

# ECONOMIC BENEFITS OF DEVELOPING INTERMODAL TRANSPORT IN THE EUROPEAN UNION

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*Transport plays a crucial role in economic and social development and its contribution goes beyond what is normally captured in traditional cost-benefit analyses. Transportation investments can have large long-term economic, social and environmental impacts.*

*The European Commission when developing transport policy, focuses on the intermodal transport, which is seen as a sustainable mobility solution, environmentally friendly and efficient in terms of resources, especially in terms of freight. European transport policies promote co-modality - combining different modes for a single supply chain - as a solution to the adverse effects of transport: pollution, traffic congestion, energy consumption.*

*Intermodal transport is found to be consistently cheaper than all-road solutions, and its external costs significantly lower, thereby confirming the high potential of intermodal transport in increasing the sustainability of the transport sector. So, freight intermodality is increasingly considered as major potential contributor to solving the sustainability problems of the European transport sector.*

*This paper addresses the pricing issues specifically related to intermodal transport. The focus is on the main economical advantages of developing intermodal transport, but also on the usage limits brought by particularities of transport modes. Special attention is given to intermodal transfer terminals with solutions for activity efficiency increase, with major implications on the quality and cost of transportation.*

*The theme discussed in this paper is of great importance, many authors and specialists developed it in their studies. Some names are needed to be mentioned: Todd Litman, Dr. Yuri V. Yevdokimov, John J. Coyle, Kenneth D. Boyer and few more. But, a special attention for this subject is paid by the European Commission and its subordinated institutions, that are interested in developing sustainable strategies and promoting concrete solutions for economic efficiency in the transportation field.*

*The methodology used for this subject is based on the statistics data from the official documents and on the research made by the authors of the paper regarding the advantages from the economical point of view derived from the development of intermodal transport.*

*The results we have reached show that the intermodal transportation is rapidly gaining acceptance as an integral component of the systems approach of conducting business in an increasingly competitive and interdependent global economy.*

*The information on this paper have implications on other related fields: social, environmental and even political and the authors brought significant contribution raising the problem of the total costs of investments in the intermodal transport infrastructure and the long-term economical benefits if it.*

*Keywords: intermodal transport, economic advantage, investments, costs, infrastructure*

*JEL Codes: L91, R41*

## **Introduction**

Infrastructure sets the degree of mobility. No major change in the transport sector will not be possible without an adequate network support and a more intelligent use of its. Overall, investment in transport infrastructure boosts economic growth, create wealth and jobs and promote geographical accessibility, trade and mobility. It must be planned so as to maximize the positive impact on economic growth, minimizing negative environmental impacts.

Transportation is a multiple service to multiple users. It is produced in transportation networks that provide infrastructure for economic activities.

The transport industry itself is an important part of the economy: within the EU, it directly employs about 10 million people and is the source of about 5% of GDP. Establishing a reliable measure of intermodal market shares is hazardous. Official statistics are few and outdated. The basic figures available and the corresponding trends however show that the market share of intermodal transport in total European transport is limited: 8% of all intra EU transport (in tkm) takes place via intermodal transport. Nevertheless, all forms of European intermodal transport have shown a considerable growth over the last decade.

Under the flagship initiative "An efficient Europe in terms of resource use", presented at the within Europe's Strategy 2020 and the new Plan 2011 on energy efficiency, the main objective of the European transport policy is to help create a system which supports European economic progress, to enhance competitiveness and provide high quality mobility services, while ensuring more efficient use of resources.

The demands of the transport industry on logistics services, and therefore also the efficiency of the logistics infrastructure is growing with the steadily increasing competitive pressure.

The development of transport system was done as a necessity of meeting the transport demands made by society. The growing needs for mobility of goods and passengers have been offered more sophisticated transport modes, both technically and infrastuctural. When designing it financial considerations always prevailed, the social considerations being in a more distant plan.

