

Final Report for Publication

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Project
Co-ordinator: Gruppo CLAS

Partners :

SYSTEMA
INRETS
NEA
CEMAT
DUSS
TFK
MOLBAY

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1 Partnership

Project Co-ordinator

Gruppo CLAS (IT) – Coordinator

Responsible of WP0 –“Project Management” (day- to- day management of the project, preparation of reports and validation of results) and of WP 5 – “Dissemination of results”, partner in WP2

Full partners

Systema (GR) - Partner Contractor

Responsible of WP4 – “Guidelines for new services and implementation plan”, partner in WP1; WP2 and WP5.

INRETS (FR) – Partner Contractor

Responsible of WP3 – “Identification of barriers for actors to develop new intermodal transport services” and partner in WP4.

Cranfield University – (UK) – Partner Contractor

Partner in WP 3 and WP5

NEA (NL) – Partner Contractor

Responsible for WP2 – “Opportunities for the development of a new generation of door-to-door intermodal operators and services” and partner in WP3.

TFK (DE) – Partner Contractor

Partner in WP1 and WP3.

2 Executive summary

2.1 Objectives

The main objectives of the PROMOTIQ project were to identify the opportunities and the barriers for actors to evolve towards a new generation of door-to-door transport services and to propose guidelines for their promotion and their establishment in the market. The aim of a new generation of services and operators is to reduce friction costs, to favour modal integration and logistics operations along a chain and to improve the quality performance.

To achieve the general and partial objectives of the project, in the first part of the project six issues have been identified which are considered as most critical for the intermodality development, in relation to the current trends in the transport market:

1. The role of the railways as traction providers;
2. Short distances (<300 km) intermodal transport;
3. Small shipments in intermodal transport;
4. New quality market segments in intermodal transport;
5. Integration of air transport into the intermodal transport chain;
6. New trends in short sea-shipping.

The second part examined the opportunities for the emergence of a new generation of intermodal services and operators in the six market sectors identified in the first report, while the third examined the existing barriers for the actors to the promotion of new intermodal services and operators; it respectively studied the commercial, social, technical and operational and legal/regulatory barriers.

Part four is based on the results of the previous parts of the project and clearly defined types of new intermodal services and operators and guidelines for their promotion within an implementation plan.

2.2. Technical description

PROMOTIQ Consortium formulates the following issues as critical for the development of new services and new operators in the intermodal transport market:

- 1) the role of the railways as traction providers;
- 2) short distance (<300km) intermodal transport;
- 3) small shipments in intermodal transport;
- 4) new quality market segment in intermodal transport;
- 5) integration of air transports into the intermodal transport chain;
- 6) new trends in short-sea shipping.

More detailed, according to the PROMOTIQ Consortium the selected issues represent the actual critical points for the intermodal transportation business for the following reason:

~~✎~~ The first issue has been chosen because many field surveys among intermodal operators and customers have identified the behaviour of the existing railways as traction providers as unsatisfying. The provided services level often do not meet the required standards of the other involved parties. While the EU-directive 440/91 was aiming at providing the necessary legal background for a liberalised railway market that could have lead to a better efficiency of the

involved railway companies for the benefit of the transport customers, new business activities are only rarely to be found among the European traction providers. In fact although an Europeanisation of the big national railway monopolies who work under various brand names can be recognised, new entrants are to be found from the side of large shipper and postal companies.

- ✎ PROMOTIQ Consortium decided to investigate on the second issue because according to the results of the IQ project, the largest potential of intermodal transport lies in the market for short distance transportation. However, intermodal transport has so far not achieved a considerable market penetration in that segment. This is caused both by operational and by technical constraints.
- ✎ The small shipment issue has been chosen by the PROMOTIQ Consortium since according to the field surveys carried out in IQ and LOGIQ intermodal transport is mostly used for full loads. The necessary logistical structures for consolidated loads seem not to be met by the most of the intermodal services supplied. However, future logistical trends will have the impact that shipment sizes will become smaller and that shipments have to be done more often in a smaller size. For this market segment intermodal transport has to adapt to the requirements of the transport of small shipments, if the market share should rise. Express transportation involves the whole transportation process, from consignor to consignee, in a manner as fast as is economically possible, on a predetermined delivery schedule and at predetermined prices. The carrier provides door-to-door carriage of the shipment and it implies that only one party (consignor or consignee) is liable for the whole transportation process. As far as speed of express transportation is concerned, in a European context, international express delivery would take from less than one day up to three days, depending on the price off the service, the distance involved and the access to the places of origin and destination.
- ✎ For the fourth issue the question is, which new markets can be approached by intermodal transport by supplying e.g. high reliability or high flexibility services, although also the further existence of the already established markets for intermodal transport is very much questioned these days. The possible new markets for intermodal transports are investigated here. A clear border line between the issues is hard to draw, since small shipments, small distances and air transport are new markets for intermodal transport as well. Additionally in this issue the question of dedicated services has been analysed. Developments of the new structured tariffs for rail transportation, the liberalised railway market without the appearance of alternative railway companies have risen the question in large companies, if not dedicated services with own block trains (operated by owned or associated railway transport companies) can play a part in their logistics. The strategy of BASF clearly heads in that direction.
- ✎ The fifth issue has been chosen because air transport volumes are rising significantly. However, only few airports are integrated as hubs into the intermodal chain. Almost all airfreight is transported by truck from/ to the airports. Often declared air freight does not even take off but goes onto the roads to be transported further. An exemption is the airport in Frankfurt, where DB has constructed a terminal and DB services connect the airport hub with e.g. Hanover.
- ✎ PROMOTIQ Consortium choose as last interesting issue the Short Sea Shipping because SSS holds an important and growing market share in European intermodal transport as regards the feeder container transport and the involvement of ferry transport concepts into intermodal chains.

The analysis of the opportunities to optimise existing services to create new logistic services in intermodal network and to transfer basic operations from other locations to the nodal points has been studied focusing the attention on the selected six issues.

The identification of barriers for actors to develop new intermodal transport services and which is the possible evolution of the role of intermodal actors have been studied considering four macro area: technical, operational, commercial and social.

The guidelines for new intermodal services and implementation plan are synthesised in an Action Plan Model directed to policy-makers at all levels (European Commission, national, regional and local) and are divided in:

- ?? Common for all issues guidelines, which refer to the promotion of intermodal transport and they are common to all combinations of modes, all countries and commodity types (horizontal);
- ?? Specific guidelines, provided for each of the selected six issues.

2.3. Results and conclusions

PROMOTIQ results can be very useful because they help to understand the current situation of the European intermodal transport and the major trends that will influence the requirements of the transport system for the next couple of years.

PROMOTIQ Consortium indicated the following conclusions as the most important for understanding the correct trade-off between cost and performance and for setting the right priorities for the service quality in European intermodal market:

- ?? the introduction of competition in intermodal transport has been an incentive for the operators to increase the level of service and price competitiveness;
- ?? the deregulation opened and enlarged the entrance to the market, both for the conventional operators as well as for new entrants;
- ?? new companies enter the intermodal transport market (mainly in seaport hinterland container traffic market);
- ?? the role of MTO (Multimodal Transport Operators) is increasing: forwarders, shipping lines, trucking companies, third parties, they all can now operate intermodal services and act as MTOs;
- ?? new management principles are introduced; e.g. axis management (overall management responsible for the operation from origin to destination);
- ?? the changing market opens the way for the introduction of better production models, meaning the introduction of shuttle and block train services, as compared to the classical wagon load models;
- ?? the new operators apply different marketing techniques (sales channels/packaging);
- ?? for certain functions in the intermodal transport chain, separate independent business units are created, this is the case in specific “public” functions as terminal operations;
- ?? the scope of activities of intermodal operators is increasing from only transport to the full range of logistics services;
- ?? terminals develop in the same direction: from pure transshipment points, to logistic centres where appropriate. However, roles and responsibilities of the terminal operator and operator of logistic centres are different and separated.

The PROMOTIQ Consortium indicated that there is a change of perspective slowly penetrating the industry that may become decisive for intermodal transport. Above it was stated that shipper increasingly are dictating their transport supply and organisation requirements and that the transport companies have to adapt to this. This is, however, only part of the truth. What is actually happening is that the logistic systems are regarded as an integral part of the companies’ business process rather than as an independently supplied facility. It is not just a matter of the transport company adapting to the shipper’s requirements at the same time as the shipper modifies the scheduling of their transport to the transport service available.

It is a different way of looking at this interaction. Rather than regarding it as a supply and demand interaction between two systems it is regarded as a joint operation in a larger system where the two are highly interdependent.

PROMOTIQ Consortium suggests new possible opportunities for intermodal transport coming from:

- ?? Integrated system approach to the production and distribution logistic chain;

- ?? European approach for low cost rail slot pricing;
- ?? Co-operation agreements, joint ventures and mergers among intermodal operators;
- ?? Direct involvement of the biggest shippers in the transport operations;
- ?? Dedicated specialised intermodal network in heavy traffic corridors.

The most important typologies of barriers for new generation of intermodal services and operators analysed in the project consist in the followings:

1. Institutional
2. Infrastructural;
3. Commercial;
4. Economic;
5. Technical and operational;
6. Social

The identification of the different barriers hindering the introduction of new intermodal services and operators was realised in correlation with the results of the first and second phases of the project, but also of the IQ and LOGIQ projects.

The guidelines for new intermodal services and implementation plan indicated in PROMOTIQ project are the following:

Common for all issues guidelines (horizontal elements):

1. Fair and efficient pricing;
2. Establish pan-European regulator for intermodal transport (in order to harmonise the liberalisation in the EU member states, to harmonise and to ease the regularities for the access to the infrastructure);
3. Encourage public-private partnerships and greater collaboration between the main actors of an intermodal transport chain with the main change being the active involvement of the shipper;
4. Limited subsidies for the establishment of new intermodal transport services;
5. Establish intermodal standards;
6. "Advertise" intermodal standards;
7. Continue R&D activities on intermodal transport;
8. Interoperability;
9. Continuation of PACT programme;
10. Promote the use of EDI;
11. Organise intermodal transport round tables.

Specific issues elements

Rail traction provision elements

1. Accessibility to rail infrastructure;
2. Capacity allocation;
3. Priority of freight trains and dedicated freight lines;

Short distance services elements

4. Establish favourable rates for short distance services

Small shipments elements

5. Establish dimensions of loading units appropriate for small shipments

New quality market elements

6. Establish high quality/capacity rail link between terminals and main rail links

Integration of air transport elements

7. Improve rail links to airport

Short sea shipping elements

8. Improve SSS network connectivity

9. Improve the image of SSS

Based on these guidelines, PROMOTIQ Consortium presented also the responsible actor or group of actors to undertake and monitor the action. Finally the project provided an indication of the timeframe and the costs for the implementation of each action previously presented.

3. Objectives of the project

The main objectives of the PROMOTIQ project were to identify the opportunities and the barriers for actors to evolve towards a new generation of door-to-door transport services and to propose guidelines for their promotion and their establishment in the market. The aim of a new generation of services and operators is to reduce friction costs, to favour modal integration and logistics operations along a chain and to improve the quality performance.

To achieve the general and partial objectives of the project, in the first report six issues have been identified which are considered as most critical for the intermodality development, in relation to the current trends in the transport market:

1. The role of the railways as traction providers;
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The second part examined the opportunities for the emergence of a new generation of intermodal services and operators in the six market sectors identified in the first report, while the third examined the existing barriers for the actors to the promotion of new intermodal services and operators; it respectively studied the commercial, social, technical and operational and legal/regulatory barriers.

Part four is based on the results of the previous parts of the project and clearly defined types of new intermodal services and operators and guidelines for their promotion within an implementation plan.

The objectives of the guidelines are to advance the existing intermodal transport system or to create a new one, to support policy decisions, to facilitate the implementation of a new concept, to overcome barriers, to build consensus among different actors and to find the means to promote and market intermodal transport. Therefore the aim of the guidelines is to assist the policy –makers at any level to increase the intermodal market share.

Two categories of guidelines are provided in PROMOTIQ project:

- 1) General guidelines, which are referring to all intermodal transport markets, all actors, commodity types, countries (horizontal guidelines);
- 2) Specific guidelines referring to each of the six issues identified in the first part.

The methodology for the presentation of the proposed actions consists of the crucial elements for intermodal growth identified in the second part of the project and the respective barriers identified in the third part, which are all related to the six potential issues for the promotion of intermodal transport. Based on these, the proposed actions are provided, as well as the responsible actor or group of actors to undertake and monitor the action.

Finally, an indication of the timeframe and the costs for the implementation of each action are presented.

4. Means used to achieve the objectives

The PROMOTIQ project started in January 1999 with a duration of 9 months.

By its contents it can be characterised as a research study investigating the opportunities and barriers for actors to evolve towards a new generation of door-to-door transport services and to propose guidelines for their promotion and their establishment in the market. The study is a preliminary research mapping tendencies of possible evolution of operators and services.

4.1 Project Management

Referring to this topics, the project is subdivided into five content related work packages, which consists each of several tasks for a total work of twenty five man-months.

WP0: Project Management;

Task 0.1 Day to day management;

Task 0.2 Preparation of reports.

WP1 Analysis of intermodal transport chain;

Task 1.1. Intermodal chain composition;

Task 1.2 Intermodal actors' roles.

WP2 Opportunities for new added value services and new actors;

Task 2.1. Opportunities for new logistic services;

Task 2.2. Opportunities for new types of intermodal actors.

WP3 Identification of barriers for actors to develop new services;

Task 3.1. Technical and operational barriers

Task 3.2 Commercial barriers;

Task 3.3 Social barriers;

Task 3.4 Analysis of the impact of Directive 440/91.

WP4 Action Plan Model;

Task 4.1 Synthesis of the results of previous WPs and Guidelines for an Action Plan Model

WP5 Dissemination.

Starting with WP1, the work packages and tasks were carried out partly overlapping but in a sequential order. Details on the individual work packages and tasks are described in the following chapter "Scientific and technical description of the project".

Because of the complexity of its content and the number of partners involved PROMOTIQ project required a well defined project management and monitoring structure.

A partner has been placed in charge of each Task and Work Package. This ensured good coordination and a harmonised approach within the Tasks and Work Packages.

A four level management and monitoring system had been developed:

- ? Day-to-day project management
- ? A Steering Committee
- ? Workpackage leadership
- ? Users validation

Lanfranco Senn was the Project Co-ordinator and Gruppo CLAS was responsible for day-to-day project management, including administrative management.

The Project Co-ordinator was supported by a Steering Committee, consisting of highly qualified experts in research in intermodal transport. The Steering Committee controlled the research work and if the deliverables met the quality standards that are required for this project.

The Steering Committee meeting were held regularly, separately or in combination with management and research meeting.

The Steering Committee was chaired by the Project Director, Prof. Lanfranco Senn from Gruppo CLAS.

The other members were the Work Package leaders:

?? Professor D.Tsamboulas from SYSTEMA

?? Mr. C. Reynaud from INRETS

?? Mr. H. Vrenken from NEA

?? Prof. Ian Black of Cranfield University

?? Mr Ralf Fiedler of TFK

The co-ordination and scientific management of work carried out in the framework of specific work packages were the responsibility of the respective work package leader. These were:

Assignment of responsibilities to work packages	
WP 0. (Project management and general responsibility)	Gruppo CLAS
WP1.	TFK
WP2.	NEA
WP3.	INRETS
WP4.	SYSTEMA
WP5.	Gruppo CLAS

Although only established for the workshop, user groups formed to act as external validators of parts of the project.

4.2. Desk research and link with other projects

All the members of PROMOTIQ Consortium have a long involvement in European research which has been really necessary for the capitalisation of data and results both at European and national level.

It is obvious that important links existed with other projects of the section “Integrated Transport Chains” of the “Transport Work Programme”. In developing its activities, the project considers not only “LOGIQ – The decision-making process in intermodal transport” and “IQ – Intermodal Quality”, but also co-operation with other projects selected within the third call of the IV Framework Programme: QUATRE MAINS and APRICOT for the decision-making process in the industry and IMPULSE for the improvement of the market penetration to all actors involved in intermodal transport.

Transport journals and magazines of the last 1-2 years, recent literature, conference papers and company brochures also have been used for the research, but EU funded projects and the personal experiences of the researchers were the most important sources. An useful input has been the exchange of information and opinions with the users’ group during the workshop held in Annecy.

In addition to the conclusion of the results within the Final Report, several documents were produced describing the project findings and submitting it to interested parties. All publications are list in the annex and all the public ones are also available for downloading on the PROMOTIQ public web-site.

5. Scientific and technical description of the project

5.1 Introduction

The main objectives of the PROMOTIQ project were to identify the opportunities and the barriers for actors to evolve towards a new generation of door-to-door transport services and to propose guidelines for their promotion and their establishment in the market. The aim of a new generation of services and operators is to reduce friction costs, to favour modal integration and logistics operations along a chain and to improve the quality performance.

To achieve the general and partial objectives of the project, in the first part of the project six issues have been identified which are considered as most critical for the intermodality development, in relation to the current trends in the transport market:

The second part examined the opportunities for the emergence of a new generation of intermodal services and operators in the six market sectors identified in the first report, while the third examined the existing barriers for the actors to the promotion of new intermodal services and operators; it respectively studied the commercial, social, technical and operational and legal/regulatory barriers.

Part four is based on the results of the previous parts of the project and clearly defined types of new intermodal services and operators and guidelines for their promotion within an implementation plan.

5.2 Overview of intermodal transport chain structure and actors involved: relevant issues and cases for the development of new intermodal transport services and new types of operators

5.2.1 Introduction

PROMOTIQ aims at analysing the conditions for the promotion of a new generation of intermodal transport services and operators.

The goal of the first part of the project is to focus on critical issues of intermodal transport which are further investigated in the following part of the project, also through two representative cases per issues. The selection of issues follows the previous research undertaken in the IV Framework Programme projects, especially IQ¹ and LOGIQ² projects

From the results of the most important European and national researches on intermodal transport and from the following basic considerations PROMOTIQ Consortium based the selection of relevant issues. In fact, regarding the appearance of new operators in the European intermodal market during the last decades, the following statements describe the situation:

seaport hinterland container traffic is the only market segment where relevant new activities can be found;

most new activities have been made by seaport companies and shipping lines;

¹ IQ – Intermodal Quality, IV Framework Project commissioned by DGVII, Inrets Consortium

² LOGIQ – The decision making process in intermodal transport, IV Framework project commissioned by DGVII, Gruppo CLAS Consortium

the monopolies and the influence of the established railway companies have increased due to new alliances and acquisitions;
UIRR companies have not managed to significantly enter the maritime container market.

