG cooperation
Empty routes	17	44
Full routes	89	62
Total routes	106	106
<b>% empty routes</b>	<b>16%</b>	<b>42%</b>

Table 1 - Empty routes' analysis

Furthermore, the transport provider increased the shipments on the Milan – Bologna route thanks to the new customers acquired through the implementation of the pilot's collaborative solution.

Route	number of routes on 3 months period with CORELOG cooperation	number of routes on 3 months period without CORELOG cooperation	Growth
<b>Milan – Bologna</b>	106	78	36%

Table 2 - Milan – Bologna route data

### 1.3. Benefits for region

The Emilia-Romagna's economic system is composed of over **300,000 small and medium enterprises** spread all over the region and marked by high technological and products specialization. The pilot results are limited to a small panel of companies in Emilia-Romagna but the results are encouraging for follows up and for public policies development. In fact the logistics issues pinpointed within the pilot are common at regional level in all the main regional manufacturing sectors. These issues refer to:

# PILOT 1 in Emilia-Romagna

- the **need to analyse transport tariffs**: the first activity the pilot carried out was a benchmark of the transport tariffs of the involved companies. The cooperation among the companies helped in the better understanding the composition of transport costs and in comparing them. This activity can represent a useful service to be promoted for groups of companies and in particular in industrial areas.

- the issue of **short distance transport**: recent Regione Emilia-Romagna surveys showed that the origin-destination distance for most vehicles' trips is under 50 kilometers, as reported in the following figure.

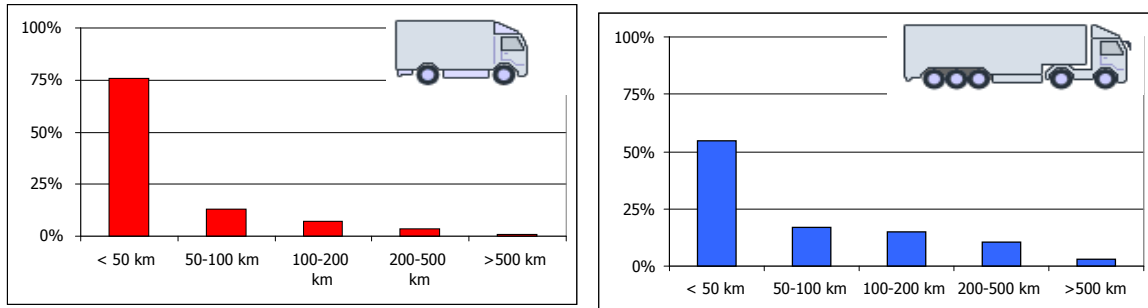


Figure 5 - Distance ranges per vehicle category

Intraregional and interregional short distance transport is therefore a primary target for public actions. This CORELOG pilot primary addressed this issue and its replication can bring significant improvements at regional level, given the significance of these flows.

The main system benefit of the pilot stems from the fact that it allowed both economic savings for the involved companies (transport costs reduction) and load factor increase, thus sustaining environmental protection through the reduction of running vehicles. This win win approach can be the base for the future public policies at system level.

## 1.4. Lessons learnt

The pilot project's main lessons learnt are related to:

- **The involvement of companies in the pilot project**

The collaboration with the local and regional associations of enterprises in the pilot project created a direct channel among companies and Emilia-Romagna Transport Ministry. This direct channel reduced the time necessary for the companies' involvement and for the pilot start up. Moreover it ensured the identification of companies representatives of regional problems in order to promote the pilot replicability
- **Company flexibility**

Companies' flexibility is a critical success factor for an effective collaboration. On the basis of the pilot experiences, the collaboration can be successful if companies decide to partially reduce their independence and grasp the advantages obtainable by the logistics cooperation. As said before, cooperation implies integration among companies that brings some costs in terms of processes reorganization. In fact, every company needs to adapt its processes to a common model that requires specific customizations. In the pilot the involved companies changed partially their purchasing process in order to test the collaborative solution.
- **Goods' compatibility**

Companies can obtain highest savings from logistics collaboration when the goods to be transported have specific characteristics (i.e. superimposable, same transport temperature for food, etc.). In fact these characteristics are critical requirements for increasing the load factor and consequently reducing the number of trips.
- **Routes' compatibility**

If companies and their main customers are located in close areas, a common logistics solution can bring to higher savings. In fact, in pilot 1 the involved companies are located in the same area, and the main customers are concentrated on similar routes. In general, similar locations increase the chances of collaboration not only on outbound flows but also on inbound logistics flows.
- **Critical mass**

Companies can obtain growing savings from a common purchasing or from the implementation of an integrated supply model when they can achieve a significant critical mass. This critical mass allows them to increase their bargaining power and consequently to obtain more competitive offers from suppliers.
- **Data collection**

The pilot met problems in the data collection phase. In fact the companies involved in the pilot project haven't the necessary transport and logistics information in their IT systems. This problem is common to the majority of SME's, as in many cases they don't perform regular reporting and analysis of logistics flows. The problem was solved by checking paper transport documents.

# PILOT 1 in Emilia-Romagna

- **Difficulties in the inbound flow collaboration**

The implementation of collaborative solutions in inbound freight flows management presents many limits related to the lack of data to plan the cooperation. In fact, SME's haven't integrated information systems that allow the monitoring and reporting of data related to the inbound freight flows. Moreover, as inbound flows are linked to the company's production system, it is more difficult to implement collaborative solutions, as this would require significant changes in the planning and production process.

- **Commitment of decision makers**

The implementation of pilot projects is successful when companies' decision makers are directly involved and can be considered as project's sponsor. In fact decision makers have a clear vision of the current company's strategies and can decide if a solution is useful for the company. If there is a lack of decision makers in the project, nobody will take the responsibility to support critical decisions able to change significantly the processes and bring real benefits.

- **Sponsorship.**

The public financing was a cornerstone to start the logistics innovation the pilot and move companies from the logistics day by day management to logistics innovation.

## 1.5. How can I use the pilot's results

### 1.5.1 Guidelines for authorities

The successful collaborative solutions studied and tested in the Pilot 1 are **replicable at regional and transnational level** in every regional scenario characterized by some basic conditions. In particular, the successful outcomes of the collaborative solutions achieved in the Pilot 1 that, *ceteris paribus*, can be obtained in other regional contexts, are the:

- implementation of **common purchasing strategies** that allow companies to obtain cost savings;
- implementation of an **integrated outbound logistics model** that allows rationalizing companies' logistics flows.

The cornerstones for the pilots replication are hereafter reported as described in the previous paragraph.

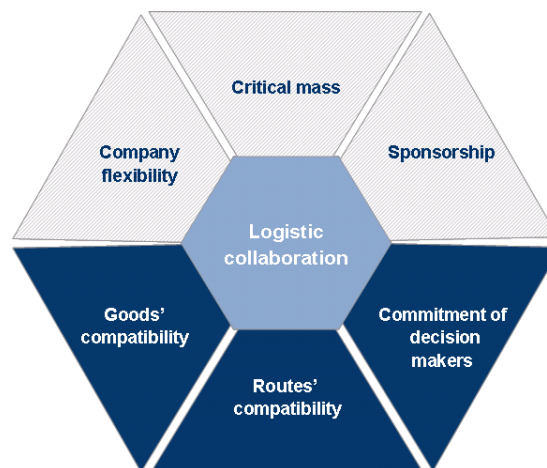
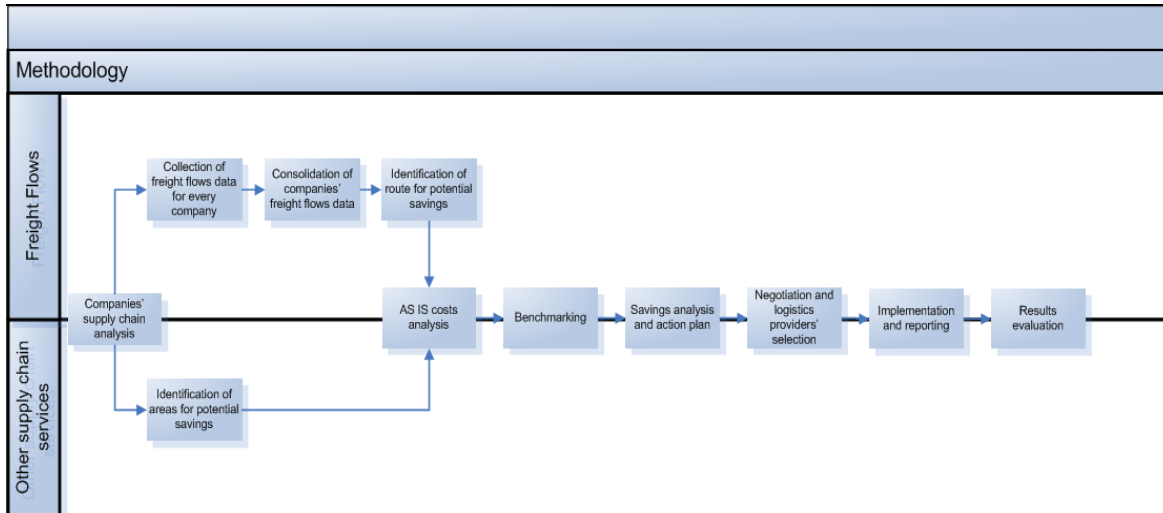


Figure 6 - The pilot replicability cornerstones

### 1.5.2 Guidelines for companies

The guidelines for companies which want to replicate the pilot can refer to the two basic solutions tested: the **common purchasing of logistics services** and the **integrated outbound logistics model**.

The **common purchasing of supply chain services** favours the increase of the **companies bargaining power** with suppliers and brings significant economies of scale. The common purchasing can refer to **transport services** but also to **other logistics services** such as the common purchasing of pallets or common contracts with portorage supplier companies. In both cases the methodology is similar, as pinpointed in the following figure.



**Figure 7 - Logistics collaboration steps**

The main process phases are hereafter presented in terms of data to be collected and activities to be carried out.

### 1. Companies' supply chain analysis

This first analysis gives an overview of the involved companies and helps in dimensioning and qualifying the status quo and the companies' expectations. The main points to be faced are:

- A. Collection of general company's information: company's industry; number of employees; main economic data (turnover, EBITDA, etc.); production plants (location, m<sup>3</sup>); warehouses (location, m<sup>3</sup>); products (volume, type, etc.);
- B. Organizational analysis: general organization; logistics bonds (production cycles); organization of shipments; warehousing policies; main logistics providers; logistics activities in outsourcing; incidence of logistics costs on turnover;
- C. Main logistics problems;
- D. Future developments.

### 2. Collection of freight flows data for every company

In order to identify the common **companies' routes** on which it is possible to implement collaborative solutions, freight flows data of each company need to be collected in terms of: Origin - Destination; date of shipment; customers interested by the shipments; Kg and m<sup>3</sup>; kind of products; logistics providers; kind of truck; load factor %; incoterm.

The following table sums up the data needed on freight flows.

Origin		Destination		Data of shipment	Customers	kg	m <sup>3</sup>	Kind of products	Logistics Provider	Kind of truck	Load factor %	Incoterm
City	Zip Code	City	Zip Code									

**Table 3 - Data collection tutorial**

### 3. Consolidation of companies' freight flows data

The data collected for each company need to be consolidated in a single database in order to identify the main **common routes** in which it is possible to test the cooperation.

### 4. Identification of routes with collaboration potential

The origin and destinations should be compared and overlapped in terms of ZIP code. For each geographic area the following issues must be considered:

- the total amount of transport flows, both in terms of number of shipments and weight;
- the distribution of flows among companies, which needs to be balanced.

## 5. AS IS costs analysis

The analysis of the AS IS costs for logistics services of SME's is a critical element due to the lack of standardized information available on the companies' IT systems. Therefore the methodology used for this analysis was the collection of cost data available on invoices and on logistics service providers' public tariffs.

## 6. Benchmarking

On the basis of companies' logistics provider contracts it is possible to carry out a tariffs benchmarking. The comparison of the contractual tariff lists allows to identify the lowest tariffs (**benchmark**) for each weight class and, when appropriate, by province or zone.

## 7. Savings analysis and action plan

For **each assumed scenario** (as previously described Scenario TO BE 1a & 1b), the **TO BE costs** and the connected **savings achievable through collaboration**, as difference between TO BE and AS IS costs are calculated. Furthermore, it is useful to define an **action plan** in order to design the **main steps** necessary for the implementation of the collaborative solutions proposed and in particular for the negotiation of the tariffs with the logistics providers.

## 8. Negotiation and logistics providers' selection

In order to obtain the most **competitive conditions and to increase their overall competitiveness**, companies need to implement a negotiation with logistics providers and prior to that define the quality expected and not only the costs of the services provided.

## 9. Implementation and reporting

In order to validate the project assumptions, it is always necessary to implement/test the **proposed solution** (a test on the Bologna-Milan route in our pilot). Hereby it is possible to evaluate the real cost savings achievable for companies. The implementation test is supported by a **reporting phase** finalized at monitoring the freight flows and the related costs and to evaluate the real results obtained.

## 10. Results evaluation

This phase aims at evaluating the **real results obtained by companies** as well as the **effectiveness of the proposed solution**. The output of this phase can be used as an input for the proposal of corrective actions and for the dissemination of the achieved results.

**Concerning the integrated outbound logistics model** it is worthwhile to mention that it is characterized by a **higher level of integration** among companies than the only common purchasing of logistics services.

The common planning of shipments can be organized on the basis of the **following principles**:

- regular departures with heavy vehicles and frequency  $\geq 1$  per week to each province of destination;
- direct shipments' collection at companies' plants by heavy vehicles, in order to avoid the stop at collection points;
- direct haulage to the haulier's branch in the destination province;
- final distribution from the haulier's branch to final recipients with the normal distribution network.

The establishment of an integrated outbound logistics model requires incremental activities for the involved companies, as showed in the next flow chart:

- **one-off activities** as for example the establishment of a consortium;
- **current/on-going activities** with weekly frequency for the regular common shipping.

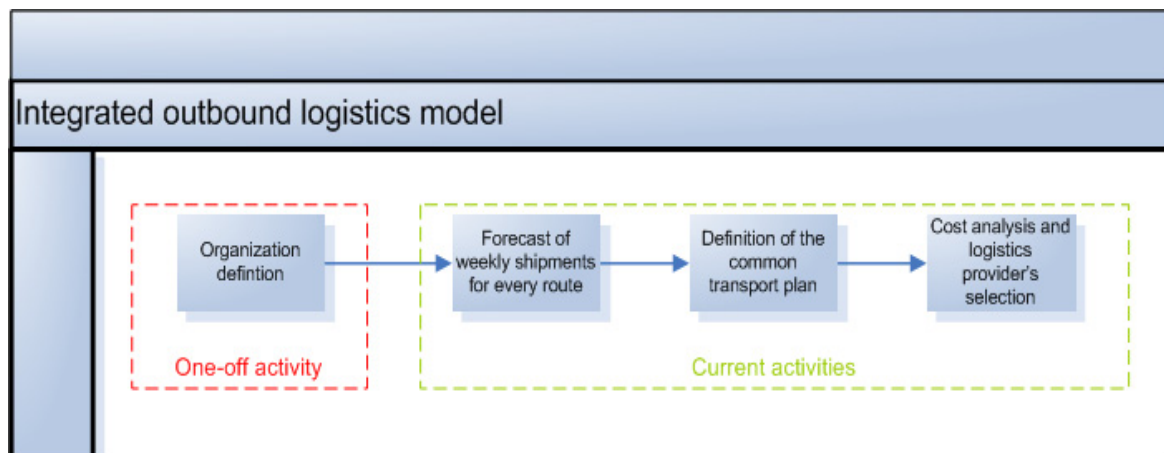


Figure 8 - Integrated outbound logistics model

# PILOT 1 in Emilia-Romagna

The implementation of this solution requires a **specific organization** that manages and coordinates companies' activities. Companies can choose among different solutions as:

- the establishment of a new **juridical subject** (i.e. a **consortium**);
- an **internet marketplace** with bid-ask real time procedures;
- other network solutions.

The main **activities** of this solution are:

## 1. Forecast of weekly shipments for every route

On the basis of the companies' orders and production systems, companies need to forecast for every route the weekly shipments.

## 2. Definition of the common transport plan

On the basis of the forecasted shipments, the companies have to agree on a **common transport plan** which defines for every shipment the route, the timings, the kg shipped and the required loading activities.

## 3. Cost analysis and logistics provider's selection

The companies need to analyze the potential costs for each common planned shipment, in order to select the most competitive **logistic provider in terms of**:

- **picking costs** from every company;
- **transport costs** from companies to the transit point in the destination province;
- **distribution costs** from the transit point to customers.

Last but not least the **providers quality** must also be assessed. Quality of transport is in fact envisaged as a pre-requisite for a contract negotiation.

## 2. Pilot 2 - STRENGTHENING THE LOGISTICS SUPPLY

### 2.1. Pilot's background

Pilot 2 promotes the logistics cooperation and integration among small and medium transport operators in order to increase their competitiveness through the rationalization of purchasing, sales and logistics processes.

Through the CORELOG project, Emilia-Romagna Region, which is strongly committed on the growth of the entire regional economic system, supported a group of 10 small and medium sized transport enterprises, operating in Parma province in order to establish the ASTRALOG consortium.

The project idea starts from the assumption that through cooperation and integration it is possible to increase the competitiveness of SME's in an industry where big worldwide operators control growing shares of the market.

Through the establishment of the ASTRALOG consortium, companies tried to:

- rationalize logistics operations;
- cut operational costs;
- offer a complete range of logistics services to the market.

The bodies involved in the pilot project, further than Regione Emilia-Romagna, the Institute for transport and Logistics (ITL) and PricewaterhouseCoopers Advisory, are:

- **ASTRA**, an association of 30 transport and logistics companies located in the Parma area. 10 of the 30 transport and logistics companies' members of the association have actively participated in the pilot project and they are now connected in the ASTRALOG consortium.
- **API Parma**, a local association of small and medium companies that work in the Parma area. It joins to Unionapi that includes 3,500 companies in Emilia-Romagna region. The organization represents the voice of the companies to the political bodies and to the economic and institutional bodies of the region.

The pilot relied on the following phases:

#### Phase 1 – Pilot companies involvement

Thanks to the support of API Parma a panel of 10 companies was selected. The following figure reports the companies involved.



Figure 9 - The Pilot companies' involved



## Phase 2 – Data collection

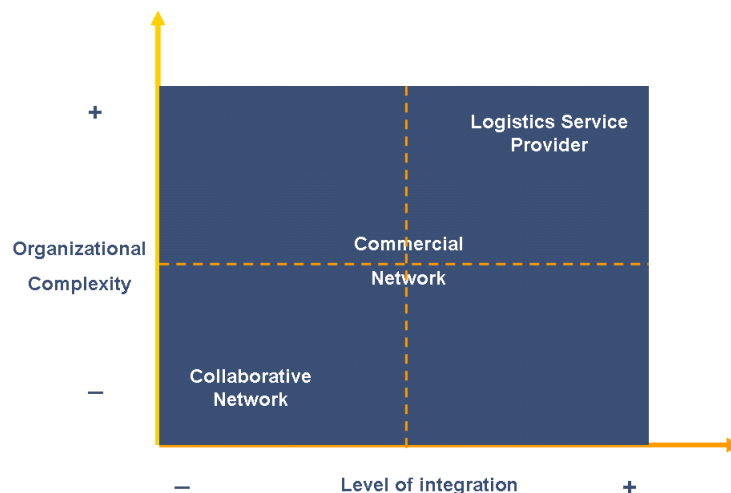
In the first two months, data were collected through interviews and workshops with the companies in order to understand the companies' business model and their main needs. For each of the 10 involved companies, the analysis was focused on the financial and organization structure, outlining key elements such as: turnover, range of action (geographic and market), service lines, customers' industry.

