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ON THE RAIL-BASED FREIGHT CORRIDOR BETWEEN CE AND SEE REGIONS AND THE MAIN OBSTACLES ON ROMANIAN TERRITORY

Summary. The project "Freight and Logistics Advancement in Central/South-East Europe - Validation of trade and transport processes, Implementation of improvement actions, Application of co-coordinated structures" (in short - FLAVIA) is carried out under the Central Europe – Cooperation for Success Programme, cofunded by the European Regional Development Fund. One of the main objectives of FLAVIA project is to consolidate a logistic corridor from Central Europe (CE) to the South-East Europe (SEE) and the Black Sea Region, based on rail and inland waterways intermodal transport. In this paper we discuss the partial outputs of FLAVIA project, mainly related to the identified actual status of rail-based intermodal transport and trade obstacles of the freight flows on the Romanian territory and the used methodology. Several operational and long-term measures to improve the trade and intermodal transport are listed, considering the advantages of the geo-strategic potential of Romania location, connected with the several improvement directions already considered into the new released intermodal strategy.

SCHIENEN-BASIERTER GÜTERKORRIDOR ZWISCHEN ZENTRAL UND SÜDOSTEUROPA UND DIE HAUPTHINDERNISSE AUF RUMÄNISCHEN GEBIET

Zusammenfassung. Das Projekt "Freight and Logistics Advancement in Central/South-East Europe - Validation of trade and transport processes, Implementation of improvement actions, Application of co-coordinated structures" (kurz FLAVIA) wird im Rahmen des CENTRAL EUROPE – Cooperation for success Programme realisiert, gefördert duch den Europäischer Fonds für regionale Entwicklung (EFRE). Eines der Hauptvorhaben von FLAVIA ist es, den logistischen Korridor von Zentraleuropa nach Südosteuropa und die Schwarzmeerregion unter Einbeziehung von intermodalen Verkehren zu stärken. In diesem Paper setzen wir uns mit Teilergebnissen des FLAVIA Projekts auseinander. Die Diskussion bezieht sich hauptsächlich auf im Projekt identifizierte Handels- und Transportbarrieren im intermodalen Schienenverkehr in Rumänien sowie die hierfür verwendete Methodik. Verschiedene operative und längerfristige Maßnahmen um den Handel und den Transport zu verbessern werden betrachtet unter der Berücksichtigung des geo-strategischen Potentials des rumänischen Standorts. Dabei wird Bezug auf die neulich verabschiedete intermodale Strategie und deren Wirkrichtungen genommen.

1. INTRODUCTION

The transport sector, these days, is in profound technological changes, perhaps, much more than the other sectors. It is following now the "era of alternatives" and it already has achieved the logistic revolution stage, through the consolidation and also the separation of the load units/vehicles into the logistic units. The changes of the entire transport system, following the logistic demand, are unequally related to the transport modes, especially because they have different adjustment capabilities in terms of their vehicles, infrastructure and technologies [7].

During the last two decades, important changes in transport sector were made in rail sector. It had to adjust its offer to the customer's exigency, sometimes in unfair competition with road transport sector. The main objective of the single European transport market imposed the rail networks interoperability, as a main foundation. However, even the several technical interoperability solutions for rail were found, the smooth-running across Europe territory has still obstacles to be over-passed, especially for freight transport.

FLAVIA project is co-funded by the European Regional Development Fund in the frame of "Central Europe – Cooperation for Success" programme. The main direction of impact of the FLAVIA project is to substantial contribute to the European cohesion, especially along the TEN-T corridors IV and VII and the FLAVIA corridor itself. This will be achieved by the reduction of organizational and network barriers in the intermodal logistic channels of the involved regions which will increase the accessibility of regions from the logistical point of view. Furthermore, strategic enlargements of the sales and supply structures are necessary to reach new potential trade partners around the Black Sea and the TRACECA area (Transport Corridor Europe – Caucasus – Asia) indicated by the dashed red line circle in Fig.1) [10]. The FLAVIA partnership involves transport operators, alliances, authorities, and research & education, from six countries located in Central Europe, but also one from South-East Europe - Romania. In Figure 1, the flags having letter F indicate the seven countries; those two arrows show the other South-North corridors represented by the Central Europe Projects SoNorA and SCANDRIA.