5.2.2 Relevant issues for the development of new intermodal transport services and new types of operators

PROMOTIQ Consortium formulates the following issues as critical for the development of new services and new operators in the intermodal transport market:

- 1) the role of the railways as traction providers;
- 2) short distance (<300km) intermodal transport;
- 3) small shipments in intermodal transport;
- 4) new quality market segment in intermodal transport;
- 5) integration of air transports into the intermodal transport chain;
- 6) new trends in short-sea shipping.

More detailed, according to the PROMOTIQ Consortium the selected issues represent the actual critical points for the intermodal transportation business for the following reason:

✍️ The first issue has been chosen because many field surveys among intermodal operators and customers have identified the behaviour of the existing railways as traction providers as unsatisfying. The provided services level often do not meet the required standards of the other involved parties. While the EU-directive 440/91 was aiming at providing the necessary legal background for a liberalised railway market that could have led to a better efficiency of the involved railway companies for the benefit of the transport customers, new business activities are only rarely to be found among the European traction providers. In fact although an Europeanisation of the big national railway monopolies who work under various brand names can be recognised, new entrants are to be found from the side of large shipper and postal companies.

✍️ PROMOTIQ Consortium decided to investigate on the second issue because according to the results of the IQ project, the largest potential of intermodal transport lies in the market for short distance transportation. However, intermodal transport has so far not achieved a considerable market penetration in that segment. This is caused both by operational and by technical constraints.

✍️ The small shipment issue has been chosen by the PROMOTIQ Consortium since according to the field surveys carried out in IQ and LOGIQ intermodal transport is mostly used for full loads. The necessary logistical structures for consolidated loads seem not to be met by the most of the intermodal services supplied. However, future logistical trends will have the impact that shipment sizes will become smaller and that shipments have to be done more often in a smaller size. For this market segment intermodal transport has to adapt to the requirements of the transport of small shipments, if the market share should rise. Express transportation involves the whole transportation process, from consignor to consignee, in a manner as fast as is economically possible, on a predetermined delivery schedule and at predetermined prices. The carrier provides door-to-door carriage of the shipment and it implies that only one party (consignor or consignee) is liable for the whole transportation process. As far as speed of express transportation is concerned, in a European context, international express delivery would take from less than one day up to three days, depending on the price of the service, the distance involved and the access to the places of origin and destination.

✍️ For the fourth issue the question is, which new markets can be approached by intermodal transport by supplying e.g. high reliability or high flexibility services, although also the further existence of the already established markets for intermodal transport is very much questioned

these days. The possible new markets for intermodal transports are investigated here. A clear border line between the issues is hard to draw, since small shipments, small distances and air transport are new markets for intermodal transport as well. Additionally in this issue the question of dedicated services has been analysed. Developments of the new structured tariffs for rail transportation, the liberalised railway market without the appearance of alternative railway companies have risen the question in large companies, if not dedicated services with own block trains (operated by owned or associated railway transport companies) can play a part in their logistics. The strategy of BASF clearly heads in that direction.

✍️The fifth issue has been chosen because air transport volumes are rising significantly. However, only few airports are integrated as hubs into the intermodal chain. Almost all airfreight is transported by truck from/ to the airports. Often declared air freight does not even take off but goes onto the roads to be transported further. An exemption is the airport in Frankfurt, where DB has constructed a terminal and DB services connect the airport hub with e.g. Hanover.

✍️PROMOTIQ Consortium choose as last interesting issue the Short Sea Shipping because SSS holds an important and growing market share in European intermodal transport as regards the feeder container transport and the involvement of ferry transport concepts into intermodal chains.

These new services and the relevant cases that has been analysed in the context of the first part of the work represent the actual critical points for the intermodal transportation business.

PROMOTIQ analysed two cases within the each issue: one case study for Northern Europe and one concerning Southern Europe.

Concerning the first issue the private rail operator in the U.K. like EWS and a German regional private rail company, HGK has been selected. For the second issue, the case study of DB Cargo Sprinter has been done.

Within the small shipments in intermodal transport issue, German Post and UPS case study was carried out for Northern Europe, while researchers analysed the French transport company TAB for the case study of Southern Europe.

Concerning the fourth issue, the BASF case study and the French intermodal transport market are analysed regarding the impact of the new market segments.

The airport Frankfurt/Main as a hub in intermodal chain and DHL's operation in Greece were the case studies carried out within the fifth issue.

Short sea shipping holds an important and growing market share in European intermodal transport as far as feeder container transport is concerned and the involvement of ferry transport concepts into intermodal chains. Minoan lines and STORA are the two case studies within this last issue.

The analysis of the cases within the 6 issues leads to the results that are briefly explained in the following paragraphs.

5.2.3 Summary of the results of the cases study on the role of the railways as traction providers

Service levels provided by the established national railways are characterised by the customers as too inflexible, too unreliable and too expensive

Large shippers and forwarders begin to build up own dedicated services, some by forming owned or associated railway companies as new traction providers.

The (former) national railways blame large parts of their intermodal transport services for losses especially in the low volume corridors and want to shut down services
The liberalisation (EU Directive 91/440) differs largely in Europe and hinders the establishment of new international intermodal services
high liberalisation does not automatically mean more competition (UK)
liberalisation has reached a stage in many member states where the creation of private operations is possible (UK, NL, DE, SE). However only few examples exist of relevant new railway operators
the following list is not meant as pre-requisite for private traction operations but these circumstances definitely help the establishment of a private railway enormously:
regional competence
own assets in terms of own rail sidings, rolling rail stock, own terminals
established co-operation with the national railways

5.2.4 Summary of the results of the case study on short distance (<300km) intermodal transport

The potential for short distance intermodal transport operations exists. According to the IQ study this is more than 1 billion tons in continental flows for the year 2010³, although IQ regards this small distance potential as not accessible because of the small distance itself.
small distance services are most successful in intermodal systems like hub and spoke or gateways or from/to maritime terminals as feeder trains.
economies of scale set tight frontiers for possible small distance services as door-to-door chains.
Shortlines has together with HGK developed a successful short distance intermodal service under the Dutch no-track fee environment, which obviously supports this service.

5.2.5 Summary of the results of the cases study on small shipments in intermodal transport

The large majority of intermodal transport today are full loads.
The potential for the intermodal transport of consolidated loads and the associated third party logistic services is not well used.
Often the time frames respectively the frequency of services do not allow the use of intermodal transport for small shipments.
Logistical and production trends will have the effect that shipments will become smaller and They will delivered with higher frequency services.
UPS and the German Post will run own dedicated overnight parcel/ express trains in Germany in order to be able to provide their customers with in time delivery. Operator will be the jointly owned Express Shuttle GmbH.
Today almost all express mail is moved by trucks that have replaced domestic air cargo transport, but rail has not managed to conquer that market significantly.
TAB in France is one of the few companies that moves successfully consolidated loads using intermodal transport. TAB organises the road collection at the different customers' premises (in average 10 customers, sometimes up to 30 or 40 customers) and the shipments are loaded into swap-bodies. TAB organises the delivery at the different consignee's premises and distributes "without break of load".

5.2.6 Summary of the results of the cases study on new quality market segments in intermodal transport

Large shippers tend to run own dedicated services, some of them even with their own railway company. The strategy of BASF clearly heads in that direction. Although the situation of BASF is unique also other large shippers begin to evaluate such a solution for their purposes.

³ IQ, Deliverable 1

Especially in the chemical industry the impression grows, that own dedicated services would fit the requirements better than the services supplied by the established railways. The reasons behind that are:

unsatisfying performance of the established railway companies mostly in terms of price, reliability and flexibility.

unsatisfying and in some cases unacceptable price regimes of the established railway companies liberalisation as the legal background to allow third party operations on the railway network

dependency of large shippers on rail transportation both conventional and intermodal

willingness of large shippers to use more rail transports

The market of perishable goods in France is seen as a market with a high potential to use intermodal transport in the future due to the type of distribution followed, although even for the biggest company in that sector, Danone's structure and frequency of the flows (2-3 units per plant daily) do not allow for the creation of full-load trains.

With the recent creation of FroidCombi the growth in the use of intermodal transport in the market of perishable goods is one objective of high importance in France. There are flows at the European level (such as the plant in Munich), where intermodal transport can be used. In the case of national flows, the quality of service remains the same in the various stages of the transport chains. If they are European though, the level of quality is not the same at the supply side and therefore the use of intermodal transport is made more difficult.

5.2.7 Summary of the results of the cases study on integration of air transports into the intermodal transport chain

The market for rail based intermodal transport in this segment is mainly the domestic feeder function for the main airport hubs which is small or medium distance, which is now mainly served by trucks.

For intra-European long distance links rail transport cannot compete with air-transport in terms of transport time, which is the major decision factor to choose air transport, either because of high-value products and time sensibility (e.g. computer products) or perishability (e.g. flowers).

For air cargo with its high value density the intermodal rail service has to provide high frequencies, low total transport times and a high degree of reliability. Flexibility and short transport times are on many intermodal rail routes hard to achieve, as IQ's field survey shows.

The loading capacities and handling technologies of the intermodal load units have to compete with the modern truck equipment. That applies for air cargo which is transported in standardised units, but the variety of air cargo load units goes from LD3 containers over various types of pallets to 20ft containers, so that the goods themselves have to be handled, which is a problem of insufficiency.

The integration of rail transport in main European airport hubs such as Frankfurt, Amsterdam or Brussels is a first step but has only achieved very little market shares so far.

5.2.8 Summary of the results of cases study on new trends in short-sea shipping

Short Sea transport is one of the most innovative fields regarding intermodal transport.

Large shippers develop new distribution concepts.

The Stora example shows an implementation of a complete new closed intermodal system as part of the main production and distributions strategy.

Feeder operators more and more take over the responsibility for the entire door-to-door chain.

Ferry operators invest into high speed ferries. However, fast ferry services only are reasonable on high traffic routes linking relatively short distances in a at least somehow protected weather conditions area. Fast ferries are very expensive, not only the vessel as such but also the operation and handling costs. They definitely require high utilisation in both directions. They are sensitive to bad weather conditions.

The impact of fast ferries on intermodal transportation can be:

reduced transport times in the total transport chain

replacement of other land modes because of its competitive speed

~~§§~~The impact of high speed ferries for intermodal transport depends on how the faster ferry link is integrated into an intermodal chain. The transport of swap-bodies on Mafy or terminal-trailers would be a good example that make the fast ferries important for the intermodal business. Another outcome of high speed ferries could be that no matter if either complete trucks or only semi-trailers are transported, fast ferries can also contribute to a better competitive position of pure road transport, if no other modes are further involved along the chain. For the time being no high speed ferry is designed as a railway ferries.

5.3 Opportunities for the development of a new generation of door-to door intermodal operators and services

5.3.1 Introduction

The analysis of the opportunities to optimise existing services to create new logistic services in intermodal network and to transfer basic operations from other locations to the nodal points has been studied focusing the attention on the selected six issues.

1. the role of the railways as traction providers;
2. short distance (<300km) intermodal transport;
3. small shipments in intermodal transport;
4. new quality market segment in intermodal transport;
5. integration of air transports into the intermodal transport chain;
6. new trends in short-sea shipping.

5.3.2. Opportunities for new operators and services in the role of railways as traction provider in intermodal transport

Concerning the role of railways as traction provider in intermodal transport, the small number of genuinely new rail operators proves that the experience, technology, pricing, regulation and charging for track access barriers are stronger than the liberalisation efforts.

In a European perspective PROMOTIQ Consortium, however, emphasised the emerging of some opportunities which are reflected in different kinds of new operators or new traction systems that has been considered of relevant importance by the PROMOTIQ researchers.

PROMOTIQ Consortium analysed the following major European market trends in the role of railways as traction providers in intermodal transport from the operators point of view:

- ~~§§~~*The privatisation model of the UK;*
- ~~§§~~*Seaport hinterland container traffic;*
- ~~§§~~*Joint ventures of regional and local railways;*
- ~~§§~~*Involvement of shippers*
- ~~§§~~*Cross-border alliances*
- ~~§§~~*Decentralisation of commercial activities*

From the services point of view the new role of railways as traction providers is strictly related to the quality and efficiency improvements.

PROMOTIQ Consortium indicated how the main changes of services, either in quality (of which reliability is the most important aspect) or efficiency, is to be expected from improved chain management or from technological improvements.

Researchers analysed the opportunities for the developments of a new generation of door-to-door intermodal services from the following methodological aspects:

- ✂✂information systems (compatible chain solutions replacing individual approaches, information transparency to the user of intermodal transport and new systems for security and accessibility of information);
- ✂✂new technologies, concerning traction, innovations in rolling stock, safety and control systems;
- ✂✂deregulation:
- ✂✂changes of added values that can be offered through intermodal transport services

In a European perspective some opportunities have emerged which are reflected in different kinds of new operators or new traction systems:

?? *The privatisation model of the UK*

The privatisation model of the UK with private operators dominating the market is heading towards a private monopoly including train operations and intermodal operations

?? *Seaport hinterland container traffic*

Seaport hinterland container traffic is the most important segment where relevant new activities may be found in both intermodal and rail traction provider transport market in Europe. Volumes in this market have been increasing in both absolute and relative terms in the intermodal markets. Strong co-operation among different types of companies in the maritime and hinterland chain has contributed to the establishment of high-quality hinterland services.

?? *Joint ventures*

Joint ventures of regional and local railways might be the newcomers in rail traction provider market for intermodal transport along a few European corridors. Present initiatives are in regional distribution of freight, which is complementary to the European intermodal supply.

?? *Involvement of shippers*

Possible opportunities could come from the involvement of the biggest shippers in the rail traction providers market. The German chemical company BASF AG decided to set up their own railway service after DB Cargo raised prices, without improving their performance. This example may be followed by other companies or consortia, which have sufficient volumes, capital resources and bargaining power.

?? *Cross-border alliances*

Most important opportunities for new types of operators in the role of rail traction providers will come from the variety of co-operation agreements, joint ventures and even mergers among the national freight railways. Cross-border alliances will be more effective in setting up international railways-based intermodal services.

?? *Decentralisation of commercial activities*

The role of national railways in pan-European intermodal operator Intercontainer-Interfrigo (ICF) is changing. Commercial activities have become more decentralised, in order to establish a more direct link between customers and operations.

The national railways develop strategies to protect their market position by enlarging alliances or hindering competition. This is the main driver of changes in the European rail market. The European national railways market picture could be schematised in the following way:

- ?? The national railways are limited in their monopolistic position by EU directive 91/440 and they tend to increase their market using their financial resources in order to improve the spectrum of supplied services.
- ?? The principal instrument to achieve the aim of being integrated logistic operators is the acquisition of transport and logistic company (DB Cargo, Rail Cargo Austria policies are clear exempla)

- ?? Cross-border alliances, joint ventures, mergers or international co-operative agreements are the main instruments for enlarging the market.
- ?? The enlargement of the spectrum of supplied services may include a direct involvement in intermodal transport companies, in particular in ICF.

Improvement of railway services, either in quality (of which reliability is the most important aspect) or efficiency, is to be expected from improved chain management or from technological improvements.

The efficiency of management of the supply chains will be assisted by information systems that have been developed for this reason. The main opportunities rest in the following aspects:

- ?? compatible chain solutions replacing individual approaches. The current solutions are very individual and they cannot be applied to every market actor. The integration of systems is very difficult at the moment due to the wide incompatibility.
- ?? information transparency to the user of intermodal transport.
- ?? new systems for security and accessibility of information.

Information systems also contribute to a reduction in document flow, although paperless operation is not to be expected. Software applications can improve fleet management and increase efficiency.

Apart from information technology, new technologies concerned with the traction of railways have been observed in practice. Innovations in rolling stock, like better accommodated wagon designs and safety and control systems also contribute to reliability and to e.g. interoperability of modes.

Also deregulation can play an important role. In addition, governments should give a framework for the respective responsibilities of government and railway.

As the European transport market changes fast due to mainly political and regulatory changes, intermodal transport services offered and the actors involved are also changing. This change does not concern so much the nature of these services and actors, but the added values that can be offered through them.

The main difficulty in identifying the parts of intermodal transport where value can be added is that pan-European services concern different countries with different economic, political and geographical characteristics. The economic power, the patterns of consumption and the modes of ownership are characteristics that play a significant role in setting the various value-added services.

Generally speaking, the new generation opportunities that have been identified here are characterised by changes concerning deregulation, technological advances, changes in trading patterns and the degree of information technology adoption by the intermodal transport market actors. The history of intermodal transport has shown that changes sometimes require a fairly long period for commercial and social acceptance. This is true especially in Europe, where intermodal transport has never been the favourite way of moving goods, as opposed to road transport that is also showing a rise in its share every year. The process of new services and operators being accepted in the market is not always easy and straight, but it is a dynamic process.

Policy makers are able to give added value to the intermodal rail services in Europe. Europe's railways should be given the autonomy to manage their own affairs. One could say

that this can be achieved with privatisation, but whether privately or publicly owned, the railways need government to take responsibility for three issues:

- ?? Definition and implementation of a policy framework setting out the respective responsibilities of government and railway;
- ?? Provision by the government of the transport infrastructure needed by the society,
- ?? Contracts that have to be in place for provision of public transport.

5.3.3 Opportunities for new short distance intermodal operators and services.

The common public opinion is that intermodal transport cannot be operated cost efficiently on distances shorter than 500 km. Indeed, practice shows that in many segments of the market, intermodal transport has not been able to obtain a market share on these distances. However, other examples show successful short-distance intermodal services, and present initiatives of companies in the intermodal transport market that show their confidence in such services.

PROMOTIQ Consortium decided to analyse the intermodal transport chain on short distances using the following modalities:

- ✂✂ Intermodal barge services (as the one from Antwerp to Rotterdam)
- ✂✂ Intermodal rail services (emphasising from methodological point of view the key success factors such as extremely high volume on the link, or the hub and spoke system or the shuttle services).

PROMOTIQ Consortium included in the study a methodological part on the importance of the information and communication systems, which must be harmonised and preferably should be simple.

Another key factor analysed by the researchers is the principle of costing and pricing of both operations and infrastructure on short distance intermodal transport.

Probably most successful services are the shuttle services provided between Rotterdam and Antwerp, on a distance of less than 100 km. Intermodal barge and rail services carry the largest share of maritime containers, which are repositioned between the seaports. Also entrant NDX (which left the market again in 1998) chose this link to launch their services. The key success factor is the extremely high volume on the link. In addition, rail efficiency was improved in such a way that equipment turnaround time, and hence its utilisation, achieved very high levels.

