

# Intermodality: Main Direction of Research in European Projects

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Intermodal transport provides services based on the combination of at least two different modes. Its aim is to provide transport efficiency and to reduce transport costs by combining the strengths of the different modes in ways which are unbiased and which provide door-to-door services, meeting user requirements. Developments so far have concentrated on combining road and rail services, but there are opportunities for other combinations such as road-sea and rail-sea, and other types of cargo, including general cargo and bulk. Therefore, all transport modes should be considered: rail, road, sea, inland waterways and air. Addressing the full range of combinations and cargoes in a systematic way will bring benefits through better balances of supply and demand.

In order to create a common understanding, it is proposed to define intermodal transport as "the movement of goods (in one and the same loading unit or vehicle) by successive modes of transport, without handling of the goods themselves when changing modes" [1].

A number of obstacles have been identified which prevent the extensive use of intermodal transport. These include the lack of a coherent network of modes and interconnections, the lack of technical interoperability between and within modes, a variety of regulations and standards for transport means, data-interchange and procedures. These are uneven levels of performance and service quality between modes, different levels of liability and a lack of information about intermodal services. As a result, mode-independent door-to-door transport is underdeveloped.

Implementing an intermodal transport system in a pan-European dimension requires an intensive co-operation in research and development in view to coordinate development of transport policy on European, national and regional level.

Four key strategies will provide the necessary impetus to the development of intermodal transport:

- common research for understanding intermodal transport in pan-European dimension;
- common research for a pan-European strategy for infrastructure: Trans-European transport networks and nodes;
- common research for a pan-European strategy for interoperability;
- common research for a pan-European strategy for implementing the Information Society in the intermodal transport sector, in particular logistic.

## 1. Common research for understanding intermodal transport

Knowledge of demand of goods transport is essential for policy decision on the improvement of intermodal transport, both in the Union and in Central and Eastern European Countries.

It is thus necessary to provide statistics about intermodal transport systems, established scenarios for its development and develop an appropriate modelling and methodologies able

to help to define policy measures to improve interchanges services as well as measures necessary to make intermodal transport efficient and economic.

More specific, development of intermodal transport in a pan-European dimension require to analyse what it is needed on the various issue towards integrated intermodality in and between all the European countries.

Common research in view to understand the demand of transport on a pan-European dimension with particularly regard to the intermodal network should be carry out in three different stage.

*a) General databases regularly updated*

Common information technology which is immediately applicable such as automatic data collection, will be analysed for its possible contribution to operational statistical systems for pan-European and intermodal transport, in order to permit and accelerate data-collection in processing, improve the quality and reliability of collected information and improve users access.

*b) Development of intermodal transport scenarios*

It is necessary to evaluate flows between various European countries with the aim to improve transport efficiency by combining the different modes in the optimum way and which will provide improvement of door-to-door services.

The intermodal centres have to be placed in the context of the transport chains. They must not be tackled separately but as elements essential to the operation of chains. The effectiveness of the intermodal centres can make it possible to make vast improvements to the fluidity and quality of long-distance transport. These interfaces concern both the relations between long-haul and short-haul transport, and transfers between land-based modes of transport and maritime or air methods, or between rail and road transport.

Joint actions on the technical, economic and institutional conditions for the success of an integrated "door-to-door" service are proposed. Account will primarily be taken of the methods of co-ordinating modes of transport, the quality of services etc.

It will be necessary to concentrate on the operation of the chains as much as on the characteristics of the modes.

Comparative analysis and evaluation of quality, cost and other characteristics of intermodal transport and direct (i.e. road) cargo transportation are proposed.

Scenarios are designed to support decision-making on intermodal policy and planning issue of medium and long-term development. The scenarios will consider the whole geographical dimensions of European intermodal transport systems, including the increasing integration of Central Europe and the opening up of Eastern Europe, future technological prospect and practises and the changing in society and in industry.