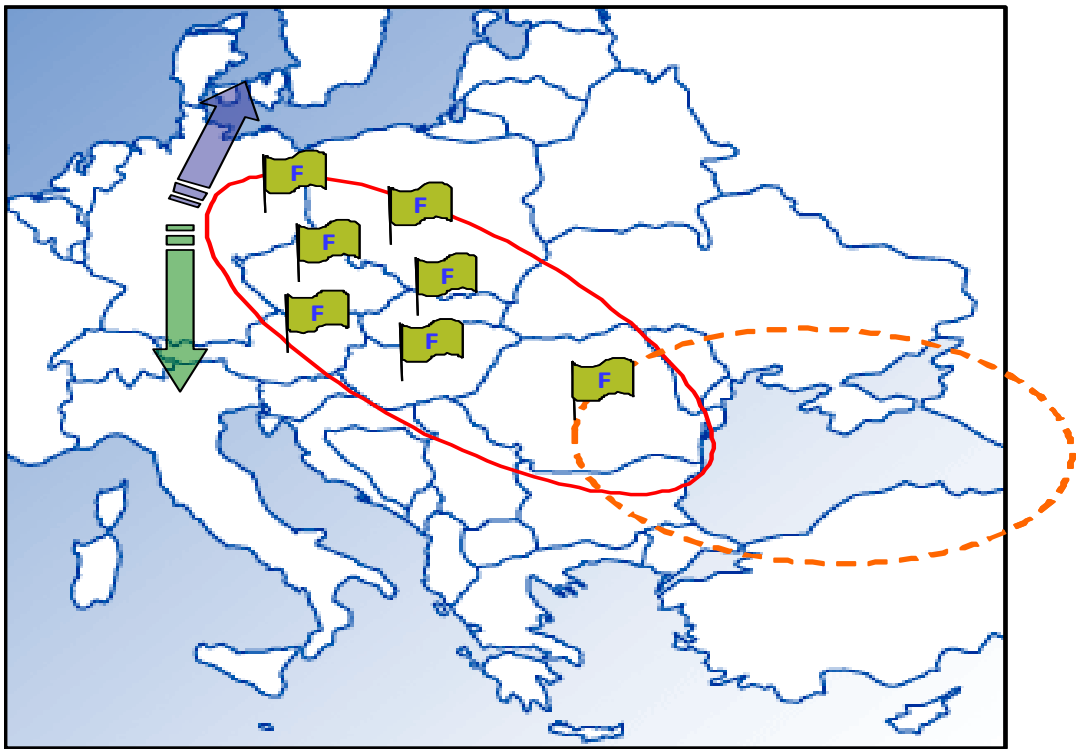

Fig. 1. FLAVIA and other corridors
Bild. 1. FALVIA und die andere Korridore

Lead Partner is Technical University of Applied Sciences Wildau - Research Group Transport Logistics (THW).

FLAVIA is focusing on operational solutions like the cooperative structures (e.g. pro-rail alliances and terminal alliances) and the transfer of best practice as well as "greener" logistics.

One of the most important work packages, with determinant role for output quality, was dedicated to the identification of trade and transport barriers along the corridor and to the appropriate measures and overcomes, on short and long terms, as well.

In this paper we present the main findings of the activities on FLAVIA project, in terms of the obstacles in front of the rail-based corridor running, mainly on the Romanian territory and the envisaged/proposed measures to be done.

In the next section we present a brief review of the actual state of the freight rail-based intermodal transport in Romania and the perceived obstacles of the involved economic actors in trade and transport on FLAVIA corridor, too. In the third section, we give a brief overview on the opportunities related to the geo-strategic location of Romania transport networks and a minimal set of measurements on both short and long terms, in order to enhance the freight rail-based transport on Romanian territory, and hence to use those opportunities in favour of FLAVIA countries. In the last section we draw the main conclusions.

2. TRANSPORT BETWEEN ROMANIA AND CENTRAL EUROPE: STATUS AND OBSTACLES

2.1. The actual status of rail-based intermodal transport in Romania

Modal share and intermodal transport

There are available now the figures and the modal share in Romania and its trends are revealed in Table 1 [4], as follows. The road transport is the most used transport even if the road transport activity was dramatically decreased, both in tonnes and tonnes-km. The most important good tendency is the stopped decreasing of the rail and inland waterway transport, considering the amount of activity; the reason may be the financial crisis, but additional and careful analyses are needed.