Other successful examples are in the NEN-network, which creates a hub and spoke system of very short-distance shuttle services. Here, high frequent services and efficient terminal operators are key to the success. IKE-trains in Germany provide overnight services on distances less than 500 km. A SBB/FS joint venture was created to develop a system similar to the German CargoSprinter. This system – earlier elaborated upon in WP1 – is a modular train system, which is suited to carry a relatively small number of load units over small distances.

All these examples show that intermodal rail transport can be operated cost-efficiently on shorter distances, but only if the volumes are sufficiently high and the frequency of transportation is high enough. In the OSIRIS project, ways of condensing hinterland traffic and innovations in railway operations and technology, organisation and lay-out of terminals are developed in order to create such circumstances.

In most of the examples mentioned above, the service is a part of a larger intermodal system, rather than being in direct competition with short-distance road transport. Services aiming at this segment in the market have not yet proven to be successful. Ideas are developed, e.g. in the Netherlands, to set up short-distance overnight rail services to link the (road-congested) areas of

Amsterdam and Rotterdam (AMRO-shuttle) and to set up a national rail distribution service in a liner train concept, but viability is still to be proven.

Successes can be seen in intermodal services on inland waterways, especially in the Rhine delta. The number of services, provided between the ports of Rotterdam and Antwerp and hinterland terminals, has been growing at rapid speed, due to low barge operating costs and the risk of road congestion at seaport terminals.

Opportunities for creating new short distance services can be exploited if cost can be reduced. This, to a large extent, puts organisational pressure: the action of each of the actors in the chain should be well co-ordinated. This could be supported by information and communication systems, which must be harmonised and preferably should be simple.

Operations at terminals and at the railways must be reliable and efficient. To have efficient short distance hinterland transport services to and from seaports, cost enhancing procedures like shunting and changing traction units must be avoided. Therefore, rail tracks at the terminals should be appropriate for full train treatment and common electrification standards should be applied. If interference with passenger transport or other freight transport cannot be avoided at the railway infrastructure, priority to freight transport should be safeguarded. Whether new or advanced technologies should be introduced is to be questioned. Productivity may be increased, but the burden of the initial investments may appear not to pay back.

Another key factor is the principle of costing and pricing of both operations and infrastructure. The German Cargo Sprinter is an example in which the burden of infrastructure charges is such that successful exploitation has become unlikely. If pricing of railway traction is based on e.g. average traction costs per kilometre of the complete package of operations of the railway company, efficiency gains in the short-distance operation are not reflected in prices. In this case the railway company will take the full benefit of the efficiency gains, without passing it through to its customers, i.e. the intermodal operator.

Infrastructure investments may offer opportunities. In densely populated regions, extension of the railway network could reduce the burden that pre- and endhaulage traffic to terminals puts on the city road network (an example is the Alameda corridor linking port terminals in the USA-West Coast area). The investment in new infrastructure for short distance railway services can be justified if it is heavily used and if higher capacity is offered through new technologies. Investment in yet new roads does not offer higher capacity most of the times anyway, since new roads produce induced traffic.

Short distance intermodal services cannot exist by their own, without having the efficient collaboration of road services for the pre- and –end haulage or with other actors in the supply chain. Therefore the short distance operators need to establish strong and steady relationships with road hauliers.

Intermodal rail transport services are more common in the U.S.A than in Europe. So-called Shortline Services provide a variety of services to small distance operators. In practice, they more and more act as intermediary, providing railway access to local shippers and transport operators on one side and access to cargo to long-distance carriers on the other. Evolution towards this usage of short distance services started after US transport deregulation in the 70's and 80's. Afterwards it has been a slow process, starting from providing services in the niche markets, which were already well known by these local operators.

Shorter distance intermodal rail services in Europe have the potential to grow, although in a smaller scale than in the U.S.A. and mainly in areas where high freight flows exist, like in North-West-Europe. The most likely scenario is that the first step in the growth towards wide usage of

intermodal transport in short-distances will be made by establishing services in high-volume niche markets.

5.3.4 Opportunities for new operators and services in the field of small shipments in intermodal transport

In the first part of the project, PROMOTIQ Consortium underlined how intermodal transport for small shipments refers mostly to express shipments (parcels market) and to consolidation (or groupage) services of LCL (less than container load) shipments into loading units. Shipment sizes of the latter are between 3 and 24 tonnes. Consolidation is either undertaken by forwarding companies in their warehouses or at seaports in container freight stations.

PROMOTIQ Consortium's perspective has been designed to emphasise the opportunities in the field of small shipments in intermodal transport analysing the following factors that has been considered critical for the success of new initiatives:

- cost aspects;
- control on information flows;
- links to the emerging E-commerce market;
- the integration into a door-to-door transport system;
- information technology aspects;
- co-operation schemes between consolidators and intermodal railway operators and airlines;
- high quality (frequency and reliability) aspects.

The activity of consolidating cargo in itself is costly, since local distribution costs cannot be avoided, the document and information flow must be well-controlled and it requires additional unloading, regrouping and reloading activities. Therefore, the advantage of consolidating shipments is high if the size of shipment is small compared to normal truck sizes and if the distance to be covered is long.

Goods transported are generally of high value. Electronic products (computers and electronics, white products) and semi-finished or finished parts (for example car parts) represent a large share of this market segment. Quite often the flows of these goods are intra-firm or related to overseas import or export.

Because of its complexity, the market is dominated by large players. The possibility of major new entrants entering the market is remote, since high investments are needed to start a risky competition with the already established players.

The total volume carried in the market is high and the market is expected to become one of the largest growth markets. E.g. the emerging E-commerce market is expected to contribute much to the long-distance market of small shipments.

Intermodal transport, of course, is an alternative to road only on the links between (de-) consolidating points. The choice for intermodal or road transport therefore is not related to the consolidating activity as such. The fact that cargo in the consolidated units is diverse also puts a strain on the longhaul operation. For longhaul transport the consolidator is forced to offer a service level that satisfies the most demanding customer.

Most of the goods, especially in the parcel market, are carried by road hauliers. Their high flexibility is very much appreciated in this market segment. Also on other important quality criteria like time, reliability and possibilities for controlling the transport chain, road transport performs better than intermodal transport, especially if customers want to operate on a European-wide scale. One

should notice that to the customer, these quality requirements should be satisfied by the door-to-door transport system as a whole, and not necessarily by its individual elements, which means that the scheduled – and therefore inflexible – intermodal services still can be part of such a system.

Intermodal transport becomes advantageous if distances increase – because of potential cost savings, but also if warehouse activities are near (or at) terminals, and thus pre-/endhaulage time, costs and risks of delays are avoided. Intermodal transport must fit in the offer of the consolidators, which means that timing (i.e. scheduling hours) and reliability are important.

For intermodal transport to be attractive, a high frequency of services is sufficient. E.g. less than daily departures may keep consolidators away from using intermodal transport. In that case they have to split up long-haul operations on a corridor between road and intermodal transport, which may be less efficient than using road transport only. The frequency that can be provided by intermodal transport operators, is strongly related to the number of load units that can be transported. High frequent services therefore are only possible in high-volume corridors or in e.g. hub and spoke systems.

Intermodal transport has proven to be capable of acting in the groupage market. Some consolidators and road hauliers have been developing partnerships and are offering rail-road intermodal services through UIRR or UIRR-like companies.

Also in the express and parcel market opportunities exist. In this segment, intermodal air/road transport has been introduced. Opportunities can be exploited, if investments are made in the infrastructure of the consolidators. An example is the Gemini project in the UK, in which Parcel Force and Royal Mail heavily invested in two hubs at Coventry Airport, which have good access to the road, air and railway infrastructure.

Information technology is inevitable in this market. Each of the companies has invested heavily in their own tracking and tracing system. It goes without saying that the high level of control should be coped with by intermodal transport as well, if intermodal operators want to be integrated in the consolidators system.

In the Swiss example of “Parcel Post 2000” special load units are designed, which are very well compatible to both intermodal and road. Development of load units of “less than truck-sizes” would certainly improve interoperability in this market segment.

In the recent past, co-operation schemes have been developed between consolidators and intermodal railway operators and airlines. E.g. a partnership was established between DB Cargo and Deutsche Post. Much of the interregional demand of Deutsche Post is carried by DB swap bodies already, but the partnership will expand after launching the Parcel Intercity project, a German domestic high-speed railway freight service. Similar services will be provided by FRET-SNCF, on its Atlantique and Sud-Est high speed lines.

The parcel and postal market is likely to change drastically in the near future. Especially liberalisation of the postal market is causing many mergers, take-overs and other types of co-operation in the market itself and in related markets. The consequence is that also the position of intermodal transport in their systems will be reconsidered. If company sizes and their ranges of activities will increase, this could be considered mainly as an opportunity to intermodal operators to succeed.

In summary, opportunities in the market of small shipments can be exploited if intermodal operators can guarantee a high quality. For this market segment this means that the operator must be able to offer frequent and reliable services, is open to control systems of customers and especially in the parcel market services should be high-speed. In groupage, speed is important, but not as important as timing, since the main requirement is that the service fits in the operation scheme of the customer.

To be successful, intermodal transport operators should be in close co-operation with its customers: the consolidating companies. The strength of the customer is the performance of its system, in which intermodal transport should define its position. Preferably, logistic nodes (terminals or airports) should be closely linked to the warehouses or freight stations of these companies.

5.3.5 Opportunities for new operators and services in the field of new quality segments in intermodal transport

In contrast to the other PROMOTIQ issues, which deal with specific new markets or specific innovations in intermodal transport, this part of the project addresses improvements in already existing market segments. This seems justified as the by far largest volumes are carried in "normal" long-distance road/rail haulage between European destinations.

Market surveys and studies show that the intermodal market is not homogenous but falls into segments which can be characterised by different quality requirements set by the clients. So far, intermodal transport has gained only very modest market shares in those segments, which feature particularly high quality demands.

These high-quality segments have been defined by PROMOTIQ Consortium as follows (in accordance also with 4FP project IQ):

- ?? *High-quality time/reliability segment*, a segment in which requirements on time, reliability flexibility and control are dominant. Client groups are e.g. shippers and forwarders, operating in just-in-time systems, high-value goods and perishables.
- ?? *High-quality national corridor segment*. Time, flexibility and control are dominant. The group consists of subsegments of customer groups, but mainly road hauliers and forwards. Intermodal transport is used as a substitute in peak times.
- ?? *High-quality international segment*. Reliability, flexibility and control are dominant. Again, the road hauliers and forwarders are important customers, as well as maritime clients in tight round trip regimes. Intermodal transport is substituting in peak times or used regularly in specific high-quality corridors.
- ?? *New network integrator segment*. Integrators look for matches with their logistic structure and require a highly reliable service. Customers are large forwarders and network integrators like UPS.

Promotion of intermodal transport in these segments is partly achieved by common measures, and partly by segment-specific measures. In some cases the promotion of one segment would even work against the other segment.

Because some segments focus on a few high-capacity corridors, where others need a pan-European network, PROMOTIQ Consortium thought was necessary a more selective approach for the following elements:

- ?? spatial cohesion of the intermodal system: focus on high-volume shuttles vs hub/gateway systems for peripheral areas

?? sophisticated telematics and infrastructure measures vs modest approaches in more price-sensitive segments.

Strategies open to intermodal operators are:

- ?? to expand VAL services, which they are already providing, i.e. the transport, transshipment and management tasks in the intermodal transport chain
- ?? to take over VAL services provided by shippers (industry/trade)
- ?? to take over VAL services provided by transport/logistics companies
- ?? to develop completely new VAL services

Theoretically, the intermodal system could offer any VAL service. However, strategic considerations of intermodal clients, know-how levels and the competitive environment limit the range of potentially successful offers.

Promotion of intermodal transport in these segments is partly achieved by common measures, and partly by segment-specific measures. In some cases the promotion of one segment would even work against the other segment.

The most important common measures promoting all high-quality segments are the following:

- ?? volumes should allow a daily shuttle train
- ?? integrated liability system including performance guarantees by railways
- ?? integrated monitoring systems for rail transport
- ?? a stable policy promotion of intermodal transport
- ?? a new allocation regime of rail infrastructure: train slot booking should also be possible for intermodal operators
- ?? flexibility of train schedules: additional trains possible at short notice and more than one departure per day

Because some segments focus on a few high-capacity corridors, where others need a pan-European network, a more selective approach is necessary for the following elements:

- ✂ spatial cohesion of the intermodal system: focus on high-volume shuttles vs hub/gateway systems for peripheral areas
- ✂ sophisticated telematics and infrastructure measures vs modest approaches in more price-sensitive segments.

Transport has become an *integrated, subordinate element of individual logistic process chains*. Integration requires a high level of synchronisation, reliability, speed and flexibility to allow reduced and postponed inventories as well as fast consumer responses. To exploit opportunities to increase its market share in these high-quality segments, intermodal transport operators should not just offer services, and meet price and quality standards, but should also take the challenge of adding value by broadening their services.

Basically, new value adding logistic (VAL) services are conceivable and feasible in the following areas:

VAL information services (chain level)

Information is the precondition for control and management of economic activities. E.g. low-inventory strategies virtually depend on the real-time supply of information to avoid bottlenecks. This opens up opportunities for intermodal transport, too. One can think of VAL services such as :

- ✍️ real-time tracking and tracing systems for transport units or specialised cargo (e.g. reefer)
- ✍️ online booking and accounting (as pursued by the EU/UIRR Cesar project)
- ✍️ inventory information

These services presently exist only in a rudimentary way in continental intermodal chains but to a much higher extent in overseas container transport between seaports. A transfer of sea related solutions to inland transport could be examined.

European-wide offers of this kind would facilitate the integration of intermodal transport into high-quality logistic process chains, thus making new markets accessible, and increasing the value added in the intermodal system. A successful example is the intermodal operator CEMAT, who offers high-quality reefer swap bodies which features real-time satellite monitoring. In case of irregularities, immediate action is possible to save the cargo. This service level equals the level in road transport, where truck drivers cover monitoring tasks.

VAL load unit services (transport and chain level)

There are three types of VAL services related to intermodal load units that are conceivable.

- ✍️ The first one takes place at terminals and includes activities such as storage of load units, cleaning, repair and maintenance. In fact, this type is already common in the intermodal business and offered in most large intermodal terminals.
- ✍️ The second approach regards the intermodal unit as a “logistics box” serving as storage unit not only during transport but also at the factory and during production. These boxes are part of the entire material flow between production places. Therefore no transshipment is needed between the worlds of production and transport. The box would enter the factory synchronised by immediate production needs.
- ✍️ With the third type of VAL services, the intermodal operator owns the load unit and takes over its management and rotation. The ownership opens up new opportunities for VAL services of intermodal operators hitherto covered by their clients. One may even think of a “grey” intermodal box jointly owned by European intermodal operators.

VAL pre/endhaul services (transport level)

Presently, truck pick-up and delivery haulage at terminals (pre-/endhaul) is carried out on by own-account transport of shippers or by third-party road haulage companies. In principle, these services could be offered by intermodal operators as well.

Clearly, there are competition problems, because in some cases, road haulage companies would lose control over part of the transport chain. On the other hand, a neutral operator of pre-/endhaul may be attractive to shippers and multimodal forwarders who could reduce their vehicle fleet and seek for opportunities for productivity (truck rotation) and quality increases of this part of the transport chain.

VAL services generated by new terminal layouts and locations (transfer, transport and chain levels)

Many terminal studies pointed at the need of expanding the scope of services, which implies an upgrading of terminals to logistics centres or cargo traffic centres. Offering cargo oriented services at terminals, like inventory keeping, commissioning, pricing and, in the case of port logistics centres, even assemblage functions, and offering load unit oriented services such as container cleaning, storage and repair, will have an impact on the terminal layout.

Reconsideration of the location of the terminal could add substantial value to the transport system. At present, the short truck pre-/endhaulage is responsible for approx. 40-50% of the overall intermodal cost. Moreover, this activity implies considerable logistic efforts by shippers or forwarders because major time buffers need to be taken into account.

The intermodal system may take over this VAL service and considerably reduce pre/endhaul costs by simply transferring the terminal to the gates of the shipper. Low-cost transshipment techniques and small modular trains ensure efficient operation. Modular terminals that could easily be enlarged, reduced or transferred to other locations would increase flexibility and facilitate investment. The proximity of terminal and factory would also facilitate the transfer of storage and inventory functions into the intermodal system.

VAL consolidation/storage services (cargo, transport and chain levels)

Large industrial shippers need synchronised and consolidated material flows as factory input. These requirements are usually met by storage buffers or by just-in-time deliveries. Complex flows that require the consolidation and de-consolidation of supply flows used to be the domain of large road forwarders.

There is a potential for intermodal transport to take over some of these VAL functions. Some examples of company container trains for the automobile industry ("logistics trains") already exist. Here, the cargo, which is already consolidated, usually travels between factories.

It needs to be examined to what extent this approach can be expanded through new train systems. They include:

- train turntables*, where individual supply units for large shippers could be consolidated and feed the clients factories in close coordination between train operator and shipper
- new trains*, such as "cargo-sprinter" and small feeder trains as well as low cost transshipment techniques would be further important elements for small and medium-sized volumes
- more flexible timetables*, allowing more than one departure per day would be another element making it possible that the intermodal system takes over storage and inventory postponement functions in the supply chain.

These opportunities also apply to inland shipping. Low-cost barges, which are properly integrated into logistic process chains by information systems, could be scheduled according to production or distribution needs. This holds even more where traction unit and vessel can be separated as it is the case with large Rhine barges ("moving platforms").

To get a substantial share in the high-quality segments, just one or two isolated measures will not suffice. Rather, a combination of the measures in the field of services should be taken.

However, the base line to operate in these segments is the provision of reliable and, for some segments, controllable and time critical transport services. Therefore public actions to support the emergence of at least a core network on which high-quality can be guaranteed are recommended.

5.3.6 Opportunities coming from the integration of air transport into the intermodal transport chain

Air cargo is a small share of the total transport market in term of tons (less than 0,1%). However, it is growing in importance, because it requires high value added logistic services and because air transport volumes have been (and will be) rising significantly.

The importance of the airport services in airfreight logistics is illustrated by the low share of flight time. On average between 80 and 90% of the door-to-door transport time in such chains is related to airport operations and transport between the airport and the client.

Therefore, accessibility and competitiveness of the airfreight services are the most critical factors to attract new traffics of an international airport and airfreight hub. The ground transport system for air cargo requires high flexibility in terms of capacities and availability and good information supply possibilities, both before and during transportation.

The freight transportation by road adequately fulfils the requirements of a surface transport system and, therefore, constitutes the dominant means of transport to co-ordinate with air freight transport. This applies to both delivery and pick-up services and to air cargo trucking, i.e. road transport between airports.

