ANALYSIS REGARDING THE ECONOMIC BENEFITS OF INTERMODAL FREIGHT TRANSPORT

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ABSTRACT

In the context of globalization there is the common goal regarding the transport system which refers to its economical aspect. Intermodal freight transport is the one that allows a "door-to-door" transport, by the convenient use of vehicles, selected in order to achieve a much faster transport of goods at the lowest possible cost. The literature showed that there are many benefits related to this transport and through this paper it was attempted to emphasize the economic benefits of intermodal transport, due to the fact that those have a major contribution in increasing the performance of a transport chain. The final purpose of the paper is to transmit to the actors of the transport system the need for a change in the supply chain, which will definitely bring economic benefits to the whole transport of goods.

Keywords: *Transport system, intermodal transport unit, economic benefits, costs.*

1. INTRODUCTION

As any system that is working towards a common goal, the transport system takes into account the requirements of the parties involved, the elements that underlying their achievement (the transport modes, an adequate infrastructure, the equipment needed), but also the way in which they interact in order to achieve the predetermined final performance (Raicu, 2007).

There is an extensive literature regarding the connection between the economy and the transport activity, those two being closely connected; increasing performance in transport activity has led to sustain economic growth. The evolution of transport, especially the emergence of container transport (an essential part of intermodal transport), has led to an economic development of transportation systems worldwide, a development that was sustained by ports expansion, the appearance of specialized terminals and also by the increasing efficiency of vehicles. As showed in the picture below we can notice the relation between transportation and economy.

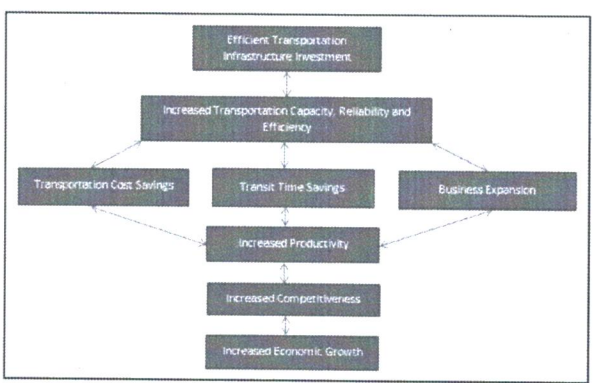

Figure 1 The relation between transportation and economy
Source: ICF Consulting (2002), Economic Effects of Transportation: The Freight Story

As was emphasized by the European Commission, the European Union has become one of the largest economies in the world, due to the development in former Soviet Union countries and to significant increases in imports and exports. The EU transportation system depends on the synergies that result from connections and integration of modes, but also on the efforts of key players in the public and private sectors.

According to the data revealed by Eurostat, in 2014, the modal split of goods transport in tonne kilometres for the EU-27 was 50.3% by road, 32.8% by sea, 12.3% by rail, 4.6% by inland waterways and 0.1% by air transport, the last two of them convers only intra-EU transport (EC/Eurostat, 2007). Analysing this data, seeing that rail and inland waterways have a relatively lower modal share, we need to point out their low contribution in intermodal transport. Despite this, we can easily notice the importance of transport within the logistic supply chain, regarding the distribution of goods.

Analysing the data provided by the Romanian National Institute of Statistics at the end of 2014, in Romania, the transport of goods increased over the same period of the previous year for all modes of transport, except road transport. Over 140,000 thousand tons were transported by road transport, almost 37,000 thousand tons by rail, 31,558 thousand tons by maritime transport (99.9% in the international transport), over 20,000 thousand tons by inland waterways, 23.6 thousand tons by air transport and over 4,700 thousand tons via main oil pipelines. In Romania there was an increase regarding the inland waterways transport of over 7%, while rail transport had a rise of almost 2%.

2. A SHORT PRESENTATION OF INTERMODAL TRANSPORT

Analysing the literature, there are many terms which are used as synonyms, even if they are relatively different (multimodal transport, combined transport and intermodal transport), but in our paper we will use the last one, defined as "the movement of goods in one and the same loading unit or vehicle that successively uses two or more modes of transport without handling the

goods themselves in changing modes" (UN/ECE, 2001, p.17).

