Inter-modality in the ports and sustainability of the EU freight transport

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**Abstract**

Over the past two decades, the intensive economic growth in the European Union (EU) has been accompanied by a strong increase in the freight transport volumes. Apart from the evident positive impact on competitiveness of the EU economy, the latter really questions sustainability of the EU transport industry, because of more and more expanding adverse transport externalities - sharply increased oil consumption, congestion, accidents and environmental pollution. Some of these externalities are due to subjective factors like inefficient use of resources and poor split amongst transport modes. Generally, it is feasible these factors would be corrected by various technical, market and regulatory means. In this connection, the potential, offered by the inter-modal transport chains with participation of waterborne transport for surmounting of these disadvantages, should be assessed carefully. However, switching of the freight transport demand to inter-modal transport solutions with participation of waterborne transport could be feasible only when the aggregate quality of the inter-modal transport service is higher than the aggregate quality, supplied by other transport alternatives. The key pre-condition for this suggestion is availability of fair rivalry amongst transport modes.

**1 Introduction**

Over the past two decades, the intensive economic growth in the EU has been accompanied by a significant increase in the freight transport demand. In relative terms, the main share of this transport growth belonged to the road transport, exclusively at the expense of the rail transport and at a lesser extent – waterborne transport. As a result, the current modal split in the EU freight transport consists of 44 % of the road transport, 41 % of the short sea shipping, 8 % of the rails, 4
% of the inland waterways and 3 % of the pipelines. By the year 2010, a new 38 % increase in the EU freight transport industry is expected. The road transport (50 %), followed by the waterborne transport (34 %), is predicted to be accountable for the major share of this growth [1].

2 Main challenges towards sustainability of the EU transport

Apart from the greater covering of transport needs of the EU industry, the above described increase in the EU freight transport volumes results in two main problems. This directly affects and questions sustainability of the EU transport sector. These two main challenges are de-coupling of transport externalities’ growth and economic growth [1] and security of the EU oil balance [2].

2.1 De-coupling of transport externalities’ growth and economic growth

Increasing of the EU freight transport volumes means that transport needs of the EU industry are covered at a greater extent. On the other hand, such considerable growth in transport activity reflects into an augmentation of the corresponding adverse secondary effects, expressed primarily in congestion, accidents and environmental pollution. Therefore, the main goal of the EU transport policy over the coming years will be to gradually break up the link between economic growth and transport externalities’ growth. Objectives of this policy goal are preventing congestion, avoiding as much as possible accidents and decreasing greenhouse emissions and noise. At the same time, reduction of transport externalities is not to be at the expense of lesser quantitative and qualitative coverage of transport needs of the EU industry at all.

2.2 Security of the EU oil balance

The EU transport industry depends entirely upon oil - 98 % of the total transport consumption, representing 67 % of the final EU oil demand. Referring to the prevailing upward trends in the EU transport sector, by the year 2020 the import dependence of the EU upon oil would increase up to 90 % from the current 50 % level. This unfavourable situation is not expected to alter even after enlargement, because the EU-candidate countries suffer similar problems with the oil supply. Such a rate of oil external dependence represents real threat for the security of the EU oil balance, with all ensuing socio-economic consequences.

3 Tools for solving the main problems in the EU transport

There are several policy tools available for surmounting the above mentioned two main problems of sustainability of the EU transport industry [3].

The targeted de-coupling of transport externalities’ growth and economic growth, without decreasing the extent of quantitative and qualitative coverage of transport needs, could be achieved by better land-use planning. The expanded
application of various information and communication computer-based solutions [e.g. Intelligent Transport Systems] might also decrease the volume of transportation required for covering of a constant size of transport demand, especially by improvement of co-ordination along the transport chain.

In regards to the security of the EU oil balance, the EU-member states have got very limited scope to influence on the oil supply side. However, they could intervene on the oil demand side, mainly by promoting effective and efficient utilisation of fuel in transport.