Several of the main European airports are connected to the rail network, but only Schiphol and Rhine/Main airports are linked by intermodal services. At present, the share of the cargo transported by rail is only marginal.

To incorporate air cargo transport into intermodal chains, a high flexibility of the overland system is required, both in terms of capacity and availability. The current patterns of time-tabled trains do not fit into these requirements of these logistic chains. Therefore, the potential rail transport market share is estimated to be around 20% of the total air cargo.

Air freight transport has seen a rapid development. Some new initiatives for the integration of air cargo into the intermodal chain may be considered as a forerunner for many developments, since they create new opportunities to optimise existing services and to create new logistic services for new types of intermodal operators.

Four examples are elaborated:

1. *Amsterdam - Frankfurt/Main Aircargo shuttle.*
2. *Underground transport system in Amsterdam area.*
3. *"Cargo sprinter" system.*
4. *Express Shuttle GmbH.*

Common characteristics of the above examples are:

- ☞ There is a close formal co-operation between different companies (express service operator, air cargo forwarders, airport companies, specialised forwarders)
- ☞ New high value market segments are exploited (parcel and smaller shipments)
- ☞ There is an integrated system approach considering the productive-logistic chain as a whole (new door-to-door services).

5.3.7. Opportunities for new operators and services in short-sea shipping market

In order for SSS intermodal services in Europe to become more efficient and profitable several issues have been analysed. It is very important that European ports become connected in a SSS network where ports and suitable equipment will be available to handle efficiently the loading units transported by intermodal transport. This will be achieved mainly by building the necessary infrastructure after identifying the needs at all European ports.

The PROMOTIQ Consortium analysed the opportunities in the SSS market through the study of the following factors:

- ☞ Legal aspects;
- ☞ Technical aspects;
- ☞ Port technologies aspects;

✍️ New technology ships.

Optimisation in the SSS intermodal operators' business has been analysed focusing on the co-operation and competition between them. This is applied to all the classes of operators involved in a SSS intermodal transport chain (sea transport operators, inland transport operators and ports for example).

Interoperability (in legal and technical issues) in SSS operations plays a very important role. If combined with the standardisation of loading units, it can contribute to the minimisation of friction costs occurring at the port intermodal terminals. Another area possible for contributing to the optimisation of the existing services is the use of new technology ships, offering greater efficiency through higher capacity and higher operating speed, although there is a trade-off for their use because of their particularly high initial costs.

As far as the opportunities for the creation of new generation SSS intermodal services is concerned, these will mainly be developed through the use of new technology ships, the development of infrastructure at the ports and the introduction of new legislation by the EU, completing the already existing legal framework on SSS operations. The creation of new services means that new customers will be attracted to SSS intermodal transport, probably by taking them off road transport. Other possible factors contributing to the creation of new SSS intermodal services are the effective functioning and management of ports, the collaboration between ports authorities, shipping lines and the railway operators. Relevant on-going research funded by the European Commission as well as future programmes are important in order to identify the inefficiencies in the functioning of SSS intermodal transport chains and lead to the creation of new services through the elimination of these inefficiencies.

Optimisation in the SSS intermodal operators' business can mainly come from the co-operation and competition between them. This is applied to all the classes of operators involved in a SSS intermodal transport chain. Sea transport operators must be in close co-operation with inland transport operators and especially with railways. This should also happen with sea operators (e.g. between container feeder operators and intra-European Lo-Lo and Ro-Ro operators). These collaborations are sometimes difficult for various reasons, but their effects on the quality of service to the intermodal customers are certainly very important and therefore worth proceeding. The use of new technologies is certainly very important in optimising the services provided by the operators, although their high initial cost has to be justified.

As far as the creation of new generation operators is concerned, these can become from the collaborations (alliances, joint ventures, etc.) of the existing operators. These collaborations are happening and are expected to be more in the future and they are formed between operators of different types (railways and ports for example) or of the same type (shipping lines). The collaborations refer to the operation side of the business or simply for exchanging information regarding their services.

Possible scenarios for the future development of SSS intermodal transport in the EU have been given, based on the existing trends but also on experience of the researchers taking part in the project. These scenarios are dealing with the concept of fast ferries, the use of OITBs, the collaborations between operators, the deregulation being brought by the relevant EU legislation and also the role of the SSS market actors in the creation of new SSS intermodal services and operators and the future of the SSS intermodal share in the European freight transport market.

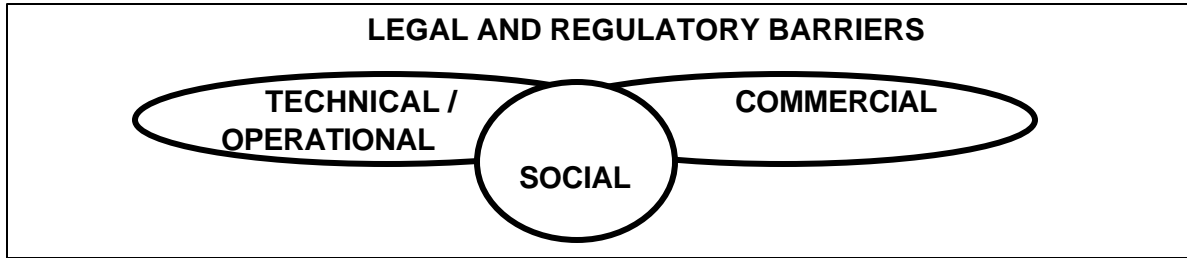
5.4 Identification of the barriers to the introduction of new generation of intermodal services and operators

5.4.1 Introduction

The objective of this part of the Project is to identify the technical / operational, commercial, social, legal and regulatory barriers hampering the introduction of new generation of intermodal services and operators as regards the issues and opportunities defined within the first parts of Promotiq.

The original structure of the workpackage 3 was to analyse independently different kinds of barriers : technical and operational (task 3.1), commercial (task 3.2), social (task 3.3), legal and regulatory (task 3.4).

But, as close interdependencies and interrelationships exist between the different types of barriers (especially the technical/operational, commercial and social ones ; the legal and regulatory context establishing general rules to regulate the whole transport market), the tasks



3.1, 3.2 and 3.3 have been analysed commonly per issue, hence the new workpackage 3 breakdown :

LEGAL AND REGULATORY BARRIERS (Task 3.4)	
Tasks 3.1, 3.2, 3.3	ISSUE 1 : RAILWAYS AS TRACTION PROVIDERS ISSUE 2 : SHORT DISTANCE INTERMODAL TRANSPORT ISSUE 3 : SMALL SHIPMENTS IN INTERMODAL TRANSPORT ISSUE 4 : NEW QUALITY SEGMENTS ISSUE 5 : INTEGRATION OF THE AIR TRANSPORT INTO THE INTERMODAL TRANSPORT CHAIN ISSUE 6 : NEW TRENDS IN SHORT SEA SHIPPING

The identification of the different barriers, hindering the introduction of new intermodal services and operators, was realised in correlation with the results of the Promotiq workpackages 1 and 2 but also of the IQ and LOGIQ projects, respectively studying the quality of the intermodal terminals and networks and thus of the services (IQ) and the process of the decision-making in using intermodal transportation (LOGIQ).

5.4.2 Barriers to new services and operators in the railways as traction providers

Many investigations and commentaries have noted the difficulties that face new entrants to the railway traction sector. PROMOTIQ Consortium’s methodological approach underlined the importance of barriers that embed the competitiveness problems of new services and operators.

PROMOTIQ researchers analysed the freight transport railways sector and indicated the following barriers as the critical ones and therefore researchers studied in detail the consequences of each of them:

Institutional: uncertainty about rail liberalisation, institutionalisation of existing actors, the way of prioritisation of existing capacity;

Infrastructural: train capacity, route accessibility, gauges and train length;

Economical: track access cost, who pay the gap between marginal cost and full resource cost; high investments for terminal implementation for diffuse traffic, trade-off between multifunctional intermodal sites and transfer sites;

Technical: undercapacity of the rail network, heterogeneous gauges, not adapted terminal interfaces access, terminal not inserted within industrial poles.

The White Paper is an attempt to decouple the provision of services from track capacity management. There has been considerable reluctance in some of the member Railways of much of the EU to move even to this position with technical, administrative and competency arguments foremost. Underlying this reluctance are two main issues. The first is the competency of the

nationally owned railway companies to undertake commercial or quasi-commercial operations. Separating track from operations places a considerable burden on the established and new actors to find and develop new administrative, financial and operations practices. It is not yet clear that these are developing in a helpful way for potential and existing intermodal rail traction operators. The second is the particular way in which liberalisation and open access is organised in and between each country. In principle moves towards open access would help new entrants but a major challenge, even for established national operators, are trans-national intermodal operations. If liberalisation takes radically different forms in different countries the barriers facing new entrants will be formidable and the situation would tend to favour the status quo (existing large-scale national operators).

The UK is often quoted as an example of the most privatised railway system in Europe. The particular policy imperatives that underlay that privatisation resulted in a particular structure which is highly fragmented and it is still unclear as to the balance of private/public interests. Recent observations by Railtrack have argued, for instance, that it cannot see rail freight ever covering its costs in a way that yields a profit to Railtrack. It calls for a “new economic architecture” which more explicitly recognises the social/environmental benefits of transfer of freight from road to rail. This can be interpreted as a bid for social/environmental benefits to be financially paid for at the point of track usage.

A significant set of barriers involve institutional aspects of traction provision at a number of levels. Issues vary from those involving the EU and national governments to the need for regulation of the second-hand market for locomotives. One of the potential institutional/commercial barriers to long term entry is that the process of privatisation will favour a set of recognised and favoured freight operators, often quite large. It is probable that a large proportion of the growth in rail freight and intermodal traction provision will arise from organisations with increasing economies of scale and connectivity. However, the constant presence of small operators to detect and develop unusual, small and niche markets is essential. Therefore, the bureaucratisation of liberalisation could mitigate against a new set of intermodal entrepreneurs of competitive traction markets. The different models of liberalisation of access in each country could threaten trans-national operations because it will generate an unnecessary increase in negotiations and transactional costs. The institutionalisation of existing “actors”, national operators particularly, could inhibit small scale entrants both short and long term.

Furthermore, the growth in demand for passenger and freight paths on existing infrastructure has led to fierce debates about prioritisation of existing capacity which may be unfavourable to freight and intermodal operations. Of concern is the differential affect on different scales and scope of intermodal operations.

Moreover, the institutional and political uncertainty creates barriers to new entrants and to long term planning and access to finance of established intermodal traction providers.

One of the barriers to new entrants and small growth operators is the management of the second-hand market for locomotives, which in the UK has had to be partially regulated.

Finally, the control of safety cases by the infrastructure manager could be differential with respect to different types of operator and may fail to generate economies of scale in safety management authorised operator and bidding.

Infrastructural issues overlap with many others. That is because most of the infrastructural barriers facing traction providers are to do with access and costs and thus more to do with institutional arrangements and economics. Operators are mainly involved with infrastructure in terms of physical properties of routes and how they affect train performance and with the provision of terminals. Issues to do with terminals are largely economic, social and environmental.

Indeed, technological, economic and path capacity barriers can be generated by route up-grades to higher (usually passenger) specifications than needed by freight. The train capacity barriers may occur differentially to different operators depending on routes selected for gauge enhancement.

The route accessibility and thus service performance barriers may be generated by selective route enhancement.

Finally, the train length barriers may occur differentially to different operators depending on routes selected for gauge enhancement and new track capacity. This may affect both operations and revenue per train.

Commercial barriers are most commonly associated with institutional, economic and technical barriers. There are some interesting examples of commercial interdependence in supply chains and of a wide range of lease/hire arrangements. None of these appear to form barriers in the UK situation although they might elsewhere in Europe. One of the key commercial barriers has been uncertainty about the institutional and regulatory environment as distinct from conventional business risks associated with the market. Uncertainty has been dealt with in respect to the relevant topic.

For instance, the small operators have severe barriers associated with access to capital and therefore access to the most up-to date and efficient equipment and smaller hire/lease companies are involved in the second-hand locomotive market and in the hire/lease market. Their ability to function in these markets depends on the commercial availability of redundant stock and a set of niche and short-term markets for use of equipment.

Within the privatised context of the UK, many of the economic aspects are reduced to commercial issues for private operators. However, a number of commercial barriers might, in other contexts and countries, be considered as economic. More general issues of the effect of intermodal traction providers on sectors of the economy are clearly relevant but there is virtually no evidence available of the effect of traction providers on these. There are, however, some economic barriers, such as the provision of access grants and subsidies, which are fundamental in intermodal rail economics.

With track access costs such a high proportion of total operating turnover, and probably a higher proportion of total train operating costs, it is not surprising that traction providers express concern about them and the way in which they are calculated and paid for. Attention has also been drawn to the barrier of track access costs for new entrants and during restructuring of national railways in the EU White Paper.

The access cost barriers could be generated by full cost pricing new track capacity. The arrangements for meeting the economic gap between marginal social cost pricing and full resource cost of the network are uncertain. Who pays that difference and at what point in time will have a profound effect on the potential for rail traction providers and intermodal growth.

Moreover, there is a relationship between viable intermodal traction provision and terminal density and network connectivity. Where specific flows between single origins and destinations is relatively high, as for inland maritime container movements, simple route structures and a small number of terminals are sufficient. Where markets could be more spatially diffuse there, are barriers arising from the need for large numbers of simple terminals and high levels of network connectivity.

There may be also a trade-off between the benefits of large scale, multi-functional intermodal sites within sophisticated logistical chains, and a large number of simple intermodal transfer sites.

Technical barriers are seldom simply intractable engineering problems. They normally involve problems of access to knowledge and experience. In many other sectors considerable effort is being put into understanding the knowledge as sets of organisations and knowledge management. The evidence here (and in the passenger rail sector) is that technical and operation knowledge is an essential component for rail traction providers.

Indeed, there are barriers of operational, technical and regulation knowledge with respect to the performance, operation and maintenance of locomotives. More experienced companies will suffer these less than new entrants. The lack of extended networks of contacts and suppliers of equipment and services are a barrier to efficient and innovative operations.

There is also an uncertainty barrier about future standards and inter-operability of rolling stock, about speed and loading gauge changes and therefore about train speeds and rolling stock design.

Finally, three main areas of social barriers can be considered. Again, these overlap with other types of barriers. Social problems of loss of amenity associated with terminals also can be considered as an institutional barrier (planning and environment). The employment issues within traction provider companies overlap with commercial issues. The impact of employment between rail and road can also be considered as an economic issue. There is little evidence about the social and spatial impact of intermodal transport in terms of employment. Increases in rail based freight will reduce demand for lorry drivers, management and maintenance staff and ultimately in vehicle manufacturing. Corresponding increases in railway staff have not occurred since inefficiencies in staffing are a major target for private operators. However the maintenance of locomotives, rolling stock and infrastructure and related training are likely to generate demands for skilled labour. A barrier that might arise is in the geographical distribution of these skills.

The barriers to terminal development due to loss of amenity to local people is offset by increase in amenity due to road traffic reduction but is not spatially uniform. Spatial equity of amenity and environmental benefits is a related issue. These benefits are differentiated by where in the road system the number of trucks is reduced.

An important employment barrier is the combining of efficient utilisation of capital equipment with progressive terms and conditions for train crew.

A more constructive and progressive industrial relations environment has aided this in the UK. Similar circumstances have already been achieved in some EU countries but some national railways still have difficult industrial relations in the railway industry.

Under conditions of growth and relatively high employment a further barrier will be employment costs and availability of trained crew.

Provision of technical and operations training may be a barrier to small operators or new entrants.

5.4.3 Barriers to new services and operators in the short distance intermodal transport

The provision of personalised and proximity products implies an increase of the ratio quantity X frequency as soon as a next step within the logistical chain is achieved, hence the importance of the short distance flows (80% of the European traffic is exchanged around 200 kms).

PROMOTIQ researchers subdivided the short distance flows in three kinds of traffics:

- 1 the cross border exchanges
- 2 the regional distribution flows that are of two types:
 - a) Industries – consumer flows
 - b) Intra industries transfers.

The different technical, commercial, economical and social barriers are analysed for each type of traffic.

The cross-border exchanges

Due to the time-sensitivity of the sub-segment, the major constraints is to combine efficient rail operating systems with terminals operations to offer a competitive transit time and flexible solution to allow high service frequencies.

In addition, the intermodal alternative suffers, on the one hand, of high rail traction rates, and on the other hand, of an under-capacity of the rail networks traduced by important congestion within the dense areas ; the artificial increase of the capacity being hampered by European gauges incompatibility.

Furthermore, the lack of interconnection and interoperability at a technical / operational and human level penalizes, in terms of time consumption, the short distance intermodal transport.

As regards the constraints linked to the terminal operations, the access rail network – terminal and shunting operations, the performances of the transshipment equipment and organisation and the road access interface constitute the major barriers to efficient intermodal transport services.

Regional distribution / inter-regional flows

The market penetration of intermodal transport on this segment is low. Indeed, this traffic is high time-sensitive and fragmented in case of interplant and industries-consumers flows, whereas for intra-transport transfers, intermodal transportation could largely be competitive even if some constraints may be overcome.

a) Industries-consumers flows

The major constraints for freight flows are more the rail network congestion and the problem of the flexibility of the transport system because of the high customers requirements in transit times and because of the fragmentation of the market.

The barriers linked to the terminal operations are similar as for the cross-border exchanges.

b) Intra-transport transfers

The technical / operational barriers linked to these types of traffic do not differ really. To be efficient and competitive, these kinds of transport have to be operated by frequent shuttle or block trains or barges-shuttle (for the inland navigation).

The success of the services are completely dependent upon the flow volume and the infrastructure availability, the configuration of the harbours and seaports zones and on the rail or inland waterways networks.

Indeed, the maritime harbours and ports suffer of bad rail connection (track length insufficient, not enough tracks number, electrification systems incompatible with the rail standards, congestion).

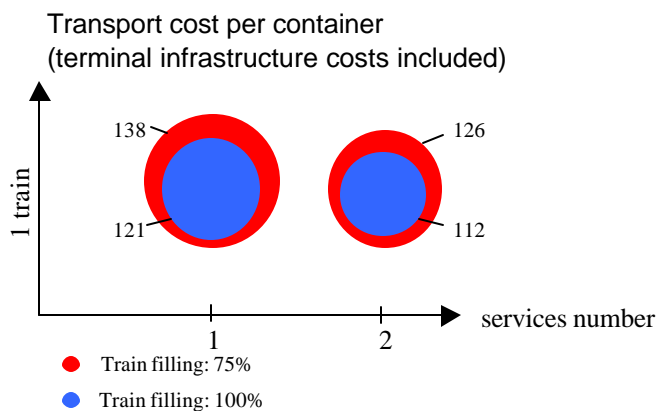
Furthermore, the volume of traffic may enable the operation of longer and heavier trains in order to be economically more competitive but the rail networks gauges do not allow it.