Table 1

The evolution of the transport activity and modal share in 2010, in Romania

Transport mode	Measure of activity	2007	2008	2009	2010	modal share in 2010
Railway	Million tonnes	69	67	51	53	20.4%
	Billion tonnes-km	16	15	11	12	23.1%
Inland Waterway	Million tonnes	29	30	25	32	12.3%
	Billion tonnes-km	8	9	12	14	26.9%
Road	Million tonnes	357	365	293	175	67.3%
	Billion tonnes-km	60	56	34	26	50.0%
Total	Million tonnes	455	462	369	260	
	Billion tonnes-km	84	80	57	52	

Considering the intermodal transport, the total amount of intermodal transport in Romania had a bad evolution [9]:
- maritime intermodal transport had an important increasing after 2003 (when Constanta South Container Terminal was opened) but this was interrupted by the beginning of the world financial crisis;
- railway intermodal transport had a sharp drop after 1990, and a weak increase before the 2008. This was similar with evolution of the entire rail system in Romania. There were settled an inadequate competition frame for road and rail transport during all 20 years, and it is obvious that rail transport was the big looser.

Intermodal units

Internal intermodal transport had a bad evolution also because of the continuously decreasing of the large container' stock.(Fig.2) [9], from about 6306, in 2003, to the 180, in 2009.

Statistic data regarding container transport performances are available only related to the operated transport from and to Constanta Harbour.

But even so, in the below Table 2 [9], it can be seen the dominant position of road transport with origin or destination into the port (in 2009, 51% from the total of arrived or departed containers were transported on roads). To those, it can be added the volume of containers addressed to Giurgiu terminal (the free zone on Danube River), that not being connected to rail system, has only road container traffic.

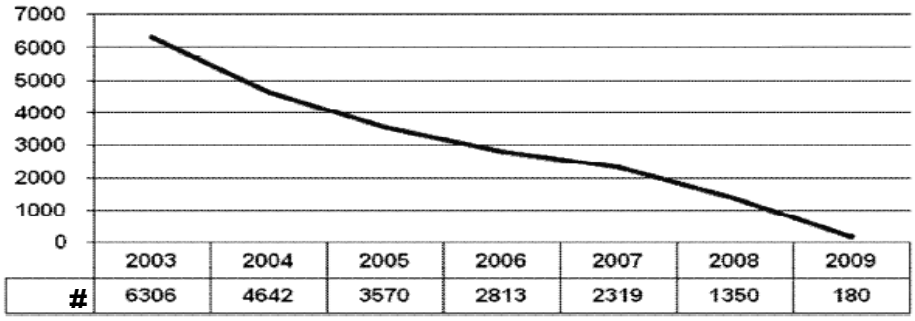

Fig. 2. The continuum decreasing of large-container stock in Romania
Bild. 2. Die verkleinerte Reihe der Kampagne von große Container in Rumänien

Table 2

Large containers through Constanta Harbour and market share for TEU, in 2009

Year	TEU	Railway		Road		Maritime		Inland water way	
		market share	TEU	market share	TEU	market share	TEU	market share	TEU
2009	594303	18.33%	108936	51.14%	303927	29.03%	172526	1.50%	8915
2007	1411414	14.70%	207478	14.80%	208889	69.00%	973876	1.60%	22583

In Romania, the total stock of the *intermodal transport units* in 2007 had the structure displayed in Fig. 3 [8]. As it can be seen, the 40’ containers are dominant (about 60%). It can be appreciated that this situation generates a week utilization of wagons' capacity: traditionally, on the Romanian railways the most used wagons are Rgs series, for containers transport purpose. The main disadvantage of Rgs wagon is represented by its dry weight (25 tonnes), which hamper its maximum net load. The main conclusion is that the wagons specialized in intermodal transport is not adequate to the transport

demand. Here we can mention the need and the opportunity of the wagons acquisition for mobile boxes and road trailers.