During the interviews, the needs and criticalities of each operator were collected. The analysis of these needs allowed the identification of the following **critical items**:

- operational costs for SME's belonging to the transport and logistics sector seem to be too high, leading to a reduction of operative margins, in comparison to the costs of "big operators";
- limited range of services offered to customers (this point excludes many of the SME's from a large slice customers which are particularly profitable);
- inefficient use of fleets due to low volumes of shipments and reduced number of clients;
- high risks due to the limited number of clients for each company; the low bargaining power against major clients reduces furthermore their operative margins in comparison to the big operators of the sector.

## Phase 3 – Feasibility study

The objective of this phase was the identification and the analysis of potential collaborative models and of the related costs and benefits. The feasibility study, as showed in the next picture, suggests three solutions characterized by different degrees of integration and organizational complexity.



**Figure 10 - Collaborative solutions**

### A - Collaborative Network

A collaborative network model aims to increase companies' competitiveness through:

- joint purchasing of materials and services;
- rationalization of logistics flows;
- integration of the present offer of services through sharing of present customers.

### B - Commercial Network

In this scenario the consortium presents itself to the market as a commercial entity with one brand and an integrated range of services. A commercial director should be employed and he/she should work in order to promote an integrated range of offered services (sum of the services currently offered from all associated) to new customers.

The rising organizational costs are, in this model, balanced by a potential growth of the consortium's turnover due to the acquisition of new customers.

### C - Logistic Service Provider

This scenario is characterized by the highest level of integration and it aims at creating a new entity that offers a complete range of logistic services to clients and that makes joint investments. In fact, in this scenario the ASTRALOG entity will furthermore grow through the:

- realization of common investments on the fleet and facilities in order to satisfy the growing demand of added value services;

## PILOT 2 in Emilia-Romagna

- creation of partnerships with other transport operators that supply services currently not offered by the ASTRALOG associated companies in order to extend the ASTRALOG's range of services.

### Phase 4 – Establishment of the Consortium

The CORELOG project set up, in cooperation with ASTRA a API Parma, the ASTRALOG consortium. The main ASTRALOG goals are to plan coordinated commercial activities, increase companies' bargaining power, exploit the opportunities offered by IT innovation, get savings from common purchasing of materials, sources of energy and assets, promote and coordinate the exchange of services among associates.

In order to get these goals, the consortium wants to:

- work as a transport agency for national and international shipments;
- perform logistics, road haulage, storage, warehousing, packing, handling and customs activities;
- stipulate agreements in order to get better conditions for members;
- build and manage internal petrol stations;
- purchase trucks, machines and other assets;
- realize researches and studies also in collaboration with other institutions;
- support the access to credit;
- promote the ASTRALOG brand;
- support the members in each activity;
- promote members' training;
- in general, run every activity for the realization of the consortium's goals.

The following table reports the ASTRALOG bodies as reported in its statute.

ASTRALOG'S BODIES		
<b>ASSEMBLY</b>	Members	All ASTRALOG's members
		The President of Apindustria Parma and the board of the auditors have the right to participate
	Activities	Nominates the board of directors
		Nominates the consortium's president
		Defines rules and directions
		Adopts a final balance sheet
<b>BOARD OF DIRECTORS</b>	Members	Among 5 – 15 ASTRALOG's members
		The President of Apindustria Parma and the board of the auditors have the right to participate
	Duration	3 years
	Activities	Nominates its President
		Each activity related to ordinary and extraordinary consortium's administration
<b>PRESIDENT</b>	Duration	3 years
	Activities	Convenes and chairs the Assembly
		Represents the consortium
		Controls the documentation preservation
		Verifies that the consortium works according to the general objectives

**Table 4 - ASTRALOG's bodies**

# PILOT 2 in Emilia-Romagna

## Phase 5 – Reporting and analysis

This phase aims at monitoring and reporting the potential savings that the consortium can get by the common purchasing of services and other initiatives. The approach is based on three pillars:

- services analysis;
- savings evaluation;
- in itinere interviews and workshops.

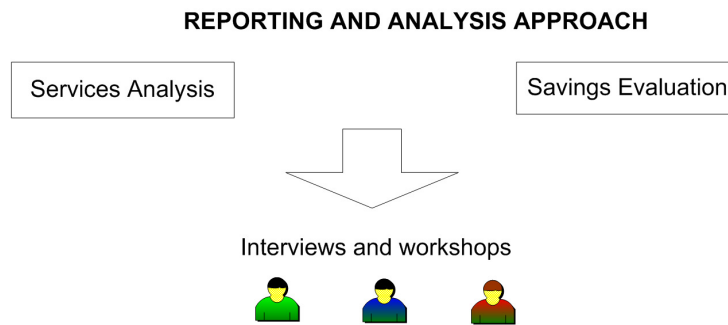


Figure 11- Analysis & reporting

Through the **services analysis** it was possible to collect all the data of the AS-IS supply of the ASTRALOG members. In particular the analysis was focused on the potential of each company in terms of: covered routes, number and capacity of trucks, number and capacity of warehouses, description of added value services.

## Phase 6 – Results evaluation

This phase aims at evaluating the qualitative and quantitative companies and systems benefits obtained through the consortium establishment. As in all the CORELOG pilots, an incremental approach was adopted, by starting with a collaborative network, as described in this paragraph. The collaborative network promising results brought to a more consolidated cooperation scheme: the set up of a commercial network. The following paragraphs report on the ASTRALOG network results.

### 2.2. Benefits for companies

The first step of the ASTRALOG cooperation was based on the creation of a **buying consortium** of inputs to the transport service performing, namely assurances, batteries, glasses, pneumatics, chrono-techographs. The savings stemming from the common purchasing strategy are the direct outcome of economies of scale.

The following table sums up the savings obtained by the ASTRALOG companies on yearly basis.

	Saving %	Saving (euro)
Assurances	10%	116.200
Pneumatics	3%	19.700
Batteries	60%	20.100
Glasses	47%	8.500
Chrono - tachographs	81%	29.200
<b>TOTAL</b>		<b>193.700</b>

Table 5 - ASTRALOG's savings on joint purchasing

## PILOT 2 in Emilia-Romagna

The further step, based on the positive results of the common purchasing, was the creation of a commercial network in order to reach new customers. The commercial strategy was implemented through four main tools.



Figure 13 - ASTRALOG commercial strategy tools

**Director** - he supports the companies in their commercial activities by finding new customers and he manages the consortium as a new entity created by the members.

**Internet portal** - it is used by the companies to share information on customers and on transport routes. It also works as a transport bank.

**Brochure** - it is a commercial instrument which presents the ASTRALOG services. It helps in finding new customers by presenting an integrated range of transport and logistics services: one bigger provider on the market with 43.100 sqm warehouses and more than 700 owned vehicles.

**UNI EN ISO certification** - the ASTRALOG members were supported by CORELOG in defining the basic requirements for a future certification which can improve the image of the consortium on the market and help the consortium best management. This part of the pilot was developed in cooperation with EUROSTUDIO S.r.l.

### 2.3. Benefits for region

The analysis of the Emilia-Romagna regional system shows that the advantages achieved by the pilot project's companies can be replicated to the whole Emilia-Romagna's system. Emilia-Romagna, as well as all Italy, is characterized by the **wide presence of small transport and logistics companies**. This situation has been considered a **weakness of the transport and logistics industry** and recently the Italian national government has introduced measures which foster the dimensional growth of transport and logistics companies. It is very significant that small-medium logistics providers can rationalize their activities through the implementation of collaborative solutions, as showed in the pilot project. The potential savings that companies get through the establishment of ASTRALOG can be reached by every company that works in the regional and national system. These savings grow with the increase of the number of **companies organized in consortium** as well as with the **increase of the areas of collaborations**.

The establishment of a **Shared Services Centre (SSC)** concentrates company resources, which are normally spread across each company's organization, in order to serve more companies at a lower cost and with higher service levels, with the common goal of "delighting" customers and enhancing corporate value. The following figure reports the Shared Services Centre model.

## PILOT 2 in Emilia-Romagna

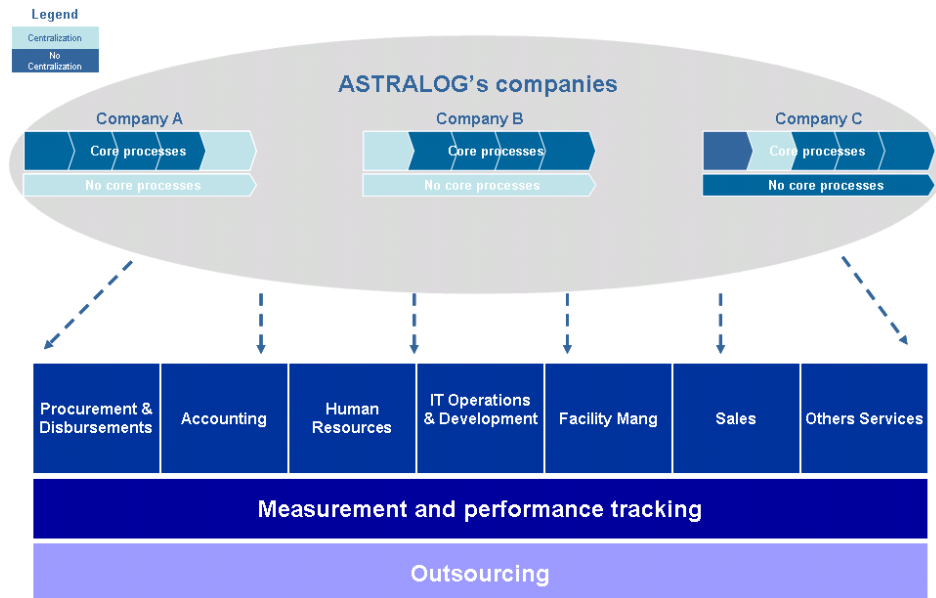


Figure 14 - Shared service centre model

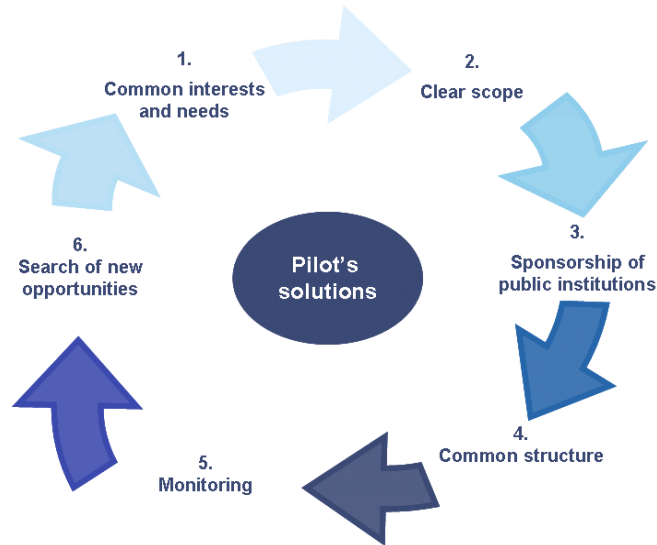
### 2.4. Lessons learnt

- **Quick wins.** Companies are mainly focused on quick wins. For instance, the ASTRALOG's companies decided to implement a common purchasing strategy as soon as possible in order to get immediate advantages. Long term and more solid results can be achieved if a step by step and incremental project approach is foreseen. The first step is always to convince companies with short term saving proofs.
- **Customers' sharing.** Even if companies established the consortium, they had significant problems in sharing information on customers and routes. The finding of new customers, more than the sharing of the present ones, on which testing the consortium services proved to be the best solution to strengthen their cooperation.
- **Low bargaining power of logistics providers.** Small logistics provider are characterized by a low bargaining power due to the structure of the transport market, where small operators, as the ASTRALOG's companies, suffer from the competitive pressure of big operators that, thank to scale economies, can offer more competitive prices. Consequently, SMEs' collaborations can be a chance to increase their competitiveness.
- **Flows rationalization.** Companies have significant problems in terms of logistics flows rationalization. For instance, companies declared that they have frequent empty routes from the South of Italy areas. The collaboration among them can reduce empty routes. In fact, companies could share their routes in order to maximize their load factors and reduce their empty routes. One example of possible cooperation routes refers to Italian seaports.
- **Tutoring companies.** Logistics providers on average underestimate the advantages of cooperation in logistics and have limits in developing it. Companies declared: *"they don't feel they have the necessary experience to develop a more structured partnership without support"*. During the implementation of the pilot's solution the role of PwC, RER and ITL was very important in the estimation of the potential benefits companies could get and in the promotion of collaborations' advantages. In particular an ongoing tutoring was performed for this purpose.
- **Involvement of companies in the pilot project.** The collaboration with ASTRA e API Parma created a direct channel among companies and the Emilia-Romagna Region. This channel reduced the time necessary for the companies' involvement and for the correct choice of the companies really committed to the consortium development.

### 2.5. How can I use the pilot's results

#### 2.5.1 Guidelines for authorities

As showed in the following picture, the **collaborative solution is replicable at regional and transnational level with some basic conditions.**

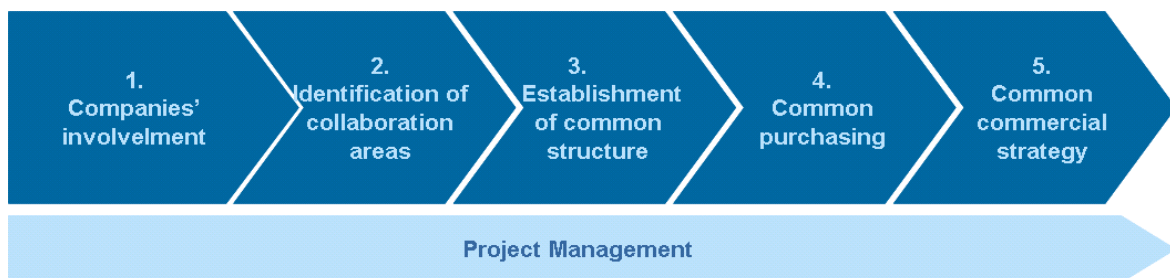


**Figure 15 - Success conditions for replicability**

- 1. Common interests and needs of the involved companies.** It is important to involve in the project companies with common interests and needs in order to find solutions that satisfy each company. This is the base for a solid cooperation. For this purpose the enterprises associations support proved to be fundamental.
- 2. Clear scope.** When companies agree the scope the project scope and action plan, they are more committed in pilot's activities. They understand the relationship between activities and results and they work in order to get them. Before starting a pilot always share a clear action plan with companies.
- 3. Sponsorship of public institutions.** The sponsorship of public institutions helps companies to create commitment to the project. Public institutions are seen as a trust interface in the project development.
- 4. Common structure.** The establishment of a common structure among companies is necessary not only for the implmenetation of the joint activities but also as contact point for companies. Create a contact point for the pilot.
- 5. Monitoring.** Mmonitoring activities arre crucial to keep the project on the right path. Monitor the results achieved, and not achieved, so that companies are aware of their improvements.
- 6. Search of new opportunities.** The finding of new customers was the cornerstone to consolidate the consortium as overapssed the resistance to share present customers.

## 2.5.2 Guidelines for companies

The **main steps** necessary for the implementation of the pilot, as showed in the next picture, are:



**Figure 16 - Pilot project steps**

The main tools used in the project development were one-to-one interviews with companies, workshops among companies and specific analysis on the services provided by each company and of their logistics flows. The meetings were of utmost importance to **agree a rule for distributing the consortium profits** among the consortium and the companies and among the involved companies.

## 3. Pilot 3 - AUTOMOTIVE CLUSTER OF SLOVENIA (ACS) TRANSPORT COSTS OPTIMISATION

### 3.1 Pilot's background

The Pilot Project is focused on the automotive industry in Slovenia, which is currently facing increasingly severe market conditions (especially concerning short delivery-windows). The project includes 21 companies (Slovenian suppliers of components for the most important European automotive manufacturers), members of the ACS cluster (Automotive Cluster Slovenia). Moreover the project involved logistics providers, research/consulting companies, logistics experts and public bodies.

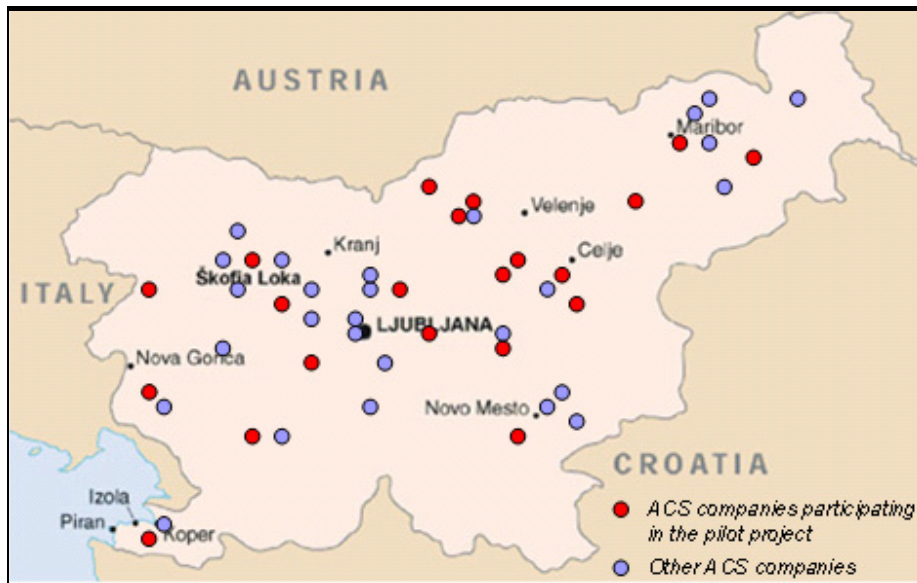


Figure 17 - Location of ACS companies

The aim of the pilot project was to analyse and rationalize logistics problems of the companies of the automotive cluster (ACS) in Slovenia. Based on the gathered results the most outstanding problems and possible solutions were defined. The main objective of the pilot project was to find appropriate solutions for the outlined problems by means of a feasibility study defining the short, medium and long term logistics strategy of companies.

The main pilot's assumption was to develop and implement a "tailor made" joint transport ordering (optimization) system for ACS manufacturing companies, which would enable them to reach positive synergy effects. Preliminary calculations showed that the estimated savings stemming from their cooperation could on average amount to 15% of their total transport costs, which means 6-7 million EUR per year.

The Pilot Project was divided into three phases:

**Phase 1** - Analysis of logistics freight flows

**Phase 2** - Analysis of logistics activities and logistics problems

**Phase 3** - Quantification of identified possible solutions and selection of the most appropriate ones

### 3.2. Benefits for companies

Based on the freight flows analysis, the most important potential fields for the reduction of transport costs were defined. The total transport costs of the analysed companies were estimated at **EUR 42 Million per year**. Major savings may be provided through the following actions:

#### a.) Reduction of the Number of Empty Runs

In order to determine the possibilities for the reduction of empty runs, an analysis on the overlapping of incoming and outgoing freight flows was carried out by involving the ten most important ACS partner countries. The analysis has detected significant potentials for optimisation (joining) of transport flows, which would result in a reduction of the number of empty runs and consequently the of logistics costs of the companies.

As shown in next table, potential savings assessed by the analysis of overlapping in the freight flows were estimated at **EUR 680,000 annually**.