The intermodal transport is considered to be a particular case of multimodal transport, which uses the ITU: intermodal transport units- container, swap body, trailers (UN/ECE, 2001, p. 43), as a mean of increasing the efficiency of the transport system, this is why intermodal transportation researches have recently increased; intermodal transport is considered to be the backbone of world trade (Bektas, T. and Crainic, T.B., 2007).

As there can be seen in the picture below there are many relationships between intermodal transport and other transport market segments, road freight transport being the segment which contributes most to the door-to-door services required by distribution and transport systems. When referring to sea, rail and inland waterway transport there is a need in decreasing the size of shipments, in order for the intermodal transport to obtain a share in transport sector of bulk goods, as with containerization was won an important share of general cargo traffic (Vrenken et. al., 2005).

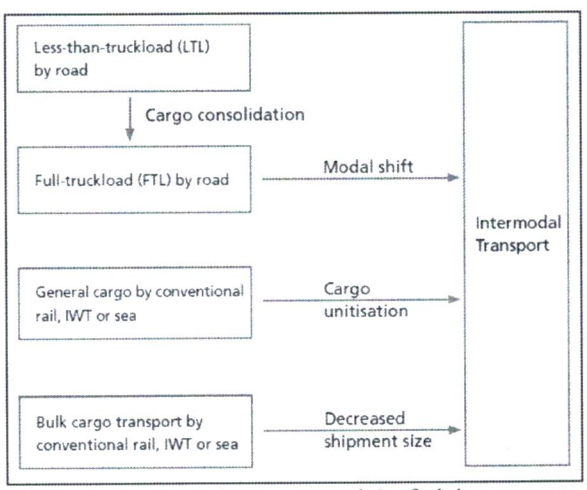

Figure 2 Intermodal transport and the freight segments closest to it

Source: Vrenken, H., Macharis, C. & Wolters, P. (2005), Intermodal transport in Europe, European Intermodal Association (EIA)

Studies have revealed that an intermodal system is defined both thru its points of connections and the links between them. There was introduced the need and accomplish of a "seamless transport" that allow the change in mode to be done as efficiently as possible without noticeable losses of time (Abbasi, M.F., 1996).

3. THE ECONOMIC BENEFITS ANALYSIS

Many studies have emphasized that the economy gains from the social and economic benefits intermodal transport, due to the fact that it allows obtaining integrated transport services at lower environmental costs.

A short analysis regarding the benefits of intermodal freight transport revealed many of them, all having a major contribution to the growth performance of a transport chain. When referring to intermodal transport system there are two important categories of costs: external and internal costs. Every type of costs appears in every stage of the intermodal transport, depending on several factors such as (Janic, M., 2007):

- The network in general: its location, the distances and the number of nodes;
- The efficiency of services;
- The prices of inputs;
- The number of activities related to every stage of the network.

Hanssen and Mathisen (2011) consider that the reduction of external costs is the main advantage of intermodal transport. Many studies were conducted to show that by combining the advantages of every mode of transport, usually replacing road transport with any other type of transport, entails a reduction in the value of external costs (congestion, air pollution, accidents or energy consumption).

Dragu (2009) emphasizes the social benefits of intermodal transport by improving working conditions for drivers, reducing the risk of accidents or congestion, especially by enhancing traffic safety.

When referring to the economic advantages the list is longer. The transport of intermodal transport units uses inland waterways, sea or rail instead of road transport leads to significant gains in terms of staff costs, maintenance and repair of vehicles or energy saving. Using at least two modes of transport reduces the final cost by combining the specific advantages of each mode used. In order to have an effective, efficient, and economical transportation system, the minimization of total transportation costs are required, due to the fact that they are an important selection criterion, when choosing the transport modes (Sahin et.al., 2014).

By measuring the economic benefits of intermodal transport, there was revealed the need for an investment in the logistical infrastructure, in order to support the growth of intermodal transport.

