

RAILROAD TRANSPORT AND GLOBALIZATION

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Abstract: Since the end of World War II, the transport sector has not ceased to grow, accompanying the economic development of the Old Continent in the past twenty-five years, by practically doubling its activity. Due to some interacting effects of change arisen in the activity evolution, such as the opening of the common market and the adoption of common currency, this powerful and continuous growth can only accelerate...

After the maritime transportation, the railroad is considered to be the second important means of transportation, considering the number of tons/km which has varied around the value of 7000 billion tkm for more than one decade. The global railroad tonnage load is approximately of 8 billion tons and the average distance covered per ton is of 875 km. This means an average transit strongly influenced by the traffic of high tonnages and on large distances in vast networks, like the ones in the United States, China and Russia.

The globalization of trade places the logistics flow management as a main concern for companies. A perfect supervising and a permanent exchange of information about the load transit provide the industrial companies' reactivity, a guarantee of their competition. The globalization of supplying, production delocalization, the faster and faster information exchange, the more and more complex and crossed flows, are becoming classic parameters in management for logistics providers. Therefore, their industrial clients can, for instance, have their parts made in China, supply electronic components from Taiwan, assembly everything at Dunkerque and distribute finite products all over Europe.

1. Geographical Distribution and Transformations in the Railroad Transportation

The CEI Railroad network serves almost half of the traffic – the United States 30%, China 20%, India and Canada between 4% and 5% and Europe almost 30%. Generally, the railroad traffic is higher especially in countries with a big surface, requesting easy connections among the populated regions and the far away economy regions, with road infrastructure poorly developed (this is the case of countries which have had a planned economy for a long time). The Eastern countries integration in the European Union on the 1st of May 2004 and the 1st of January 2007 should generate a growth of flows between Western and Eastern Europe with more than 60%. The opening of frontiers in the East represents a market of 125 billion euros. This should also be the opportunity to consolidate the transportation sector between the European agents and local specialized operators. If the consequences on goods flows are not so important, taking in consideration the industry in these countries, transactions will represent an extra traffic.

Additionally, for the time being, in the East, road competition is less strong than in the West, although its virulence is growing rapidly; railroad intermodal competition remains still low. Therefore, networks in central and oriental European countries have been able to stabilize their load since 2002. Furthermore, networks in the CEI countries have been able to announce progresses of 9% in 2002 and 16% in 2003, continuously growing until 2007, due to the Russian high demand transit, import and export.

The Polish network, for example, which highly suffered from the decline of the mining and metallurgy industry and which reduced its load by almost 12% in 2001, knows a revival by 20% of international traffic due to the German-Russian traffic. The transit between Russia and the European Union also contributes to the Baltic countries welfare, as to networks in Ukraine and Belarus. The growing percentages have two digits in Latvia and Lithuania, countries in which harbours allow the Russian foreign commerce be done on the Baltic Sea. A relative easy terrestrial traffic is also in the advantage of Belarus, where the network's level of load has increased by 19% in the last 2 years, approaching 30 billion tk and being ranked as the 6th at the European level. The other important beneficiary of the Russian transit is the Ukraine network, which also has also seen its load growing by 20% in the last 2 years.

Maurice Bernadet, professor at Lumiere University, Lyon and researcher at the Laboratory of transportation economy says that as an effect of new policies, the railroad transportation could gain from 3 up to 4 points on the market share by 2020. The picture of goods transportation could be strongly modified, on a long term, precisely from 2010 to 2020, under the effect of new transportation policies, especially at the European level. Rapid development of goods transportation, stimulated by low levels of practiced prices, tends to face a major difficulty, such as the infrastructure financing.

It is still rare to see companies taking into account the environmental protection when they choose the means of transport. Instead, many of them are aware of the fact that the future should be protected and decisions which to forbid the change of a means of transportation should be avoided. Therefore, when they choose a logistics platform, companies are interested in knowing if it has a railroad connection, even if they do not have an immediate intention to use this means of transportation. So, these enterprises are aware of the fact that under new conditions, we can forecast a development of alternative means of transportation to road transportation.