## PILOT 3 in Slovenia

Transport /Month	Procurement (t)	Sales (t)	Total Costs (€)	Overlapping (%)	Price Discount (10 %)	Savings/Year (€)
Austria	1,860	1,207	200,000	64.89	6.49	156,000
Croatia	2,118	179	63,000	8.45	0.85	6,400
Czech Rep.	158	59	8,800	37.34	3.73	3,960
France	980	362	148,000	36.94	3.69	65,000
Germany	4,275	1,667	410,000	38.99	3.90	193,000
Hungary	814	376	30,000	46.19	4.62	17,000
Italy	1,665	1,620	128,000	97.30	9.73	149,000
Poland	542	174	118,000	32.10	3.21	45,000
Slovakia	876	511	44,000	58.33	5.83	31,000
Spain	1,412	85	188,000	6.02	0.60	13,500
<b>TOTAL</b>						<b>680,000</b>

Table 6 - Potential savings resulting from the reduction of empty runs (discount by transport providers)

### b.) Increase in Load Factor

As indicated by the analysis, the average load factor was 0.8. The increase in the load factor might ensure important results in the reduction of the transport costs. Possible savings resulting from the increased load factor have been quantified based only on the outgoing freight flows – in fact a great part of the incoming flows are currently organised by the ACS companies' suppliers. As shown in the next table, an increase in the load factor by a minimum of 10% may result in savings of **EUR 1,200,000 annually** (in addition to the savings resulting from joining of the flows indicated in the previous table).

Country	Sales/Month	Number of Companies	Total Costs/ Month	Savings/Year (10%)
Austria	1,860	8	171,000	205,000
Croatia	179	3	1,400	1,700
Czech Republic	158	7	6,400	7,700
France	980	9	93,000	111,000
Germany	4,275	13	337,000	405,000
Hungary	376	5	11,000	13,500
Italy	1,620	7	82,000	99,000
Poland	542	6	108,000	130,000
Slovakia	511	6	18,000	21,500
Spain	1,412	4	177,000	212,800
			1,007,000	1,200,000

Table 7 - Potential savings resulting from increase in the load factor



## PILOT 3 in Slovenia

### c.) Milk Run (Groupage) Transport System

At present 25% of the companies' shipments are the LFTL (less than full truck load) shipments, which are 3-5 times more expensive than the FTL (full truck load) shipments. A large share of small shipments (up to 12 tons per delivery) represents an important field for transport optimisation.

Based on the implementation of the milk run transport system (joining of small shipments originating from several companies), there might be major savings. Namely, if as little as 10% of small shipments were jointed into large ones, potential savings might amount to **EUR 2 Million annually**.

### d.) Harmonisation of Transport Tariffs in the ACS Companies (Economies of Scale)

The participating companies have reported significantly different transport tariffs. The analysis has shown that the tariffs for similar freight volumes and transport distances may have differed by up to 30% (see next table).

	Company X		Company Y	
	2005	2006	2005	2006
Italy	0.97	1.21	1.28	1.29
Germany	1.02	1.02	1.00	0.85
France	0.96	0.96	0.76	0.75

Table 8 - Different tariffs (in EUR per km)

It was established that harmonisation of tariffs may result in a reduction of total transport costs by as much as 5%. Expressed in cash, such reduction would result in **EUR 2 Million** of additional savings for the ACS companies **annually**.

### e.) Total Potential Savings

As shown in the next table, the potential **savings** in the ACS companies resulting from all the above-mentioned actions may amount to approximately **EUR 6 - 7 Million annually**, which accounts for approximately **15% of the total transport costs**.

Saving Category	Savings (Million €)
Backhaul	0.7
Increase in load factor	1.2
Introduction of milk run	2.0
Harmonisation of transport tariffs - ACS level	2.0 - 3.0
<b>TOTAL (Approx. 15% of costs)</b>	<b>6.0 - 7.0</b>

Table 9 - Summary of total potential savings

## 3.3. Benefits for region

The realization of the pilot project suggested solutions which would also have considerably positive effects on the environment, by promoting the cooperation among SME's and by also creating the critical mass for modal shift (intermodal transport).

Moreover the pilot collected data concerning freight flows which are very useful for the further planning of the transport system in Slovenia and which can be used by public authorities.

### Freight flows

The key outcomes of the freight flows analysis may be summarised as follows:

- Transport volume of 21 ACS companies amounted to 1 Million t/year.

## PILOT 3 in Slovenia

- Over 96% of goods were transported by road.
- Railways carried only 3% of total freight.
- Intermodal transport accounted for 1% of total goods transported.

The following figures report the international freight flows of the ACS Member Companies (outgoing & incoming)

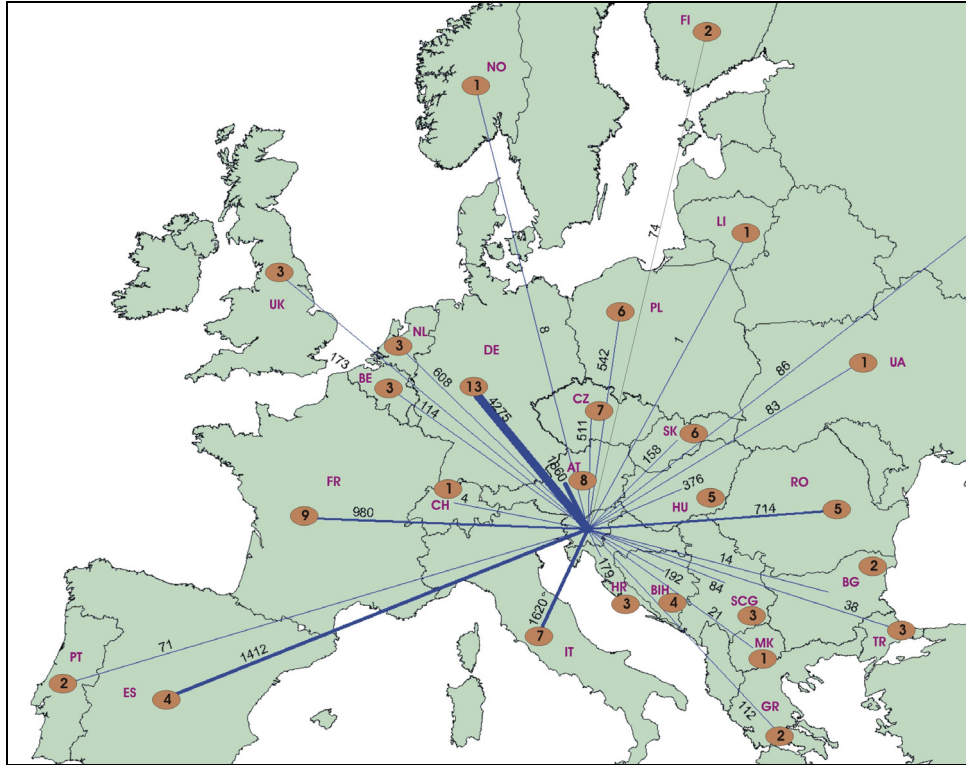


Figure 18 - ACS International outgoing freight flows



Figure 19 ACS - International incoming freight flows

## PILOT 3 in Slovenia

Concerning the regional production and attraction freight flows of the ACS Members the following figure and table report the volumes by statistical region.

Statistical Regions	Procurement		Sales		TOTAL Volume of Freight	
	Volume in Tonnes	Structure (%)	Volume in Tonnes	Structure (%)	Volume in Tonnes	Structure (%)
Savinjska	9,891	51,4	14,596	73,2	24,487	62,5
Koroska	4,877	25,4	3,432	17,2	8,309	21,2
Goriska	1,734	9,0	22	0,1	1,756	4,5
Obalno-kraska	766	4,0	480	2,4	1,246	3,2
Podravska	812	4,2	154	0,8	966	2,5
Jugovzhodna Slovenija	458	2,4	372	1,9	830	2,1
Notranjsko-kraska	322	1,7	411	2,1	733	1,9
Osrednjeslovenska	70	0,4	323	1,6	393	1,0
Spodnjeposavska	206	1,1	91	0,5	297	0,8
Gorenjska	101	0,5	72	0,4	173	0,4
<b>TOTAL ACS in all regions</b>	<b>19,237</b>	<b>100,0</b>	<b>19,953</b>	<b>100,0</b>	<b>39,190</b>	<b>100,0</b>

Table 10 - Monthly volume of freight of ACS members – Breakdown by statistical regions

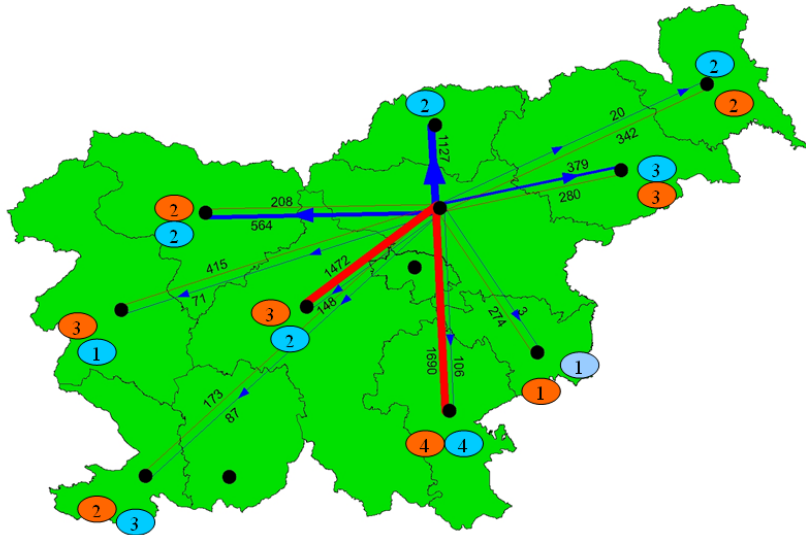


Figure 20 - Incoming and outgoing freight flows in the Savinjska region

The key outcomes of the freight flows analysis are:

- Concerning optimization possibilities, the international freight flows of ACS companies are of major importance (large distances and big quantities of freight);
- a large number of the ACS companies (up to 13 companies, depending on specific destination) transport the goods to or from the same destinations;
- possible improvements are:
  - joint shipments in international freight flows;
  - increasing of backhaul – freight flows overlay in terms of quantities and destinations;
  - the milk run system, which might be an interesting solution for the transport flows within Slovenia

### 3.4. Lessons learnt

The most important lessons learnt in the pilot project is that the savings in the field of transportation are possible provided that the companies' management starts understanding the optimization possibilities reachable through cooperation. Unfortunately transportation

flows are, to a great extent, still considered as company' secrets. Nevertheless companies presented a rising of awareness of the possible positive effects which can be reached through cooperation.

The most important lessons learnt include:

- **the optimisation of the logistics process is a long-term project**, namely:
  - at the project start, it was necessary to carry out a detailed analysis of the ACS companies' logistics organisation (which had not existed earlier);
  - the implementation of the suggested solutions requires the development of feasibility studies;
  - consequently, it is not reasonable to expect that the full implementation of identified solutions could be carried out and end within the period of the pilot project duration;
- a **short-list of problem solutions and implementations** was of a vital importance for **improvement** of the logistics processes;
- there were **significant differences** concerning the **level** of the logistics **knowledge and practices** among the analysed companies, namely:
  - larger companies employ a logistics manager responsible for logistics problems solutions (high logistics costs), while,
  - in smaller companies, logistics is not seen as an important field for savings (due to a small transport volume);
- **logistics optimisation processes** in Slovenian companies are still in their **initial phases**, which may be illustrated by the fact that most of the companies have separated departments responsible for purchase and sales, which contributes to the problem of numerous empty runs;
- in companies, **data on transport flows is considered "business secret"**, which represents a serious obstacle to the development and introduction of any joint & inter-company activities;
- there is low level of awareness of the benefits that may be achieved through cooperation; consequently, there is a need to promote inter-company cooperation and cooperation between companies with **public bodies' support** (e.g., PPP regulations);
- the implementation of a joint transport service ordering system would reduce the transport costs and provide a sustainable information flow; however the companies are willing to use the system only in deliveries to non-popular destinations (problem of empty runs) and for LTL deliveries. This issue imposes a specific implementation strategy: **to start with a small sample of companies and gradually involving additional ones in case of positive effects.**

### 3.5. How can I use the pilot's results

#### 3.5.1 Guidelines for authorities

##### Optimisation of freight flows

The transport flows can be optimised through improved inter-company cooperation. A joint ordering system would enable companies to optimise the volume of freight flows through:

- backhaul (in average, the incoming or outgoing freight flows overlap by 44%);
- increased load factor (possible 10% increase, which means 10% reduction in traffics);

It is necessary, however, to encourage cooperation among companies (currently, there are no incentives or promotion activities available) and provide for the measures regulating this field.

Optimisation of the freight flows may be additionally facilitated with the use of modern information systems supporting the transport ordering and reverse logistics. It is suggested that the public bodies should promote investments in such systems, together with the transfer & implementation of best practices already applied.

##### Modal shift

As shown by the analysis, at present, most of the freight is transported by road. It was estimated that it would be feasible to shift up to 30% of the ACS freight flows from road to rail (which represents about 30.000 tones equalling 15.000 HDV). Shifting of this freight to the railway, can bring important benefits at the regional and national levels (e.g., less busy road infrastructure, environmental benefits).

Although intermodal connections are already available to the ACS companies, they are currently not used, mainly due to low flexibility and reliability of the railways. In order to encourage the use of the railway system, companies should be provided with relevant incentives. In addition, however, the railway system needs to be modernized, which would enable it to compete with the road transport (especially at short distances).

### PPP regulations

In the countries where cooperation between the public and private sector (PPP) was implemented, it has proven to be very successful. Under the pilot project, there were some PPP schemes suggested in establishing of logistics centres and joint warehouses. Such projects would ensure benefits at the national and regional levels (improved logistics planning, optimisation of freight flows, improved spatial planning).

As observed, companies are interested in the operation of joint warehouses, but they are not willing to invest in such facilities. Consequently, in order to increase the interest for investment among companies, it would be necessary to promote such projects with the involvement of public bodies.

In addition, it is necessary to have relevant legal environment regulating the cooperation between the public and private sectors. Since, at present, there is no PPP regulation adopted in Slovenia, identification of examples of good practice at national level has not been feasible.

### Establishing of regional logistics centres

At present, each company has its own warehouses and logistics facilities. The establishment of common logistics centres would enable the concentration of logistics activities in one area, which would reduce the road transport (through optimisation and modal shift).

In Slovenia, there is not a sufficient number of logistics centres available, also because this field is not properly regulated. There should be relevant regulations adopted, including the establishment of a public body to be responsible for regional and national logistics, thus ensuring also proper planning of the location of logistics centres (improved spatial planning).

### 3.5.2 Guidelines for companies

Evidence and the analyses showed that inter-company cooperation may provide for numerous positive effects for the companies, such as:

- joint demand for transport by several companies;
- possibility to select among several transport providers;
- increased number of FTLs;
- increased load factor (groupage);
- easier ordering of transport services;
- shorter reaction times of providers;
- better routing and better utilization of transport capacities;
- positive synergy effects based on joining of different information systems.

The above mentioned positive effects can provide the rationalization in the fields of:

- empty runs;
- load factor (and, additionally, reduced transport prices, logistics costs and environmental costs);
- ordering process (less time-consuming);
- transport and logistics planning (easier and more transparent).

The establishment of a joint web transport ordering system (portal) was identified as the most appropriate solution (it was named SIGMA), which would connect:

- existing information transport (and logistics) ordering systems of large manufacturing and trading companies;
- small companies buying transport services (with direct access to the system);
- transport providers to the companies participating in the project; in fact small providers usually communicate with their customers by phone and are not included in the company's information systems.

The following figure reports the SIGMA system model.

# PILOT 3 in Slovenia

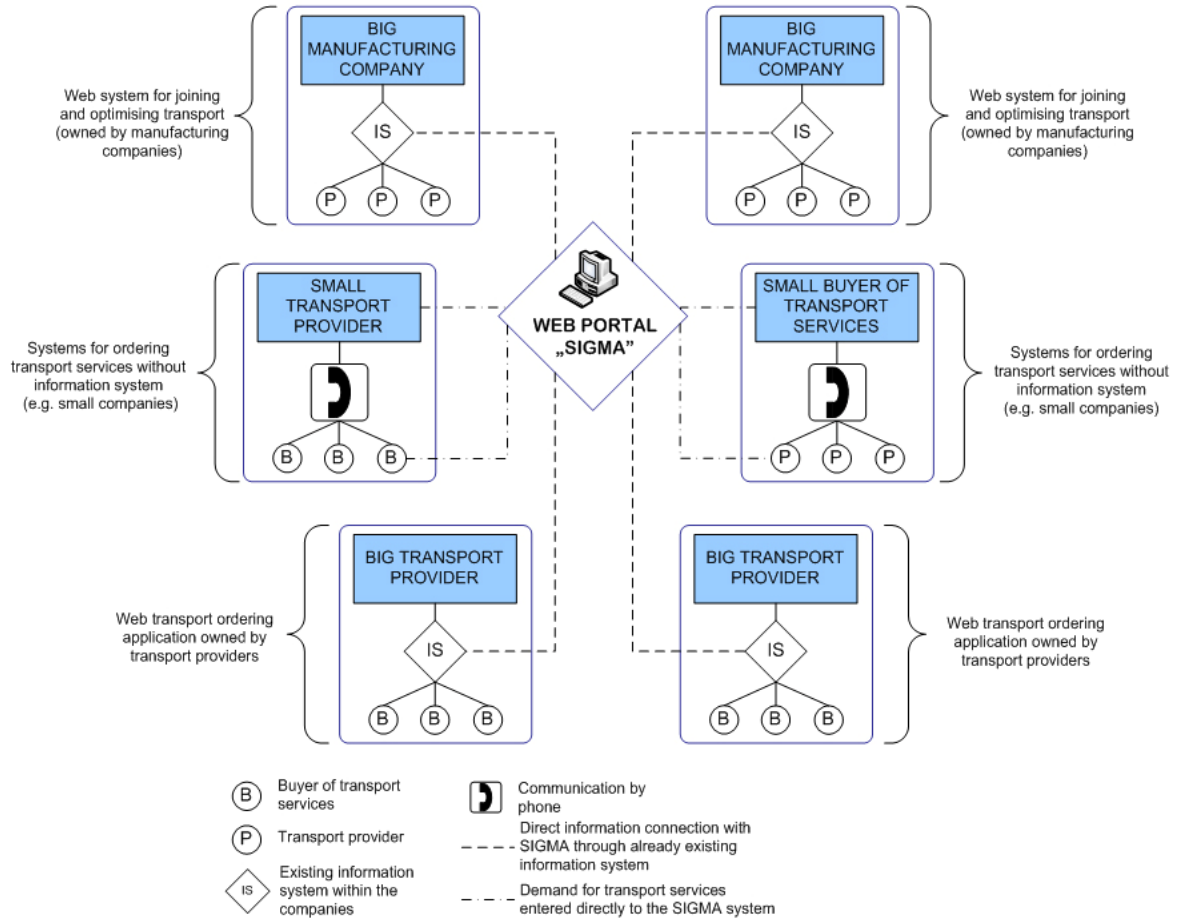


Figure 21 - The SIGMA System



## 4. Pilot 4 - IMPROVEMENT OF LOGISTICS EFFICIENCY

### 4.1. Pilot's background

The scope of the pilot project is the elaboration of a feasibility study for the potential development of a Freight Centre in the Region of Central Macedonia in Greece with main objectives consisting in the coordination of logistics processes and operations, including the cooperation between the public and private sector, with the purpose of improving freight flows management within the Region and upgrading the integrated intermodal transport chain between the region and the rest of Europe.

The pilot project of the Region of Central Macedonia addresses the following issues:

- lack of coordination of the current logistics processes and products flows in the Region of Central Macedonia;
- poor level of offered services regarding the supply chain management and transport/handling of goods in the region of Central Macedonia;
- small scale use of intermodal transport in the wider area;
- extremely fragmented transport sector in the region of Central Macedonia;
- lack of public – private partnerships and initiatives in the transport and logistics sector at regional level.

The objectives of the proposed intervention are:

- coordination of logistics processes and operations with the purpose of improving freight flows management inside the Region and upgrading the integrated intermodal transport chain between the Region and the rest of Europe;
- cooperation between the public and private sector with the purpose of participating in PPP initiatives in the logistics sector;
- motivation of the private sector to participate in such type of initiatives.