On the supply side, the main reserve is associated with improvement of the balance split amongst modes. Here, the main target is decreasing the excess share of the road transport by promoting use of other modes, as well as better linking up the transport modes. Actually, the expanded application field of the road transport is the main cause for the synchronised growth of economy and transport (and of transport externalities respectively), as well as for the increased fuel consumption in the EU transport sector. Thus, the main tool for overcoming both main challenges in the EU transport sector is alteration of split amongst transport modes, giving priority to the rail and waterborne transports. As in most cases, the latest technologically is not capable of performing door-to-door transport services, the main emphasis in the coming years should be optimal combination amongst transport modes, i.e. inter-modality, as shown in Figure 1.

Figure 1: Transport inter-modality and sustainability of the EU freight transport.
4 What the “inter-modality” means

As usual, under the notion “inter-modal transport”, it is understood that it is a movement of goods whereby at least two different transport modes are involved into door-to-door transport chain. Taking into consideration reasons given in the previous paragraph 2, this definition of inter-modality could be modified as movement of goods whereby the major part of journey is performed by rail and/or waterborne transport, and any initial and/or final legs, carried out by the road transport, are as short as possible [4].

In fact, inter-modality represents an indication of the extent of integration amongst transport modes. The economic basis for inter-modality is the opportunity to use into integrated door-to-door transport chains individual strong points of each transport mode, while eliminating consequences of their weak sides, in order to improve the overall efficiency and effectiveness of the transport process.

5 Characteristics of the waterborne transport inter-modality

The key question for inter-modality is how to attract freight transport demand. This could be realised only if in the potential customers’ concepts the relative aggregate quality of the overall transport service, offered by inter-modal transport chains, is higher than the aggregate quality, supplied by the uni-modal transport opportunities [5]. It means that in the potential customers’ mind the inter-modal transport alternative ought to be safer and/or more secured and/or cheaper and/or faster and/or more reliable than the uni-modal transport alternatives available. The relative priority of these criterions defers on case-by-case basis. In regards to the inter-modal transport chains with participation of waterborne transport, their relative competitiveness towards other transport opportunities (including fully terrestrial inter-modal transport options) depends on the following general and mutually related factors:

5.1 Type of the goods

The specific qualitative and quantitative characteristics of the goods could very often pre-determine the choice between uni- and inter-modality. Sometimes it is highly recommended that transportation of some specific cargoes (hazardous, high-value, perishable and etc.) be performed with minimal transhipments. However, this obstruction could be overcome by wider application of containers.

On the other hand, transportation of typical mass cargoes on relatively long distances is better if performed exclusively by waterborne transport, subject to availability of suitable waterways, even if it is accompanied by certain increase in the voyage distance. Therefore, in most cases the inter-modal transport chains could be considered as more feasible for cargoes, carried by the liner shipping freight segment, but not by the tramp one, where the great majority of cargoes are mass ones. However, when inland transportation of mass or dangerous cargoes is needed, the inter-modal transport chains with participation of river or combined sea-river transport, where possible, should be considered as the best transport opportunities.
section 5.2 Techno-economic characteristics of ports and shipping services

One of the main conditions for successful inter-modal connections in the ports is availability of good links between the waterborne transport and terrestrial modes of transport. Therefore, the rightful and prospective design of ports and terminals, as well as standardisation of loading units and handling equipment, are absolutely indispensable for the effectiveness and efficiency of the inter-modal transport connections in the ports [6]. Finally, the cargo-handling infrastructure in the ports ought to allow secured storage of the goods, safe and expeditious handling and transhipment, adequate information and communication procurement of the transport process, including pre- and end-haulage stages.

section 5.3 Specifics of the voyage

It is generally assumed that the inter-modal transport chains are competitive on distances not less than 500 km. However, the combination amongst good co-ordination amongst elements along the inter-modal transport chain, adequate and well developed port infrastructure and high-quality management over the waterborne part (voyage and stays in the ports) of the inter-modal transport process could earn competitive inter-modal transport solutions even on considerably shorter distances.