## **Intermodal transport: evolution and application in the economy**

According to a commonly agreed definition of the main regional and international organizations and cooperation structures: UN, CEE, ITF, EU, ICB, ICC, intermodal transport is that transport system involving the successive use of at least two modes and where the intermodal transport unit is not divided to change modes.(1)

This entails that:

- two or more different transport modes are deployed, and therefore at least one transshipment takes place

- the main haulage is not carried out by road, but by rail or water, while trucks/lorries are used for the initial and final legs of the goods movement (pre and post haulage).

David Collenette (1997), the Transport Minister of Canada, noted: Intermodalism today is about safe, efficient transportation by the most appropriate combination of modes. (The Summit on North American Intermodal Transportation, 1997)

These statements define intermodal transportation as a macroeconomic concept, because an effective transportation system is a vital factor in assuring the efficiency of an economic system as a whole.

The structure of intermodal transport system is based on three elements (Fig. no 1):

1. a system of freight over long distances (usually involving modes of shipping, rail, inland waterways and / or air);
2. transport terminals to ensure efficient transfer of cargo units on a modal transport to another
3. a collection and distribution of freight flows at points of origin, respectively destination of the transport chain (usually made by road transport).

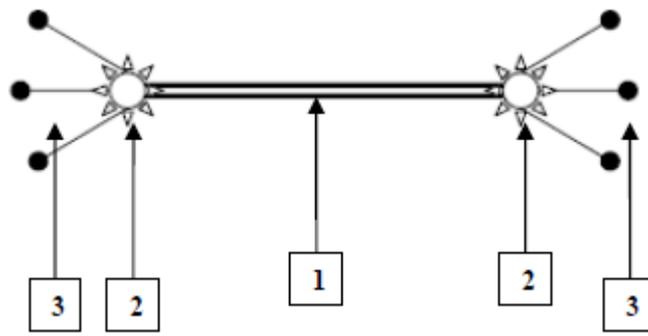


Figure 1: Basics elements of intermodal transport  
Source: Ankner 2006

Intermodal transport involves a large number of operators from the private sector. The market environment in which they operate is highly competitive. As opposed to the general situation observed for many other transport services, direct competition can often be found among players operating on the same network segment. This situation largely influences the pricing strategies of operators and their overall market attitude:

- published prices, when they exist, are often found to be substantially different from real prices offered to customers. Discounts for high volumes, for frequent and/or regular shipments, and, more generally, for strategically preferred customers are common practice, and hardly documented

- similarly, cross subsidisation between routes is frequently adopted by operators seeking to gain dominant positions on specific itineraries and services. (Ricci 2002: 4)

Expansion of the intermodal transportation network is associated with economies of scale and better accessibility to input and output markets. The overall impact of intermodal transportation can be divided into four elements:

- an increase in the volume of transportation in an existing transportation network;
- a reduction in logistic costs of current operations;
- the economies of scale associated with transportation network expansion;
- better accessibility to input and output markets. (Yevdokimov 1997: 3)

Intermodal transportation is characterized by optimal frequency of service and modal choice and increased reliability. Combined, these two features define the just-in-time delivery – a major service produced by intermodal transportation. (Blackburn 1991: 27)

It appears that just-in-time delivery reduces the burden of inventory holding costs. Reduction in the inventory holding costs directly improves the productivity of an economic system.

### **Investments in infrastructure**

Traditionally, the benefits of a transportation investment have been primarily evaluated through reduced travel time and reduced vehicle maintenance and operation costs. In order to measure total economic benefits of investing in intermodal transportation, it is necessary to understand their basic relationships with different economic activities.

Improvements in transportation reduce transportation costs. The immediate benefit of the reduction is the fall in total cost of production in an economic system under study which results in growth of the system's output.

An efficient transport network requires substantial resources. EU cost of infrastructure development, so as to meet the demand for transport, was estimated at over EUR 1 500 billion for the period 2010-2030. Completion of TEN-T requires about EUR 550 billion by 2020, of which about EUR 215 billion to eliminate critical bottlenecks. These figures do not include investments in vehicles, equipment and charging infrastructure, which may require an additional

EUR 1 000 billion, to reach emission reduction targets for the transport system. (European Commission)

There must be diversified funding sources, both public and private. It is necessary a better coordination of structural and cohesion funds with the objectives of transport policy and Member States must ensure that their budget planning provides sufficient national funds and sufficient capacity planning and project implementation. Other sources of funding to be considered are systems to internalize external costs and user charges of infrastructure, which could create additional revenue streams, which in turn would encourage private investment in infrastructure.