Intensive development of major basic industries lead to the creation of mining railway systems or utilization of existing networks, better adapted to a heavy tonnage circulation. This field refers to heavy traffic of ore and coal and is provided from the extraction basins up to the export docks or to electrical plants, iron and steel and metallurgical basins with trains with wagons from 100 to 200, with 100 tons load per wagon, or with ten or twenty times heavier than European trains.

In this field, railway systems get to completely satisfy the transport demand and to develop themselves without any fear for competence. Railroad transportation is unequalled by records of quality and quantities.

In the USA, the company Norfolk and Western connects ports Norfolk in Virginia and Baltimore to the mines in the Appalachian mines. Heavy-duty transportation requires many railway lines in the United States. The American railroad system is more and more exploiting the financial and technical advantages inevitable in transport with heavy-duty and greater length trains because they reach economies of scale which allow the reduction of unit cost per transported net ton.

The construction of the Labrador railway from 1950 to 1956 connects Shofferville with Saint-Laurent bay and reaches 576 km of main roads. Two Canadian networks for ore transport 15 million tons and, respectively, 25 million tons of ores. The high quality ore is transported by a train with 117 up to 265 wagons with a minimum load of 100 tons each. Daily, two trains run in both directions at an average speed of 44km/h loaded and 55km/h empty. There are, thus, convoys of 14000 up to 32000 tons of useful load with two diesel railway engines in front and intermediary engines which to direct the

annual 15 million tons of ores serving steel foundries worldwide. Because of the hard climate, a special attention is given to fix installations and rolling stock.

In Brazil, a country where 200 million tons of ore are extracted yearly, the largest manufacturer, Companhia Vale do Rio Doce, has initially constructed the line Vitoria to Minas. Being 950km long, the railway allows exploitation of the Itabara fields in the state Minas Gerais, in the South-East of the country and its export through the Atlantic Harbour of Tubarao. Diesel railway engines operate on the railway with metrical gauge in order to carry 320 wagons of 100 tons, with a length of 3200 m. Convoys of 32000 gross tons are possible to be formed, due to three engines of which two are intercalated and distance controlled. On less than 1000 km of a road with a traffic which reaches 100 million tons per year and overpasses 50 billion tkm, we can find the same load volume as of SNCF on a 30000 km of railway.

In Mauritania, the company Miferma opened a normal railway with 26 t of load on axle in 1963. The ore train in Mauritania crosses a desert country in South Morocco. It covers 704 km from the Zouarate complex up to the Nouadhibou harbour. With a maximum length of 2,5 km and pulled by 3 or 4 railway engines (diesel engine from General Motors with 3300 hp), the 230 84-ton-wagons of useful unit load can cover the route in less than 20 hours. The annual traffic is 12 million tons.

In the Morocco soil there are some of the most important resources of ore that require terrestrial transport towards maritime ports: the Casablanca harbour at a distance of 160 km, El Jorf Lasfar at 240 km and Safi at 155 km. The three electrified railway systems with important altitude differences allow movement of trains with a capacity of approximately 3800 useful tons pulled by one engine. The daily circulation of 18 trains moves 65200 tons per day and a total of 22.5 million tons per year. If we add derivate products, like phosphoric acid, sulphate and fertilizers, the quantities reach 30 million tons and represent 85% of the total activity of the Railway National Office in Morocco.

Australia rivals with Brazil as far as the production of iron ore is concerned. It is extracted from the Pilbara basin in the North-West of the continent. The network BHP Iron Ore Railroad is the one which collects the records. 217 and 426 km tracks connect the BHP group's mines to Port Hedland. Trains are formed by 8 railway engines, a sole mechanic with distance control, in order to pull 682 wagons, meaning 7353 m length and a gross tonnage of 99700 tons. Other networks in Pilbara evacuate ore from the basins of the Robe River and Hammersley groups, one situated at 500 km and the other at 200 km away from the harbour. Trains can have 200 up to 220 wagons, having a useful load from 20000 to 29000 tons, with two railway engines in the front and other two used in the back.

