THE EVOLUTION OF CONTAINER TRANSPORT IN THE FRAMEWORK OF INTERMODAL TRANSPORT

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ABSTRACT

The importance of intermodal transport increased greatly during the last years on global level, the transporters searching always for the optimization of external costs, but also for the combination of the advantages related to each mean of transport, in an advantageous way. The container transport improved considerably especially in terms of the increasing capacity of the means of transport, but also through the construction of some performing means, which allow the efficient transport of the intermodal transport units (ITU). Through this paper, I have tried to present the evolution of the container transport both in terms of capacity and of construction of the means of transport.

Keywords: *Container transport, intermodal transport unit, containerships.*

1. INTRODUCTION

Taking into account the decreased transport capacity of road and rail transports and also their ill effects on the environment, the transporters' attention and, especially, the European Union's attention, was directed on the use of some combinations of means of transport, less pollutant and more safe (Leinbach, 2007). As shown by the specialty literature, both the trade and the transport are in a close connection, because the efficient transport has as a goal a successful trade. In general, the international transport involves the use of some variable means of transport, each connection corresponding to a transfer, to a store keeping or to a transport operation which takes place in the country of origin, a transit country or in the final destination country. The development of the "door-to-door" transport imposed the development of the intermodal transport because of the fact that it allows the advantageous combination of the advantages related to each mean of transport (taking into account the increased transport capacity on the railway, the decreased costs of the sea transport, the flexibility of the road transport or the high speed of the air transport).

With the years 1960, it was introduced the concept of intermodality, like a quality indicator following the efficient integration of the means of transport on the level of the infrastructure, of the related operations, at the same time taking into account the regulation conditions. In this way appeared the notion of intermodal transport which presupposes the freight transport through an intermodal transport unit (ITU- container, mobile box or semi-trailer), using at least two different means of transport, without the splitting of the unit at the changing of the means, thus the goods not being manipulated, but only the transport unit. The introduction of the intermodal transport units represented a very important step for the international trade, causing changes both on the level of the means of transport and on the level of manipulation equipment and devices.

In order to minimize the negative effects of the globalization phenomenon, taking into view the cutting of transport costs, but also the cutting of external costs generated by the activity transport, it was considered that the intermodal transport represents one of the simplest examples of globalization which has in view one of its fundamental objectives: the long term sustainable development. Taking into account the globalization conditions, the realization of intermodal transport presupposes the existence of a corresponding infrastructure, able to allow the displacement of the means of transport under high performance conditions, the cutting of the parking time in certain points of the transport networks, but also the use of modern installations adapted for various categories of goods (Remes, 2011).

2. THE ROLE OF INTERMODAL TRANSPORT UNITS

As Raicu (2007) states in his book, the economic advantages of the intermodal transport units are multiple, both for the participants of the intermodal transport chain and for different economic sectors. The transport units determine the use of the means of transport for a longer period of time, as a result of the decrease of the duration of loading/unloading operations and trans-shipment from port, environment protection (through the reduction of packages traditionally used, which presupposes wood and paper), the introduction of some modern systems for the identification of the freight location (through the identification of intermodal transport units), but especially, and the most important, the realization of the "door-to-door" transport.

In Floden's paper (2007) are presented the three components of the general structure of the intermodal freight transport system:

- Freight collection and distribution system (a);
- Transport terminals (b);
- Transport system of flows of goods on long distances (c).

The figure below presents the development way of the activity realized within an intermodal transport system. All determinant elements of the intermodal transport system have the intermodal transport units at base. Nowadays, on European level, the most used

transport unit is represented by the container, which allows the easy freight transport along this system: in the freight collection and distribution system is used the road transport because of its flexibility, the transport of the flows of goods on long distances is realized using means of transport with a higher transport capacity than the road transport (railway, fluvial or sea transport). The role of transport terminals is to ensure the efficient transfer of containers from a modal transport system to another in maximum efficiency conditions.

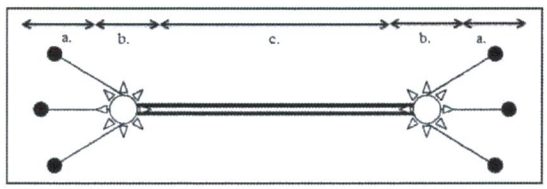

Figure 1 Basics elements of intermodal transport
Source: Flodén, J., *Modelling Intermodal Freight Transport- The Potential of Combined Transport in Sweden*, BAS Publishing, 2007

3. A SHORT ANALYSIS OF CONTAINER TRANSPORT

The freight transfer from a transport mean to another imposed modern transport technologies which use the transport units. In this way, besides the formation of packages (system used in order to obtain some packages which resist to the transport of various categories of goods, such as: logs, rolled steel etc.), appeared the pallet operation and the containerization (Raicu, 2007). The global market needs an integrated intermodal transport system, which offers the highest performance level at the transfer points (OECD, 2002). The containerization answered the best to the requirements regarding the efficiency of the freight transport, trans-shipment and manipulation operations.

