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TRANSPORT NETWORKS AND IMPACT ON THE PROGRESS OF TRADE EXCHANGES

Economic research

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Abstract

The restructuring of the economy as a whole is a key factor determined by the Romanian international trade restructuring. Restructuring process contains elements that are specific to the transformation in a market economy mainly characterized by competitive spirit and by enforcement of competitive advantages. The idea of international trade has been long debated starting with the Smith's theory of absolute advantages (Adam, Smith ,1908) to the perspective of the competitiveness presented by David Ricardo(2001) followed by the major paradigm change brought by Porter's Diamond (Michael, Porter 1990). Among the determinants of international trade, especially in order to promote exports, a special importance should be given both to the companies and market's features and to distance to the country in question, to infrastructure and to access roads. The quality of a country's infrastructure is one of the important factors in the development of international trade relations. Depending on its quality level this factor becomes a driving force the development of which must forego the start of other economy sectors.

Introduction:

Although the current conditions of the transport market are not the most encouraging, Romania has made some progresses in facilitating the trade during the recent years. All data show that the importance given to the transport networks in order to boost the trade and to help the economic growth is a constant issue debated in the European Union. The growth of international transport by 80% by 2050 and the increased volume of merchandise in ports by up to 60% by 2030 are among the most important challenges of the future (EU Transport GHG,2010). Given the objective of the European Union, the one to create a smooth modern supply chain, a trans-European transport network, this paper aims to analyze and progress of transport networks in Romania and the impact on the value of exports (free on board) and imports (cost, insurance and freight) recorded during 2001-2013. After the collected data have been processed, the consequences have been logically compared, in order to identify links between sea, rail, waterway, road transport networks and the values recorded during the trade exchanges.

Bringing in the foreground the geographical situation in current conditions, the role in the inter- and trans-European networks and last but not least the amenity showed by Romania for the European and international business environment, we should mention the fact that the geographical position of this country is extremely important and advantageous. The position of Romania in the Eastern Europe, the Black Sea outlet, the Danube mouths are only some very important strategic points in international negotiations. The well-known thesis defended by Halford Mackinder presents the following idea: "Who rules East Europe commands the Heartland; Who rules the Heartland commands the World Island; Who rules the World Island commands the World" (Halford, Mackinder, 2004, pp. 298-321).The geo-strategic importance of Romania needs to be helped by a wise action in order to potentiate the strengths and to reduce the disadvantages, as the most significant disadvantage is to be coveted.
The more transport means facilitate its presence on as many points on the globe, the greater the power of a country. Romania has some geographical points that have not lost their importance despite the technological evolution of the last century. Danube together with its mouth s and Black Sea outlet are some of the key factors in the international trade. A certain geographical position may facilitate the development of trade, but it needs to be complemented by a physical configuration allowing development. Used in a strategic purpose, by means of trade manipulation, the economic measures are designed to stimulate the independence. To avoid the possibility that a particular state would be manipulated by various constraints, it must diversify its procurement sources and export destinations, insisting upon the transport services that are used to carry them out. The position of Romania as a gateway between Asia and Europe highlights the importance of a well-developed infrastructure. Moreover, Romania must put special emphasis on the promotion of exports in order to reduce the deficit of trade balance.
Although this paper aims to focus on the values of exports and imports recorded over the period 2001-2013, a different exhaustive approach in terms of logistics performance and an improvement plan in order to achieve the levels registered in EU can represent the elements of further analysis.

1. Progress of transport networks in Romania

Although the situation of land transports in Romania bears the imprint of communist period (Popa, Ioan, 2007), the decreased share of road transport is caused by the economic policy that considers this way of transport is disadvantageous because of energy high consumption, we can see, according to the Eurostat data presented in *Table 1* that the regional road transport network was recording in 2013 about 644 km of operated highway and 84,243 km of public roads. As we can see only 5 regions benefit from highways, most of which are located in the following regions South-Muntenia, Bucharest-Ilfov and South West, which is crossed by the Pan-European Corridor IV.
Since 2001 until 2013 the highways sector has been growing by about 469%, from 113 km recorded in 2001 to 644 km recorded in 2013. After Romania joined the European Union in 2007, the growth percentage was 130% compared with the reference year 2013. Major changes were not felt the same way before the integration within the European Union, we see how Romania had years in a row the same number of kilometers of highway. After Romania's integration in EU, we witness an uptrend, the most significant increase being recorded in the period 2011-2013.
Regarding the length of Romanian public roads we can see how the growth in this sector increased to 7.5%: from 78,379 km in 2001 to 84,243 km in 2013. The increase was about 4, 5% in this sector of transport networks between 2007 and 2013. The largest increase was however represented by the growth in the sector of county and municipal roads.
Worldwide, the rail transport is ranked second and, thus, is one of the most used modes of transport. In Europe the largest railway network belongs to Germany and it is four times greater than the Romanian railway network. However, statistically speaking, Romania has more kilometers of railway