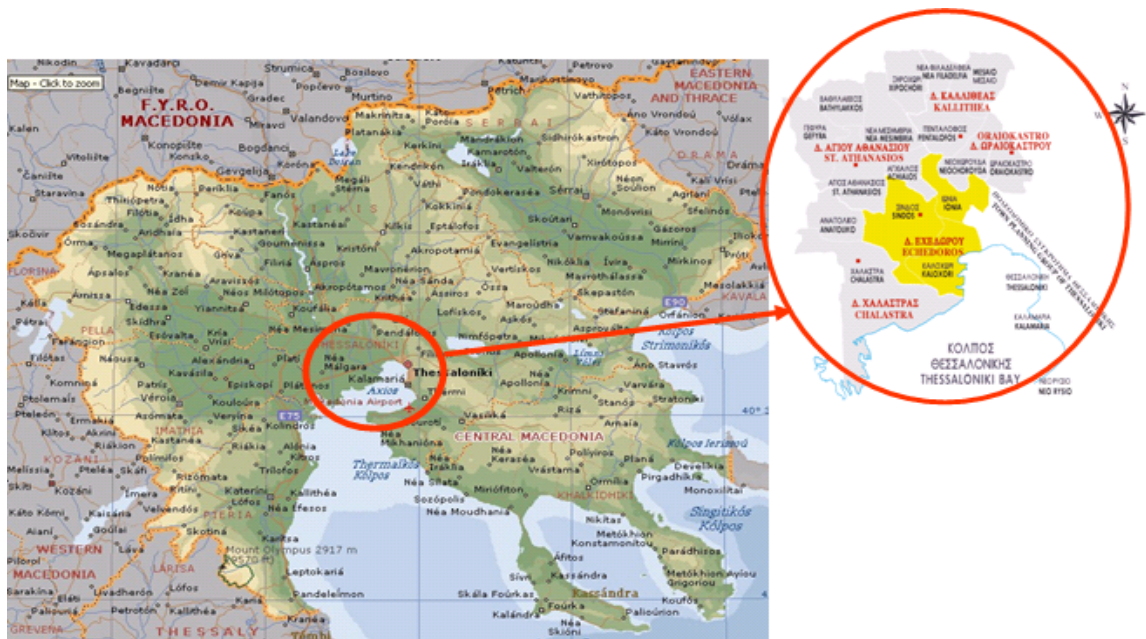


Figure 22 - Map of Central Macedonia region and municipality of Echedoros

The single phases that led to the elaboration of the feasibility study for the purposes of the pilot are described below:

- analysis of freight flows in the Region of Central Macedonia (RCM);
- identification of the main areas that generate or attract freight flows in RCM;
- presentation/description of the current situation of the freight transport/logistics sector in RCM;
- review of best practices/experience in the development of freight/logistics centres at national and European level;
- definition of the influence/catchment area of the potential freight/logistics centre to be developed in RCM;
- estimation of the expected demand (freight flows) that a potential logistics/freight centre in the Region could serve;
- identification of the location of the freight/logistics centre;
- presentation of the current transport infrastructure in the wider area of the potential freight/logistics centre;
- identification of the strategic objectives of the potential freight/logistics centre;

## PILOT 4 in Central Macedonia

- determination of the services to be provided by the potential freight/logistics centre;
- identification of the main operational areas/spaces of the potential freight/logistics centre;
- preliminary financial analysis for the development of the potential freight/logistics centre;
- identification of the organizational structure.

### 4.2. Benefits for companies

#### Strategic objectives of the Freight/Logistics Centre

The proposed strategic objectives that the potential Freight/Logistics Centre in the Region of Central Macedonia could adopt are hereafter briefly presented:

- provide complete services combined with integrated transport networks;
- serve as an intermodal inter-balkan logistics centre;
- serve as a national warehousing and distribution centre in the greater Balkans area;
- operate as a transit gate of the national flows using road and rail infrastructure;
- support the transit flows attracted by the Port of Thessaloniki and provide 3PL services for those flows.

#### Proposed offered services of the freight/logistics centre

The potential freight and logistics centre could provide the following services:

- road transport/forwarding services and transshipment facilities (Road - Road), as well as supporting services for the vehicles and their drivers;
- intermodal transport terminal (Road - Rail), grouping and collection/distribution services for the goods, as well as supporting services for the transshipment (temporary warehousing of the transhipped goods, custom clearance);
- rail transshipment services (Rail - Rail), grouping and collection/distribution services of the goods, as well as supporting services of the transshipment (temporary warehousing of the transhipped goods, custom clearance);
- rail - ship transshipment services (as long as this service is not provided directly at the port of Thessaloniki), grouping/ungrouping of the transhipped goods (including packaging/repackaging), warehousing, forwarding and distribution of those goods;
- maintenance/station for repairing damaged containers;
- empty containers handling station;
- warehousing and 3PL services including the final assembly of goods;
- networking and information provision to the customers;
- advanced information technology services (inventory management, vehicle/cargo monitoring).

#### Total operational areas needed

Based on the analysis carried out, there is a demand for an area of 468.000 sq.m. As presented in the figure below, there is need for areas used for the transport and forwarding of goods, as well as for general and specialized warehousing areas. In order to handle the expected volumes of international and national intermodal (road - rail) transport, a medium - sized (compared to the European average) intermodal (road - rail) transport terminal is required (78000 sq.m). In the intermodal transport terminal a parking for trains, the potential for the operation of a loading and unloading equipment from truck to wagon and vice versa, as well as for the temporary warehousing of containers should be taken into account.

The intermodal transport services area is estimated to 32000 sq.m. The services provided to unitized loads (containers/RoRo trailers) are related to the port and the rail, including storage/warehousing, cleaning, maintenance/repair of cargo units, unpackaging, consolidation/split of goods.

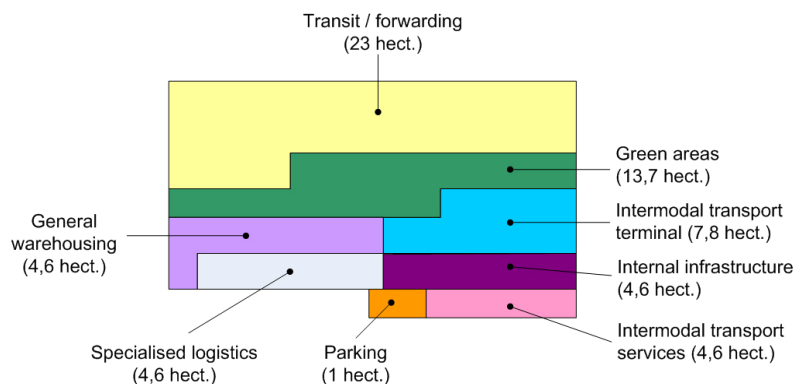


Figure 23 - Area demand of the Freight Centre



## PILOT 4 in Central Macedonia

### How much would it cost? - Preliminary financial analysis

#### General - assumptions

The preliminary financial analysis of the Freight Centre was implemented based on the following assumptions:

- the land will be given to the concessionaire, who will then develop the infrastructures for the operation of the Freight Centre and will subsequently rent space to parties interested in using the Freight Centre;
- the concessionaire will not participate in the operation of the Freight Centre, but will only be involved in the management of the services concerning the "infrastructure". Infrastructure services are defined as operational activities concerning cleanliness, maintenance of the basic infrastructure, safety, basic information technology infrastructure;
- the estimated investment cost for the implementation of the Freight Centre is derived from the land costs (or charges based on usage since it involves concession), the estimated requirements for open spaces, infrastructures, building and warehousing facilities, equipment and transport infrastructures;
- in the framework of the present analysis the investment cost is considered as being the cost of the buildings and facilities and of the general spatial configurations;
- the main sources of generating income will originate from the renting of areas and facilities as well as the charges concerning cleanliness, maintenance of the main infrastructure, safety and basic information technology infrastructure.

#### Calculation of the investment capital

The cost of investment is presented in the table as follows:

Category of investment cost	Cost (€)
Warehouses	31.190.000
Administration Building - Auxiliary Services	3.250.000
Road construction - Parking spaces	13.137.257
Spatial configurations	18.105.116
<b>TOTAL</b>	<b>65.682.373</b>

Table 11 - Investment cost

#### Calculation of the income

As previously mentioned, the foreseen income is expected to be generated through the renting of space. The renting charges of the various facilities of the Freight Centre are estimated in accordance with the current market facts and figures. The charges for renting conventional warehousing areas is determined as being 4 Euros per sqm/month, while for the open storage areas as being 1,5 Euros per sqm/month. In addition, the development of auxiliary services (restaurant, small hotel, gas station, etc.) is expected to produce 7 Euros per sqm/month. For the provision of the main services required for the operation of the Freight Centre (cleanliness, maintenance of main infrastructure, safety, basic information technology infrastructure) a charge of 0,5 Euro per sqm/month is estimated.

The calculation of the estimated annual revenue is presented in the next table. In the estimation of the financial viability that follows an annual increase of 3% in rents is assumed.

Category of revenue	Revenue (€)
Renting of open storage areas	4.005.113
Renting of conventional warehouses	4.608.000
Renting of auxiliary services	252.000
Usage charges for the facilities	4.324.557
<b>TOTAL</b>	<b>13.189.670</b>

Table 12 - Estimated annual revenue

#### Estimation of financial viability

For the estimation of the financial viability of the proposed project, the Net Present Value (NPV) and the Internal Rate of Return (IRR) are calculated. The capital cost is assumed as being 9%.

## PILOT 4 in Central Macedonia

	i	1	2	3	4	5	6	7
	9%	9%	9%	9%	9%	9%	9%	9%
Expenses	65.682.373	0	0					
Revenue	0	13.189.670	13.585.360	13.992.921	14.412.709	14.845.090	15.290.442	15.749.156
Cash flow	-65.682.373	13.189.670	13.585.360	13.992.921	14.412.709	14.845.090	15.290.442	15.749.156
$(1+0,09)^{i-1}$	1,0000	1,0900	1,1881	1,2950	1,4112	1,5386	1,6771	1,828
NPV	-65.682.373	12.100.615	11.434.526	10.805.344	10.213.087	9.648.440	9.117.192	8.615.512
NPV	-65.682.373	-53.581.758	-42.147.233	-31.341.888	-21.128.801	-11.480.361	-2.363.169	6.252.343
IRR			-43,39%	-20,36%	-6,53%	2,13%	7,81%	11,69%

**Table 13 - Net Present Value and Internal Rate of Return (€)**

The above analysis shows that if the use of all the operational areas specified is accomplished during the first year of the Freight Centre operation, then prior to the end of the sixth year of operation, the net present value turns positive and internal rate of return is 11,69%.

This approach could be considered as an optimistic scenario since it is based on the assumption the entire areas of the Freight Centre being utilized. However it constitutes the basis for the thorough planning that an investor should adopt for the implementation of the Freight Centre.

The above results are in accordance with the general theory and practices existing in the field of real estate concerning warehouses, based upon which (also depending on the cost of land that is not included in the above analysis) the return is in the order of 8 to 10 years.

### 4.3. Benefits for region

#### Range of the Logistics Centre

The catchment area of the potential Logistics Centre in the wider area of Thessaloniki includes areas that are located not only in the Region of Central Macedonia but also in the Regions of Western Macedonia and Eastern Macedonia - Thrace. Hence, the catchment area encompasses: the Prefecture of Chalkidiki, the Prefecture of Drama, the Prefecture of Florina, the Prefecture of Imathia, the Prefecture of Kastoria, the Prefecture of Kavala, the Prefecture of Kilkis, the Prefecture of Kozani, the Prefecture of Pella, the Prefecture of Pieria, the Prefecture of Serres, the Prefecture of Xanthi, the port of Thessaloniki, Doirani border, Euzonoi border, Kristallopigi border, Niki border. The catchment area of the potential Freight Centre in the Region of Central Macedonia is depicted in the following map.



**Figure 24 - Catchment area of the potential freight centre**

### **Current transport infrastructure in the wider area of the former military camp of Gonou as possible location of the freight centre**

The former military camp of Gonou is located in the western side of Thessaloniki and in particular in the Municipality of Echedoros. It covers an area of 971.271 sq.m west to the inner Ring Road of Thessaloniki, south to the Edessa – Veria national highway and north to the Pontou Street.

The military camp in its present condition has one entry/exit gate. The connection with the PATHE (Patras - Athens - Thessaloniki - Evzonoï) national highway and the inner and outer Ring Road is accomplished through the junction that is near to the Central Market and the junction of Tsertseti - Polizoiti Street, which is situated approximately 2 kilometres away from the military camp. On the Ring Road and at a distance of 6 kilometres towards the airport from the junction of the Fruit Vegetable Market, there is the K18 junction connecting the Ring Road with the Egnatia national highway. At a distance of 500 meters from the entry/exit gate of the military camp there is a direct access to the Thessaloniki – Edessa national highway connecting Thessaloniki with the northern part of the West Macedonia Region through the cities of N.Chalkidona, Giannitsa and Edessa. This particular branch of the Thessaloniki – Edessa national highway is an alternative choice to the Egnatia national highway that connects Thessaloniki with the city of Verioia. The “Macedonia” airport of Thessaloniki is located approximately 30 kilometres away from the camp of Gonou through the Ring Road which is a road with sufficient geometric and operational features so as to serve “heavy” traffic. As far as railway connection is concerned, the military camp of Gonou is situated next to the marshalling yard of the Hellenic Railway Organisation (HRO). Hence, the camp of Gonou could potentially be connected with any of the existing lines of the HRO railway network (to Eidomeni, Promachonas, Athens, Alexandroupoli, etc.). The military camp of Gonou is located about 5 kilometres away from the Port of Thessaloniki and it is connected with it through the Central Market junction and the new west entrance of the Port at the Gate 16. Finally, the area of the military camp is adjacent to the Industrial Area of Thessaloniki (Sindos) and at the same time it has direct access to the main urban areas of the wider city of Thessaloniki through the Monastiriou Street the Ring Road.

### **4.4. Lessons learnt**

#### **Involvement of companies in the pilot project**

The Hellenic Railways Organisation and Thessaloniki Port Authority are fundamental bodies for the centre development.

#### **Criticalities emerged during the project**

By all accounts, in Greece, there are considerable difficulties in contacting, meeting and interviewing both private companies and bodies of the wider public sector especially if they do not benefit directly from the implementation of a project. Hence, it is an important matter to convince all the stakeholders to be involved and support such a project by participating in meetings, workshops and providing information and data (that what the pilot did). This issue becomes much more difficult when it has to do with collaborative initiatives involving cooperation between public bodies and private companies. It should be pointed out that emphasis must be laid on the promotion of such initiatives in order to stimulate cooperation and private participation in the investment.

#### **Opportunities for new initiatives (needs and interests expressed by companies, which were not expected at the beginning of the project)**

During the implementation of the pilot project, industrial and manufacturing companies, transport and logistics enterprises, the Hellenic Railways Organisation and the Thessaloniki Port Authority expressed their newly emerged needs and interests. An ongoing fine tuning of the project was needed.

**The majority of commercial and export companies** expressed their interest in using more 3PL services for the carrying out of transport regarding supplies or distribution of final products in the forthcoming future, especially after the development of the potential Freight Centre. On the contrary, they seem not to rely on 3PL providers for the management of their stocks. This trend should be reversed after the development of the Freight Centre.

The interviewed executives of companies, were asked to assess the critical factors that influence the successful operation of a Freight Centre. According to them, the strategic location of the Freight Centre near the transport and industrial infrastructure constitutes the main factor for the successful operation of a Freight Centre. Furthermore the reduction of the overall transport cost concerning users, the opportunity for direct transshipment from one means of transport to another (truck, train, ship), as well as the concentration of logistics services and support services (customs, maintenance, etc.) in one place (**one-stop-buying**) are considered as indeed essential factors for the successful operation of a Freight Centre.

In regard to the potential for a commercial/industrial company to be installed on the premises of a Freight Centre and use its facilities and services, commercial/industrial enterprises showed limited interest considering that storage areas must be situated near their main activities. They also appeared to be uncertain about what to choose between the creation of new facilities inside the logistics centre and the translocation of their existing facilities into the logistics centre. Notwithstanding the limited interest, none of the companies adopted an absolutely negative stance on the potential for installing its facilities in a logistics centre.

As concerns the allocation of available areas for the establishment of businesses inside the Freight Centre, industrial/commercial companies expressed their needs more for indoor spaces than for open storage areas.

Furthermore, commercial/industrial companies have not realized the importance of economies of scale and co-operative schemes to a large extent. As their main object does not have to do with the field of logistics, they are not interested in cooperating with other businesses established in the Freight Centre. Hence they show small interest in participating in Freight Centre operation.

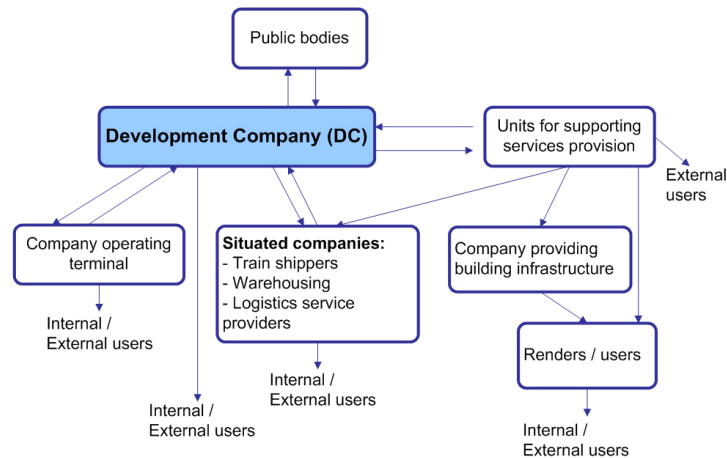
## 4.5. How can I use the pilot's results

### 4.5.1 Guidelines for authorities

#### Generalised business model of Logistics Centre

The way in which the entities/bodies that might be interested or should be involved in the operation and development of the Freight Centre interrelates in the context of the operation and administration of the Centre and defines its organizational status or business model.

A generalized business model of the Freight Centre is displayed in the following figure.



**Figure 25 - Generalised business model (organisational status) of a Freight Centre**

#### Defining the potential stakeholders of the Freight Centre

The main interested bodies to participate in the development of the Freight Centre are the Hellenic Railways Organisation (HRO) and the Thessaloniki Port Authority (ThPA).

As resulting from the analysis of the stakeholders' model, the fulfilment of a number of prerequisites is necessary. These prerequisites are:

- existence of the required land area for the development of the Freight Centre;
- ensuring the required capital for the development of the facilities and the provision of equipment that is necessary for the provision of services of the Freight Centre;
- ensuring the required know-how for the operation of the Freight Centre;
- ensuring the handling of the cargo volumes needed during the first stage of the Freight Centre's development;
- emergence of the Freight Centre as the main nodal point in managing freight transport flows in its catchment area and ensuring the support and promotion of the Freight Centre by bodies with adequate power and influence.

The existing land area for the development of the Freight Centre is 700.000 sq.m (500 sq.m of facilities and operational areas and 200 sq.m road/rail infrastructure, common use areas).

In realizing the required facilities and the provision of the corresponding equipment, the following could contribute:

- the Hellenic Railways Organisation (HRO), which could undertake the development of the Freight Centre entirely as long as its realization is confined within the limits of the former military camp;
- a large transport freight forwarder/company providing 3PL services, which could develop the facilities for the provision of such services;
- a financial institution (bank), which could offer financial support, if this is considered necessary;
- any other potential stakeholder (e.g. smaller freight forwarder, professional associations/commercial chambers) wishing to. This case refers to specific operational units that could be developed by the specific stakeholder so that he could use/operate them himself (in the case of professional associations/commercial chambers, their members).