There are two main aspects for intermodal transport scenarios: one of those is the strategic aspect of a spatial organisation and co-ordination related to the development of a Trans-

European transport network, including the diversification of centre and exit points for flow of goods. The scenarios should identify the need of intermodal transport generated by the new dimension of the demand related to the entire Europe, the efficient connection of peripheral regions, the appropriate integration of sea links in a pan-European transport network and the problems of transit regions.

The other concern is how the intermodal transport will be able to respond to medium and long-term changes in society including growing in environmental and social constraints.

*c) Spatial coordination for intermodal transport and modal split*

Taking account of the permanent information systems and the scenario, common research activity should identify the key problem of intermodal transport, to develop methodologies and guidelines for multicriteria modelling packages able to improve the efficient and the competition of the intermodal transport and finally to develop economic instruments, regulatory measures, institutional and organisational frameworks design to promote intermodal transport and an optimum modal distribution.

*d) Reverse benchmarking/best practices*

Following the benchmarking activity of European ideal intermodal solutions, a guide of transferable "best practices" should be established. Secondly, an activity of best practices transfer and organisation of cycles of training for transport operators, researchers and decision-makers should be set.

## **2. Common research for a Pan-European strategy for infrastructure: Trans-European transport networks and nodes**

*a) Network integration of intermodal terminals*

Control of the organisation of the transport sector, and its optimisation within the framework of a liberalised system involves the creation of inland terminals and ports which have the role of serving as an interface between the various modes of transport, the various traffic flows, the networks (local and international) and the operators. Such control of the development, which would enable optimum management of traffic flows, has to be established at a relatively early stage, before the operators themselves establish their own structures in an uncoordinated way.

This involves, therefore, defining the driving elements, which determine the choice of these terminals, as well as the parameters, which make it possible to define the most suitable characteristics. The various types of additional logistical services connected with such terminals must also take into account.

More specifically, this area wants to identify the most optimal location and structure for transfer centres in the intermodal transport network. The first step may be to associate the interested parties to the dissemination and transfer of knowledge activities developed by the individual projects. Evaluation of successful experience of intermodal terminal operation in

Europe will provide for elaboration of European countries concerning development and integration of terminals network into Transport Network.

Extended modelling and simulations could be done on the European countries to verify proposed terminal locations. Further study on specific case studies, to analyse the transferability of the data, could also be done.

*b) Intermodal infrastructures and their interfaces with transport means and systems*

*Terminal operations: improvement of terminal activities and management  
(equipment and organisation)*

The efficiency of transfer points, which is one of the major bottlenecks of intermodal transport, could be improved with a know-how transfer for the introduction of performant transshipment technologies and methods for the optimisation and rationalisation of terminals management and organisation. The know-how transfer could take place with an important participation in projects' dissemination activities of 4th and of 5th Framework Programmes.

Joint cooperation could be done in the following areas:

- development and operational economic validation of the functional and technical specifications for transfer and storage techniques and equipment; development of systems for different terminal types;
- development and application of steering and management systems in order to optimise vehicle movement in terminals (micromodels, simulation techniques);
- development and assessment of the impact of the flexible new working conditions in terminals; and
- automatization of crane movements: crane and spreaders vs. intermodal transport units positioning, vehicle (rolling stock) positioning, stock and depot operations.

*1) Network operations: improvement of transport organisation and interoperability  
between infrastructure, transport means and intermodal transport units*

The objectives of this theme of cooperation are to improve, infrastructure, rolling stock, and loading units/intermodal transport units, in order to enhance the interoperability, capacity and economic effectiveness of the pan-European network. On the basis of alternative solutions, the economic distributional and modal split consequences must be shown (on micro and macro level). Practical/commercial functionality must also be demonstrated.

Another major objective is to study existing charging systems and arrangements of various modes and parts of integrated transport chains, establish a review of best practice and develop proposals for increased pricing effectiveness.

Common research and pilot projects are proposed:

- to evaluate new network operation concepts;
- to develop new transport systems and specialised equipment; and
- to highlight the economic costs and possible operational consequences for combined transport users and other actors in the logistic chain.