than Slovenia, Luxembourg, Estonia, Latvia, Lithuania and Greece.
In the Romanian railway sector the changes have began in the 90s when a monopolistic structure dismantling process was gradually performed. The activity was outsourced in four different companies only in 1998. In the sector of merchandise transport, the company called CFR Marfa took that time over the assets and tasks of the former state-owned enterprise, which later became an autonomous administration.
In *Table 1* we can see that the total number of the railways decreased between 2001 and 2013 by about 2.3%. The largest decrease was recorded in the period 2001-2007, thereafter the length of rail lines being maintained at about the same level.
Taking into account strictly the electric rail lines we can see that they had an uptrend from 3950 km in 2001 to 4029 km in 2013, thus assisting to an increase of about 2%. The increase of 1.39% was recorded in 2007-2013 after Romania joined EU.
This type of transport retains a number of advantages compared to other modes of transport, the most important being the energy efficiency, increased reliability, significantly higher transported amounts, an increased degree of merchandise integrity ensured, lower costs and last but not least, lower environmental pollution.
In terms of navigable waterways and rivers, Romania recorded no change compared to the data registered in 2001. In 2013 the country benefited from 132 km of navigable waterways and 1647 km of navigable rivers as in 2001.

2. Future perspectives of the Romanian transport services:

Romania benefits from a number of competitive advantages in the land transport sector as this country is crossed by three of the ten Pan-European transport corridors. Corridor IV (Dresden/ Nuremberg - Prague - Vienna- Bratislava- Budapest -Arad - Bucharest - Constanta/ Craiova - Thessaloniki - Istanbul) and IX (Helsinki -Viborg- St. Petersburg - Moscow/ Pskov -Kiev - Libashevska- Chisinau – Bucharest - Dimitrovgrad - Alexandroupolis) (Ministry of Transport and Infrastructure, 2009) are multimodal and include seaports, riverports, road and rail components.
Corridor VII (Vienna- Belgrade - Calarasi -Braila - Galati - Tulcea) (Status of the Pan-European Transport Corridors and Transport Areas, pp. 80-87) the one of the Danube, is more important for Romania than for other countries it crosses as it flows into the Black Sea on the territory of the country. Thus, the Danube mouths represent very important strategic points for the control of the Black Sea, the second after Bosphorus and Dardanelles.

Danube always represented the most significant inland waterway transport route of Romania. Free navigation in the area of the Danube mouths can be provided only by a strong Romania. The importance of this river is greater for the trade future of the country, the wider is the process of its transformation into a major commercial axis of Europe. The press releases of the Council of Europe refer to its introduction in the transport corridors covering the following regions: Orient/ Eastern Mediterranean and Rhine - Danube. Rhine - Danube corridor will link Strasbourg and Frankfurt with Vienna, Bratislava, Budapest and the Black Sea, with an important component ensuring the connection between Munich, Prague, Zilina, Kosice and the border with Ukraine (Mobility and Transport, Infrastructure - Ten-T – Connecting Europe, 2014).
Another important geographical element for Romania is the Black Sea. This one, as a strategic point of great importance for Romanian trade, was described by Gheorghe Bratianu, the author of the first synthesis of the Black Sea history, as the the cast plate of international trade (Gheorghe, Bratianu, 2000). Romania has sea interests; so, it must investigate all consequences arising from this position, analyzing at the same time the geopolitical value while varying depending on the intensity of the trade and of the economic life.
The Orient/ Eastern Mediterranean Corridor is going to connect the sea transport infrastructure from the North Sea, Baltic Sea, Black Sea and Mediterranean Sea, optimizing in this way the use of the EU countries ports, including the Port of Constanta. Due to this canal, the Central European countries have direct access to the Black Sea and from here to the Suez Canal.
The new trade route Suez Canal - Central Europe via Constanta can bring multiple benefits to Romania, so that this country would have the opportunity to take advantage of the favorable position of the Black Sea ports towards the Suez Canal for the routes of the Indian Ocean and the Far East (I. Seftiuc, I. Cartana, 1974).
As a future perspective of the road transport we must mention the approval of the infrastructure project released by the Council of Europe for 2014-2020, which states that two of the two major European corridors should cross Romania on the route Arad - Brasov – Bucharest - Constanta or Bucharest – Pitesti - Craiova -Timisoara.
The problem of the railway infrastructure, which has been constantly exposed to deterioration in the last two decades, should be highlighted and solved. In this transport sector, Romania is in favourable position to request within the Orient/ Eastern

Mediterranean program the European funding for the Arad –Timisoara –Calafat route.
Romania still has to fulfill the obligations undertaken for the TEN-T central network and some revamps will be performed in order to achieve the running speeds of up to 160 km/ h, to finally ensure the optimal connectivity between Central/ Western Europe and Constanta port.