Table 1. Economic benefits of intermodal freight transport

Item no.	Primary impact	Associated direct benefits	Associated indirect benefits
1.	Modal shift, road to rail	Reduced transport cost (fuel consumption, maintenance and staffing costs)	Increased value of trade and GDP
2.	Increased direct investment (local economy)	Increased direct employment (number of jobs created)	Induced economic activity (through cluster development) and associated employment growth
3.	Reduced fuel consumption	Reduced CO2 and other atmospheric emissions and associated value	
4.	Reduced road traffic	Reduced road traffic accidents and associated costs	Reduced travel time (in urban areas) and associated

		Reduced road maintenance costs	saving

Source: United Nations ESCAP (2009), Policy Framework for the Development of Intermodal Interfaces as part of an Integrated Transport Network in Asia, 102 p.

Studies have shown that the economic benefits of intermodal transport begin to be effective while the transportation distance gets longer. On a certain distance the total cost of transport is lower for intermodal transport compared for example to the road transport (which has a smaller fixed component). For every transport there is a point in which the costs are equal (the lines intersect), as is presented in the picture below, point known as the break-even point. On a distance of less than 100 km the road transport cannot be beat, while over 500-600 km the intermodal transport represents a viable solution (Vrenken et. al., 2005). The comparative analysis between those two modes of transport revealed that intermodal transport brings much more economic benefits that a unimodal transport.

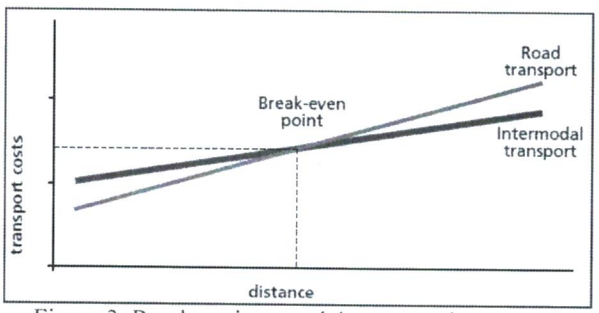

Figure 3. Road vs. intermodal transport in terms of transport costs

Source: Vrenken, H., Macharis, C. & Wolters, P. (2005), Intermodal transport in Europe, European Intermodal Association (EIA)

So, after this analysis, when we refer to the economic benefits of the intermodal freight transport we need to point out several conclusions (Yevdokimov, Y.V., 2000):

- It usually determine a reduction in the logistic costs (for the operations that are develop in every transport of goods) by introducing just-in-time distribution system;
- The expansion of the transport network fosters the development of the economies of scale;
- There is an increase regarding the volume of goods transported that can lead to economies of density usually achieved by cargo containerization and consolidation;
- It allows better accessibility for both input (specialized labour skills) and output (the opportunity to enter on broader markets) markets.

4. CONCLUSIONS

As was highlight Hanaoka and Regmi (2011) it is essential to promote intermodal transport, due to its economic advantages, but also to its environmental benefits. The intermodal transport requires the development of three important elements like: transport links (railway networks, highways or inland waterways), transport nodes (airports, ports or stations) and transport services, that always need to be taking into consideration.

The advantages obtained from fulfilling an intermodal transport are multiple, those having a major contribution in increasing the performance of a transport chain. It is important to note that in order to achieve these benefits, the most essential decisions refers to the selection of the intermodal transport unit, decision that that must take into account the type of cargo, the destination and the organization of the transport awarded. Such intermodal transport allows a seamless transport of goods from the point of dispatch to the destination.

This paper has reviewed the economic benefits of intermodal transport, which showed that:

- The intermodal transport is an attractive solution that needs to be considered when taking a logistical strategy;
- The benefits of intermodal transport begin to be effective while the transportation distance gets longer;
- The intermodal transport replies very well to the challenges of globalization and internationalization.

So, in order to achieve all the economic benefits of intermodal freight transport, there should be given a bigger importance on designing and development of intermodal development centres with the goal to ensure effective promotion and tailor made solutions to "intermodal users", with the general objective of improving the quality and the sustainability of freight transport.

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