At the level of the inland waterways, the major constraints are the access to the seaports (lack of infrastructures, gauges, lock crossing), the gauges as regards the draughts and lock hampering the increase of the barge capacity, and the vessel priority at the harbours or the lack of specialised facilities at the seaports.

Commercial barriers

On the one hand, the high competition existing on these segments reinforces the balance of power of the demand vis-à-vis the offer ; hence a necessary increase of the performances (transit times, flexibility, reliability) and a supply of added value services (stripping&stuffing, transport monitoring) at a low price in order to be competitive by comparison with the road haulage.

On the other hand, the development of new intermodal / rail services and entrants is hampered by the constitution of large co-operations between rail traction providers and intermodal operators. This trend is linked to the fear of the total market liberalisation and the volume constraints of intermodal transportation in order of produce economically viable services.



Indeed, the structure of the costs and the charges for the operators imply an important need in cash flow, which can discourage new actors to entry onto the market ; hence the complex financial structure of the intermodal transport companies emerging by hauliers and enabling thus to split the financial risks between shareholders.

Social barriers

The introduction of new intermodal service and actors onto the short distance market may imply an impoverishment or / and a bankruptcy of the small road companies (less than 20 employees and particularly the driver-managers), redundancies of the truck-drivers more than the administrative and commercial personnel due to the development of the forwarding and logistical providing function and of the sub-contracting to intermodal transport operators and small road hauliers and redundancies in the vehicles manufacturing and maintenance sector.

5.4.4 Barriers to new services and operators in small shipment intermodal transport market.

The globalisation of the economics and the individualisation of the services lead to the development of new transport markets requiring the supply of global services, otherwise integrating the technological, logistical and commercial functions and personalised services.

This trend implies directly the reduction of the unit volume of the consignments and for socio-economical reasons, the decrease of the transit time.

PROMOTIQ researcher subdivided the market segments in two sub-segments:

the groupage;

the parcels services and express

For each sub-segment of small shipment market segment the technical, commercial, economical and social barriers are studied.

Groupage

The groupage traffic is one of the most important exchange pole in Europe. Combined transport has still broken into this transport market, especially through the initiative of the road hauliers having developed partnerships to create their own combined transport companies (UIRR members).

Nevertheless, the access of combined transportation on this market is hampered by technical / operational and commercial constraints.

First of all, at a technical level, the containers standards do not allow the frontal loading of pallets, whereas this packaging is particularly used by the customers for this kind of traffic, and which implies a transport volume loss.

At the same level, the too frequent rail bottlenecks do not favour the utilisation of intermodal transportation.

At an operational point of view, the lack of flexibility of the rail haulage is a major barrier and particularly the lack of polyvalence of the personnel, the time scheduling and cut-off-times of the trains and the multiplication of the intermediaries within the transport chain.

Finally, because of the intensive competition existing within this market segment, combined transport operators must provide added value services and especially a constant monitoring of the goods and a stripping & stuffing of the boxes at the same service quality as the road haulage.

At a commercial level, in spite of the high rail rates, the offer of door-to-door services by intermodal operators is a barrier for the road hauliers and forwarders (potentially customers) for competitive considerations. Moreover, the globalisation of the intermodal offer is not well perceived in the sense that the combined transport operators are not well seen as specialist but more as generalist and then as not impressive carriers.

2. Parcels services and Express

The penetration of the parcels services market segment is an important stake for combined transportation because of the high potentialities of the segment in terms of volume and revenues, due to the intensive development of the e-commerce.

However, this market segment is difficult to catch for the combined transport because contrary to others segments, the integrators and operators of the sector do not sell transport but TIME.

This time sensitivity necessitates the implementation of an integrated network organisation to provide a seamless service at the lowest price as possible.

Therefore, the high requirements in terms of transit time (12 – 24 hours in door-to-door services for the overall Europe and 48 hours for the remote regions) is a first limit to combined transportation utilisation because that implies the use of a flexible system able to overcome any hazards.

And the flexibility of the system is hampered by time-consuming operations ; as the stopovers at intermediary terminals or nodal points due to the necessary shunting operations, and by incompatible transport windows with the customers requirements, which leads to a lack of efficiency and reliability of the intermodal transport chain.

Furthermore, the lack of interconnection between rail network electrification systems and the terminals ones implying a locomotive change, is a major constraint because means a disruption of the chain.

At the level of the terminal itself, the opening hours and days of these structures do not meet at present the integrators needs (late evening pick-ups and early morning deliveries). According to the integrators, more flexible freight terminals will make shorter linehauls commercially feasible and take a lot of vehicles off the road.

Moreover, the integrators deplore the lack of airside capabilities at the rail terminals, which would allow direct transfer of material between air and rail, whereas secondary road movements were necessary.

Finally, at the level of the rolling stock, their lack of multimodal homogenization (especially between air and rail) does not facilitate the inter-mode transfer, whereas the rail haulage could position itself as a pre- and endcarriage mode of the air mainhauls.

Within a commercial view, the supply of added value services is essential because of the character of the traffic : small volume, hence the provision of stripping&stuffing services and because of the customers requirements : express delivery, hence the necessity to use efficient information systems to enable a constant transport monitoring and to be reactive in case of hazards.

Social barriers

For the groupage sector, redundancies are expected:

- ✂✂for the administrative, commercial and technical personnel redundancies in proportion of the turnover loss within the medium and large enterprises;
- ✂✂for the drivers.

Bankruptcy of small companies are inevitable because generally the groupage is the nodal point of the flows and of the revenues. Furthermore an impoverishment of the small companies may be foreseen because these last are obliged to support the decrease of the prices due to the higher competition and new restrictions.

As regards the express sector, creation of employment may be planned particularly within the integrators bodies and even if redundancies of the road staff are foreseen, a reconversion or a transfer is possible at the integrators.

In any case, indirect employs will be cancelled : vehicles manufacturers, maintenance personnel and economical consequences for services companies are conceivable (c.f. consequences of the closing of the Mont Blanc tunnel)

5.4.5 Barriers to new quality market segment in intermodal transport

PROMOTIQ Consortium underlined that intermodal transport has to overcome a number of barriers and obstacles before it will obtain major shares in high-quality market segments.

Four segments could be identified which the measures should address:

1. the high-quality time/reliability scenario ;
2. the high-quality national corridor scenario;
3. the high-quality international scenario;
4. the new network integrator scenario

The large potential markets of segments 1, 2 and 3 are only marginally developed. In some cases time or price levels are simply too demanding for intermodal and can only be served by road. Segment 4 is a new segment which fits quite well into the profile of intermodal transport but has not yet been developed.

Segment	Main customer groups of goods characteristics	Size of the market	Present market share of IT
1. High-quality time/reliability	Perishable and high value goods, shippers-forwarders in just in time systems	Large	Very small
2. High quality national corridor	Subsegments of all customers groups but mainly road hauliers and forwarders	Very large	Very small
3. High quality international	Subsegments of all customers groups but mainly road hauliers and forwarders and maritime clients in tight round trip regimes	Very large	Small
4. New network integrator	Network integrator (e.g. UPS, large forwarderw)	Medium	Close to zero

PROMOTIQ researchers analysed the different requirements that each of these segments require as regard the entry of new operators, the focus on shuttle trains, the focus on domestic vs cross-border transport and as regards the quality profile in the dimensions of reliability, flexibility, control and price.

For each subsegment the institutional, technical, economical and commercial barriers are studied.

It has become clear that one or two isolated measures will not suffice to remove the critical barriers and obstacles. Rather, an integrated approach addressing several fields at a time is crucial. A combination of measures in the field of services, operators, infrastructure and policy is necessary to lift intermodal quality to an attractive level.

The following obstacles need to be overcome altogether to meet *at least minimum* requirements for the high-quality segments:

- ?? **The long-term vision of intermodal policies:** The course of the intermodal policy is important for all four segments. Unexpected policy changes (e.g. regarding the exemptions of pre/endhaul hauls, Swiss transit policy, rail liberalisation, no success in road infrastructure pricing and rail freeways) deter any long-term investment of potential intermodal customers.
- ?? **Minimum intermodal transport volume on a given link and the use of shuttle trains:** It is highly important for all four segments that the link volume allows daily shuttle or block trains. Inferior train forms would jeopardize the quality of the intermodal offer in terms of time, flexibility, but also reliability and price. This holds esp. for Segment 2 and 4.
- ?? **European approach to a low-cost approach for rail slot pricing:** The present trends in rail slot pricing are a major threat to intermodal transport. High-price regimes make it virtually impossible for high-quality trains to compete with trucks in the segments 2,3,4.
- ?? **A liberalised regime of train slot allocation:** At national but especially at the international level, long and complex allocation and pricing procedures prevent the combined transport operators to easily respond to markets requirements. For high-quality segments it is important to have direct slot access (new operators) or direct bargaining power when negotiating with the intermodal operator. Unexpected and not negotiable changes to schedules and tariff systems by railway companies - as often observed in the recent years - are a high risk that deters many potential customers.
- ?? **Improved rail links between terminal and main rail line:** An important obstacle to high quality links is the short connection between terminal and trunk rail line. Studies have shown that the short rail links between terminal and main rail line is often characterised by operational, organisational or technical problems.
- ?? **Market entry of new intermodal operators:** A number of new operators have disappeared from the market over the last couple of years. Hardly any new company takes chances any more. This is due to low intermodal growth and fierce price competition through existing large operators. Moreover, railway companies and interlinked railway authorities find many reasons to delay licenses and impose costly regulatory demands. These trends are negative for high-quality offers because new operators, who feature closer links to transport customers and their individual wishes (or customers that become operators themselves), would be in a better position to develop dedicated offers (Segment 1), to be more flexible (Segment 2), exert a higher level of control and reliability (Segment 3) or develop their own European network as new operator (critical for Segment 4).
- ?? **The course of strategies of railway companies & railway liberalisation:** The strategies of railway companies can be another obstacle to intermodal growth in high-quality market segments. There are a number of threats such as: commercial strategies may lead to the close down of a number links (barrier for segment 2); a roll-back strategy involving the re-integration of intermodal activities (or the old public service approach) into the railway monopolies could reduce market flexibility and control levels (segments 1,2,3) , the market entry opportunities for new competitors (segment 4); also, the revival of conventional rail transport is attractive for railway companies since here they control and operate a larger part of the transport chain, which increases their revenue share; for intermodal that could mean reduced investment and a thinning-out of the intermodal network; the strategic downgrading of intermodal in the railway portfolio would mean more or less an end to any major investment in that area

- ?? **Price levels in road haulage:** This last point is out of the scope of this study but nevertheless the most important single issue for the future of intermodal transport in Europe. Ever-falling price levels on European roads will stop further investment and the development of new market segments in intermodal transport.
- ?? **Social barriers:** The transition to higher levels of flexibility, efficiency, control and privatisation are likely to be delayed by social problems. The main barriers could be the transitional loss of quality due to organisational or technical innovation and increased working stress, as well as passive or active forms of resistance by the labor force due to the threat of unemployment and deterioration of working conditions.

5.4.6 Barriers to the integration of the air transport into the intermodal transport chain

On the one hand, the integration of intermodal operations with air-freight must be based on the combined elements of costs and services.

On the other hand, the transfer between air and other modes at airports creates friction costs. These costs include time cost and resource costs. In addition to these friction costs the issue of unit load devices and packaging may be present.

The institutional, technical, commercial and economical barriers are studied in detail in order to present a quality indication of the costs of the integration of the air transport into the intermodal transport chain.

Transferring consignments from an air container requires appropriate space and equipment for stuffing and unpacking. Further transfers from the unloading location to storage are likely. Conceivably further stuffing for onward movement may be necessary. Some commentators suggest the handling friction costs can amount to 50% of the total resource costs (depending on the type of consignment).

The institutional barriers occur in three ways. There are those which arise from the rail sector itself and the problems associated with liberalisation and access to the network. As for other intermodal situations great demands are also made on the ability of companies to collaborate and co-operate. This requires them to not only form alliances but to be able to accept the cost/performance trade-offs that are generated from truly holistic logistical chain development. The third area is that of technical compatibility. This occurs in the design of ULDs (most of these issues are noted in Technical barriers) and in compatibility of information and tracking systems where institutional collaboration will be essential.

Concerning the infrastructural barriers, one of the key issues is the rail access to airports. Less than half of airports have any form of rail access and very few have rail to within a short distance of air freight handling. Without a suitable rail infrastructure nothing rail based intermodal cannot be developed. The technical problems are not severe although the engineering could be costly. Most of the issues are about the economics of such links, particularly since traffic may be well below capacity in the first years. In this area the availability of grants or subsidies for infrastructure could be of importance. The second infrastructure issue is about infrastructure facilities at the airport for handling freight prior to the physical air/rail interface. Handling problems at that interface overlap with technical barriers of ULDs although the physical movement equipment is likely itself to be conventional.

The commercial barriers are partially about factors that affect pricing and hence revenue, or cost management. These overlap with economic issues since the economic context will determine commercial decisions. In this respect the rate of return required on capital and whether that is at purely commercial rates or at social rates is relevant. Other commercial issues revolve around trade-offs within the service design and technical interfaces. There is an interaction also between

technical issues of ULD compatibility and operation management. Finally, the ability of the rail traction provider to offer an information system, which is compatible with air transport and just as good, may be a barrier.

Indeed, a barrier will exist when there are differences in required rates of return and differential access to capital at different rates.

Furthermore, the operating costs of rail for small loads at frequent levels of service generates operating cost and revenue barriers

There is also an unfavourable trade-off between unit costs of rail, train length and frequency

In addition to the commercial risks there are additional uncertainties about how liberalisation of railways will develop and the affect this will have on subsidies and on track access costs.

As might be expected economic barriers overlap with commercial barriers as well as with technical, infrastructural and institutional barriers.

The trend towards freight with a higher value:density ratio and towards smaller consignment sizes is in the opposite direction to that which favours conventional rail container operation

Moreover, there is at the moment no strong evidence that air traffic will concentrate on a limited number of large multi-activity hubs. The scale effects that would lead to more viable rail operations are therefore not necessarily developing as favourably as possible.

The accessibility of the air freight services to the origins and destinations of consignments is crucial in the development of new cargo traffic at an airport or airfreight hub. The spatial pattern of true origins and destinations may not map well onto the relative locations of airports and the rail network.

One other significant type of barrier is that of “friction cost” at the intermodal terminal. This presents issues not just of cost but because of the time sensitivity of air freight; transshipment and handling speed is a critical factor. This is not just the case at the airport but applies to the origins and destinations where flow rates may not justify sophisticated systems.

Furthermore as the cost of the track (per km) is fixed, it will take some time for traffic to move to rail sufficiently to exploit its capacity (if at all). The time delay on return on investment could be a barrier to commercial interests.

Finally, some airports may never generate enough overall air freight for there to be a viable rail operation even under the most optimistic estimates of market share for rail.

Most technical barriers interact with operational issues and thus with economic and commercial issues. However, some technical problems, such as those to do with compatibility of systems or equipment require institutional intervention for them to be resolved. Some of the technical barriers concern rail vehicle technology. Conventional wisdom on rail operations favours large point to point flows of relatively heavy products. The possibility of designing shorter, lighter train technology, or exploiting variations on passenger vehicles (as for RailExpress and CargoSprinter) opens up the potential for more frequent and spatially dispersed operations.

For instance, the spatial dispersion of origins and destinations creates a difficulty in designing train operations and origins and destinations may be remote from current railheads and the flow rate may not justify further rail connections and terminals leading to time consuming collection/delivery systems.

This consolidation process will also consume time and in conjunction with an intermittent service offered by rail lead to a longer door-to-airport time.

Moreover, viable commercial operations may require access to specialised rail vehicles such as CargoSprinter thus reducing the access for small operators and new entrants.

An other technical interface that could prove a barrier to intermodal transport is the compatibility of unit load devices (ULD) and the friction costs between modes and the efficiency of movement of consignments between aircraft, rail equipment and road vehicles is critically dependent on the use of ULDs.

There is a need to for compatibility of ULDs with all modes including air and how standards can be developed to help all intermodal movements. Rail operations are constrained by the need to use ULDs. Wagons need to be capable of carrying the various designs of ULD used by the airline industry or ULDs appropriate for the range and type of consignments found in airports. Finally, rail suffers from the length of trains, which requires frequent movement of the train, or a long space (and movement) required for unloading.

The creation of new intermodal services will require extra employment for the new services both for any construction activity, vehicle assembly associated with its introduction and its operation. Airports provide dense concentrations of employment concentrated on the periphery of cities; wage rates are often higher than surrounding areas and labour can be difficult to attract. Whilst this may create a barrier in terms of attracting labour at an acceptable wage to intermodal facilities located on the airport this is not reported in the case studies or in other reports as a serious constraint. Any move to intermodal services implies some reduction in, for instance, road services to and from airports. This reduction in employment in the road freight industry could be regarded as a barrier, though resistance in this industry is likely to be muted given the general upward trend in the demand for road freight services. The *net* effect on employment clearly depends on individual circumstances.

At the same time the development of new intermodal routes and their accompanying services linking an airport to its hinterland may be inhibited by social and environmental barriers. New routes can be accompanied by environmental costs concerned with noise and visual intrusion. When, however, the net effects over the whole transport network (where there will be a reduction in road traffic) are taken into account then intermodal solutions will be favorable.

5.4.7. Barriers to the introduction of new services and new operators in short sea shipping

As regards the short sea shipping market PROMOTIQ Consortium's study approach started considering the first type of barrier that is the port network and the connectivity of the network.

The other phases of the study included the analysis of the technology of loading and unloading, the ferry performance, the efficiency of port operations.

The study analysed in detail how the following factors can influence the overall performance of the short sea shipping:

- ✍️ technology for handling vehicles;
- ✍️ technology for handling load units;
- ✍️ restrictive practices in port operations usually affecting cargo handling (these might be legitimately referred to as social barrier).

In the short sea shipping intermodal market PROMOTIQ researchers considered the technical and commercial barriers as the ones that necessitates a more detailed analysis compared to institutional, economical and social ones.