3. Imports analysis (cost, insurance and freight) on the main modes of transport

During 2001-2013, according to *Figure 2*, Romania has been recording CIF imports amounting to EUR 17,383,000 million and EUR 55,269 million. During 2008-2009 the total imports decreased in intensity, recording in 2009 a 46.94% lower value than the one in 2008. If the total level of CIF imports recorded value has suffered a decline, we see the same situation with the value of imports recorded for each transport sector. The difference between 2008 and 2009 shows up to 36.74% lower values in road transport, 72.18% in sea transport and a decrease of over 126% in rail transport.
As far as the road transport is concerned, we can see that based on this service there has been recorded the highest value of CIF imports: from EUR 12,026 million in 2001 to EUR 40,690 million in 2013. The share in the total value recorded in 2001 reached 69.18% in 2013 and exceeded 73% in 2013. The lowest share was recorded in 2006: 63.8% of the total value of CIF imports.
CIF imports recorded as a result of sea transport services reached in 2008 the amount of EUR 10,312 million, representing 18.01% of the total. In this sector we can see the uptrend during 2001-2008: from EUR 2,297 million in 2001 to EUR 10,312 million in 2008; an amount of only EUR 8,414 million was recorded in 2013.
As far as the rail transport is concerned, there was an uptrend between 2001 and 2008: from EUR 1,435 million to EUR 3,297 million. The decline between 2008 and 2009 had a major impact on later recorded values. As a percentage, the value of CIF imports related to the rail transport reached in 2001 8.25% of the total and in 2013 the values recorded in this sector represented only 2.71% of the total.
The value of inland waterway imports is quite low compared to the available potential reaching 1.05% in 2010 and 1.04% in 2009. During those years the value of CIF imports reached EUR 496 million, respectively EUR 407 million. During this interval, except for the above mentioned periods, the percentage recorded in the total volume of CIF imports was below 1%.

5. Exports analysis (free on board) on the main modes of transport

As we can see in *Figure 3*, FOB exports recorded in 2013 amounted to EUR 49,562 million. Considering the methods of transport analyzed, we can see that 67.5% of this value was recorded by road transport, 21.7% - by sea transportation, 4.8% - by rail transport, 0.7% - by inland waterway transport and the difference - by the other types of transport.
Exports conducted between 2001 and 2013 have substantially increased, the highest value being recorded by the road transport.
In 2001 Romania was reaching a value of FOB exports of EUR 12,722 million, of which EUR 8,387 million were recorded by the road transport. The constant growth of total exports is sustained over time by values recorded by the road transport: from EUR 8,387 million in 2001 to EUR 33,457 million in 2013. The exports conducted by the road transport service lead the way: from 65.92 % in 2001 to 67.68% in 2013. In the analysis we can see that the highest recorded share occurred in 2009, when the exports performed by road transport services reached 70.5% of the total recorded value.
In contrast, the group of inland waterway transport services, with a maximum value of exports of EUR 579 million recorded in 2011, holds in the same year only 1.27% of the FOB exports total value. In this transport sector the largest share was reached in 2001, when EUR 229 million represented 1.8% of the total exports recorded. If in 2001 the value of exports conducted by inland waterway services recorded the largest share of the analyzed period, in 2013 this transport service had only 0.76% of the total. Such low shares were also recorded in the period 2002-2003.
Chapter 1 of the paper reveals the fact that the overall rail line was continuously decreasing, a situation with direct impact on the value of exports recorded in this sector of transport. The share of exports in the total recorded amounts decreased from 6.47% in 2001 to 4.86% in 2013. Although due to the rail transport Romania recorded in 2013 a value of EUR 2,411 million, the highest recorded value, it was lower of the total exports share compared with other recorded values. As expected, the highest share was reached in 2001, followed by 5.29% recorded in 2008 and 5.05% in 2011.
In 2009, the FOB exports value recorded by rail transport reached the lowest rate, i.e. 4.08% of the total FOB exports in Romania.
Analysis of FOB sea exports value shows the fact that the highest value was reached in 2013, when Romania recorded a level of EUR 10,769 million by sea transport. That year the share of value recorded by sea transport represented 21.72% of the total export. The largest share, however, was reached in 2005, when the exports conducted by these transport services held 27% of total FOB export.