section 5.4 Partners involved in the transport chain

Peculiar characteristics of parties in the transport process could also favour or prevent utilisation of inter-modal transport chains. For instance, very often relatively small cargo consignors and shippers prefer to use uni-modal transport alternatives even if the aggregate commercial conditions (prices, duration of the voyage and etc.) are worse than those ones of the inter-modal transport opportunities. As usual, this phenomenon is due to lack of knowledge, as well as to unawareness, respectively - fear of the inter-modal and waterborne transport procedures and regulations.

section 5.5 Rivalry with terrestrial transport modes

The level of rivalry with terrestrial transport modes could considerably influence customers’ choices between uni- or inter-modal terrestrial transport alternatives and inter-modal transport options with participation of waterborne transport. Others things being equal, if a well developed terrestrial infrastructure and/or competitive prices of terrestrial freight transport services are available on routes, where inter-modal opportunity with involvement of waterborne transport is presented as well, the relative competitiveness of the latter would be questioned seriously.
6 Key problems associated with the waterborne inter-modality

The most frequent problem, met by the inter-modal transport chains with participation of waterborne transport, is the lack of co-ordination amongst different transport modes involved. As a result, all parties in the inter-modal transport chain suffer significant losses, risen by high-cost time delays. As usual, the lasts are incurred by unsynchronised working hours of inter-modal terminals in the ports with schedules of the terrestrial transport modes, uncoordinated and unproportional - in terms of speed and time - handling of cargoes, consequent congestion, poor punctuality of terrestrial pre- and after- waterborne haulage legs and etc. Therefore, the unwillingness to use inter-modal transport alternatives with participation of waterborne transport sometimes is due to a previous bad experience, no matter whether that experience has been directly suffered or has only been reported by someone.

At some extent, the problem with delayed handling of cargoes could be partially solved by broader utilisation of standardised loading units and means of transport. Unfortunately, apart from containers, common standards of many other loading units are still missed. For instance, presently there are several different kinds of pallets, standardised on country-by-country basis only.

The time delays in the ports could also result from lack of proper communication and information exchange. Sometimes the former is prevented by the fact that the relatively small truck operators, involved in the inter-modal transport chain, are not willing or do not have enough financial resources to invest in communication network required. The misunderstanding of the corporate confidentiality usually causes the latter.

At the end, but not at the last, the question of the internal mutual rivalry amongst different independent operators could also prevent the successful functioning of the inter-modal transport chains. The problem becomes more complicated especially in the case of the presence of many relatively small road transport operators and/or in periods of low business activity and falling freight transport demand.

7 Main reserves for improvement of waterborne inter-modality

7.1 Improved management of inter-modality in the ports

Apart from the measures, logically ensuing from the above described problems with inter-modality in the ports like intensification and better co-ordination of handling of vessels and cargoes, a flexibility of the suppliers of the waterborne transport services towards customers’ needs is also essential. At least this means that a market, i.e. seller’s approach towards the existing and potential customers ought to be perceived, but not an employee’s one. On the other hand, the role and importance of the in-land agency offices and freight forwarding representatives ought to be noticeably risen, in order to attract more potential cargoes and customers to the inter-modal waterborne transport services [7].
7.2 Fair pricing in the waterborne transport

A wider application of fair pricing for the complex waterborne transport service has to be introduced as soon as possible by its suppliers - liner freight forwarders and ships’ operators. It means that in order to shift more cargoes and customers from the uni-modal terrestrial transport alternatives to the inter-modal waterborne transport opportunities, a pricing much closer to the actual transport costs incurred plus a reasonable risk premium ought to be applied. The reason for this affirmation is related to some of the peculiar characteristics of the liner shipping, like availability of various freight alliances of ship owners and/or operators, and relatively lower extent of specific chartering knowledge by the typical customers of the liner shipping services. Therefore, some liner operators and freight forwarders sometimes are tending to gain an extra-income and profit at the expense of customers by offering them higher freight rates than the realistic ones and/or by inserting in the transport contracts quite unfavourable clauses, being sometimes even in breach with usual established shipping practice. In short-term aspect, such kinds of actions could potentially ensure some benefits. However, in long-term perspective, this most probably will reflect in a loss of customers, who would switch to the terrestrial transport alternatives, because of the unfair pricing and/or contractual behaviour.