Another very significant element for the successful operation of the Freight Centre concerns the securing of the required know-how for its operation, through the participation of bodies that could provide this know-how to the share capital of the Freight Centre. In the next table, the subjects of the required know-how for the operation of the Freight Centre as a nodal point combining two transport modes and the potential providers of this know-how are displayed. The only issue that remains "grey" concerns the coverage of the requirements of the Centre's clients for the design and implementation of 3PL solutions according to their specific needs. Although some of the existing freight forwarders could probably contribute to this section, this subject requires simultaneous specialized and wider insight of the field that will possibly have to be covered by the Freight Centre by creating a special department and attracting business associates that have the relevant expertise.

## PILOT 4 in Central Macedonia

Required know-how	Potential providers	
	Hellenic Railways Organisation (HRO)	Freight forwarding & 3PL company
Planning, organising, managing and operating intermodal transport terminal	✓	
Planning, organising, managing and operating rail transport	✓	
Planning, organising, managing and operating road transport		✓
Planning, organising, managing and operating 3PL facilities		✓
Planning and implementing 3PL solutions custom made		✓

**Table 14 - Required know-how for the operation of the Freight Centre and its potential providers**

Regarding the 3rd Party Logistics (3PL) activities, the participation of a freight forwarding or 3PL company in the share structure of the Freight Centre, could provide to the Freight Centre significant cargo volumes from its very start.

Concerning the emergence of the Freight Centre as the main nodal point managing freight flows within its catchment area, apart from the service providers (Hellenic Railways Organisation, 3PL company), the participation in the share capital from the part of its potential users as well as from the local community is necessary. The participation in the share capital of the Freight Centre by professional associations/commercial chambers and the Administrative Region with a small percentage could contribute in a positive way towards this direction. The majority of the European Freight Centres has followed a similar strategy.

All the above issues are concisely presented in table.

Field of contribution	Potential shareholders				
	Hellenic Railways Organisation	Freight forwarding & 3PL company	Professional associations/ chambers	Administrative Region	Financial institution
Ensuring the required land area	✓				
Creation of the required facilities & provision of equipment	✓				
Ensuring the required know-how	✓	✓			
Ensuring the cargo volumes needed	✓	✓	✓		
Emergence of the Freight Centre as the main nodal point in managing freight transport flows in its catchment area - support and promotion of the Freight Centre	✓		✓	✓	
Financial support					✓

**Table 15 - Potential shareholders and their contribution to the development and operation of the Freight Centre**

The potential stakeholders that were identified can be categorized as follows, depending on the role that they could play:

- Promotion, contribution, support of the venture: Hellenic Railways Organisation, professional associations/commercial chambers, Thessaloniki Port Authority, administrative Region (conformity with the national transport policy).
- Active contribution to the development of the Freight Centre: Hellenic Railways Organisation, Financial institution, 3PL and freight forwarding company, secondarily the professional associations/commercial chambers of the region or the Administrative Region by a small percentage.
- Operators: Hellenic Railways Organisation, freight forwarding company and 3PL, smaller transport/freight forwarding companies to be established in the Centre.
- Users: end customers of the various operators, commercial or manufacturing companies that will be renting facilities within the Centre for their own account.

From the above analysis, it can be deduced that the two bodies that must be involved in the development and operation of the Freight Centre in order to ensure the combination of the two transport modes, the adequate know-how and the required cargo volumes for its operation in accordance to the strategic placement as decided, are the Hellenic Railways Organisation and a large freight forwarding or 3PL service providing company. In order for the rest of the conditions for the success of the Freight Centre to be ensured, the

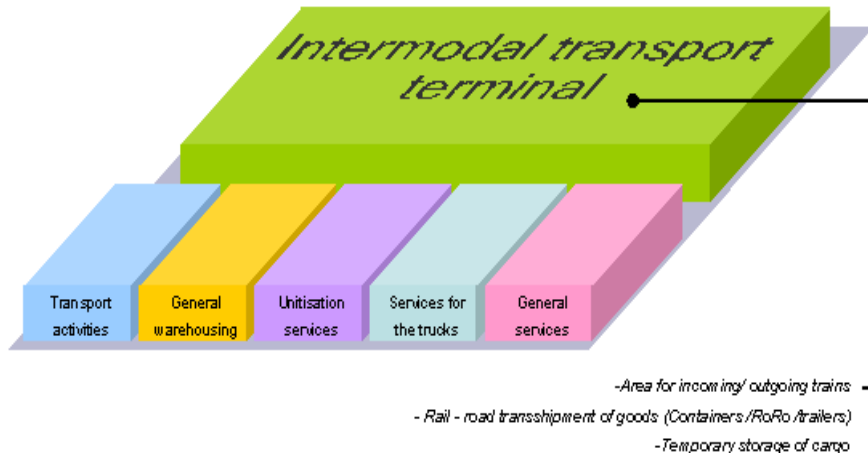
## PILOT 4 in Central Macedonia

participation of a financial institution, professional associations/commercial chambers of the region as well as the support from the part of the Administrative Region must also be sought.

### 4.5.2 Guidelines for companies

#### What typical operational areas look like?

Hereafter the main areas envisaged for the Freight Centres are described.



**Table 16 - Allocation of land uses in the potential Freight Centre**

For the handling of the total incoming flows and the local volume, the existence of a *Space for the Transport and Forwarding Activities* is necessary.

The *General Warehousing* areas consist of warehouses of different types and dimensions used for the sort/long term warehousing of general cargo, the configuration of shipping and the preparation for distribution.

The *Intermodal Transport Terminal* consists of the operational areas where the handling of incoming/outgoing trains, the transshipment of the intermodal unitized cargo (container/RoRo/trailers) amongst the wagons and trucks and the areas used for the temporary storage of unitised cargo take place.

*Unitized Cargo Services* means warehousing, filling and infilling, consolidation and split of goods, cleaning and maintenance of the units are provided.

*Services to the Trucks* consist of standard parking for trucks, several other services, such as maintenance or fuelling, may be provided.

*General Services*, such services include the administration and the customs office, the telecommunications and general control centre.

## 5. Pilot 5 - COMMON LOGISTICS OPERATIONS

### 5.1. Pilot's background

The pilot presents a justified approach for the coordination of the cargo flows in the Region of Crete towards consolidated and optimised transport and logistics services via the Port of Heraklion. The pilot study has proved the wide users' acceptance for the establishment of a Logistics Centre in the catchment area of Heraklion Port.

#### Pilot project objectives

The main objective of the pilot is to coordinate the cargo flows in the Region of Crete towards consolidated and optimised transport and logistics services via the Port of Heraklion. This is achieved through the accomplishment of the following sub-objectives:

- to analyse the current situation in the Region of Crete in terms of demand and supply of logistics services with the emphasis to Heraklion Seaport catchment area;
- to provide an in depth analysis of the flows for a representative sample of SME's in order to configure the actual business needs and requirements for transport logistics services;
- to review the best practices for the development of Freight Villages/Logistics Centres in European countries;
- to identify the required services in order to attract the flows in the Heraklion Seaport area;
- to identify the actors that are interested in participating in a PPP initiative which will gain the trust of the relevant business societies;
- to provide a guideline of specific actions to the interested parties for the successful implementation of the initiative based on a justified analysis.

#### Pilot phases

##### Area 1: Prework

*Phase 1.1:* Participants identification. In the context of this phase the mobilization of the parties directly related to the pilot's objectives has been performed. Criteria for the selection of the users have been set and the first list of contacts formulated.

*Phase 1.2:* Participants involvement. This phase included the meeting with the stakeholders informing them about the project and their role in it.

##### Area 2: Implementation

*Phase 2.1:* Data collection.

- collection of data regarding import (incoming) / export (outgoing) freight flows towards / from the island of Crete through its ports;
- collection of data regarding current freight flows between the prefectures of Crete island (Heraklion, Chania, Rethimno, Lasithi);
- collection of data regarding the provision of current logistics services in Heraklion area;
- collection of data regarding services provision from the Heraklion Port.

*Phase 2.2:* Data Analysis. This phase included the analysis of the data collected in phase 2.1

*Phase 2.3:* Feasibility Study

- identification of the main actors (from transport demand and transport supply side);
- qualitative analysis of the selected actors business cases;
- collection of the main bodies views and comments regarding the pilot prospect;
- review of best practices from the European experience;
- identification of the services to be provided for the improvement of the current logistics services;
- increase the awareness of the local public and private community for the benefits of the initiative;
- identification of the bodies that have interests in such like initiative;
- formulation of the "road map" for the actions required for the better coordination of the logistics flows in Crete;
- formulation of the preliminary business plan.

## 5.2. Benefits for companies

This chapter presents the main expected benefits from the implementation of the pilot's objectives as justified from the study.

### Better organization of transport services

The Logistics Centre provides the organised environment for the provision of transport and logistics services. The concentration of the activities in the area with easy and direct access to the main import/export gate as it is the Port of Heraklion will provide better services to the industrial and commercial services. The organised environment of warehousing with 3PL services is beneficial for all the companies from both the demand and supply side. The Logistics Centre will improve scheduling and routing to reduce freight vehicle mileage and increase load factors (e.g., avoiding empty backhauls). Logistics improvements that increase freight delivery efficiency can provide financial savings to the shippers.

### Development of new services

The organised environment that the Logistics Centre can provide will help the industrial and commercial companies to trust the outsourcing of logistics since the majority of them believe that the organisation of transport should not be of their responsibility. Furthermore, they are willing to assign this part of their activities to the specialists as long as they are able to fulfil their needs in a reliable and trustful way. On the other hand the transport operators understanding the "messages" of their clients and their sector believe that the typical service of "just transport" does not lead to a competitive advantage. The Logistics Centre will support the provision of new services according to the clients' needs and requirements.

### Reduction of transport cost

Transport cost is considered to be 20% of the total cost of a product. Business users have to negotiate or bid for the transfer of goods, because tariffs are changing constantly. Especially on the high peak seasons (especially for agricultural products) the prices substantially increase while the level of services decreases. The introduction of the Logistics Centre will help to change the situation of "poor services at a low cost" to "value for money".

### Economy of scale

Another condition affecting transport costs is related to economies of scale or the possibilities to apply them as the larger the quantities transported, the lower the unit cost. There are commodities that are highly suitable to obtain lower unit transport costs if they are transported in large quantities. The industrial and commercial companies can take better advantage of this opportunity. The economies of scale achieved by Logistics Centre users, from sharing the same facilities and equipment and from the synergy generated by the concentration of transport activities in one and the same place, decrease the overall transport cost while offering a higher quality of transport services.

### New market opportunities

The big transport operators in the Crete Region are very interested in the logistics services, even if the emphasis is given on warehousing activities. The introduction of the Logistics Centre will open new market opportunities in terms of offering new services. The provision of adequate infrastructure for handling will attract the interest of the shippers/traders, since a successful business model is the most convincing marketing tool. This is quite related to the critical mass, which after that efficiency and effectiveness will be visible, becomes easier.

### Provision of better services

The trade globalisation, increase in freight transport, and growing competition between all local production areas have forced industries to ask for more efficient transport and logistics solutions: this means removing bottlenecks and diseconomy. Logistics Centres can offer the best solutions in terms of logistics, transport and storage activities to the production sector of its catchment area. This involves controlling both transport cost and industrial productivity competitiveness. Better services can be applied to physical, organizational and administrative procedures required for handling the freight flows. The high service quality standard is one of the most important elements in assuring the level of competitiveness.

### Familiarisation with the Logistics Centre concept

The study has accomplished the stimulation of the users communities regarding the initiation of specific actions for the improvement of the transport and logistics activities of the area and has increased the awareness on the benefits that they can have from them. The road map with the required actions for the successful implementation provides a practical guideline that can be followed for the successful planning and implementation of the initiative. The review of the European experience has helped the users' community to understand the scope and objectives of the Logistics Centres and the actual benefits that they will have from its implementation.

### Justification for participation in the Development Company

The preliminary financial analysis shows that the participation of interested parties in the Development Company is a profitable activity. With the Net Present Value to become positive with the completion of the sixth year is very much in line with the general rule in the area of the real estate of the warehouse that the NPV should become positive between the year 8 and 10. The approach used for this analysis represents the optimistic scenario since it is based on the assumption that the Logistics Centre will have its full capacity from the first year. It provides though a sound basis for further elaboration and analysis for the Development Company and the investors.



## 5.3. Benefits for region

### Qualitative analysis of the supply side

- the transport operators have very little involvement in the organisation of the transport logistics. They serve their clients based on the level of available fleet capacity. The planning of their activities is based on practical experience;
- the big transport operators in the Crete Region are very interested in the logistics services, but with the emphasis to be given on warehousing activities. More specifically, they have plans (supported by the new Development Law) to build warehouses firstly for their own needs and secondarily for renting the spare storage space;
- logistics operators want to change the current situation of “poor services at a low cost” which is also depended on the production side required quality standards;
- investments in IT systems are made providing to customers some added value services. Even as an exemption, there are a few that use GPS/GPRS technology in order to better control their drivers, while others pay special attention to the safety of the cargo (e.g. they have equipped the trucks with special sensing technology that control and monitor the internal temperature);
- there is concern about the initiatives that are taken from the production side, for building warehouses and entering the logistics area;
- only few of the main actors consider logistics services as more than warehouses and storage places;
- the lack of an organised environment for the development of logistics and the lack of space are their main concerns;
- coordination, guidelines and education regarding logistics sector, are considered as major needs;
- new transport services must be available in the Crete region. The Port of Heraklion must take all necessary actions to attract more container lines and must be supported by the transnational trade cooperation programmes.

### Analysis of the current logistics demand/supply in the Region of Crete

The successful initiation of a new logistics model is a quite complicated issue where a lot of parameters must be considered before its introduction and operation. The level of transport demand in the study area and the provision of logistics services are the first to be considered. The work undertaken is divided to the following activities:

- Activity 1: Analysis of import (incoming) / export (outgoing) freight flows towards / from the island of Crete through its ports;
- Activity 2: Analysis of current freight flows having as origin and destination and intermediate destination Heraklion prefecture;
- Activity 3: Analysis of the current logistics services in Heraklion area;
- Activity 4: Analysis of the current services provision from the Heraklion Port and the other Cretan Ports.

### Import/export freight flows from the Region of Crete through its ports

Crete has several ports, the majority of them located in the North part of the island. The main Cretan Ports are the Port of Heraklion, Port of Souda, Port of Rethimnon and Port of Sitia as depicted in the map below. According to the Greek port classification, Heraklion Port is of national importance while the other ports are considered as of regional importance. The Heraklion Port and Souda Port have been included in the ports of the Transeuropean Transport Networks. The ports of regional importance mainly serve passenger flows connecting the island of Crete with other Greek regions and export specific type of products during high peak seasons.



Figure 26 - Main ports of the Crete Region

## Formulation of the Development Company

According to the European experience the establishment of a Development Company is the first required action for the implementation of a Logistic Centre/Freight Village. The main stakeholders should be: Heraklion Port Authority, Local Authorities (Municipalities of Alikarnassos, Heraklion, Prefecture), Region of Crete, Chambers of Commerce and Industry, Consulting companies, Construction Company, Banks.

The following three models describe the most common business models (combinations of the three models have been also applied) responsibilities of the Development Company:

- the Development Company of the Freight Village offers organized areas in terms of basic infrastructure (roads, water and sewage networks, telecommunication network) and the customers of the Freight Village undertake the responsibility for the construction of the super structure and the development of their installations. The premises can be used for their own needs or for third parties. The customer buys or leases the land.
- the Development Company offers the land and undertakes the responsibility for the infrastructure and superstructure for the clients that will rent or buy the developed areas (not the land).
- the Development Company offers the land and undertakes the responsibility for the infrastructure and superstructure and the operation of the Freight Village.

## Preliminary Financial Analysis

This section provides a preliminary financial analysis for the establishment of the Logistics Centre in the Region of Crete in the vicinity area of the Port of Heraklion. The analysis is based on the following assumptions:

- the Development Company will provide the infrastructure and will rent the installations to the users. The land owners will make concession of the required space to the development company for long period (e.g. 25 years), which will be agreed;
- the Development Company will not participate in the operation of the Logistics Centre and it will only provide "infrastructure services". These services are mainly related to the security, cleaning, telematics infrastructure;
- the investment costs include the cost of land (in this case the cost of the concession of land), the development of storage areas (open air and closed), buildings, equipment and transport infrastructure;
- in the present analysis for the calculation of the investment cost, the cost for the construction of the open air and close warehouses is considered;
- the calculation of the income is made by considering the rents of the installations and the user charges for the provision of the infrastructure services.

The financial feasibility of the investment is calculated with the indicators of NPV and IRR. The capital cost is considered 9% while the rent increases 3% per year. The NPV and IRR calculations are presented in the table below. The pilot approach is consistent with the pilot carried out in Ccentral Macedonia.

	i	1	2	3	4	5	6
	9%	9%	9%	9%	9%	9%	9%
Costs	11.030.000	0	0				
Income	0	2.352.000	2.422.560	2.495.237	2.570.094	2.647.197	2.726.613
Cash Flow	-11.030.000	2.352.000	2.422.560	2.495.237	2.570.094	2.647.197	2.726.613
$(1+0,09)^{n-1}$	1,0000	1,0900	1,1881	1,2950	1,4112	1,5386	1,6771
Present Value	-11.030.000	2.157.798	2.039.020	1.926.824	1.821.212	1.720.523	1.625.790
NPV	-11.030.000	-8.872.202	-6.833.182	-4.906.358	-3.085.146	-1.364.623	261.167
IRR			-41,28%	-18,12%	-4,35%	4,20%	9,77%

**Table 17 - NPV and IRR calculations**

The analysis shows that if the operational areas of the Logistics Centre will be used from the first year, the Net Present Value becomes positive with the completion of the sixth year and the Internal Rate of Return is 9,77%.

## 5.4. Lessons learnt

The users consider the pilot's objective as a necessity for their activities but also for the economic development of the Region and they have welcomed the initiative. The main points from the users' point of view are presented below:

- the pilot objective appears to be a necessity in the transport logistics business environment of the Crete Region. Both demand and supply side ask for logistics measures and practical solutions that help to better organize the transport and the logistics activities of the Region;

- the establishment of a Logistics Centre that will organize the transport and logistics environment, improve the quality of transport services and enhance the economic development of the local society is highly appreciated by all users. Different interests and different expectations have been expressed by the interviewees. All of them have agreed that the initiative must be supported by the main regional actors of the demand and supply side in order to serve the regional needs;
- regarding the spatial establishment of the Logistics Centre, the area in the vicinity of the Port of Heraklion is considered favourable. They all believe that the access to the port must be facilitated since it is the main import/export gate of the Region and can provide significant flows in the operational phase of the Centre. They strongly believe that the Port must take the initiative in order to ensure the support from the Regional and Central Government and to attract investors;
- the organised environment that the Logistics Centre can provide will help industrial and commercial companies to trust the outsourcing of logistics and become aware of new transport concepts and practices. This will increase the activities of the transport and logistics operators. On the other hand the majority of the industrial and commercial users believe that the organisation of transport should not be their responsibility. They are willing to assign this part of their activities to the specialists as long as they are able to fulfil their needs in a reliable and trustful way;
- the supply side has some reservations regarding the cost of infrastructure that will be provided by the Logistics Centre, believing that it will be expensive. Cooperation between the transport operators even with some reluctance is considered necessary in order to achieve economy of scale and a better growth of the companies;
- the initiative for the establishment of the Logistics Centre should be taken on a public – private cooperation basis. The lack of public – private cooperation interest is a usual problem in many sectors at national and regional level. In transport and logistics sector specifically, the lack of public – private cooperation concerns policies, decision making processes, strategies as well as implementation of investments and projects;
- the careful time planning of the Logistics Centre is another important issue. The opportunities that the new Development Law provides to the logistics sector have led to several initiatives for construction of warehousing facilities. These can be competitive to the Logistics Centre initiative and a major threat for its successful operation.