In Australia, the North-South interconnection, provided through Neva Never Line opening, is the latest major railroad connection built. With a length of 2750 km, it links Adelaide, in the South, to Darwin, in the North, via Alice Spring, the most continental city of the country. It brings new perspectives to the disintegration of the economic enclave of Northern Territory. The construction works, evaluated at 1.2 billion dollars, were financed by a private consortium, Asia Pacific Transport, which will exploit it for 50 years. This new railroad infrastructure will compete against the famous "road trains" of 120 tones and 53m. Up to now, the lanes were providing food supply, materials and fuels and, in the opposite way, they were providing transport of cattle and mining products.

On 3rd of February 2004, the cargo train Ghan, inaugurated this new

transcontinental line, the largest one all over the world: Austra Asia. With a length of 1.8 km, Ghan is named after the Afghan leaders of camels, who, in the 19th century, opened the route across Australia. This train connects Adelaide and Darwin three times a week in 47 hours.

In Europe, iron and steel and the metallurgical industry have approached harbours, and therefore, trains with high capacity have reduced their tonnage. European networks outside Russia represent a dime of the global freight, meaning 629 billion tkm, and a quarter of tonnage with 2050 million tons, which corresponds to an average transit of 300 km, a reduced transit due to the absence of heavy-duty transport of ore and coal on large distances in Europe.

In fact, pre and post-manufacturing transport are getting rare because the iron and steel industry and the metallurgical industry have got closer to harbours, especially in Europe, where all means of transport are in competition without allowing railroad transportation to capitalize its trumps as well as the ones in the United States, Brazil, Australia, South Africa, and China.

All in all, in 2001, the International Union of Railways has worldwide counted approximately 500 million tons per year of ore and coal and 400 billion of tkm of ore networks which do not appear in its balance sheet. These quantities are far from being neglected, especially because this is about transport flows which beat all records of railway productivity and which allow getting the lowest costs of the terrestrial transport in the world.

2. The Railroad Transportation and the Intermodal Transportation

Modern logistics is described not only by taking into consideration the whole system of transport/manipulation/storage, but also, equally, by adapting production and distribution to a diversified and fluctuating demand in time and in volumes. Just-in-time delivery leads to the management of logistics platforms, real joint points for the interconnection of flows of goods and information related to exchanged goods. The correct size container allows a solution for the apparent contradiction of commercializing discontinuity, supplying and regulated rhythm of production. The full service, the only one able to respond to logistics requirements, leads the transporters to multi-modalism, eventually a-modalism, favouring the content. This one is compatible with all means of transit, but completely different to each other; the owner of an intermodal transport unit is the one who chooses the optimal means of transport for each transport function, from a nodal point to another... probably with immobilization and adjustment in these nodal points. It is also the way of introducing informatics in this transport; informatics allows tracking intermodal transport unit and its transported merchandise in real time and worldwide, in any moment of transport. "The black holes" of transport disappear and, thus, "mobile" or "floating" inventories can be managed.

Intermodal transportation is of an economic interest, obvious for all its participants. For consigners, it mainly means a cost reduction for intermediary manipulation, because the set formed by container and content is the one which is manipulated:

- for transporters, it means a reduction vehicle parking time (wagon, truck, flat-boat...), immobilized not only during transport time but also during delays with loading and unloading the content;
- for the community, it means an improvement of work conditions in road transportation, a reduction of the number of trucks on the roads, a transport means which respects environment and energy savings.

By using containers in their exchanges, world regions have important growths. For example, in the containers' transportation, the Singapore and Hong-Kong harbours together manipulate nowadays over 14 million EVP containers, towards 4.1 million in New York or 5.5 million in Rotterdam. These figures put light on the vitality of global exchanges. Therefore, the railroad should be ready to assure terrestrial extension of these maritime transports.

3. The Railroad Transportation Strategy in Romania

a. The Strategy Regarding the Rolling Stock Sleet The technical parameters for the proper rolling stock fleet must be the same as the ones of the International Union of Railways norms in order to fulfil the European requirements and, in this way, to compete on the market against any private operator, Romanian or foreign, with a chance to become a European operator. The railway engine fleet in the Romanian rail cargo patrimony is 26 years old. In the fleet, the electrical Diesel engines are the oldest, their period of operation having expired since 2001. Given the age and aging of the railway engine fleet, the strategy covers several measures:

- the replacement of the engine fleet, mainly electric Diesel engines of high aging;
- the age and technical status of electrical railway engines allow the acquisition and modernization programme to focus on electric Diesel engines in the next 15 years,;
- the endowment of the fleet will be done by acquisitions of modern railway engines, of latest generation;
- regarding the important funds needed to totally replace engine fleet (1506 million USD), the acquisition should be planned gradually on long term, and measures to prolong the period of operation for engines should be considered.