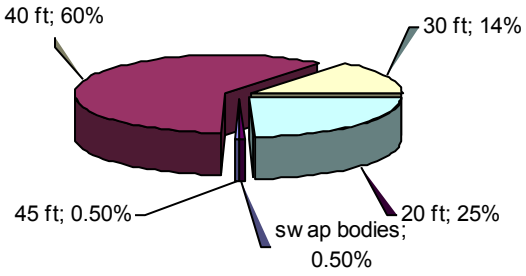

Fig. 3. The weight of different types of intermodal load units, in 2007
Bild. 3. Das Gewicht die verschiedene Typen von Maßeinheiten die intermodale Fracht, im Jahr 2007

Intermodal terminals

The above two important problems generated the other one: the weak utilization of *rail intermodal terminals*. At the beginning of 1990, in Romania, 44 container terminals were active and interconnected by specialized trains [5]. In 2011 the situation was, as follows:

- 22 terrestrial terminals belonging to the rail national operator and exploited by a derived organisation SC CFR Transauto (established by externalizing the road expedition auxiliary services of the national rail, and then, it was taken-over in 2004);
- 7 private terminals, from which 4 serve exclusively their owners. From the 3 terminals opened to the public, 2 have reduced capacities. The third one belongs to a mixed society (Bilk Kombiterminal and the Slovak firm Trade Trans) and it is Rail Port Arad in the west of the country;
- another one private terminal under construction, at Ploieşti;
- 2 inland waterway terminals (Giurgiu and Galaţi) from which only the last one has a rail connection;
- 4 maritime terminals that have rail links from which one (APM) doesn't work. One of the four maritime ports is Constanţa Port Container Terminal (CSCT) is the biggest from the Black Sea and has modern manipulation and administration equipment.

This last information is very important for the national strategy: Constanţa Port Container Terminal strategical position; the CSCT's large and very modern capacity together with the good coverage of the railway network in Romania [6] have to be exploited in a smart way.

Most of the intermodal terminals in Romania use classic equipments and technologies for vertical manipulation that consists in portal cranes on rail and on wheels, quay cranes (portainer) mobile cranes, frontal loaders and chassis and terminal tractors. In the terrestrial terminals that belong to CFR Marfă there are equipments with ages between 25 and 38 years.

In terminals from Romania straddle carriers, automatic guided vehicles or horizontal manipulation systems are not used. Most of the administration and control procedures are made manually. There are two exceptions:

- CSCT terminal, where the exploitation informatics system, Navis (Sparcs and Express), was implemented;
- SOCEP terminal, where data exchange in EDIFACT format can be realised.

Railway network structure

Before 1990, inside those terminals, the container transshipments on short-distance had been performed by road transport, on one side, and, on the other hand, the container consolidation processes for trains had been performed on a well-structured hub-and-spokes network. During that time, there were the following block-trains connections:

-from terminal to terminal;
-from terminal to internal (private) industrial line;
-from terminal to public operational line in a railway station;
-from an internal (private) industrial line to another internal (private) industrial line (from a different location), as a door-to-door service.

In 2010, only a few types of services are experienced in Romania; there are missing hub-and-spokes models, multi-group trains, adequate liner services, door-to-door services on industrial lines.

2.2. Trade and transport obstacles: experiences of FLAVIA's economic actors

The above difficulties of the intermodal and rail transport on Romania territory are well perceived by the economic actors involved into the trade and transport between CE and SEE regions.

The qualitative assessment of the obstacles which were experienced by the economic actors during their freight transport was conducted in FLAVIA project [11]. The used questionnaire consists of seven main category of obstacles, dealing with: (i) - cultural/linguistic; (ii) - administrative/legal; (iii) - technical/interoperability; (iv) - safety/security; (v) - trade; (vi) - transport; and (vii) - infrastructure barriers, between the FLAVIA, Black Sea and TRACECA countries.

Every chapter contains several questions about important and critical issues for the respective barrier. The possible answers for these questions could be chosen between 0 and 5, while 0 meant no barrier, 1 small barrier, 2 low barrier, 3 medium barrier, 4 high barrier and 5 barrier that makes trade and/or transport impossible. If a question was given the value 5, the interview partner has to give a more detailed explanation.