### **5.5. How can I use the pilot's results?**

The main conclusions that are of interest to the pilot's objectives are depicted below:

#### **Planning phase**

The initial planning phase is very crucial since it sets the basis for the development of the logistics solution. Most of the times the development of a Freight Village/Logistics Centre follows the national transport and environmental policy and several issues must be respected. The private sector's acceptance is not always guaranteed and significant effort must be put in order to attract the investors and the users, which is quite time consuming. The legal and institutional limitations of the regulatory frameworks and corresponding interventions for the development of the Freight Village must be examined and solved in the planning phase.

#### **Role of the management scheme**

The development and management schemes are crucial for the successful implementation and operation of the Freight Village. The European experience proves that the "development company" must be a healthy company from the financial point of view and that must the wide acceptance of the involved parties.

The participation of the public and private sector in the form of PPP schemes and the establishment of the operational model of the Freight Village/Logistics centre is considered as a well working model. The permanent participation of the public sector in the development and management schemes facilitates the financial support and on the other hand can control the competitiveness issues between the companies established in the Freight Village.

Another issue to be considered is the type of companies that can participate in the development scheme. This is also under the competitiveness issue, since their interests and development plans do not always follow those of the Freight Village. e.g. the participation of a big logistics operator in the development scheme can discourage the participation of companies with similar activities due to competitiveness and suspicion for not equal opportunities.

#### **Benefits for the regional economy and wide socioeconomic development**

The benefits from the development of the Freight Village/logistics Centre must be clear to the regional economy and the corresponding society. The European experience has been developed with the assumption that concentration of activities, private investments and increase of employment in the area will be beneficial for the local and regional activities.

#### **Intermodality**

Intermodality, in terms of using different transport modes for transport services provision is an important characteristic for the majority of the Freight Villages/Logistics Centres in Europe. The majority of the Freight Villages have well established container terminal for intermodal transport (most of the times rail-road). The European experience can be transferred regarding the advantages from the efficient shift of cargo to intermodal transport units.

#### **Use of the assets (sell or rent)**

At the beginning the most common practice of the management scheme was to sell the land and facilities to the interested parties. Nowadays, the most common practice is to rent the land with contracts depending on the needs and requirements of the investors/users.

## Synergies

Synergies between the established companies in a Freight Village are important success factors. Even not very easy, synergies have been accomplished because they provide optimization of the transport flows, reduction of the operational cost, ability to serve special services and provision of integrated services to the clients.

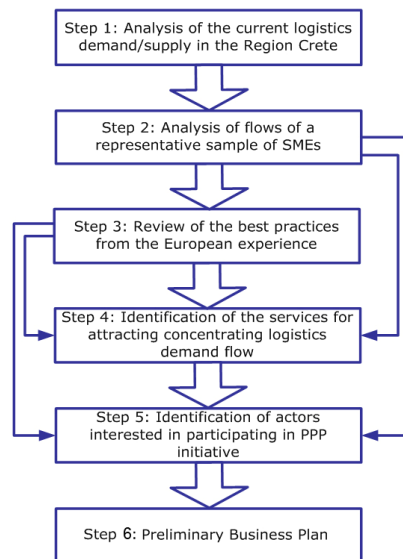
Summarising the main conclusions can be highlighted below:

- while the Freight Villages enhance the regional economy and development, their successful implementation rely on the actual interests of the local business community. This is an issue that must be considered carefully and the marketing approach as well as the target groups shown from the European experience must be considered;
- the planning phase, the management and operational schemes that have been adopted in other countries can be used as examples for the development of the logistics solution in the Region of Crete. All models must be adapted to the actual needs and reality of the Region of Crete;
- the services that will be provided by the Logistics Centre must address the actual needs and requirements of the Cretan society. The European experience should be used as guideline and not as a rule.

## 5.5.1 Guidelines for authorities

The study conducted in the pilot activities has high transferability potential areas to other regions in Greece and Europe. In particular the framework followed for the execution of the study is based on the commonly accepted methodologies used for feasibility studies for the establishment of Logistics Centres /Freight Villages. The logical structure of the activities, as defined in the working plan, has led to justified conclusions regarding the freight flows in the region, user needs and requirements, operational character of the solution and required actions for implementation. The users' acceptance of the approach has been positively evaluated. This methodology step provides answers to the following questions:

- Who will undertake the initiative?
- What are the funding opportunities?
- Who will participate in the Development Company?
- Which are the required studies?
- What are the results of the preliminary financial analysis?



**Figure 27 - The methodological framework and its relationship**

### Step 1: Analysis of the current logistics demand/supply in the Region of Crete

The analysis of the current situation is the first step towards the description of the environment that the pilot will be studied and developed. The successful initiation of a new logistics model is a quite complicated issue where a lot of parameters must be considered till its introduction and operation. The level of transport demand in the study area is important in order to justify the establishment of a Logistics Centre. In the context of this analysis the flows and the main origin and destination points are specified. A categorization per type of product is also important in order to identify those products that are suitable for the Logistics Centre and to define the required critical mass for its operation. The identification of the available logistics services, the localization of the operators are themes also included in the analysis of the current logistics demand and supply.

The output of this first step provides input for the identification of the main bodies to be involved and the identification of the main services to be supplied.

### Step 2: Analysis of flows of a representative sample of SME's

Having set the current logistics demand and supply scene of the study area, the analysis of flows for a representative sample of SME's (either in terms of quantities or/and in terms of representative types of products) is performed in order to configure the actual business needs and requirements for transport logistics services.

The analysis includes cooperation with the main actors (from transport demand and transport supply side), qualitative analysis of the flows (seasonality, special characteristics), current practices in executing the logistics activities and collection of users' views and comments regarding the prospect of a consolidated logistics solution by/related to the Port of Heraklion (or generally speaking in the area under consideration).

The output of the second step provides input to step 4 of the methodology regarding the logistics services to be provided by the Logistics Centre and step 5 regarding the intention of the actors to collaborate towards the establishment of the logistics solution and their intention to use it.

### Step 3: Review of the best practices from the European experience

The critical review of the European experience regarding the environment and the conditions operated in other logistics centres can help to draw conclusion regarding the potential alternatives for the operational, organisational and property status framework. The European experience adapted to the Greek – Cretan special characteristics contributed to the successful initiation of the pilot's expectations.

Therefore the review is made at a country level in order to obtain a clear idea of the overall development framework of other European countries. Then the analysis is focused on the areas of main interest i.e. review of the development schemes, organisational structure and provision of services of selected Freight Villages /Logistics Centre.

The output of the third step provides input to step 4 of the methodology regarding the logistics services to be provided by the Logistics Centre and step 5 for the formulation of the development and organizational scheme of the Logistics Centre.

### Step 4: Identification of the services for attracting concentrating logistics demand flows

The aim of the fourth step is to provide the general direction for the development of the logistics solution by defining the operational character and the provision of required services. The identification of the services is a crucial factor in order to attract the logistics activities of the Region of Crete and the operational framework needed for better coordination of the regional logistics flows.

The provision of services should satisfy the actual needs and the operational character of the logistics solution to be developed. In addition the handling of goods and transport activities should take place in an optimum way from physical and administrative point of view. The identified services are provided under an integrated approach for the development of the logistics solution.

### Step 5: Identification of actors interested in participating in a PPP initiative

The aim of this step is to propose the development scheme required for the initiation and development of the logistics solution as defined and examined in the previous chapters of the report. The identification of the stakeholders that will participate in the scheme and their roles is the main objective.

For the identification of the bodies interested in participating in a PPP initiative, a critical review was performed regarding the synthesis of the development and operational bodies involved in the European Freight Villages, cooperation of Public and Private sector and main funding sources. Furthermore, the results of the interviews conducted with the main potential stakeholders in the Region of Crete was reported and the proposal for the PPP scheme was formulated.

### Step 6: Preliminary Business Plan

The aim of this step is to provide a guideline of specific actions for the successful implementation of the initiative. The formulation of the preliminary business plan can be used as a tool for the approach of possible investors and stakeholders that are interested to participate in the Development Company, providing justification for the feasibility of the action.

## 5.5.2 Guidelines for companies

### **What the operational character of logistics centre should support?**

The operational character that the logistics solution should follow can be depicted below:

- support the port activities: The Port of Heraklion as the main entry/exit gate of the Region provides significant amount of cargo flows and generate requirements for services to the corresponding goods;
- support the interregional freight flows: Organisation of the road freight transport by consolidation of goods, better use of available fleets and optimisation of the transport planning activities;
- support the regional logistics needs: Provision of an organised environment for warehousing and 3PL activities;
- support the logistics organisation and transport of fresh products: Provision of organised services to fresh products market – attract flows from the region of S-E Mediterranean functioning as “fresh produce” hub.

### Services to be provided

A logistics centre can have different functions which are considered below and which correspond to different structural types. The change of modality, integration of in/out flows and integration of logistics services are defined as generic functions. The three functions are not alternative to one another and they jointly contribute to the optimization of the transport system and increase of the products values.

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 providing storage services (cross-docking)
INTEGRATION OF IN/OUT FLOWS	Use of the infrastructure as a “hub” for activities such as consolidating/deconsolidating goods and optimization of the freight transportation near either production areas or destination markets.
INTEGRATION OF LOGISTICS SERVICES	Use of the infrastructure as a place to organize 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 stripping of containers

**Table 18 - Main functions of logistics centre**  
**Source: Regione Emilia-Romagna**

6. Pilot 6 - SIMULATION TOOLS FOR MODAL SHIFT

6.1. Pilot's background

The aim of the project was to examine why logistics operators prefer road transport to railway transport. The aim of the pilot project was to reveal these causes and to create a decision-making model and an action package, the implementation of which can prevent a further decline in the use of railway transport. The pilot project includes two parts. In the first part the attitude of the operators of the logistic market was revealed by a survey, and in the second part a decision support model based on the revealed causes was created. With this decision support model, interventions were identified, to help the rentable and sustainable operation of RO-LA traffic (Rolling motorways).

6.2. Benefits for companies

Based on the literary and on the reasonable considerations deriving from the nature of the pilot, the research group of Széchenyi István University has selected and listed the following issues as the pillars to be examined:

1. **Transport costs** – the price level defined by the company carrying out the activity which is benchmarked versus the general, average price level of the market.
2. **Transport time** – what kind of gross transportation time can be achieved by the company?
3. **Accuracy** – capacity and willingness to comply with the expected, assumed term, effectiveness, efficiency regarding volitional, organizational, executing factors.
4. **Reliability** – carrying out the tasks assumed in writing or oral form, fulfilling obligations.
5. **The existence of quality assurance system** – does the company have a registered, well-functioning, effective quality and system?
6. **Flexibility** – activity aiming at the resolution of abruptly raised demands and problematic situations which are derived from the fast changing market demands and the unavertable, unexpected, randomised events of the production and service, as well as the propensity, willingness and effective realization of them.
7. **Information possibilities, follow-up procedure of goods** – the possibility and simplicity of inquiring about the performance of the contractual obligation at any time.
8. **Complaint handling** – the reception of defaults, as well as indications regarding problems which have occurred - irrespectively of the person carrying out the task - during the achievement of the transportation, the compensation of the caused losses, damages, the most customer-friendly, smooth realization of this process.
9. **The popularity of the company** – general, professional popularity of the logistic company and its performing and financial reliability.
10. **Engagement to the supplier** – building up a long-term relationship with the logistic supplier, experiences, business relations deriving from these.
11. **Type and age of vehicles** – with respect to the material factors of the logistic supplier, the most important one is the composition, age, quality of its vehicles.

The following figure reports the importance given to each characteristics (100 = top importance) on the base of an original questionnaire filled in by Hungarian companies. The ranking indicates the characteristics expected by logistic providers and indirectly on RO-LA services they may use by shifting from road to rail.

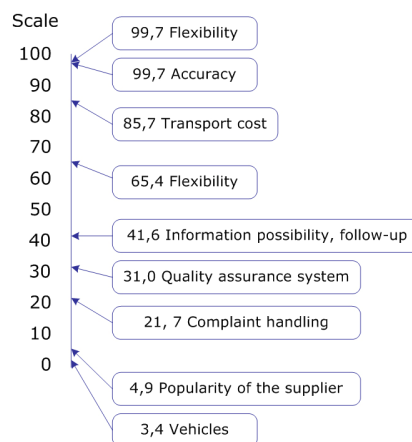


Figure 28 - The order of importance of the logistic supplier's characteristics on the scale 0-100



## PILOT 6 in West Transdanubia

The answers pinpoint that Flexibility and accuracy play a fundamental role, even more than costs, thus claiming for frequent and reliable rail services.

### 6.3. Benefits for region

Further than a qualitative analysis of the logistic service requirement the pilot developed a model to calculate all road vs RO-LA costs and define possible public incentives. The following figures report the route on which costs were assessed.

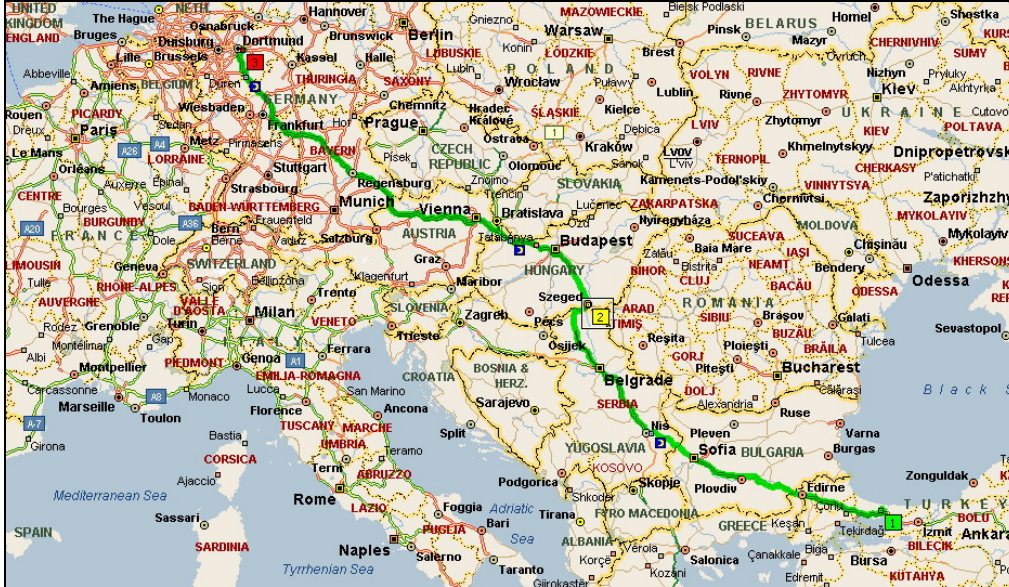


Figure 29 - Map for all-road transport

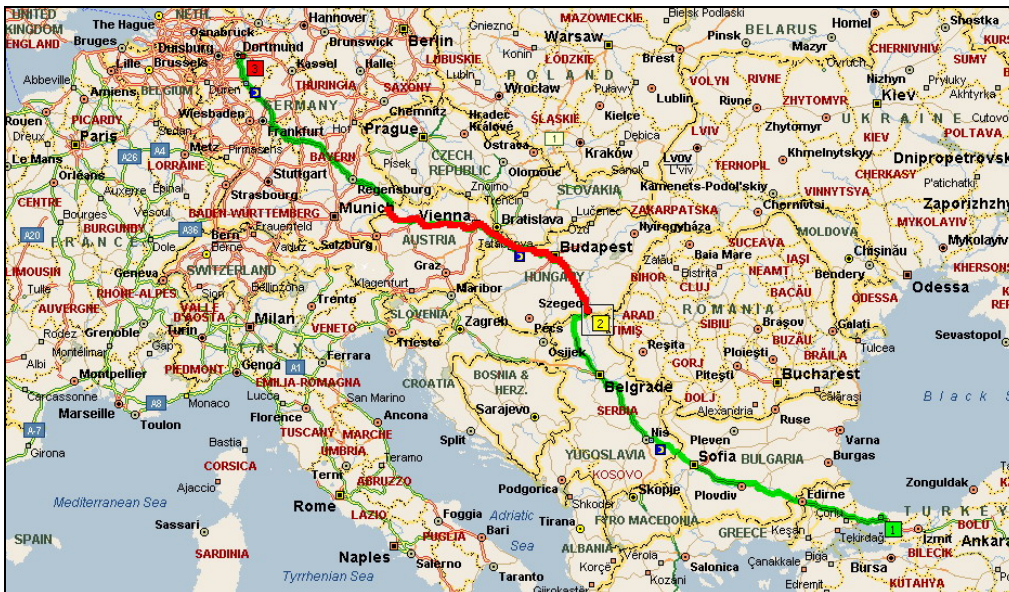


Figure 30 - Map for road and Ro-La transport

The table below shows the differences between road transport and intermodal (Ro-La) transport expenses. Sums marked '+' indicate Ro-La cost advantages, sums marked '-' presents advantages of unimodal (road) solution.



## PILOT 6 in West Transdanubia

Difference RO-LA vs ALL ROAD	Total
Personal expenses	53,57 €
Constant expenses	66,65 €
Expenses depending on km	233,30 €
Toll	96,63 €
Ro-La charges	-504,00 €
Total	-53,85 €
Difference of specific expenses [€/km]	-0,02 €

**Table 19 - Differences between expenses of all-road transport and Ro – La traffic with current market conditions**

After the comparison of the two solutions the pilot concluded that road transportation costs for a lorry amounts to 53,85 € less than that by Ro-La. This fact requires an improvement of competitiveness of Ro-La to become a potential alternative to all-road transportation.

One possibility is introducing toll charges: Ro-La trains are obliged to pay toll charges on railways, while lorries do not pay any charges on roads (that is actual km run on roads) when crossing Hungary. This situation does not meet the conditions of equal competition. The table below presents cost calculations after the introduction toll changes (0,23 €/km for trucks in Hungary).

Difference	Total
Personal expenses	50,88 €
Constant expenses	47,00 €
Expenses depending on km	233,30 €
Toll	172,22 €
Ro-La charges	-504,00 €
Total	-0,60 €
Difference of specific expenses [€/km]	-0,00 €

**Table 20 - Differences between expenses of all-road transport and Ro–La traffic after introducing toll changes**

The main issues to be pinpointed are:

- **Introducing road charges according to actual road usage.** According to the calculations road charges of 0,23 €/km are needed in the present economic situation to equalize the differences between Ro-La and road transport costs. Experience and practice show that equalizing is not enough. The road charges to be introduced should reach the amount of at least 0,25 €/km so that transporters switch to the Ro-La services 'voluntarily'.
- **Revision of charges of rail usage.** This component is a determining factor in Ro-La cost structure. According to the available information, charges of rail usage, compared to other charges in Europe, are relatively high in Hungary, seemingly without any reason. It is even more irrational, knowing that lorries in transition pay a negligible sum for the same function. Consequently, road charging system needs an urgent intervention.
- **Temporary budget support of accompanied combined transportation.** This intervention is also seen as a priority provided that market neutrality is ensured. Moreover, the EU turned it into practice in the frame of its own program 'Marco Polo'.

### 6.4. Lessons learnt

The most important achievements of the pilot-project are:

1. **The rate of road versus railway in the West Transdanubian region will decline without proper technical-economic inventions.**
2. **There is a market demand for railway products which meet the quality demands of the consumers.**
3. **There exist railway products with proper technology,** but you cannot spread them on market due to the present cost structure.

4. **Internalising of road negative externalities promotes Ro-La.** According to the calculations road charges of 0,23 €/km are needed in the present economic situation to equalize the differences between Ro-La and road transport costs.
5. **Revision of charges of rail usage.** According to the available information, charges of rail usage, compared to other charges in Europe, are relatively high in Hungary, seemingly without any reason.

### 6.5. How can I use the pilot's results

#### 6.5.1 Guidelines for authorities

The pilot-project is based on a questionnaire survey made in Hungary but it highlights issues present in the whole European Union. The transport systems we examined are structured similarly in all EU countries. Consequently, extension and replication of the project at transnational level meets no obstacles at all.