### **3. Common research for a Pan-European strategy for interoperability: harmonisation of regulation and competition rules and identification of obstacles to intermodal transport**

#### *a) Improvement of intermodal freight operations at borders crossings*

In order to overcome technical and administrative barriers at borders crossings, cooperation is proposed in the following areas:

- to develop intermodal management procedures to reduce the burden of border control inefficiencies for intermodal services;
- to improve access where the rail gauge differs and more generally technical controls by railways. For example special terminals are situated at the interface between Central European standard rail gauge and Russia rail wide gauge network, and various techniques to overcome this interchange exist and must be looked after;
- to reduce customs waiting time, increase security, harmonise regulations, and to develop additional functions to accommodate certain borders crossings terminals (such as regroupment, customs clearance, etc.)

#### *b) Harmonization of rules and standards*

One of the major obstacles to trade in European countries is constituted by the lack of harmonisation of procedures and national regulations. It will therefore be extremely important to identify the principal incompatibilities between the various systems, and to determine which type of regulatory harmonisation is possible, enabling trade to be facilitated while respecting the interests of the countries concerned.

Intermodal transport integrates a lot of participant's demands to solve actual regulatory problems. Therefore it is necessary to identify existing obstacles, which prevent extensive use of intermodal transport and to elaborate certain ways of their elimination.

Particular emphasis will be made on drawing up unified transport and cargo documents for intermodal transport. This project should include analysis of actual European and national transport and cargo intermodal documents aiming at creation of unified data interchange in Central and Eastern European countries (basing in particular on standardised data fields sets).

#### *c) Strengthening of operators*

Europe's transport market is undergoing rapid change and will increasingly see intermodal operators competing with each other across modes and increasing market share. It is essential to determine the conditions of the opening the transport market, ensuring the healthy competition and strengthening of operators and to compare size and structure of operators and other firms engaged in intermodal transport in EU and CEECs (similarities, differences, development trends).

A joint cooperation should identify the opportunities and the barriers for actors to evolve towards a new generation of door-to-door transport operators and to propose guidelines for their promotion and their establishment in the market. These operators would provide services on a door-to-door basis and would have a neutral view of the different modes.

The research should consider the integration of all modes of transport and should focus on the identification of the obstacles and opportunities that each type of actor faces in order to fulfil intermodal transport functions and meet logistics requirements. It will highlight the commercial, social, technical operational and regulatory areas where there is scope for action by the authorities or the actors involved in the market.

#### **4. Common research for a Pan-European strategy for implementing the information society in the intermodal transport sector: harmonisation and extension of intermodal communication and information systems**

##### *a) Evaluation of existing information technologies and potential development and application*

Making use of the experience gathered in the Framework Programmes (IMPULSE, CESAR, PRECIS-IT, OCTOPUS, TRACAR, MULTITRACK, X-MODAL, etc.), joint research and development action could be done to investigate the state of the art of the existing information technologies in CEECs and EU.

On the basis of this inventory, joint cooperation should identify requirements to implement a common development and application of information technologies, and then to develop solutions.

##### *b) Development of harmonised EDI standards between intermodal parties based on single electronic document*

Electronic data interchange (EDI) organisation is a most important stage in the process of intermodal transport development. This helps to shorten goods delivery periods because of saving time for border crossing, customs formalities and reloading procedures. A common work on the development of harmonised EDI standards is necessary.

##### *c) Research on drawing up and implementation of rules and recommendations for creation and support of tracing systems*

Various satellites (GPS, GLONASS, GALILEO), tracking and other tracing systems are widely used and developed presently. It is important to carry out joint European countries analysis and evaluation of existing tracing systems and draw up common rules for the development of such systems, providing for their interoperability and possibility to collect information and to trace any moving vehicle in any geographical point at the European countries territory.

#### **Reference**

1. Intermodal transport. Glossary for transport statistics – EUROSTAT, ECMT, UN/ECE, 1997.