The interviews were held face to face, via phone or were completed on the internet and the respective interview partners were selected from four different areas: production or distribution companies, transport operators, transport executors and chambers of commerce, in every single FLAVIA country. Every interviewed representative, located in a certain country had to express his/her opinion (experience) in relation with trade and transport in all the other six countries, but not in his/her own country. All identified obstacles were categorized and also classified into short, medium and long term horizons in order to provide a timeline of implementation of improvements for the corresponding private and public stakeholders.

The most important results of this investigation related to the reported obstacles on the Romania trade and transport, mainly rail-based, are summarised in Table 3, considering all registered answers, as they are in 3.2. Action Report of FLAVIA [11].

Table 3

Reported level of obstacles for the trade and transport in Romania (selection for rail)

Interviewed person's country	Category of reported obstacles in Romania	Top specific obstacle inside that category	Declared value of that specific obstacle for Romania	Average declared value for all FLAVIA country
AT	(ii)- administrative/legal	Corruption/mismanagement	2.78	1.63
	(iv)-safety/security	General transport safety	2.89	1.69
	(v)-trade	Lack of quality requirements	2.17	1.32
	(vi)-transport	Transport capacity rail	3.00	1.95
	(vii)-infrastructure	Extension level of rail network	2.88	2.08

DE	(i)-cultural/linguistic	Reachability/availability of staff	3.36	2.25
	(ii)-administrative/legal	Organizational effort/ organizational aspects	3.25	2.21
	(iv)-safety/security	General transport safety	3.50	1.94
	(v)-trade	Exchange rate risks	3.50	1.18
	(vi)-transport	Transport quality rail	3.50	2.5
	(vii)-infrastructure	Transport capacity rail	3.50	3.25
PL	(i)-cultural/linguistic	Service orientation of staff	2.50	1.70
	(ii)- administrative/legal	Organizational effort/ organizational aspects	2.25	1.59
	(iii)-technical/ interoperability	Realisation of ERMTS (rail)	3.25	2.81
	(iv)-safety/security	Accidents regarding damage of goods (rail, IWW, intermodal)	3.25	1.96
	(v)-trade	Exchange rate risks	1.75	0.93
	(vi)-transport	Transport quality rail	3.33	2.52
CZ	(i)-cultural/linguistic	Reachability/availability of staff	2.83	1.85
	(ii)-administrative/legal	Organizational effort/ organizational aspects	2.40	1.53
	(iii)-technical/ interoperability	Competitiveness compared to truck (rail)	3.83	3.06
	(iv)-safety/security	General transport safety	3.50	2.22
	(v)-trade	Exchange rate risks	3.20	2.17
	(vi)- transport	Transport quality rail	1.60	0.90
	(vii)-infrastructure	Extension level of rail network	1.20	0.71
SK	(i)-cultural/linguistic	Reachability/availability of staff	2.40	2.03
	(ii)-administrative/legal	Corruption/mismanagement	2.60	1.53
	(iii)-technical/ interoperability	Lack of innovation (rail)	2.25	1.50
	(iv)-safety/security	Theft of goods	2.20	1.30

	(v)-trade	Exchange rate risks	2.20	1.23
	(vi)-transport	Waiting time at borders	2.25	1.00
HU	(i)-cultural/linguistic	Service orientation of staff	3.33	2.41
	(ii)-administrative/legal	Corruption/mismanagement	3.67	2.35
	(iii)-technical/ interoperability	Competitiveness compared to truck (rail)	3.67	3.24
	(iv)-safety/security	Theft of goods	3.33	1.88
	(vi)-transport	Transport quality rail	3.67	2.29
	(vii)-infrastructure	Transport capacity rail	3.67	2.47

The results are obvious: almost all interviewed persons from every country reported a quasi high mark for their in-satisfaction, in relation with trade and transport on Romanian territory; in Table 1, for the specific obstacles, trade & transport in Romania has the worst marks which are higher than the average mark for all countries. Considering the medium obstacle 3, we may find two extremes of exigency: on one side, there is DE highly exigent point of view, giving more than 3 (improving is necessary but not critical), for all class of reported barriers, and the other one side is SK's marks, above 3 for all class of reported barriers.