The cost structure of road transport is not country-specific, so the use of the model in other EU-countries is possible. Similar is the basic cost structure of railroad transport, so the use of the model by foreign railway operators is also possible

The Hungarian Ro-La operator applied the elaborated tool for decision preparations in countries (Bulgaria, Turkey and Rumania) interested in the Ro-La system. In these countries the simplified version of the model is also used as marketing tool that proves the adoption possibility at transnational level.

#### 6.5.2 Guidelines for companies

The advantages and disadvantages of applying combined transportation techniques need to be examined from the main market participants' aspects, points of view namely road transporters, railway companies, and all transport operating companies. The main advantages and disadvantages of Ro-La are hereafter reported.

##### Advantages of Ro-La application:

- Compared with unaccompanied combined transportation, the Ro-La system is easy to access as it has no investment requirements for the road transporters.
- Saving time: According to logistics tendencies, time is the most considerable factor of quality. Reducing transportation time contributes to a higher competitiveness of the company, which results in attaining new costumers on the transportation market. For this purpose frequent RO-La services should be established.
- Efficient utilizing of driving time: referring to AETR, the amount of time when the freight vehicle is transported on the train is considered as resting time from the driver's point of view.
- Compared to running vehicles, vehicles in the Ro-La system can make a longer distance within the same time.
- Environmental protection: taking social affects into account, the biggest concern is environmental pollution. It is widely known that rail transportation is much less harmful to the environment than road transportation. Increasing rail freight transportation is a social necessity.
- RO-LA combines costs efficiency on the main transport leg and door-to-door services.

##### Disadvantages of Ro-La application:

- High prices compared to current road costs.
- Transportation can take place on a limited (or fixed) route, due to the specific character of railways;
- Lack of frequencys and services.

## 7. Pilot 7 - REVITALISING RAIL FREIGHT TRANSPORT IN WIELKOPOLSKA REGION

### 7.1. Pilot's background

The goal of the pilot project in Wielkopolska was to analyze the possibilities of redirecting selected transport flows from roads to rail through economic activation of railway station areas in district towns, as well as through establishing and implementing a programme of cooperation between local authorities and logistics and railway operators. Increase of share of railway transport in goods flows is to decrease the number of trucks on Wielkopolska roads. The pilot project's starting idea is cooperation of companies, local authorities and ILiM consultants within a regional discussion group.

The key aspect of the pilot project is the concept of revitalization of railway freight transport in Wielkopolska, which was created by the set up of a Regional logistics forum.

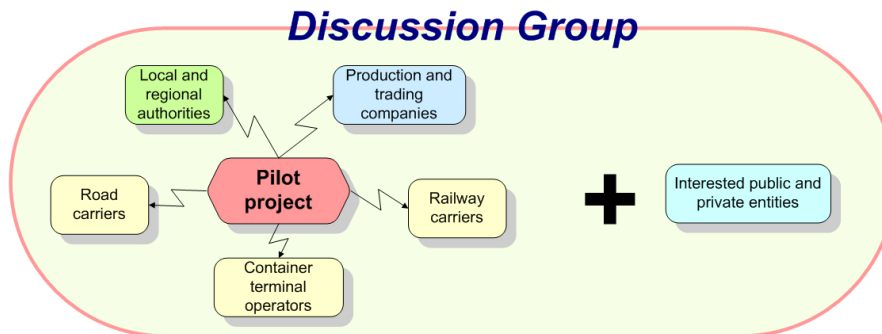


Figure 31 - Pilot project partners

The tasks in the pilot project comprise an analysis of three scenarios of utilizing railway transport and optimizing the processes connected with using road transport by companies from Wielkopolska as well as the matter of supporting the companies by local authorities. Each of the scenarios refers to a certain company involved in the project. In general the companies involved in the pilot project are: production companies located in Wielkopolska, railway hauliers, companies owning a container terminal in Wielkopolska, the Marshall's Office of the Wielkopolska Region and local authorities representing selected cities of the region.

The following figure presents the benefits for the companies from being an active member of the pilot project.

- cooperation with the Institute of Logistics and Warehousing resulting in the access to up-to-date logistics knowledge
- acquisition of knowledge on logistics strategies implemented by companies in other regions of the EU
- possibility of participating in regularly organised events dedicated to regional logistics
- possibility of participating in a pilot project and benefiting from its results
- linking with representatives of public administration interested in supporting entrepreneurship
- promotion of the company and new business contacts

Figure 32 - Benefits from taking part in pilot for the companies

The following figure presents the benefits for the public administration from being an active member of the pilot project.

- acquisition of knowledge on successful initiatives realised in other EU states and best practices of policies and strategies realized by public administration.
- possibility of participating in regularly organised events dedicated to regional logistic
- possibility of participating in a pilot project and benefiting from its results
- development of a long term plan of activities for formulating regional policies
- development of terms of cooperation with the private sector

Figure 33 - Benefits from taking part in pilot for the public administration

**7.2. Benefits for companies**

**Cost comparison between road and intermodal haulages**

One of the project’s aims was to analyse possibility of using intermodal transport instead of road haulages. Therefore together with involved manufacturing companies and transport companies costs were calculated.

Firstly, the delivery structure and the used transport loads prove that use of intermodal transport is possible in the company. In the first stage it was assumed that CargoSped Sp. z o.o. would be the intermodal service provider and PKP Cargo S.A. would be the railway carrier.

An analysis of half-finished product transport time and cost on selected routes is presented below. The results for intermodal transport were compared with the ones for road transport.

Cost calculations comparing intermodal and road transport considered reloading costs and costs of delivery from the container terminal in Kobylnica to the factory in Bolechowo. The values in the table have been aggregated i.e. changed into percents.

Relation	Intermodal transport Costs of 20' container	Intermodal transport Costs of 40' container	Vehicle with semitrailer renting costs
Gdynia Port - (Kobylnica) - Bolechowo	100%	108%	108,7%
Świnoujście Port – (Kobylnica) - Bolechowo	100%	107,9%	107,1%

**Table 21 - Analysis of transport costs for intermodal and road transport**

In second step, total transport time was calculated. The table below presents the analyses of transport time of a UTI from Polish sea ports to the factory in Bolechowo.



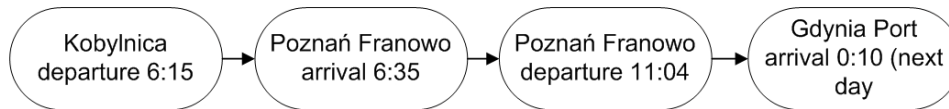
**Figure 34 - Routes analyzed in Polish Pilot**

Relation	intermodal transport time of 20'/40' container [h]	Road transport time of 20'/40' container [h]
Gdynia Port - (Kobylnica) – Bolechowo	about 19 h 30 min.	about 6 h
Świnoujście Port – (Kobylnica) - Bolechowo	about 16 h 30 min.	about 7 h

**Table 22 - Analysis of transport time for intermodal and road transport**

Such long intermodal transport time results from the fact that trains run according to a fixed time-table and that they must be prepared some time earlier (the car must be delivered to the station at least 2 hours before leaving). The total transport time involves the time of transport, time of waiting at middle stations and time of preparation of the train. Nevertheless, if we compare total transport time from China to Poznan and also take into consideration possibility of delay arrival of the ship (due to the bad weather conditions), the time difference between road and rail is not so significant.

The figure below presents the departure hours of trains in the relation Kobylnica – Poznań Franowo – Port of Gdynia.



**Figure 35 - Departure hours of trains in the relation Kobylnica – Poznań Franowo – Gdynia Port**

### What kind of products can be transported either by road or by rail transport?

Transport susceptibility is one of the factors determining modal choice. Transport susceptibility of loads is their resistance to the conditions and results of transport. It consists of partial vulnerabilities which result from some characteristics of transported loads. Thus, loads may be characterized by the following kind of susceptibility:

- o natural;
- o technical;
- o economic.

**Natural transport susceptibility.** Detailed features and properties of loads must be recognized by a logistics decision-maker since they decide to some degree about:

- o sensitivity to the time of transport;
- o sensitivity to damages caused by the influence of mechanical energy during transport;
- o sensitivity to humidity, temperature and light;
- o harmfulness to human health;
- o possibility of damaging or destroying other objects in the vicinity of the load;
- o susceptibility to absorption of other smells or production of their own;
- o susceptibility to being spilled and evaporating;
- o susceptibility to spontaneous combustion, explosion and combustibility.

Natural susceptibility results from physical, chemical and biological characteristics of loads. Taken this, loads with smaller transport susceptibility are easy spoilable goods such as fresh flowers, fry or glass plates. Bigger transport susceptibility features goods such as coal, broken glass etc.

**Technical transport susceptibility.** It is susceptibility to the conditions and results of transport depending on the size, shape and volume of loads. While taking transport decisions, parameters such as weight, volume and extreme dimensions of each piece of the load should be considered. The type of transport and reloading operations depends on the kind of the parameters. The weight of loads and repeatability of transport may decide about using certain loading units (for example pallets or containers) which may increase technical susceptibility of the loads.

**Economic transport susceptibility** is determined by the value of transported goods. The bigger the value, the smaller the economic susceptibility. It is caused by the fact that they need to be taken more care during transport. Delivering more valuable goods requires particular transport quality standards from transport service providers. In particular, it relates to the time and safety of the transport. Bigger value of the goods makes it possible to choose between different modes of transport since it is possible to choose more expensive options then.

Taking into consideration the definitions above and main groups of goods identified in Wielkopolska region an analysis of transport susceptibility of each group was made. The analysis involved only natural and technical susceptibility. Each group of goods was given values 0 or 1, which stand for invulnerable or vulnerable to rail or road transport respectively. The details of the analysis are presented in the table.

EKD section	Vulnerability			
	Natural		Technical	
	road	rail	road	rail
Mining of coal and lignite	0	1	1	1
Manufacture of food products and beverages	1	0	1	0
Textile industry	1	1	1	1
Manufacture of wearing apparel and furriery	1	1	1	1
Processing of leather and manufacture of leather products	1	1	1	1
Manufacture of wood and wood, straw and wicker products	1	1	1	1
Manufacture of pulp and paper	1	1	1	1
Publishing, printing and reproduction of recorded media	0	0	0	0
Manufacture of chemicals and chemical products	1	1	1	1
Manufacture of rubber and plastic products	1	1	1	1
Manufacture of other non-metallic mineral products	1	1	1	1
Manufacture of basic metals	1	1	1	1
Manufacture of metal products	1	1	1	1
Manufacture of machinery and equipment n.e.c.	1	1	1	1
Manufacture of office machinery and equipment	1	1	1	1
Manufacture of electrical machinery and apparatus n.e.c.	1	1	1	1
Manufacture of radio, television and communication equipment and apparatus	1	1	1	1
Manufacture of medical, precision and optical instruments, watches and clocks	1	1	1	1
Manufacture of motor vehicles, trailers and semi-trailers	1	1	1	1
Manufacture of other transport equipment	1	1	1	1
Manufacture of furniture; manufacturing n.e.c.	1	1	1	1
Electricity, gas, steam and hot water supply	0	0	0	0
Collection, purification and distribution of water	0	0	0	0

Table 23 - Analysis of transport susceptibility of identified groups of goods

### 7.3. Benefits for region

One of the project aims was to reduce number of trucks on the roads in Wielkopolska. Therefore, in the early stage of the project a detailed study on traffic was carried out. Based on that study, regional authorities have a complex knowledge about the pilot involved parts of the region, where the traffic problems are very serious and it is a must to improve the situation very soon. According to the gathered data the largest national road truck traffic in Wielkopolska is on motorway A2 section Dębina – Krzesiny. It is a part of the Southern section of the ring road of Poznan which has a significant influence on its load, both local and transit traffic. Average diurnal road traffic intensity in measured points on the section was 11.512 trucks in 24 hours. The twenty national roads with largest truck traffic in Wielkopolska in 2005 are presented hereafter.

No.	Road no.		Description	Trucks (average diurnal road traffic in measured points)
	Country	E		
1	A2	E30	DĘBINA-KRZESINY	11512
2	A2	E30	KOMORNIKI-DĘBINA	10820
3	2	E30	KOŚCIELEC-KOŁO	8438
4	11		POZNAŃ-GĄDKI	8175
5	2	E30	KOŁO/OBWODNICA/	8103
6	2	E30	GR.WOJ.-BOLEWICKO	7551
7	25	E30	KONIN-MODŁA	7375
8	5	E261	POZNAŃ-KOMORNIKI	7365
9	A2	E30	WRZEŚNIA-SŁUPCA/WĘZEL/	7295
10	2	E30	KONIN-GENOWEFA	7270
11	2	E30	GENOWEFA-KOŚCIELEC	7212
12	A2	E30	SŁUPCA/WĘZEL/-MODŁA	7102
13	A2	E30	KRZESINY-WRZEŚNIA	6623
14	10		PIŁA/OBWODNICA/	6553
15	2	E30	KOŁO-KŁODAWA	6549
16	2	E30	CHODÓW-GR.WOJ.	6336
17	A2	E30	BUK-KOMORNIKI	6221
18	2	E30	KŁODAWA-CHODÓW	6166
19	92		POZNAŃ-SWARZĘDZ	6065
20	A2	E30	NOWY TOMYŚL-BUK	5959

Table 24 - 20 national roads with largest truck traffic in Wielkopolska in 2005

To minimize the traffic, it was essential to define zones with the highest congestion in Wielkopolska. The figure below presents road traffic intensity on analyzed roads in most commonly known industrial centres.

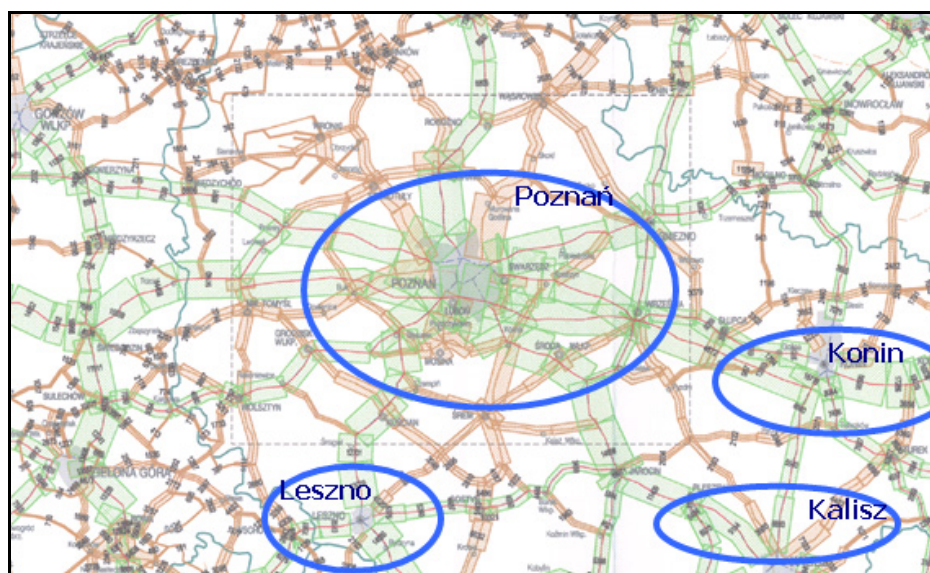


Figure 36 - Road traffic intensity analysis in main industrial centres in Wielkopolska  
Source: Own sources of ILiM based on Transproject Warsaw for 2005



Road no.		Description	Trucks (average diurnal road traffic in measured points)
Principal road no.	E		
A2	E30	DĘBINA-KRZESINY	11512
A2	E30	KOMORNIKI-DĘBINA	10820
11		POZNAŃ-GĄDKI	8175
5	E261	POZNAŃ-KOMORNIKI	7365
A2	E30	KRZESINY-WRZEŚNIA	6623
A2	E30	BUK-KOMORNIKI	6221
92		POZNAŃ-SWARZĘDZ	6065

**Table 25 - Road traffic intensity in Poznań area**

Road no.		Description	Trucks (average diurnal road traffic in measured points)
Principal road no.	E		
2	E30	KOŚCIELEC-KOŁO	8438
2	E30	KOŁO/OBWODNICA/	8103
25	E30	KONIN-MODŁA	7375
2	E30	KONIN-GENOWEFA	7270
2	E30	GENOWEFA-KOŚCIELEC	7212
A2	E30	SŁUPCA/WĘZEL-/MODŁA	7102

**Table 26 - Road traffic intensity in Konin area**

Road no.		Description	Trucks (average diurnal road traffic in measured points)
Principal road no.	E		
5	E261	ŚMIGIEL-LESZNO	3895
S5	E261	ŚMIGIEL/OBWODNICA/	3874
5	E261	LESZNO-RYDZYNA	3582
12		DŁUGIE ST.-LESZNO	2438

**Table 27 - Road traffic intensity in Leszno area**

Road no.		Description	Trucks (average diurnal road traffic in measured points)
Principal road no.	E		
25		KALISZ-OSTRÓW WLKP.	3549
12		KALISZ-OPATÓWEK	3294
12		PLESZEW-KALISZ	2471

**Table 28 - Road traffic intensity in Kalisz area**

#### 7.4. Lessons learned

During the work on the project the real barriers to development of Intermodal haulages were identified. The barriers are:

- transport time of intermodal solutions is longer;
- intermodal transport costs are similar to road transport costs, however, they are much more complex;



- o difficult access of private railway operators to the existing container terminals which are the property of PKP Cargo S.A;
- o lack of clear policy on freight transport development in the region of Wielkopolska;
- o road administrators do not take under consideration the need of linking container terminals with the road network included in construction and modernization plans (lack of coordination);
- o lack of a concept of constructing accessible container terminals and reloading points in Wielkopolska;
- o lack of fast international intermodal services operated by one operator;
- o there is no possibility of railway private carriers becoming independent from PKP due to lack of rolling stock (locomotives and special cars) and the fact that railway the infrastructure in managed by PLK S.A. – one of PKP Group companies. Strategic investment planning is hindered for the companies due to the fact that the behaviour of the public railway operator is unpredictable;
- o long time of waiting for information from the railway infrastructure management on the possibility of activation of a private train;
- o different types of rail gauges in Europe;
- o different types of train traction supply in European states.

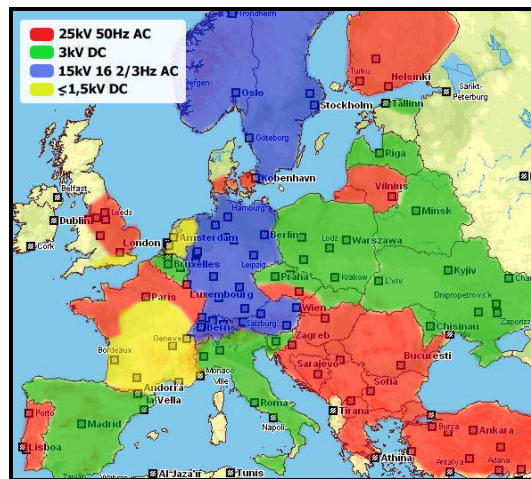


Figure 37 - Train traction voltage in selected EU states

## 7.5. How can I use the pilot's results

### 7.5.1 Guidelines for authorities

To revitalize rail freight transport in Wielkopolska and to reduce number of trucks on roads it is crucial to eliminate identified barriers to development of Intermodal haulages. To achieve such an aim, the partners involved in project in Wielkopolska created a model concept of railway freight transport in Wielkopolska. The general rule of transport system organization in the company based on fast trains carrying goods from/to Wielkopolska is presented in the figure below.