In terms of the advantages offered (increased resistance, goods safety, high piling coefficient), the containers represent the most used intermodal transport units. The figure below presents the number of TEUs existing in the global fleet of port-container ships on the 1st of July 2014. In this way we can say that the container is at the base of the intermodal transport, this being the fundamental element which determined the development of intermodal transport, the largest part of the volume of transported goods which use the intermodal transport being realized through the containers (David and Stewart, 2008).

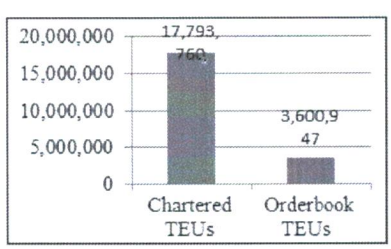

Figure 2 Number of TEUs chartered and orderbook
Source: www.statista.com

Regarding the structure of international seaborne trade, as shown by UNCTAD in the figure below, in 2014, the containerized trade (nearly 15%), has increased by over 5%, accounted for about two thirds of "other dry cargo" (general cargo and break bulk).

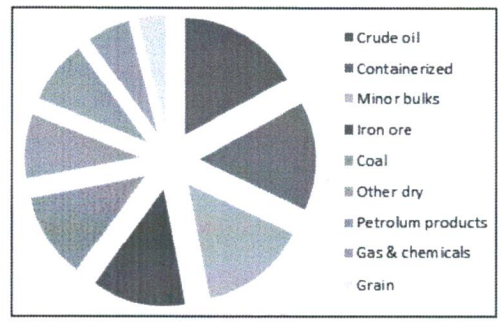

Figure 3 Structure of international seaborne trade, 2014
Source: UNCTAD, Review of Maritime Transport, 2015

As can be seen over the last years (1980-2014), the volume of goods transported in containers greatly increased which shows the importance of intermodal transport worldwide. The table 1 offers a general overview over the freight container transport regarding the millions of tones that were loaded.

Table 1. Freight container transport, selected years (millions of tons loaded)

Year	Millions of tons loaded
1980	102
1985	152
1990	234
1995	371
2000	598
2005	969
2010	1,280
2011	1,393
2012	1,464
2013	1,544
2014	1,631

Source: UNCTAD, Review of Maritime Transport, 2015

4. THE EVOLUTION OF CONTAINER TRANSPORT

As Vrenken, Macharis and Wolters (2005) pointed out, when we refer to the specific means of transport of the maritime and fluvial transport, it's important to remember that their evolution refers first of all to their transport capacity, but also to other important elements, such as:

- The existence of the means of manipulation aboard: these determine an increased cost of ships and a decreasing loading capacity, but at the same time it allows a higher flexibility level in the realization of loading/ unloading operations;
- Different designing of the space related to the storekeeping of the transport units;

- The country where the ships are registered;
- The ships class, etc.

The apparition of the transport units (especially the container's apparition) represented an innovation of the transport sector, ensuring the development of the international trade through the evolution of the means of transport, but also of the specialized ports or terminals (Vrenken, 2011). Either we refer to the ships used for the maritime of fluvial transport or to the railway trucks or means used for the transport of containers, semi-trucks or mobile boxes, all these suffered changes which allow them both the correct loading of the units and their safety transport.

The container determined the construction of some specialized means of transport, whether we refer to the road, railway, maritime or fluvial transport (ECMT, 2005) or not. For example, the apparition of the cooling container determined the construction of some specialized means of transport allowing its connection to the cold air feed for the entire duration of the transport.

If first port-container ships appeared under the form of some conversions of other types of ships, especially of tanks, gradually these evaluated from the point of view of the transport speed (existing projects which follow the realization of some fast ships, crossing the Atlantic Ocean in three days and half), but especially from the point of view of the loading capacity, in searching the realization of the size economics. The specialty studies show that it is followed the construction of some port-container ships of largest sizes, which transport a maximum number of containers, taking into account, at the same time, the restrictions from ports, but also the restrictions imposed by the transit of certain channels (David and Stewart, 2008).

As you can see in the figure below, the size of containerships has grown very fast over the last decade, and taking into consideration the ship orders that have been made, their size is expected to grow over the next years. Shipping lines as CMA CGM, MOL or OOCL have orders containerships with over 20,000 TEU capacity, with micro-optimisation in new ship design (Merk, O., et.al., 2015).