As regards the networks, the first barrier that can be addressed is the concerned with the network and the connectivity of the network. This depends on the availability of ports and even more crucially the availability of suitable equipment for the efficient connection of modal networks. In terms of connections to the road network all ports can be considered to have adequate if not always congestion free connections. In the case of links for Ro-Ro rail ferries there are many ports (particularly in the Greece-Italy corridor that is the subject of one case study) that do not have a

suitable rail connection to the port (with in some cases gauge differences). In other ports suitable equipment does not exist for unloading and loading trains (or their wagons) from vessels. This clearly restricts the feasibility of developing new services. The considerable expense that is incurred if these facilities are to be introduced ensures that this lack of connections creates a serious barrier to the development of Ro-Ro rail ferries.

A further factor that is relevant only to rail is the technology of loading/unloading. Access from the vessel to dockside involves the use of ramps that not only have a horizontal dimension but also allow the vehicles to access the ship in a vertical dimension depending on the state of the tide. In the case study areas of the Baltic and the Mediterranean this is of no serious consequence; in the routes between and within the British Isles the large tidal change requires expensive equipment for long ramp access and can under some circumstances limit the time window available for loading and unloading rail wagons.

Concerning the ferry performance, the Minoan lines case study specifically identified speed as a critical barrier that inhibits the attractiveness of short sea shipping. The speed of vessels is a technical barrier that may be overcome to some extent by the emergence of the new design of fast ferries. Most of these new vessels are **Ro-Pax** with a high (relative to older vessels) capacity for passengers, cars and freight vehicles. The fast ferries are not restricted to the Ro-Pax market. KARVOR offers a very flexible means for loading and unloading cargo either Ro-Ro or Lo-Lo.

Speed *per se* is of more concern to ferry passengers rather than freight traffic. However increasing speed is closely connected to vessel operating cost. Higher speeds make better use of assets with faster turnaround times, but, on the other hand, speed is bought at greater cost particularly in terms of higher energy consumption per km and to a lesser extent higher capital costs of motive equipment or ship redesign. Higher speed will not therefore overcome cost barriers that might exist on lightly used routes (as it increases the cost for individual shipments) or lengthy routes (compared with for instance the more direct road alternative).

Whether speed or cost is regarded as barriers therefore depends on individual circumstances and the availability of alternatives.

The cost barrier can be further reduced by adoption of automation in operations which replaces crew when the ship is underway. Although this promises only a small reduction in cost it faces what might be considered a social barrier which is reflected in concerns by crew members who do not feel safe in unstable conditions; and as a result inhibit its introduction.

Moreover, the efficiency of port operations is a critical component in the performance of an intermodal chain that contains a link over the sea. Poor performance will be reflected in terms of delays transiting the port itself, increased resource costs and possibly damage and pilferage to cargo. The less than optimum performance can stem from a number of reasons:

- ?? Lack of up to date technology for handling vehicles
- ?? Lack of up to date technology for handling load units
- ?? Restrictive practices in port operations usually affecting cargo handling – these might be legitimately referred to as social barriers

In addition to these the manoeuvring and mooring of the vessel can be time consuming and costly in terms of time lost and the extra costs suffered by the vessel.

Furthermore, an important factor for the successful launching of new services or the attractiveness of an existing intermodal service through a port is the existence of modern communication systems that are able to strengthen the integration between sea operators and inland transport operators.

Key improvements are needed to overcome the barriers of long waiting and turnaround times. Modern communications and information can yield benefits not only to the sea operators but also to

inland transport operators. Improved co-ordination therefore benefits the whole supply chain through the reduction of time and costs. Adequate information and communications networks and a 'working in a real time' philosophy makes it possible to integrate short-sea shipping with inland connections as an integral part of the logistics chain from customer to producer. Unless all ports (especially the small and medium sized) move towards greater use of 'best practice' telematics solutions (often found in large well managed ports), then this subject will still represent a barrier to more efficient and effective new intermodal services.

Intermodal movements rely on the interoperability of loading units that minimise the friction costs at nodes in the intermodal network. The variety in the design of load units responds to customers needs. Different commodities, different packaging requirements (pallets, bulk etc) and different consignments mean that the ideal load unit from a customer's point of view will vary. But, due to restrictions on loading of vehicles together with the prohibitive cost of a multitude of different containers, only a limited set of sizes and construction are available (broadly represented by ISO containers, CEN's European container (2.5m wide) and CEN swapbodies. Within the standard container sizes (particularly the 20' and 40') there exists numerous configurations to allow the carriage of different types of commodities (refrigerated, bulk, liquid and collapsible forms) sizes at the same time increases cost.

The resolution of the trade-off between cost and variety has influenced the load units used on intermodal transport today has involved a number of different parties - customers and suppliers as well as the intermodal industry itself. In addition the set of containers used today has also been influenced by the processes and framework used by national and international standards agencies to determine the set of standards for containers.

With the liberalisation in short sea-shipping operations well underway and due for full completion within 5 years, barriers to new services by operators that were not allowed to operate in certain areas are now removed. In the western Mediterranean many ferry routes are dominated by national carriers, some of which are (or near) monopolies in the market, or in some circumstances they receive large subsidies from national governments. These restrictions will disappear in line with EU competition legislation. The main role will be played by the withdrawal of cabotage restrictions leading to liberalisation of short-sea shipping operations in general and ferry operations in particular. Opportunities for the creation of new generation operators and services in this transport market will be within the grasp of efficient non-national operators. Supervision by the appropriate EU enforcement bodies will also limit the possibility of national authorities maintaining or erecting new barriers to prevent competition in the ferry market. Deregulation of EU maritime transport therefore will lower the barriers inhibiting new entrants and genuinely contestable markets. As a result changes in the short-sea shipping transport network design and operation will take place (particularly in the Eastern Mediterranean) leading to greater efficiency and more choice.

Because of the high capital investment and sunk costs (set-up costs, initial marketing costs) inherent in a new short-sea shipping service, operators have found it necessary in order to gain new markets (or even stabilise their market share) to form alliances. The strategic goals in forming such alliances are to reduce both vessel movement and port costs. These alliances are also seen as desirable at an intermodal level. These alliances have been found to be an important component in developing many intermodal services (consider the UIRR companies and the alliances between ports and railway operators). The prospect is therefore for alliances between a combination of port, shipping lines and railway companies. The pattern of co-operation within alliances will certainly be different involving such devices as vessel sharing agreements, joint use of terminals, shared feeder services, co-ordinated and centralised organisation of hinterland movement, common pool of boxes and possibly centralised marketing. Perceived or actual barriers may restrict the move towards alliances and integration of intermodal networks. Directive 91/440 creates the basis for such alliances. The barriers restricting cross border co-operation between companies in the EU have been effectively removed. The only barriers are those inherent in forming company alliances – those associated with the set-up costs and the risk associated with sharing commercial practices.

The creation of new short sea shipping services supporting intermodality will necessitate extra employment in terms of the construction of new vessels and port facilities although a number of new vessels are constructed outside Europe. Their operation also implies additional employment both on the vessels, their servicing, at the nodes and on the new intermodal services. Shipping in certain areas of Europe has experienced a decline in recent years with its associated social implications. A move towards greater employment in this section of the transport industry can be expected to yield a significant social benefit. The introduction of new short sea shipping services such as those presented in the case studies may have two distinct effects on employment in the other transport sectors of road and rail. In the first place short sea shipping in itself may be a substitute for road transport. This is where the service attracts traffic previously moving entirely on land. Some examples of this could occur in movements from Greece to Northwest and Southwest Europe. Secondly the introduction of the short sea service improves and integrates the intermodal services, which in turn attracts more traffic from road based alternatives. Any move from road to intermodal services implies some reduction in tonne km, vehicle km and hence employment in the road freight industry. This could be construed as a barrier if it is regarded as a serious social impact. Given the generally buoyant nature of employment in the road freight industry in recent years this barrier is not likely to present a serious hurdle to the introduction of new services.

The introduction and development of short sea shipping and its associated intermodal routes should not be inhibited by environmental barriers. New routes can be accompanied by environmental costs concerned with noise and visual intrusion in the vicinity of the ports. This may create some resistance. Examination of the net environmental effects including the land based transport network (where there will be a reduction in road traffic) must yield a net environmental improvement. These occur not only in the areas of noise and visual intrusion but also the critical area of energy consumption and its derived environmental effects. The greater energy efficiency of shipping and rail intermodal services guarantees a reduction in emissions and global warming.

5.4.8. Legal and regulatory barriers to the introduction of new generation of intermodal services and operators

PROMOTIQ project analysed of the Directive 440/91/EC (the separation from regime for the rail infrastructure and the traction operation) and the later directives (95/18/EC and 95/19/EC) and resolutions focus on free transit rights and net access for international consortia. The aim of this part of the study is to indicate if they have removed some barriers for transeuropean intermodal transports.

PROMOTIQ considered the following hypothesis in order to ensure the emergence of new transport operations and new transport operators:

1. Limited subsidies for the establishment of new intermodal transport services;
2. Client-oriented allocation of track slots;
3. The commercialisation of the railway companies;
4. Harmonisation of the liberalisation in the EU member states;
5. Harmonisation and ease of the regularities for the access to the infrastructure.

Directive 440/91/EEC

The Directive 440/91/EEC (the separation from regime for the rail infrastructure and the traction operation) and the later directives (95/18/EC and 95/19/EC) and resolutions focus on free transit rights and net access for international consortia have removed some barriers for transeuropean intermodal transports, but in accordance with the wide scope of kinds of possible transposition, a couple of new problems have been introduced.

The separation from regime for the rail infrastructure and the traction operation also has negative impacts. Instead of an integrated approach where an overall responsibility exists it has significantly

increased the friction problems between the interfaces of the interacting departments for rail transport.

Another problem is the different levels of implementation and different modes of transposition of the Directive 440/91/EEC. A wide range of different levels of liberalisation can be identified in direct neighbourhood to each other. Some countries try to hinder any further privatisation directives to save the monopoly of the state owned railway as long as possible.

As regards the European perspective of cross-border services and operators three different types of developments can be identified.

A private monopoly of train and intermodal operations. (UK)

Bi-national monopolies and European alliances. (e.g. Germany, the Netherlands)

National monopolies and national intermodal operations. (e.g. France)⁴

A dynamic more efficient environment for railway undertakings has not been established in Europe. In fact the entrance of new railway undertakings is hindered even in the more liberalised markets (see German case study) by various regulatory, technical and financial barriers. A relevant appearance of new operators providing intermodal transport services has not happened.

The liberalisation cannot avoid that political goals for intermodalism, like the coverage of all areas with intermodal supply and the function of intermodal transport as the fall back option for the increasing transport demand, cannot be achieved that easily anymore.

Freight Freeways

The corridor approach of the freight freeways has been for sure a useful measure to speed up the harmonisation and co-operation among the involved European railways and has therefore contributed to a faster liberalisation of the market. But, the acceptance of the freight freeways is far from the expectations. The offer is not sufficiently market orientated; the supply does not meet the demand.

Indeed, the service level on the freight freeways is not guaranteed and there are still no independent authorities controlling the performance level.

The pricing of the different national parts of the freight freeways is not harmonised at all and the focus on extremely long point-to-point connection does not meet the demand of the transport companies.

Furthermore, the freight freeways are too few and chosen rather for political and strategic reasons than for market acceptance.

In spite of the allegedly easy access via the one-stop-shops the barriers to use the offer of the freight freeways are still too high.

The attractive slots are still under the control of the established railway companies;

The intermodal operators still cannot choose between different traction providers;

The intermodal operators cannot book slots themselves since they are not approved railway companies.

Regulation proposed to ensure the emergence of new transport operations and new transport operators

Limited subsidies for the establishment of new intermodal transport services

Although fair competition issues are always highly prioritised in the European policies intermodal transport could also be regarded as a semi-public product, which means that subsidies from the

⁴ Compare with the findings in IQ, Task 3.5

public sector are regarded as a useful contribution and sometimes as a pre-requisite for supporting this transport mode. This idea puts the intermodal transport of goods on the same level of public interest as public passenger transport.

Client-oriented allocation of track slots

If also intermodal operators, forwarders and shippers could book slots for their specific transport needs, there would be the possibility for them to order the traction for this particular slot from a traction provider of their choice, which naturally does not have to be the established railway companies. This is proposed by the UIRR and is regarded as a key issue to:

- promote intermodal operators in acquiring the freight;
- building up own independent wagon fleets;
- establishing an own integrated chain management.

Currently the slots are blocked by the established railway companies and the intermodal operators do not have much choice in changing their traction providers.

The commercialisation of the railway companies

This commercialisation could mean a concentration of traffic, the close down of non-profitable routes, fierce competition between conventional rail transport and intermodal within these rail companies and blocking of attractive rail slots for the most profitable usage, which might not be intermodal trains.

However, intermodal transport must turn into a main factor for the future market strategy of the railway companies. Future strategies of the large (former) state railways on the base of the analysis carried out in PROMOTIQ will have to be

- to become transnational than just national companies. DB Cargo's strategies clearly head in this direction. Another example is the envisaged merger between SBB Cargo and FS Cargo.

- to improve the interoperability of the network operations and the data exchanges.

- to restructure the supply more to the shipper's demands, which would include:

 - European-wide harmonisation of time tables and slots

 - European network-management

 - release the freight traffic from being always last priority

This commercialisation is not contradictory to the first point, 'the intermodal transport as an semi-public product'. As long as the cost structure of all transport modes is not completely changed to install a fair competition between the modes, the commercialisation without subsidies from the public sector would mean the close down of many intermodal services.

It's important too that the railway companies begin to develop a business climate in which the railway of the neighbouring country is no longer seen as the main competitor but as a partner in the supply of a logistic chain, while the main competitor remains still the road sector.

Harmonisation of the liberalisation in the EU member states

There are different levels of implementation and different modes of transposition of the Directive 440/91/EEC. A wide range of different levels of liberalisation can be identified in direct neighbourhood to each other. The measure to install the freight freeways shows that it is principally possible to sell the product 'slot' at a fixed price in a simplified procedure. However, the prices must be competitive, the buying of the slots must be possible for all actors and the freight freeways must be converted from few point-to-point corridors to large freight freezones, that cover the economic centres of Europe. It is important that the prices of such freight freezones are set in co-operation between the railways with the clear aim to offer a product that is competitive (see commercialisation of the railways) and that is conform to existing price levels.

The freight freezones would put an end to pricing procedures like in Germany where every single detail of the infrastructure is charged, like every single used part of track, brake-test-facilities, weight-bridges, etc.

It is expected that the railways which have succeeded in giving themselves a liberalised structure will have more resources to take care of their business strategies again while they have to put less efforts into their inner re-structuring.

A further harmonisation would mean that the obstacles for new entrants will become fewer.

Harmonisation and ease of the regularities for the access to the infrastructure

The regulatory framework, a set of technical, financial, capability requirements, is in most cases not constructed to make the market entrance of new competitors easier. It is a construction of old interests of the established railways, technical regulations for rail operation sampled over decades by state authorities and driven by a non-existing business climate in the mostly state owned infrastructure authorities.

Of course, most of the technical and safety issues in the regulation are necessary and reasonable, but one should also compare it with the also high safety level in the road sector, where no inspections or break-tests are required at border crossings, where the safety systems of tractive units are highly standardised, where the driver does not have to prove that he has driven this road under official supervision before, etc. Also a comparison with the airline industry will show that high safety standards are possible in another way than it is required by the rail infrastructure authorities these days. In the regularities for the access to the infrastructure surely many points can be taken away without risking the safety level of the railways.

The harmonisation of the regulatory framework is a prerequisite to ensure European intermodal services. With the required ease of the market entrance for new operators comes also the client orientated slot allocation.

5.5. Guidelines for new intermodal services and implementation plan

5.5.1 Introduction

The objective of the last part of PROMOTIQ is to synthesise the results of the previous parts, in order to provide guidelines to the policy-makers for the promotion of intermodal transport in Europe.

The objectives of the guidelines are to advance the existing intermodal transport system or to create a new one, to support policy decisions, to facilitate the implementation of a new concept, to overcome barriers, to build consensus among different actors and to find the means to promote and market intermodal transport. Therefore the aim of the guidelines is to assist the policy –makers at any level to increase the intermodal market share.

The starting reference for PROMOTIQ researchers to build the guidelines have been the barriers identified in the third workpackages of the project.

Two categories of guidelines are provided in PROMOTIQ project:

- A. General guidelines, which are referring to all intermodal transport markets, all actors, commodity types, countries (horizontal guidelines);
- B. Specific guidelines referring to each of the six issues identified in the first part.

The methodology for the presentation of the proposed actions consists of the crucial elements for intermodal growth identified in the second part of the project and the respective barriers identified in the third part, which are all related to the six potential issues for the promotion of intermodal transport. Based on these, the proposed actions are provided, as well as the responsible actor or

group of actors to undertake and monitor the action. Finally, an indication of the timeframe and the costs for the implementation of each action are presented.

5.5.2 Guidelines for new intermodal services and implementation plan

The present chapter is suggesting solutions for alleviating the barriers identified in the previous part of the project in order to let the opportunities/chances identified in the section “Opportunities for the development of a new generation of door-to-door intermodal operators and services”. As a first step the common guidelines are presented and the specific ones follow in the subsequent steps. The last part of the chapter is providing a general plan for the implementation of the guidelines, any difficulties or conflicts that may arise during their implementation, as well as any specific elements, applicable to one or more issues of those examined.

The objectives of the guidelines are the advancement of the existing intermodal transport system or the creation of a new one, the support of a policy decision, the facilitation of the implementation of a new concept, to overcome barriers, to build consensus among different actors and to find the means to promote and market intermodal transport. Therefore, the aim of the guidelines is to assist the policy-makers at any level to increase the intermodal market share.

There is no doubt that the urgent need for policy action exists, since an efficient transport system is very important for the economic growth of the EU. Congestion causes great pollution in Europe today as well as great time loss and the annual number of road accidents is still high. It is evident therefore that there is urgent need to take traffic off road and raise the share of intermodal transport, which is recognised as a much less polluting and much safer mode of freight transport. Although many actions have already been taken towards the decrease of road freight transport by the European Commission, the share of road transport is still increasing. An effort to propose actions for the promotion of intermodal transport in Europe is made in the current report.

The identification of “target” markets is associated with commercial, social and operational barriers for the emergence of operators, which are the potential providers of such services. Therefore, guidelines are proposed for such identification process, which is useful for the policy maker. The guidelines form the “core” elements of the Policy Action Model. It aims at identifying the sources of barriers and at creating more favourable conditions for the emergence of a new generation of services and operations. The guidelines and the Policy Action Model are applied to the six issues identified in the previous Deliverables. Finally the Implementation Plan is developed with specific identification of who responsible to take the necessary action, supervise and monitor the implementation of the specific action in the future. An estimation of timeframes and costs of the specific actions is presented in this respect.