The biggest hurdle in the development of adequate combined traffic offers the necessary infrastructure requirements. The construction of terminals is challenging and unrealistic to expect the operators themselves to manage it. In general, as in the railway infrastructure, the public sector has to pay for it, at least in part. The installation of terminals in turn is a complex task, whose success with the integration of technology and modern logistics connected by rail and also the market potential is very closely linked. The market opportunities in combined traffic, depending on the quality of combined transport terminals vary considerably. Investment requirements for transport companies, however, are manageable. The additional costs for crane lifting containers in road transport, as compared with conventional semi-trailers, are small. (Bakukin et al. 2010: 7)

Price signals play an important role in many decisions with long-term effects on the transport system. Transport charges and fees must be restructured towards a wider application of the principles of "polluter-pays" and "user-pays". They should strengthen the role of transport in promoting European competitiveness and cohesion objectives, while the total load of the sector should reflect the total costs of transport, including infrastructure costs and external costs.

### **Pricing the intermodal transport**

The most important criterion in the transport organization is the economics of transportation.

To organize intermodal transport economically from the perspective of market participants, many parameters are important. In particular, the efficiency of the ports (terminals, as well as countries and systems boundaries) and the economic orientation of the rail companies are of the utmost importance in order to determine the marketability.

Over longer distances, the intermodal transport offers, theoretically, significant advantages in terms of the road driving and rest periods.

The main cause of the relatively low development of intermodal transport is its inability to respond in a satisfactory customer's requests in the new logistics environment.

Road transport is recognized as being more flexible, cost-effective, transparent, effective and thus provides a good quality service.

Intermodal transports are cost-effective over long distances and it is known that in Europe most of the shipments of goods are made on short distances; about 57% of the transported goods moving within a radius of 50 km. (European Commission)

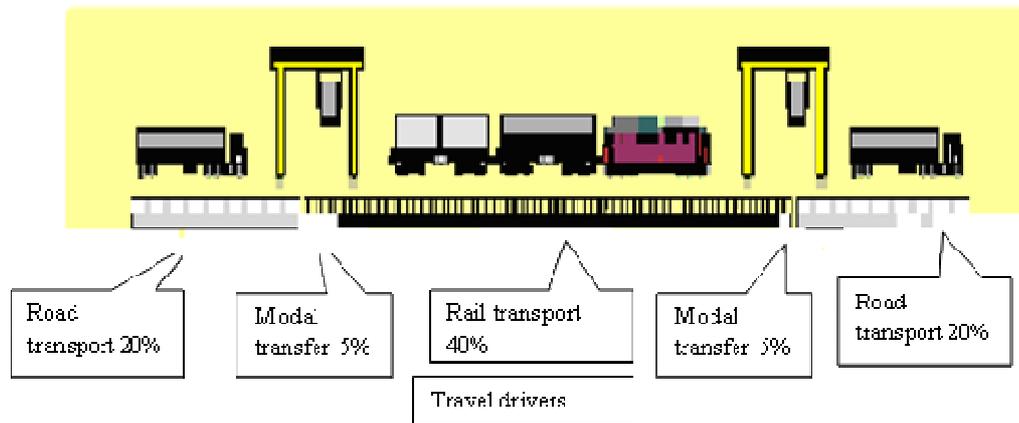


Figure 2: Share of costs involved in intermodal transport

Multimodal freight transport and combined rail-road transport are two strong axes of sustainable development policy of the European Union, because such operations are carried on long distances and in large quantities. These transport present the following economic advantages: transport in a single train of 20-25 swaps, in a single barge of 130-175 containers or in a single ship of 8,000 or more containers, replace the same number of trucks and leads to significant gains in economy energy, personnel costs, vehicle maintenance and other costs that are considered internal and external.