The main finding of the cross-border specific results between the FLAVIA countries shows that intermodal transport processes with Romania have the highest level for improvement. The room for improvement includes all surveyed fields [11]. However, the additional research on necessary number of interviewed persons, their level of expertise and the adequate sample of interviewed persons, considering the number of similar experiences in the international transport, are needed.

3. IMPROVMENT ACTIONS

3.1. The advantage of the Romania geo-strategic location

The most important transport potential of the Romanian (considering Constanta Harbor) geo-strategic location is represented by the shorter oceanic route for Europe – Asia services; it avoids more than 2,400 nautical miles (almost 4,500 km) versus North Sea ports and thus shortens travel time by 3 to 4 days [2]. Constanta can be called a container hub for the Black Sea Region, because the major part of handled TEUs is for third countries in the region (approx 75%); Constanta has become a port of direct call for major container lines (MSC, CSAV Norasia, ZIM, CMA CGM, Hapag Lloyd, Maersk Line) [3].

Besides this, the Danube channel and Danube River (as the second largest river in Europe, navigable over 2,300 km) with direct access to Rhine-Main-Danube corridor, having dedicated river/maritime basin for Danube-Black Sea Canal direct link, may improve the intermodal connections and the large territory accessibility by the railway transport [2]. Moreover, Constanta Terminal has water depth for vessels up to 200,000 dwt and modern handling capacities for containers. It is handling together about 180,000 TEU in 2007 for rail hinterland traffic [1].

However, the container transport (together with inland waterway transport and rail transport) in Romania (through Constanta port) is competing with the great European ports (Trieste, Koper, Rijeka, Rotterdam, Hamburg) for containers transport demand that have the origin and/or destination in Hungary, Slovakia, Austria. The study COLD, reveals the potential of those markets from Hungary,

Slovakia, Austria but also the advantages/disadvantages of the transport modes from Romania in this competition [3].

All land locked countries from Central and South East Europe, but not only, may capitalize their own advantages from this favourable geo-strategic location, only in case of the single European rail network is interoperable from the technical, administrative, managerial, operational points of view.

3.2. Improvement actions for trade and transport between Central and South East Europe

Romanian Strategy for Intermodal Transport, 2020 [8], recently released, contains measures on short and long term. We provide here a list of the most promising measures to improve especially rail-based intermodal transport, considering all above issues: the actual status of rail and intermodal transport in Romania; the different class of the reported obstacles for trans-regional transport on Romanian territory; the geo-strategic potential of Romanian location, considering the inter-continental routes between Asia and Europe; and a selected measurements included already into the national strategy of intermodal transport.

Measures and short or medium term should deal with overlapping of technical obstacles, organizational issues, legislative weak and more.

The short term selected measures that implies these issues are the following:

- Works completion for the last sections of the IV TEN-T corridor on Romanian territory,
- Implementation of CEELOG (information data base regarding the advantages of combined transport for commercial relations with *European Economic Community*),
- Technical assistance; facility guarantee; knowledge transfer,
- Terminal equipments improvements,
- Transport Master Plans for economic cluster areas,
- Development of a quality indicators measurements system,
- Data base development for information exchange,
- Implementation of intermodal certification,
- Implementation of liner services on corridor on the rail network with an adequate hub-an-spokes structure.

On long term, the following measurements are proposed:

- Development of the transport terminals,
- Improvements of transport logistics and new logistics centres,
- Upgrade for industrial platforms.

4. CONCLUSION

In this paper we gave only a small part of the research outputs of FLAVIA project activities.

The brief review on the actual status of rail-based intermodal transport, especially related to the infrastructure investment needs, was pointed out. Besides this, the synthesis of the perceived opinion of the involved actors in trade and transport from all other FLAVIA countries about trade and transport on Romanian territory helps us to find the obstacles and to rank them. This output shows, once again, how the actual situation in freight transports (especially by rail) on Romania territory is, and that the room for improvement includes all surveyed fields.

However, all land locked countries from Central and South East Europe, but not only, may capitalize their own advantages from the favourable geo-strategic location of Romania (considering the Black Sea neighbourhoods), but only if important measures to improve its rail-based intermodal transport will operate soon. A list of operational and long-term measures to improve the trade and intermodal transport are listed; it is connected with the several improvement directions already considered into the new released intermodal strategy.

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