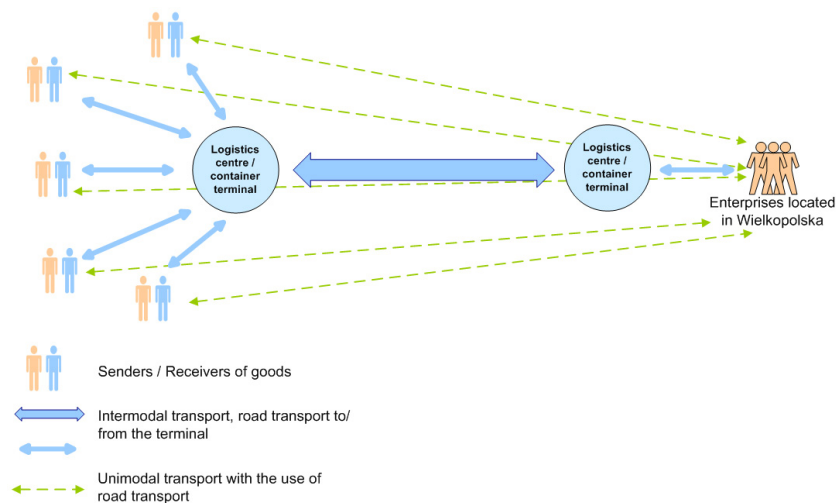
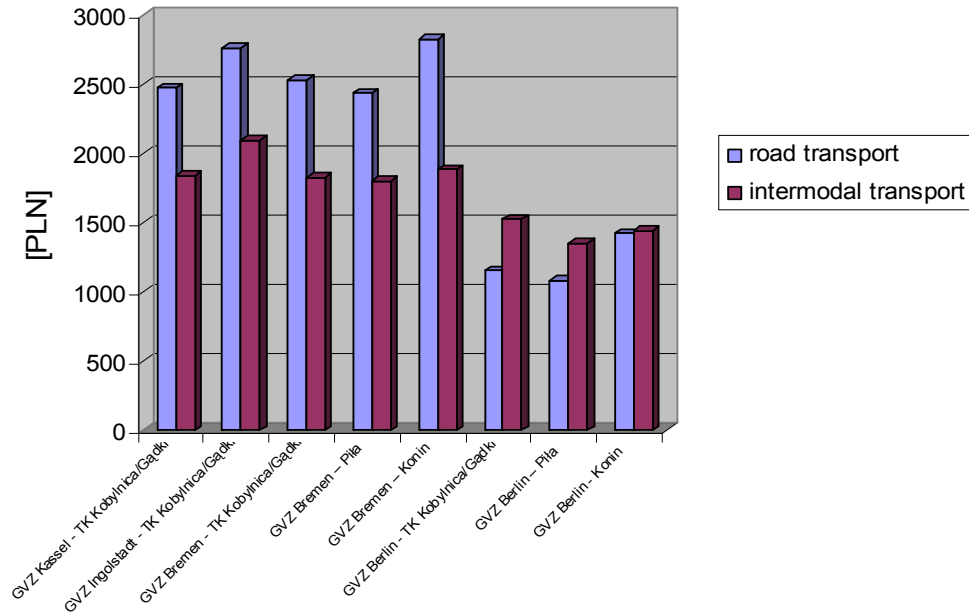


Figure 38 - Model of intermodal transport

## PILOT 7 in Wielkopolska

According to the assumptions the loads are carried by rail to assigned consolidation/deconsolidation points. Delivery to the consolidation point and the final distribution of the loads is carried out by road.

In order to carry out a profitability analysis of the offered solution, a simulation of the costs of activation of container trains handling the flows of goods of pilot project companies was carried out. It turned out that on many routes intermodal haulages are much cheaper, than most of the companies thought.



**Figure 39 - Results of a simulation of road transport costs and Full Train Loaded**

On second step transport time was calculated.

Routes	Road transport time [h]	Rail transport time [h] *	Time of handling activities and transport to/from the terminal [h] **
1. GVZ Kassel - Kobylnica/Gadki	24,15	25	1
2. GVZ Ingolstadt - Kobylnica/Gadki	27,23	30	1
3. GVZ Bremen - Kobylnica/Gadki	24,39	26	1
3.' GVZ Bremen – Pila	26,26	26	1
3." GVZ Bremen – Konin	25,31	29	1
4. GVZ Berlin - Kobylnica/Gadki	5,46	16	1
4.' GVZ Berlin – Pila	6,42	16	1
4." GVZ Berlin – Konin	6,35	12	1

\* time of transport and handling

\*\* road transport to/from the terminal within 50 km

**Table 29 - Results of a simulation of road and rail transport time on selected routes**

### What is required to implement the presented solution?

As there is no plan of construction of national logistics centre network, it is advisable to increase the level of intermodality of the current network through the development of the existing container terminals and building new ones which would increase the number of intermodal operations.

The present **concept of construction of container terminal network, with open access**, assumes the use of two types of intermodal transport nodes:

1. container terminals (CT) – nodes with the following technical parameters:
  - o at least 2 rails, minimum 650 m each, for reloading of intermodal loading units;

- equipped with a reloading platform with a hard surface enabling to use gantry and self-propelled cranes for reloading operations;
  - with storing ground for short-term storing of containers and long-term storing of empty containers;
  - equipped with communication infrastructure and organization system enabling providing services for many intermodal transport operators at one time;
2. container reloading points (CRP) – temporary established objects for concrete users – receivers of intermodal loading units, with the following parameters:
- minimum one reloading rail for handling full trains or a part of them;
  - hard surface made from precast elements for reloading with the use of self-propelled cranes;
  - storing fields for short-term storing of full and empty containers;
  - providing service for one intermodal transport operator.

Due to the fact that the railway infrastructure is well developed in Wielkopolska, there are good conditions for construction of an intermodal reloading points network. There are two aspects of their location:

- technical possibility of creating a node;
- local/regional needs for intermodal transport services and related terminal services.

In Wielkopolska, Polskie Linie Kolejowe (Polish Railway Lines) has a complex network of railways and nodes where freight railway services are carried out. On the basis of an analysis of the railway infrastructure, potential locations of container terminals and reloading points in Wielkopolska were indicated. They are described in the Figure below.

### Proposed

- Container reloading point
- Container terminal

### Existing

- Container terminal

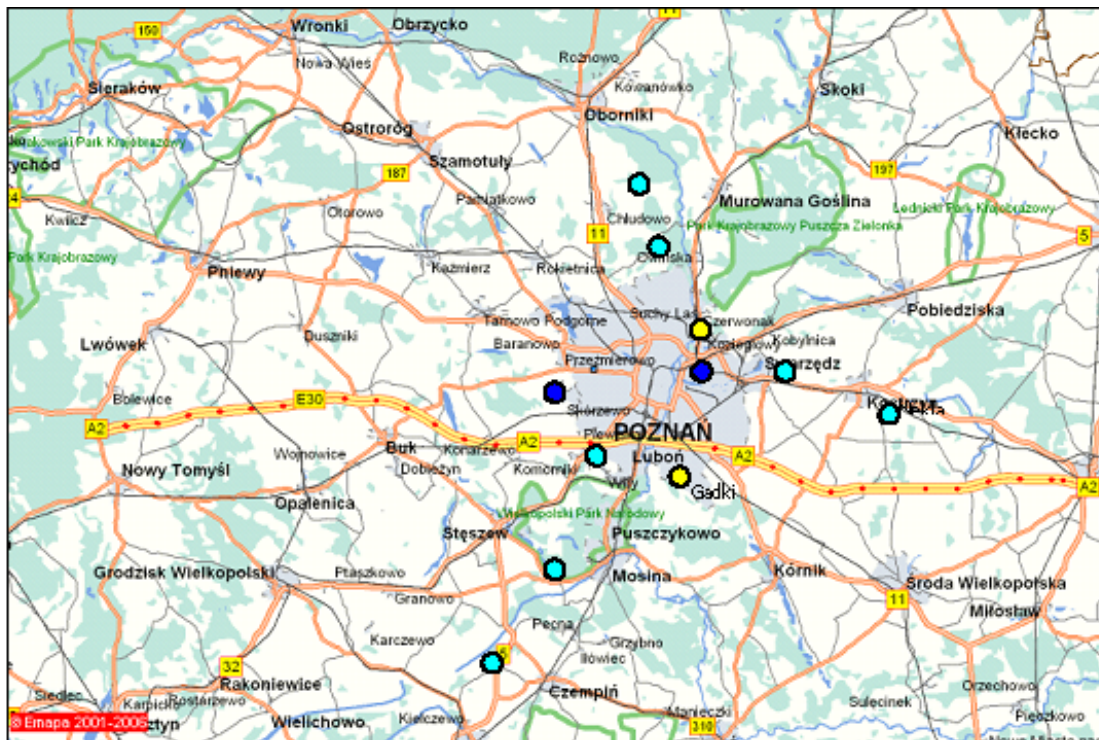


Figure 40 - Existing and proposed locations of container terminals and reloading points in central Wielkopolska



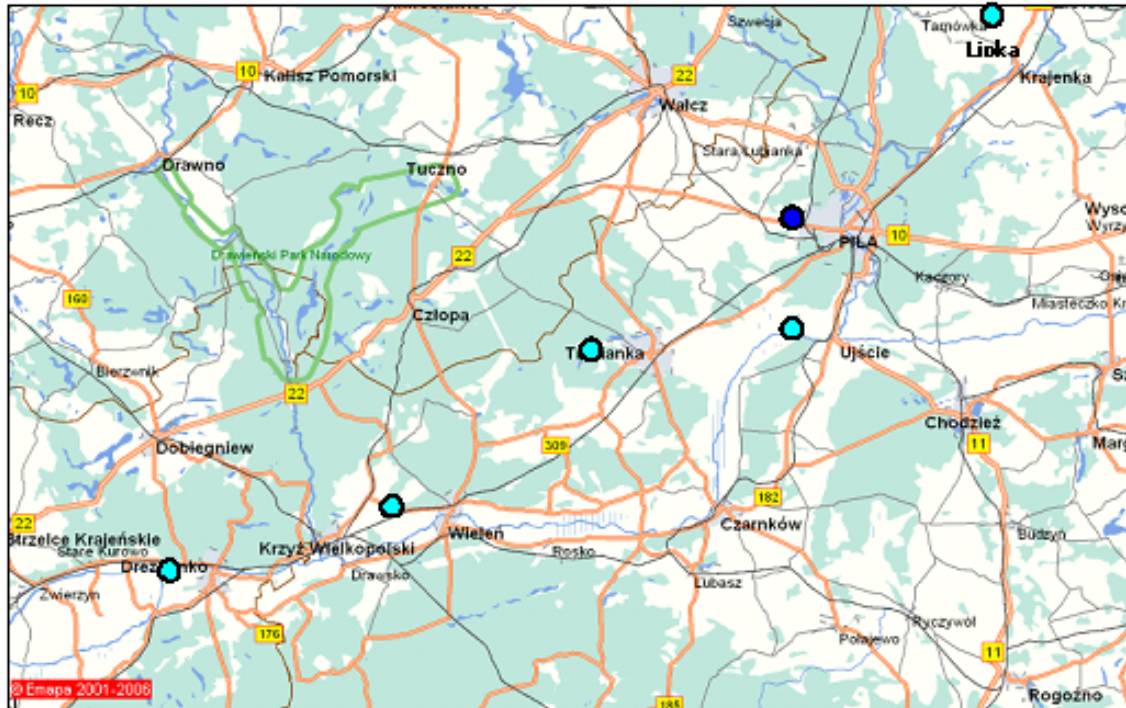


Figure 41 - Existing and proposed locations of container terminals and reloading points in Northern Wielkopolska

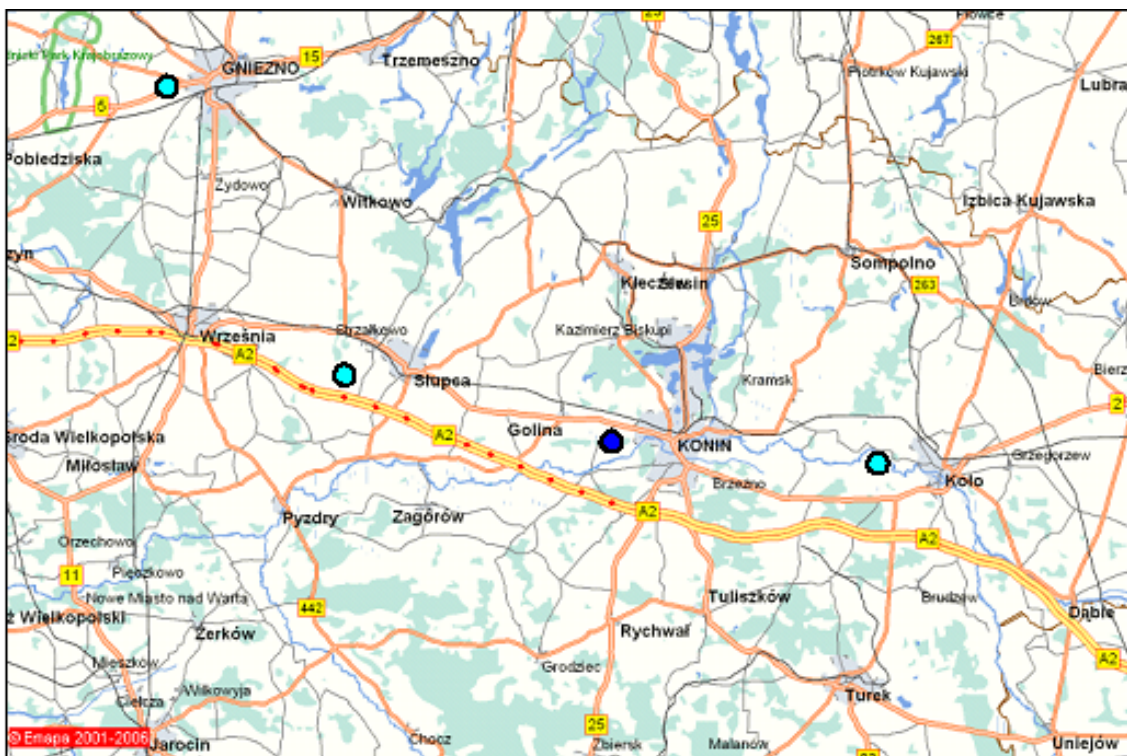


Figure 42 - Existing and proposed locations of container terminals and reloading points in Western Wielkopolska

### 7.5.2 Guidelines for companies

#### How to organize transport processes?

Effective logistics process organization is to ensure fluency in the current delivery realization with minimum costs and high customer service level. Most companies use road transport, which is characterized by short delivery times, availability of “door-to-door” services, competitive service prices or flexibility. However, the efficient transport process organization is connected with route planning and proper truck selection, which is also necessary in case of external transport. Improper transport organization may lead to serious financial consequences. Therefore, it is the company’s concern to establish a time-table for customer deliveries and deliveries from suppliers to the supplying warehouse, and assign proper trucks to particular tasks in a way that makes the total transport costs minimal. Minimization of transport costs cannot have a negative influence on the customer service level or rational inventory management in the company.

Therefore, the main aim of each of the enterprises is to minimize total transport costs and the number of vehicles delivering goods to companies. To achieve that aim, companies should firstly analyse their transport system. The analysis of the transport system should be carried out according to the following scheme:

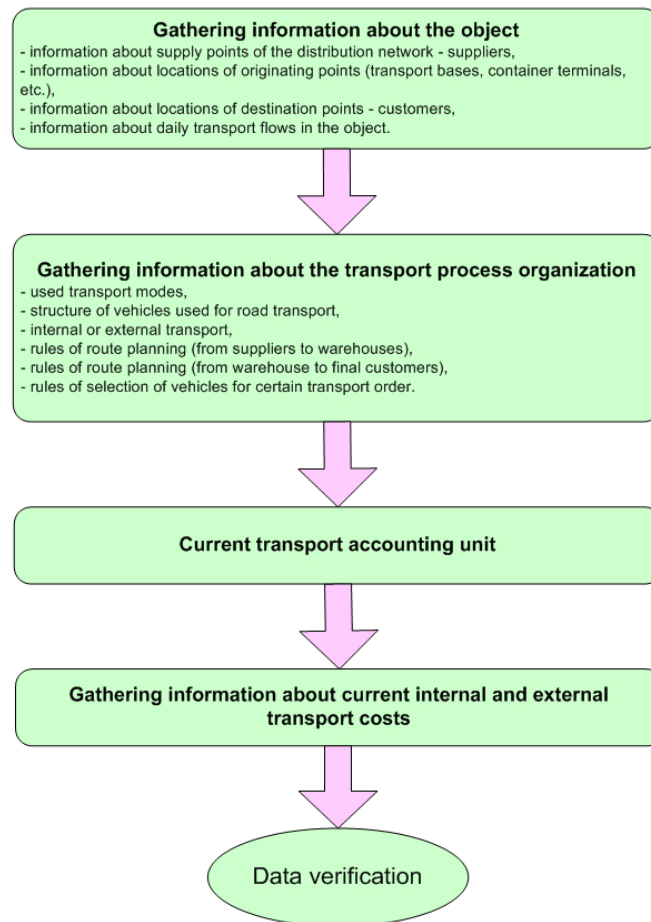


Figure 43 - Identification of analyzed transport system scheme

#### How to plan deliveries from producers?

If a company pays for deliveries from producers, it is natural that the deliveries are planned in a way that reduces transport costs and meets certain requirements. Therefore, if there is a necessity to deliver products from many producers in similar time frames, there appears a problem of rational transport organization and finding appropriate number of vehicles. Such deliveries may be handled in several ways, which is showed in detail in the Figure below.

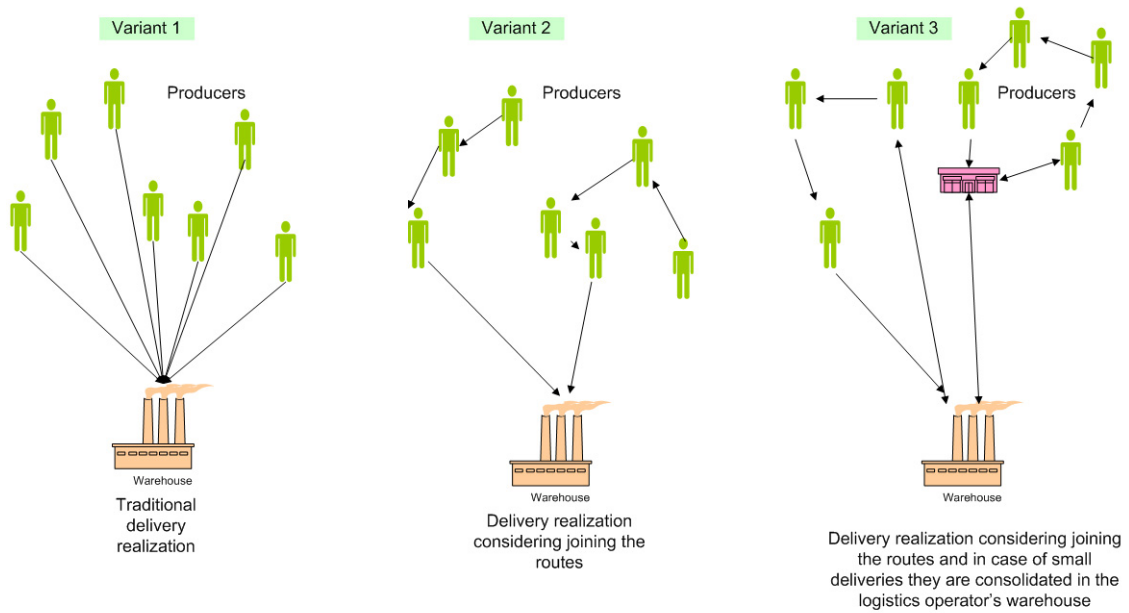


Figure 44 - Possible delivery handling variants

Using linear programming algorithms show that the transport system rationalization in Solaris company had a big influence on both transport cost reduction and truck traffic limitation in the region. It is confirmed by the results in the table below.

No.	Parameter	Before rationalization	After rationalization
1	Total number of Full Container Load deliveries	106	116
2	Total number of general cargo deliveries	43	21
3	Reduction of delivery vehicles	0%	8%
4	Total transport costs	100%	91%

Table 30 - Five-week results of the transport system rationalization

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