Intermodal interfaces, strategically located where networks of different modes converge, allow goods, particularly those in standard containers, to be transferred efficiently between transport modes, thereby ensuring optimal usage of the networks as a whole. These intermodal interfaces are not only important at seaports, but are increasingly being recognized as beneficial at inland points of intersection as well.

Socio-economic benefits and positive externalities justify a certain level of public funding, but in the future transport users will probably have to pay a larger cost than today. It is important that users, operators and investors receive fair and consistent monetary incentives.

Internalize externalities, removing tax distortions and unjustified subsidies and free and undistorted competition are, therefore, part of an effort to align market choices to sustainability needs (and taking into account the economic costs of "non-sustainability"). They are also required to establish fair market conditions between modes that are directly in competition.

Oil will become more rare in the coming decades and sources of supply will become increasingly uncertain. As shown recent by IEA, the success of the global economy in terms of decarbonisation is lower, the oil price will be higher. In 2010, bill of EU oil imports amounted to about EUR 210 billion. If we do not solve the problem of oil dependence, people's ability to travel - and our economic security - could be seriously affected, with serious consequences on inflation, trade and global competitiveness of EU economy.

It is important that new transport models appear, in which large volumes of freight and more passengers are transported in common at destination with the most efficient (combinations of) ways.

Future development should be based on:

- performance optimization of multimodal logistics chains, including increased use of inherently more efficient ways in terms of resource use, where other technological innovations are inadequate (eg. freight over long distances)
- more efficient use of transport and infrastructure by using a series of improved traffic management systems and information (eg ITS, SESAR, ERTMS, SafeSeaNet RIS), by using an advanced logistics and implementation of market measures such as developing a comprehensive

integrated European railway market, elimination of cabotage restrictions, removal of barriers to short sea shipping distances, no distortion rates, etc. (Raoul 2009: 12)

On long distances, decarbonisation of road transport options are limited, and multi-modality freight should be attractive from the economical point of view, for carriers.

EU needs corridors especially developed for freight, optimized in terms of energy consumption and emissions, in order to minimize environmental impact, but which can be also attractive because of their reliability and reduced congestion and due to the low administrative and operational costs.

### **Recommendations and conclusions for increasing the efficiency of intermodal transport**

Regarding intermodal transport has been found that a significant amount of time is lost in terminals where the transfer of goods to / from the means of transport in the deposits or their transshipment between different modes of transport is realized. Efficiency measures of the intermodal chain also apply to investment and organizational solutions applicable to intermodal terminals.

Main economical obstacles to the development of intermodal transport refers to the high investment costs for both intermodal transport units and terminals, high costs of transfer and storage; cost structure is often unknown and the division between infrastructure, terminals, traction, rolling stock operation, handling, etc., is unclear.

Development and profitable solutions of the business in intermodal transport terminals relate to measures of investment and organization. Investments measures are:

- modification of terminal groups of lines by increasing the number and length of tracks;
- improving access to train in the terminal area by reconfiguring the diagonals in order to increase the number of simultaneous paths and reduce the duration of the terminal input and output;
- expanding the area in which the transfer of road - rail cargo units is realized;
- improve terminal access road and increased parking spaces;
- the provision of transfer equipment performance and with high productivity
- the equipment with means for automatic identification of vehicles (cars, tractors and trailers) and of cargo units (containers, swap).

Organizational and operational measures aimed at:

- increase uptime daily of the terminal;
- superior organization of activities by simultaneous operation of terminal
- sizing technological processes and work teams
- increased use of electronic computing equipment (optimization solutions by setting optimal order of introduction to the activities of loading / unloading) and of information systems, command, control and communications.

Since most finished products are transported in containers and that they are the primary means to facilitate intermodality, it is estimated that, in the twenty-first century, intermodal transport, with technological improvements of used transshipment systems, is the cornerstone of international trade, being considered the most effective way of managing international transport activities from "door to door". This is because intermodal transport allows the combination, advantageously in a certain way, of the specific advantages of each mode of transport, such as road transport flexibility, high capacity of rail transport, low costs of shipping transport and high speed of air transport.

### **Notes**

- (1) United Nations, 2001, *Terminology on Combined Transport* (New York and Geneva)

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