In order for the transportation to properly cover the forecasted growth of traffic (14.75% in 2008, as compared to 2007) with an actual fleet of 63000 cargo wagons, of an average age of 23, CFR Romanian rail cargo has established a number of wagons, according to the series, needed to be kept in function. In this context, it is clearly that in order to maintain the wagon fleet at a level which can permanently assure beneficiaries' requests for transportation, some measures should be taken for the modernization of the existing wagons, and for the acquisition of new ones.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
RK Fleet	800	1325	1800	1800	1050	700	350	2250	2500	3500
Construction fleet (acquisitions)	660	440	106	117	124	122	146	302	419	875
RK value (mil. USD)	20	33,13	45,00	45,00	26,25	17,50	8,75	56,25	62,50	87,50
Construction value (mil. USD)	18	14	6,44	6,44	6,82	6,71	8,03	16,61	23,05	48,13
Total value (mil. USD)	38	47.13	51.44	51.44	33.07	24.21	16.78	72.86	85.55	135.63

Chart no.1

Source: Ministry of Transportation.

b. Intermodal Traffic in Romania

The Romanian policy for the integration in economic-social space of the European Union has imposed a consequent appliance of market economy's principles and internal legislation harmonization with the community legislation, including the intermodal traffic. The intermodal traffic development supposes:

- the improvement of the legislation for combined transportation;
- offering reductions and relief from taxation or rates for the companies which operate in the combined transportation field; and giving subsidies to the Railway System for the combined transportation field from external, national and local sources;
- free of charge issue of road authorizations for transit or continuity of transit, in the case of trucks, TIR, that use the RO-LA technology or the ferry;
- offering good facilities for the Romanian ferry boats in Constanta harbour;
- the request and getting of an extend relief from port taxes in Georgia harbours from the Georgia Ministry of Transport, and, mutually, from Constanta harbour; the modification of road conventions with Iran and Turkey;
- the improvement of technical conditions on the ferry line Constanta- Poti/Batumi, etc.

4. Conclusions

If in Europe, the increase of rail cargo transportation is slowed down by an exacerbate intermodal competition in competitive conditions that are hardly equitable, the situation is different in other continents where the railroad transportation remains one of the most powerful agents of the commercial transport, for example in China, India, South Africa or in the United States, where railway has more than 40% of the total market.

The American railway sector has, in its essence, a vertical delimitation: railway enterprises own almost all the network they use. Being in a difficult financial situation at the end of the 60s, the sector knew an ample reorganization between 1970 and 1980, which led to the creation of the public enterprise Amtrak and freight market liberalization, completely held by private companies. These companies, which are subdivided in several major companies and more than 500 small companies specialized in traffic types or geographical axis, have been money-making since then and have turned the railway into the first and most important means of cargo transportation (in tkm). Traffic is facilitated by the investments made in infrastructure and by the low proportion of traffic bottlenecks as compared to the network size. The railway freight has been renewed since 1980, when the Staggers Act liberalized this sector of activity. It was followed by an important wave of mergers and acquisitions and a concentration of major companies on the railway freight. These mergers allowed the acceleration of the exploitation cost reduction, and since the liberalization, an important increase of productivity has been noticed, as well as a decrease of average tariffs per tkm, an increase of traffic by more than 50% at the end of the 20th century and beginning of the 21st century, an increase of investments with a focus on congestions' reduction and a decrease of accidents.

In Europe, the rail cargo transportation sector has not yet really overcome structural difficulties in order to do qualitative services at an acceptable cost. Most companies have launched drastic economy programmes, but important efforts in production costs should be made in order for them to remain on the market.

The freight plan has three objectives: a financial recovery of activity, a better production system (effectiveness, predictability, higher industrialization ...) and a modernization of commercializing.

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