The guidelines are presented in the form of a set of two interrelated tables for each issue. The first table contains elements related to the crucial issues for intermodal growth as they have been identified in D2. For each issue, the elements are the barriers, as identified in D3, the proposed actions to lift barriers, as well as any supplementary actions to be taken specifically by the policy makers. In addition, in the first table the expected results by each proposed action are presented for each issue. Such a set of tables is presented below.

Table 1

Crucial elements for rail intermodal	Barrier	Action to lift barrier	Supplementary actions by	Expected results
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growth			policy makers	

Table 2

Action to lift barrier	Responsibility for action	Monitoring & control	Timeframes & costs

The second table of each set contains the implementation plan of the guidelines. Hence for each proposal action (presented in Table 1) the responsible actor for taking the specific action proposed is presented, as well as the responsible actor for monitoring and supervising the implementation of the guidelines related to the specific action. The last column provides an indication of the time horizon and the needed costs for the implementation of each guideline. Since it is not possible in the context of this research project to provide the exact timeframes and costs, estimations (short, medium, long for timeframes and low, medium, high for cost) are given. However, whenever possible a more precise timeframe and/or cost are provided.

A variety of research and pilot actions have shown the value of intermodal transport in Europe. As long as it is economically viable, the increase of intermodal share will bring the expected benefits. However, there are still many obstacles for the widespread use of intermodal transport in Europe. The interest that the European Commission shows for the promotion of intermodal transport use provides the opportunity not to be missed at this stage, taking into account the fact that intermodal use brings to the society significant benefits.

In the report, the formulation of the guidelines is taking place by following a “check list” of items, or a guidelines “profile” with the following characteristics:

- ?? Which are the guideline’s objectives?
- ?? Consensus issues among interested parties;
- ?? Barriers for implementation.

The Policy Action Plan is presented for each case in the form of prioritised actions according to the timeframe set for implementation by the responsible actors. The Policy Action Plan is able to identify possible conflicts amongst the recommended actions.

5.5.3 Overall implementation plan for the promotion of intermodal transport

Actions are needed in order for the EU to introduce measures to overcome the identified barriers for the creation of new intermodal services and operators. These barriers refer to commercial, social and operational issues. The aim is to find the way (with the assistance of the Policy Action Plan) to alleviate the barriers that have already been identified in Deliverable D3 together with their sources. The “non-value added” activities have to be removed. The Policy Action Plan is a systematic procedural framework for the readjustment of the intermodal transport policy by the EU, with the objective to overcome the barriers and enhance opportunities for increasing the share of intermodal transport.

For the development of an action and in order to make it appropriate for application, the following “check items” list has to be elaborated:

- ?? Which are the action’s objectives?
- ?? Consensus issues among interested parties for a new intermodal service;
- ?? Added value from the introduction of such a service;
- ?? Barriers for implementation;
- ?? Risk assessment;

- ?? Data requirements;
- ?? Budget restrictions.

As the planning of an action proceeds, the stages and linkages between the "checklist items" need to be established.

The actions suggested are related to the general transport policy and they address issues including:

- ?? Environmental;
- ?? Economic;
- ?? Social integration of Europe.

Based on the above, an action (regardless of the area it is applied) has the following general objectives:

- ?? *Transport objectives*: These aim to ensure the effective functioning of the Community's transport system and the protection of the environment. They also aim at advancing the state-of-the-art of an intermodal transport system or creating a new one.
- ?? *Sector objectives*: They refer to objectives which lie within a single transport sector.
- ?? *Area objectives*: They refer directly to the areas of major policy interest within each transport sector. They support a policy decision and they aim at implementing a new concept.
- ?? *Application objectives*: These address the implementation of an action and they also aim at building a consensus among different actors of intermodal transport chains.

The basic origins of an action are:

- (a) A transport measure solution to an existing situation (Top-down approach)
- (b) The existence of a policy implying the introduction of a transport measure (Top-down approach)
- (c) The development of a technology, technique or other transport measure (Bottom-up approach)

The overall implementation plan refers to the organisation for applying the actions identified in the current report. It is a general overview of the process that should be followed by policy makers in order to apply the suggested actions. It leads to the Policy Action Plan, which is a decision tree for policy makers in order to enable for rational decision-making as far as new and improved services and actors in intermodal transport market is concerned.

The output of the actions development is the Policy Action Plan, through which they will be implemented. This Policy Action Plan is a framework of sequential actions to be followed in order for the guidelines to be implemented through various stages by the policy makers, indicating the time period to be applied. The actions are also concerned with the target group of customers for the new opportunities (intermodal services), as well as with their implementation period.

In order to evaluate the results of an action or of a series of actions for the promotion of intermodal transport certain tools can be used, such as:

- ?? Cost-Benefit Analysis (CBA);
- ?? Multi-Criteria Analysis (MCA);
- ?? Cost Effectiveness Analysis (CEA);
- ?? Goal Achievement Methods (GAM).

In the context of the Policy Action Plan and in order to decide if an action needs to be taken the following steps have to be followed:

First step

Four selections of targets need to be made first: Transport market, geographical area, intermodal transport market actors and commodity types. This selection is not necessary to take place for all four targets at once. Any necessary combination can be undertaken, depending on the case.

Second step

The second step is to examine whether intermodal transport services and actors exist in the identified target markets.

Third step

If intermodal transport does not exist at all the various barriers have to be examined. Institutional, infrastructural, commercial, economic, technical/operational and social barriers should be investigated having as a guide the barriers identified in Deliverable D3. If one or a combination of these barriers exist then action should be taken for their alleviation. If they do not exist one should proceed to the next step.

Fourth step

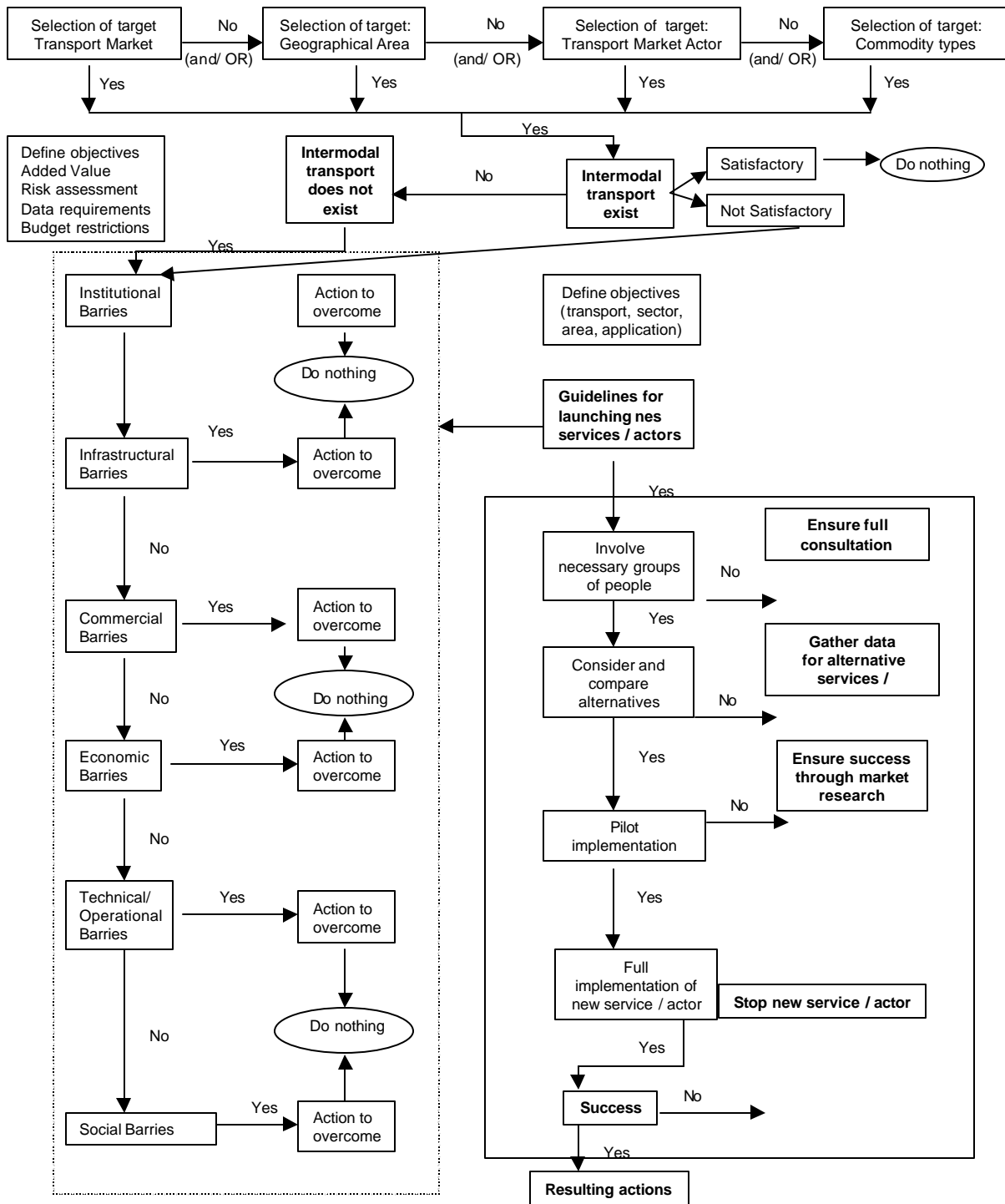
If intermodal transport exists, the objectives for promoting it further and increasing its share in the freight transport market should be set (transport, sector, area and application objectives).

Fifth step

This step is the final (implementation plan). The necessary groups of people should be involved for consultation before any action is taken. The necessary data for comparing the possible alternatives to the action should be gathered carefully and analysed. Before the full implementation of the action a pilot implementation should be undertaken. If the action leads to the creation of a new service or intermodal transport operator, this should be carefully monitored in order to examine its rate of success. If it is not proved to be successful, then it should be withdrawn.

The figure that follows shows the policy action plan described above.

ACTION PLAN MODEL



5.5.4 Recommendations for the guidelines for new services and implementation plan

Given the analysis of the actions needed to be taken in order to promote intermodal transport in Europe, as presented previously, the present section contains the main policy recommendations to the policy makers. The guidelines for the creation of new intermodal services and operators that are included in the Policy Action Plan are presented in this section. The proposed actions are prioritised in relation to the timeframe of their implementation. Possible conflicts between the proposed actions are also presented. The main recommended actions needed to be taken for the increase of intermodal share in the freight transport market are the following:

Priority Actions

The top-20 priority actions are presented in this section. They are chosen as the most important ones from the analysis presented in the current Deliverable and they are also prioritised based on the criterion of urgency for implementation. For each action the context behind is analysed in some detail, the responsible actor(s) for implementing the action is then defined and also the implementation plan for each one is given, based mainly on the time horizon for implementation and on the cost for realising the action.

General Priority Actions

Action No 1: *Fair and efficient pricing*

Context: Charging systems have developed differently for different forms of transport. It is therefore now difficult to create a European-wide, integrated, sustainable transport system that is vital to the free movement of goods in the Single European Market. In the future intermodal transport will not rise its share in the total freight transport market unless fair and efficient pricing will be applied. The pricing for infrastructure use has to be the same for all modes. Fair pricing cannot be achieved by increasing the cost for all modes except for intermodal. EU should subsidise intermodal transport that until fair and efficient pricing is achieved, without any problems and in a reasonable timeframe. At the moment rarely intermodal transport is preferred and only because of road congestion. Hence, the disbenefit is greater than the benefit.

Subsidy for intermodal transport can come in several ways and this is an area that needs to be further investigated. Certainly the major part of the EU funds should subsidise infrastructure suitable for intermodal transport, hence the intermodal transport network itself as well as the intermodal terminals and their handling equipment. New infrastructure can always be constructed with a PPP (public-private partnership) scheme, preferably together with intermodal operators or key actors in the intermodal transport chains (railways, shippers, shipping lines, etc.).

Transparent and consistent pricing system will lead to increased competition within intermodal freight transport and therefore to a lower investment risk for intermodal operators and investors. Rail infrastructure charges should be harmonised with other freight transport modes stimulating competition between rail, road and water transport. Rail freight infrastructure pricing should also be harmonised internationally.

The European Commission has already adopted a White Paper⁵ proposing a new harmonised approach for paying for infrastructure use across all modes. According to the EC, when the proposed common pricing system, which will be fair and transparent, when implemented it will save at least EURO 50 billion a year for the transport system and these savings will be passed on to the users. The new system will be based on the “user pays” philosophy.

⁵ White Paper: “Fair payment of Infrastructure Use: A phased approach to a common transport infrastructure charging framework in the EU, COM(98)466 final, of 22 July 1998.

The transport system should be gradually introduced. The different levels of liberalisation for every mode should be taken into account, as well as other complex issues and constraints. Charges should include marginal social costs pricing. These are the variable costs that reflect the cost of an extra vehicle using the infrastructure, including “external” costs such as congestion, pollution and accidents. Marginal costs can include operating costs, infrastructure damage costs, congestion costs, environmental and accident costs.

According to the White Paper, in a first phase (1998-2000), the Commission with the Member States’ committee will establish ways of estimating the marginal costs of transport, develop transparent accounting methods and advice on statistical and research needs. In a second phase (2001-2004), those principles will be put into effect in road, rail, ports and airports. In a third phase, beyond 2004, the Commission and committee will review the work to date and consider how to take it further.

Responsibility for action: The responsibility for this action mainly belongs to the European Commission, which supports the creation of the new pricing system with new regulations. The EC should be assisted by the national administrations of the EU Member States with the participation for preparing and implementing the system of the intermodal operators.

Implementation: The new pricing system should be promoted to the current and potential customers of intermodal transport as a benefit. This is a supplementary action to be taken by the policy makers apart from establishing the fair and efficient pricing system. The main expected result is that new operators will enter intermodal market and therefore competition will take the place of current monopoly situation in most cases. The new pricing system should be monitored by the European Commission and regulated by the pan-European intermodal regulator, which is proposed to be created as well as another action.

Action No 2: *Establish pan-European regulator for intermodal transport*

Context: The Regulator will exercise his functions in a manner that will be promoting the use of the network for the carriage of goods, exactly as is done in individual countries (e.g. in the UK). The policy of the Regulator should have as a main objective the increase of intermodal transport in and between EU member countries. Supportive regulation can help.

The pan-European regulator should fully understand the market needs and also work closely with the European Commission but also with the national governments for a growth in intermodal transport flows. It should regulate the infrastructure providers and also control them and making sure they meet the capacity needs of freight, including routing strategy, network enhancements and sharing investment risk. More specifically, it should take action to reduce freight transport costs, help improve reliability of intermodal services, allow open access for new operators (and new business in general) and manage its property taking account of freight needs.

The pan-European regulator has to work closely together with the national governments in order to make sure that EC Directives are implemented in each member state. In order for regulation to be effective constructive dialogue should be made in the form of round tables and conferences. Good information will enable policy-makers to take important information on how the market responds to potential or recent changes. The main role of the pan-European regulator should be to strongly pressure intermodal actors to provide the facilities for operators to grow the intermodal business

Responsibility for action: European Commission

Implementation: Although it is an action to be taken with very careful steps, its urgency is so high that it makes it a short-term action. The cost of establishing the pan-European intermodal operator is not high.

Action No 3: *Subsidise new/improved intermodal infrastructure*

Context: The construction of new infrastructure or works to improve the current one should be fully or partly financed by the European Commission, the national governments or regional administrative bodies, depending on the scale of the project and the amount needed for its completion. Public – private initiatives should be encouraged by the policy makers. Private investments should be encouraged by providing the potential benefits to the potential investors. The private parties of such investments can be the intermodal operators or more probably the shippers, who should be encouraged to create intermodal terminals in their industrial zones.

Responsibility for action: European Commission, Member-States, regional administrative bodies.

Implementation: With a medium to long term timeframe (depending on the scale of the project) and a medium to high cost (again depending on the project scale), the actual implementation should be monitored and controlled by the policy makers, who should be prioritising the necessary projects.

Action No 4: “Advertise” intermodal transport

Context: All the actors of intermodal transport market should promote intermodal transport by following the traditional methods of advertising and promotion of a product available for customers to buy. Policy makers should be advertising new infrastructure before it is complete to potential customers and operators should be advertising their new services using this new infrastructure. Advertising can be made through press (dedicated to freight transport) or through the World Wide Web or economic journals (national or international).

Responsibility for action: All actors involved.

Implementation: All actors involved. The timeframe for this action is short but should be continuous and the cost depends on the means of advertising but in most of the cases it is not high.

Action No 5: Establish intermodal standards

Context: As one important barrier has been recognised the variety in loading units. Harmonisation of loading units standards across modes will bring efficiency in intermodal operations and will also admit higher loading factors and avoid empty hauls. The creation of working groups for setting the standards of loading units as announced by the European Commission in COM(97)243⁶ is a good step towards harmonisation and should be continued until standardisation and harmonisation is complete.

One of the main barriers identified in all aspects and issues of intermodal transport is the different procedures followed and documentation required between the Member States, mainly at terminals. One way to promote intermodal transport is to harmonise these procedures, as this would cause faster and more reliable services. A lot of paperwork can be transferred to electronic form through the use of EDI, which should be extended to include more actors. The Commission should continue to promote EDI through Research and Development activities. Bureaucracy at transshipment points and at border crossings should also be minimised and this can be achieved by using uniform procedures and documentation. The Commission should decide on these standards and enforce the Member States to apply them as soon as possible.

Responsibility for action: Mainly the policy makers with the support of intermodal operators.

Implementation: This varies according to the standards to be set. For example if a best practice handbook is to be produced for a medium-size terminal it should not take a long time, but for the case of a large port, it can take long for the standards to be established. The standards of the loading units is not a time consuming procedure, but the passing from the current loading units sizes to the new standard ones can take a long time. The cost can be high as well, as in the countries with dense flows operators can easily change their loading units, this is not the case for the countries with lower intermodal freight traffic flows.

⁶ European Commission, DG VII, “Communication on intermodality and intermodal freight transport in the European Union”, COM(97)243, 29 May 1997

Action No 6: Continue R&D activities on intermodal transport

Context: The Commission should continue financing research projects on intermodal transport since the weak points of intermodal operations are identified across Europe and ways to promote are suggested as in PROMOTIQ. Other projects are dealing with innovative techniques in intermodal operations on the technical side (transshipment and transport systems, etc).

Extensive research has been financed by the Commission in the field of intermodal transport and this should be continued. The focus should be mainly on the use of modern information systems in intermodal operations and also on alternative solutions for faster operations at transfer points.

Responsibility for action: European Commission.

Implementation: The timeframe is very short (since R&D) activities are undertaken already and the cost is relatively low since most of the research projects are co-financed by the EC.