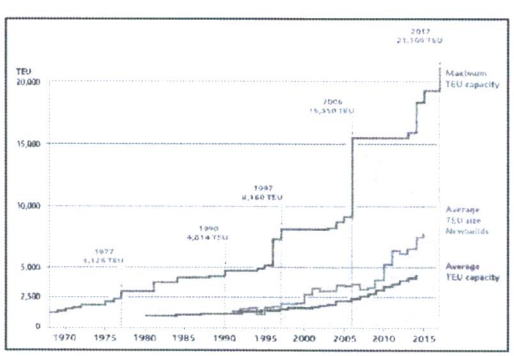

Figure 4 The evolution of container ship size
Source: Merk, O., Busquet, B. si Aronietis, R., *The Impact of Mega-Ships, International Transport Forum*, Report part of the OECD/ITF Mega-Ship project, 2005

Currently in operation there are many types of container ships, taking into consideration their design and construction, but also the type of goods that they transport (Institute of Chartered Shipbrokers, 2013). The most important types of container ships are:

a) Cellular container ships
b) Hatchless container ship
c) Feeder container ship
d) Semi-container ships

As regarding the world container fleet, nowadays containership vessels ranks third worldwide after dry bulk vessels and oil tankers; the container ship fleet increased by 5.2% in 2015 from last year[1], despite the continued economic crisis, summing 227,741 thousands of dwt.

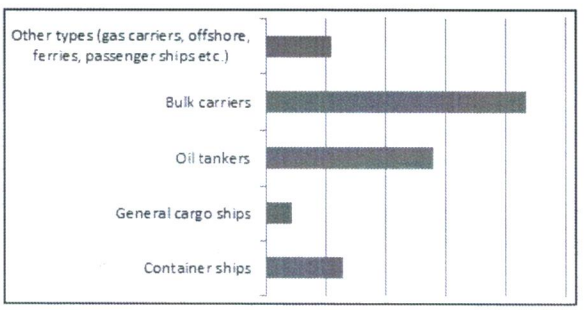

Figure 5 World fleet by principal vessel types in 2015
Source: UNCTAD, Review of Maritime Transport, 2015

5. CONCLUSIONS

The importance of goods transport registered a significant increase over time, the means of transport following a continuous improvement and modernization, taking into account the technique development, but also the constitution way of the transportation charges. The increasing volume of the transported goods, corroborated with the apparition of transport units, determined the development of some modern means of transport and manipulation technologies, allowing an easy transshipment of transport units.

The development of intermodal transport, as an essential element of the global trade, determined an increasing efficiency for the entire transport process, which involved the need to introduce some performing means. The specific means of transport of the maritime transport were developed much more once with the apparition of containers, compared to the railway or road transport, which had an evolution much simpler and less brusque.

As shown in this paper, the containerized transport was spectacularly developed over time, fact which demonstrates its importance and the major role it has within the international maritime transport.

6. REFERENCES

[1] DAVID, P.A. si STEWART, R.D., *International Logistics: the Management of International Trade Operations*, Second edition, Thomson, ISBN: 878-0-7593-9143-7, 393 p., 2008

[1] According to the data revealed by UNCTAD, Review of Maritime Transport 2014

[2] European Conference of Ministers of Transport-ECMT, *Container Transport Security across Modes*, OECD Publishing, ISBN 92-821-0331-5, 128 p., 2005
[3] FLODÉN, J., *Modelling Intermodal Freight Transport- The Potential of Combined Transport in Sweden*, BAS Publising, Suedia, Doctoral thesis ISBN: 978-91-7246-252-6, 272 p., 2007
[4] Institute of Chartered Shipbrokers, *Liner trades*, Londra- United Kingdom, ISBN: 978-1-908833-25-9, 290 p., 2013
[5] LEINBACH, T. R., *Globalized Freight Transport: Intermodality, E-commerce, Logistics and Sustainability*, Edward Elgar Publishing, ISBN-13: 9781845425029, 287 p., 2007
[6] MERK, O., BUSQUET, B. si ARONIETIS, R., *The Impact of Mega-Ships*, International Transport Forum, Report part of the OECD/ITF Mega-Ship project, 107 p., 2015
[7] Organisation for Economic Co-operation and Development OECD, *Transport intermodal de marchandises: une évaluation comparative*, 2002
[8] RAICU, Ş., *Sisteme de transport*, Editura AGIR, Bucureşti, 484 p., 2007
[9] REMES, C., *Globalizarea sistemului de transport*, Studia Universitatis "Vasile Goldis" Arad, Seria tiin e Economice, Anul 21/2011 Partea a II – a, p. 541-545., 2011
[10] UNCTAD, *Review of Maritime Transport 2015*, ISBN: 978-92-1-112892-5, 108 p., 2015
[11] VRENKEN, H., *Innovative Intermodal Transport*, Publisher: European Intermodal Association (EIA), Belgium, 103 p., 2011
[12] VRENKEN, H., MACHARIS, C. SI WOLTERS, P., *Intermodal transport in Europe*, European Intermodal Association (EIA), ISBN: 9789090199136, 267 p., 2005
[13] http:// www.statista.com