7.3 Rising of awareness and dissemination of “best practice”

Due to various factors, a great number of cargo consignors are used to call uni-modal terrestrial transport alternatives and especially the road alternatives. As a result, even when the inter-modal waterborne transport opportunity offers better complex transport service in terms of prices and/or safety and/or security and/or speed and/or reliability, very often it is equally difficult to explain to and to be understood by the potential customers. The key problem here is that such understanding requires changing their minds, which could not be done as quickly as the intention. Therefore, the wider dissemination of the “best practice” and of the awareness about successful practical cases could be considered as one of the main factors for enhancing the waterborne transport inter-modality. In addition, the increase of knowledge about advantages, principles and rules of the waterborne transport - both liner and tramp shipping sectors – via various training courses, is also essential for the broader use of inter-modal waterborne transport chains.

8 Key pre-conditions for the waterborne inter-modality

There are two main pre-conditions for development and enhancement of the waterborne transport inter-operability: the fair and efficient pricing in all transport modes [8] and the inter-operability [9].
8.1 Fair and efficient pricing in all transport modes

Under the notion “fair and efficient pricing in transport”, it is understood to be a pricing approach where all transport modes are paying for the full socio-economic cost they incur. In most cases, the last includes infrastructure, congestion, accidental and environmental costs. Presently, the most undercharged mode of transport is the road one because of the prevailing inadequate pricing system in use. The implementation of such kinds of pricing, which take into consideration the impact of transport externalities, is suggested to improve present unfair rivalry amongst transport modes, ensuing from the undercharging of some of them and respectively – overcharging of others. The key consequence from this process is expected to be a considerable amendment in split amongst transport modes, especially with increasing the relative share of the inter-modal transport chains, including wider use of both short sea and inland shipping.

8.2 Inter-operability

The inter-operability is a process, where at least two different operators and/or systems are functioning efficiently and effectively, despite various technical, physical, geographical, legislative, organisational and socio-economic barriers. In the case of inter-modality, the significance and importance of inter-operability is related to the ability of communication systems involved for safe and secured exchange of data, information and services. Due to the great dependence of the effective and efficient work of the inter-modal transport schemes on the accurate and punctual information flows, the availability of high degree of inter-operability along elements of the inter-modal transport chains becomes indispensable for the competitiveness of inter-modality in comparison with uni-modality.

9 Conclusions

The factors of success for the inter-modal freight transport chains in general and especially for transport chains, which include waterborne transport, could not be defined in broad terms like type of goods, distance of transportation and etc. In fact, the choice of cargo consignors is governed by the aggregate quality of the complex transport service supplied, which includes various parameters as prices, safety and security, speed, information procurement, punctuality and etc. Therefore, the relative competitiveness of various freight transport opportunities available - uni-modal, fully terrestrial inter-modal or inter-modal with involvement of waterborne transport - defer on case-by-case basis. However, competitiveness and customers’ choices are also governed by the market and rivalry conditions, which are not always fair and efficient by definition. Thus, sometimes market and institutional measures are needed in order to secure fair rivalry amongst transport modes in the EU freight transport sector. The impact of these measures would be improvement of the split amongst transport modes.
On its part, the last would significantly make for the sustainable development of the EU transport sector, by contributing to the de-coupling of transport externalities’ growth and economic growth and to the security of the EU oil balance.

References