Action No7: Promote interoperability of intermodal operations

Context: Interoperability of intermodal operations is not a single action, it is rather a concept and in order to be fulfilled, several actions are needed to be taken at the same time. Interoperability in intermodal operations mostly refer to interoperability at interfaces (transshipment points). It is directly related to Action No.4 (harmonisation of intermodal operations standards). Interoperability will be promoted mainly by enforcing intermodal actors to follow the standards by applying a relevant regulatory framework.

Responsibility for action: Policy makers at all levels, intermodal terminal operators

Implementation: A long term action in total and of high cost due to the need in changing the relevant technology and the standards of loading units.

Action No8: Continuation of PACT programme

Context: PACT programme has been successful since its start (1992), since innovative ideas are tested before their wider implementation and before a high amount of funds is invested. PACT programme should be continued in the medium term (in the next decade) in order to offer its services in the promotion of intermodal transport. It suggested that projects should be selected, which belong in the areas identified in PROMOTIQ as the most promising ones for the future of intermodal transport in Europe.

Responsibility for action: European Commission

Implementation: Short term (continuous), medium cost.

Action No9: Promote the use of EDI

Context: There are certain benefits that will be achieved through the use of EDI. Reductions in paper work, deregulation of terminal working hours and interconnections between and intermodal terminals are relatively modest. EDI will assist in the removal of barriers at intermodal terminals, through increased efficiency, improved co-ordination, expansion of capacity and a reduction of the number of terminal calls.

Responsibility for action: All intermodal actors. Mainly policy makers at all levels.

Implementation: EDI can be widely applied in medium term with a medium cost.

Action No10: Encourage public-private partnerships

Context: As suggested, a way to promote intermodal transport through the creation of new/improved infrastructure is to encourage partnerships between private companies that have an interest in participating in the provision of intermodal transport infrastructure and the public sector. Public-Private Partnerships (PPPs) will and should play an important role towards the acceleration of the implementation of the proposed investments in intermodal transport infrastructure and handling systems.

Responsibility for action: European Commission

Implementation: Short term, low cost.

Action No11: Organise round tables

Context: The Commission should encourage Member States to launch a round table each on intermodal transport. These Round Tables will gather the interested regional and local industries as well as the public and administrative bodies, which will contribute in removing the identified barriers at their level and will also form a common approach for the promotion of intermodal transport.

Responsibility for action: European Commission and Member-States

Implementation: Short term (for organising), long term (continuous procedure)

Priority actions for rail traction provision

Action No12: Apply uniform accessibility to rail infrastructure across Member States

Context: As analysed in D3, there are different levels of liberalisation of access to rail infrastructure in each EU Member State. There needs to be taken action for full and uniform application of EU Directive 91/440. Open access to rail infrastructure can be ensured with this action and hence liberalisation can be achieved.

Responsibility for action: EU should set stricter rules for applying EU infrastructure rules. Member States and regional administrative authorities are responsible for monitoring and controlling the full application of EU regulations.

Implementation: Since free access to rail infrastructure is already (not fully) applied, the full liberalisation is not far. The EU has set 2001 as the year of full implementation and the cost for achieving this aim is low.

Action No13: Procedures of capacity (slot) allocation

Context: Different operators should be able to bid for capacity (slot allocation), which will be awarded according to fair rules and criteria. The capacity should be allocated by an independent authority (pan-European regulator). Today, infrastructure capacity is not used in a uniform way and under the same conditions across Member States. The main action to be taken is to set standards for the procedures to bid for capacity and also set a harmonised pricing system for rail capacity allocation. The new pricing system should be promoted to the existent and potential customers of intermodal transport and the benefits should be communicated.

Responsibility for action: European Commission, Member States and rail operators should collaborate closely for the implementation of a harmonised capacity allocation system.

Implementation: It is a medium terms and of medium cost action.

Action No14: Priority of freight trains and dedicated freight lines

Context: One of the main barriers identified in D3 is the priority given to passenger trains and not to freight trains. Action should be taken either to provide priority to freight by establishing relevant rules or by establishing the already planned freight freeways. The use of freight freeways (when established) should be promoted across actors by communicating their added values. If freight transport is to be offered priority over passenger trains (in some cases), rules should be set and they should be enforced by setting relevant regulatory framework.

Responsibility for action: European Commission, Member States, pan-European regulator

Implementation: Freight priority rules: short term and of medium cost. Freight freeways: long term and high cost.

Priority actions for short distance market

Action No15: Establish favourable rates for short distance services

Context: As the most important barrier for short distance services has been identified as the one about transport rates, which are unfavourable for these services. Unless different pricing systems are applied for short distance services from long distance ones, intermodal transport will be non-viable economically for these distances. The rates should be adjusted to the distances

served and the application of the new rates should be enforced by the application of relevant regulations. The reduced rates should be advertised across current and potential customers.

Responsibility for action: European Commission, Member-States, pan-European regulator.

Implementation: Short term, low cost.

Priority actions for small shipments market

Action No16: Establish dimensions of loading units appropriate for small shipments

Context: Two of the barriers for promoting intermodal transport in the market of small shipments are the difficulty of frontal loading of the pallets in the containers and also the different standards of loading units for air and rail transport. Loading units standards should be re-defined and enforce their use through the application of the relevant regulations.

Responsibility for action: European Commission, integrators, terminal operators.

Implementation: Short term, high cost.

Priority actions to promote intermodal transport in new quality market segments

Action No17: Establish high quality/capacity rail link between terminals and main rail links

Context: One of the most important elements in the promotion of intermodal transport in the new quality market segments is the modernisation of rail tracks if they exist or the creation of new ones. This action is related to Action No2 (investments on intermodal infrastructure). This action will alleviate the barrier of high transit time at terminals and will also offer more reliability of services, hence higher quality links between terminals and main rail links. The new/improved rail tracks should be promoted to the potential users while still in construction phase and the potential benefits should be communicated. The reliability of the whole transport chains shall be improved.

Responsibility for action: European Commission, pan-European regulator, rail infrastructure providers, rail traction providers.

Implementation: Medium timeframe, high costs.

Priority actions to integrate air transport in intermodal transport chains

Action No18: Improve rail links to airports

Context: Most of the European airports do not have any facilities for undertaking intermodal operations. The main reason behind is that they do not have the necessary rail links, connecting them with intermodal transport chains. This action refers mostly to the creation of new infrastructure, or to infrastructure appropriate for intermodal operations, therefore it is related to investments for intermodal operations (see Action No2).

Responsibility for action: European Commission, Member-States, airports.

Implementation: Long term (for new infrastructure) and medium term (for improved infrastructure). They are both of high cost.

Priority actions for short-sea shipping market

Action No19: Improve the image of SSS

Context: It is very important that the image of short sea shipping is improved. The current perception of an old-fashioned, slow and complex mode of transport should be changed to a modern mode that is an important part of intermodal door-to-door transport chains. The advantages of short sea shipping (speed, reliability, flexibility, regularity, frequency and safety) should be communicated as widely as possible. Policy makers (mainly the Commission and the Member States), as well as the maritime industries should be the responsible actors to undertake this promotion. Nevertheless, short sea shipping should be promoted at all levels. Short sea round tables should be organised in all maritime Member States and a framework for their functioning should be established.

Responsibility for action: Policy makers (at all levels), SSS operators, port authorities.

Implementation: This is probably a medium to long term action but it should be realised with small steps of short term, which should be continuous.

Action No20: Improve SSS network connectivity

Context: This is the main barrier addressed in D3. Network connectivity depends on the availability of ports and also on the availability of the appropriate handling equipment for intermodal operations at ports. This proposed action is not a single action but it includes several related actions. For example the availability of ports mostly depends on the operating hours of the ports and action needs to be taken towards that direction, as the availability of handling equipment refers to investment actions and the suitability of berths and draughts to accept new fast ships.

Responsibility for action: European Commission, port authorities, regional and local administrative bodies.

Implementation: In total this action is a long term one, although the “branches” of actions are short term ones. When the action involves administrative matters the cost for implementing can be medium, but when it involves investments in handling equipment it can be high.

A definition of the timeframes mentioned in the report is:

Short term: Up to 1 year

Medium term: 1-5 years

Long term: More than 5 years

6. Conclusions

PROMOTIQ results can be very useful because they help to understand the current situation of the European intermodal transport and the major trends that will influence the requirements of the transport system for the next couple of years.

PROMOTIQ Consortium indicated the following conclusions as the most important for understanding the correct trade-off between cost and performance and for setting the right priorities for the service quality in European intermodal market:

- ?? the introduction of competition in intermodal transport has been an incentive for the operators to increase the level of service and price competitiveness;
- ?? the deregulation opened and enlarged the entrance to the market, both for the conventional operators as well as for new entrants;
- ?? new companies enter the intermodal transport market (mainly in seaport hinterland container traffic market);
- ?? the role of MTO (Multimodal Transport Operators) is increasing: forwarders, shipping lines, trucking companies, third parties, they all can now operate intermodal services and act as MTOs;
- ?? new management principles are introduced; e.g. axis management (overall management responsible for the operation from origin to destination);
- ?? the changing market opens the way for the introduction of better production models, meaning the introduction of shuttle and block train services, as compared to the classical wagon load models;
- ?? the new operators apply different marketing techniques (sales channels/packaging);
- ?? for certain functions in the intermodal transport chain, separate independent business units are created, this is the case in specific “public” functions as terminal operations;
- ?? the scope of activities of intermodal operators is increasing from only transport to the full range of logistics services;
- ?? terminals develop in the same direction: from pure transshipment points, to logistic centres where appropriate. However, roles and responsibilities of the terminal operator and operator of logistic centres are different and separated.

The PROMOTIQ Consortium indicated that there is a change of perspective slowly penetrating the industry that may become decisive for intermodal transport. Above it was stated that shipper increasingly are dictating their transport supply and organisation requirements and that the transport companies have to adapt to this. This is, however, only part of the truth. What is actually happening is that the logistic systems are regarded as an integral part of the companies’ business process rather than as an independently supplied facility. It is not just a matter of the transport company adapting to the shipper’s requirements at the same time as the shipper modifies the scheduling of their transport to the transport service available.

It is a different way of looking at this interaction. Rather than regarding it as a supply and demand interaction between two systems it is regarded as a joint operation in a larger system where the two are highly interdependent.

PROMOTIQ Consortium indicated in the followings the major new possible opportunities for the promotion of a new intermodal transport services and operators:

- ?? Integrated system approach to the production and distribution logistic chain;
- ?? European approach for low-cost rail slot pricing;
- ?? Co-operation agreements, joint ventures and mergers among intermodal operators;

- ?? Direct involvement of the biggest shippers in the transport operations;
- ?? Dedicated specialised intermodal network in heavy traffic corridors.

The most important typologies of barriers for new generation of intermodal services and operators emerged during the analysis carried out in PROMOTIQ consist in the followings:

- ?? Institutional
- ?? Infrastructural;
- ?? Commercial;
- ?? Economic;
- ?? Technical and operational;
- ?? Social

The guidelines for new intermodal services and implementation plan indicated in PROMOTIQ project are the following:

Common for all issues guidelines (horizontal elements):

1. Fair and efficient pricing;
2. Establish pan-European regulator for intermodal transport (in order to harmonise the liberalisation in the EU member states, to harmonise and to ease the regularities for the access to the infrastructure);
3. Encourage public-private partnerships and greater collaboration between the main actors of an intermodal transport chain with the main change being the active involvement of the shipper;
4. Limited subsidies for the establishment of new intermodal transport services;
5. Establish intermodal standards;
6. "Advertise" intermodal standards;
7. Continue R&D activities on intermodal transport;
8. Interoperability;
9. Continuation of PACT programme;
10. Promote the use of EDI;
11. Organise intermodal transport round tables

Specific issues guidelines

Rail traction provision elements

1. Accessibility to rail infrastructure;
2. Capacity allocation;
3. Priority of freight trains and dedicated freight lines;

Short distance services elements

4. Establish favourable rates for short distance services

Small shipments elements

5. Establish dimensions of loading units appropriate for small shipments

New quality market elements

6. Establish high quality/capacity rail link between terminals and main rail links

Integration of air transport elements

7. Improve rail links to airport

Short sea shipping elements

8. Improve SSS network connectivity
9. Improve the image of SSS

Based on these guidelines, PROMOTIQ Consortium presented also the responsible actor or group of actors to undertake and monitor the action. Finally the project provided an indication of the timeframe and the costs for the implementation of each action previously presented.

All the measures and actions recommended cannot be fully effective unless each of the parties concerned in the transport chain does everything necessary to ensure the development and efficiency of intermodal transport.

The promotion of intermodal transport in the European Union is a long-term exercise. The impact of the current efforts towards the increase of the share of intermodal transport should be evaluated on a pan-European scale over a long-time perspective. The European Commission should continue reviewing developments that will lead to an increase in the share of intermodal transport.

The role of mergers and alliances between intermodal transport actors in the development of new operators should be highlighted. There is a need for greater collaboration between the main actors of an intermodal transport chain with the main change being the active involvement of the shipper. This trend exists and its development should be supported by organising pilot cases, round tables and other marketing actions that will inform the participants on the benefits of such a scheme. The collaboration of actors will have as a result the development of pan-European operators, which will achieve economies of scale.

The potential exists also for new specialised railways to enter the intermodal transport market, which will be created by alliances between national railways in order to create international or pan-European operators. Specialised railway traction providers might also mean new types of niche railway companies, such as Cargo Sprinter that will be specialising in short distance services.

Intermodal transport should be maintained in the political agenda. More publicity should be given through campaigns promoting the advantages of intermodal transport. This can be achieved through related press or the internet, where an on-line information centre can be organised, which will be offering information on intermodal services all over Europe for potential users.

7. Annexes

Work packages and publications

The following list of publications has been produced in the PROMOTIQ project.

Deliverable 1 is titled “Relevant issues and cases for the development of new intermodal transport services and new types of operators” and the author is TFK with the contribution of Systema.

Deliverable 2 is made of a final report titled “Opportunities for the development of a new generation of door-to-door intermodal operators and services” and the author is NEA with the important contribution of Gruppo CLAS and Systema.

Deliverable 3 is made of a final report titled “Identification of the barriers to the introduction of a new generation of intermodal services and operators” and the author is Inrets with the contribution of Cranfield University, NEA and Systema and 7 annexes.

Annex 1 is titled “Opportunities for new types of operators in the role of railways as traction providers” and the author is Cranfield University;

Annex 2 is titled “Barriers for new intermodal services and new operators for short distance intermodal operators” and the author is Inrets;

Annex 3 is titled “Barriers for new intermodal services and new operators for short distance intermodal operators” and the author is Inrets.

Annex 4 is titled “New quality market segments – Obstacles and barriers” and the author is NEA

Annex 5 is titled “Barriers to new services and new operators coming from the integration of air transport into the intermodal transport chain” and the author is Cranfield University

Annex 6 is titled “Barriers to new services and new operators coming from the integration of short-sea-shipping into the intermodal transport chain” and the author is Cranfield University.

Annex 7 is titled “Regulatory barriers; the impact of EU directive 91/440/EEC and the freight freeways on the market and on the services” and the author is TFK

Deliverable 4 is made of a Final Report titled “Guidelines for new intermodal services and implementation plan” and the author is Systema with the important contribution of Inrets.

8. References

Angehrn, A., "Modelling by example : a link between users, models and models in DSS, European Journal of Operational Research, Vol.55, 1991.

Bovet, D, International freight in 2000 : success against the odds, Euromodal 91.

Cooper, J, Transforming the structure of the freight transport market, ECMT Round Table 99, Paris, 1994.

Davis, M, "A multicriteria decision model application for managing group decision", Journal of the Operational Research Society, Vol. 45, 1994.

DB Netz. Für Sie geöffnet. DB Netz, Frankfurt, 1999

ECMT, Rail Restructuring in Europe, Paris, 1998

ECMT, Report on the Current State of Combines Transport in Europe, Paris, 1998

Eurosiris, Le transport intermodal en France, 1994.

European Commission, DGVII, "White Paper on the Future of the Common Transport Policy", 1992

European Commission, DGVII, "Communication on intermodality and intermodal freight transport in the European Union", COM(97)243, 29 May 1997.

European Commission, DGVII, "Green Paper on Fair and Efficient pricing", 1995.

European Commission, DGVII, "White Paper: Fair payment of Infrastructure Use: A phased approach to a common transport infrastructure charging framework in the EU", COM(98)466 final, 22 July 1998.

European Commission, DGVII, "Green Paper on Ports", 1997

European Commission, DGVII, "Communication on Rail Freight Freeways", COM(97)242, 29 May 1997

European Commission, DGVII, "White Paper: A strategy for revitalising the Community's railways", COM(96)421 final, 30 July 1996.

European Commission, DGVII, "Community Guidelines for the development of the trans-European, transport network", 1692/96, 9 September 1996.

European Commission, "Public-Private Partnerships in Trans-European Transport Network Projects", COM(97)453, Brussels, 10 September 1997.

European Commission, "The Development of Short Sea Shipping in Europe: A Dynamic Alternative in a Sustainable Transport Chain", COM(99)317, Brussels, 29 June 1999.

Grabisch, M., "The application of fuzzy integrals in multicriteria decision making", European Journal of Operational Research, Vol.89, 1996.

- Gronau, R, "Economic approach to value of time and transportation choice", Transportation Research Record 587, TRB, 1976.
- Hall, R, "Dispatching regular and express shipments between a supplier and manufacturer, Transportation Research-B, Vol. 23B, 1989.
- Leijer, H. de, Towards a really combined transport, Delft, 1991.
- Mareschal, B., "Weight stability intervals in multicriteria decision aid, European Journal of Operational Research, Vol.33, 1988.
- Ozernoy, V., "Choosing the best multiple criteria decision-making method", INFOR, Vol. 30, 1992.
- Savy, M. (Ed.), Le rail et la route : le commerce ou la dispute ?, Presses des Ponts et Chaussées, 1997.
- Toubol, A, Possibilities and limitations of combined transport, ECMT Round Table 90, Paris, 1991.
- Van Zijst, W.A., Possibilities and limitations of combined transport, ECMT Round Table 90, Paris, 1991.
- Woxenius, J., Modelling European combined transport as an industrial system, Chalmers University of Technology, 1994.
- Wynter, L, "Stated preference survey for calculating values of time of road freight transport in France", Transportation Research Record 1477.
- IQ – Intermodal Quality, IV Framework Programme Research Project Commissioned by European Commission, DG VII.
- LOGIQ – The Decision-Making Process in Intermodal Transport, IV Framework Programme Research Project C ommissioned by European Commission, DG VII.