Although the values recorded in recent years have been significantly higher than those recorded in the beginning of the analysis, the share of sea exports was lower than the one recorded at the beginning.
In *Figure 3* we can see that during 2001-2002 the values of sea exports represented 25.65% of the total export, while during the later analyzed period the sea transport held only 21.72%. The lowest share was recorded in 2011, when EUR 8,531 million represented only 18.83% of the recorded total of EUR 45,292 million.

Conclusions:

After decades of underinvestment, the transport infrastructure of Romania features serious deficiencies, both in terms of quantityand quality. With only 644 km of highway, a value recorded in 2013, a decrease of the total number of kilometers of railway and relatively low investment in infrastructure, the underdeveloped transport network does not allow Romania to benefit from the elevated connectivity on trade markets.
The main conclusion of the whole paper can be synthesized by the importance of the impact of the investment in infrastructure on the revenue generated by trade exchanges. As you can see, the lack of investment in railway sector did not encourage the international trade recorded in this sector. Also, the lack of investment in the sector of inland waterways transport cannot support an increase of the export value recorded. We cannot say the same thing about the values of imports and exports recorded in the sea sector. Although in this sector we have been witnessing over the period analyzed a steady rise of the recorded values, the CIF imports and FOB exports have reached in the recent years similar values, except for 2013 when the FOB export value was higher than the value of CIF imports.
Relatively higher importance paid to the road infrastructure has brought many benefits, sustaining a considerable increase of the value of recorded trade exchanges. However, we can notice that in this transport sector the value of CIF imports is higher than the value of recorded FOB exports.
As future opportunities, we can prefigure a trend of development of rail and, especially, road transport because of impulses generated mainly from abroad. Given the current background of the development of future export markets, the Danube has to be one of the most important access routes towards the North-West Europe.
Among the determinants of insufficient capacity in relation to the volume of traffic that can be achieved, we can include both high dependence to road transport and the low investments in road infrastructure.
Romania has to be one of the countries to consider the attention drawn by the specialists Philip Kotler and Nancy Lee who argued that "the existence or funding level of public sector institutions are not guaranteed. Like in case of companies, they need to understand the dynamics of the forces and changing technologies; they must have a strategic idea; they must consider new and effective practices; they must innovate; they must be able to present their own virtues to the general public and to the public categories that pay taxes or watch them work" (Philip, Kotler , Nancy, Lee, pg. 18-20).
Inadequate transport network is an obstacle of economic development and, thus, of the growth of living standards; the importance to understand the need for investment in this area can be beneficial to the entire economy. Both the external and internal factors impose revamps and medium- and long-term investment in infrastructure.

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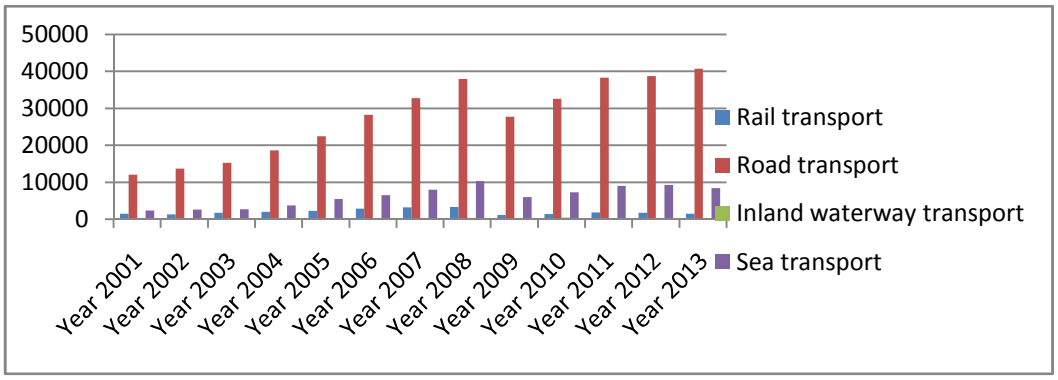
Appendices

Table 1: Number of kilometers of the transportation network

Year	Navigable waterways	Navigable rivers	Highway	Other roads	Rail line total	Electric rail line
2001	132	1647	113	78379	11015	3950
2002	132	1647	113	78783	11002	3950
2003	132	1647	113	78888	11077	3965
2004	132	1647	228	79226	11053	3965
2005	132	1647	228	79676	10948	3999
2006	132	1647	228	79724	10789	3965
2007	132	1647	281	80612	10777	3974
2008	132	1647	281	81412	10785	3974
2009	132	1647	321	81392	10784	4002
2010	132	1647	332	82054	10785	4020
2011	132	1647	350	83388	10777	4020
2012	132	1647	550	83635	10777	4020
2013	132	1647	644	84243	10768	4029

http://ec.europa.eu/eurostat/web/transport/data/database



https://statistici.insse.ro

Figure 2: Value of CIF imports

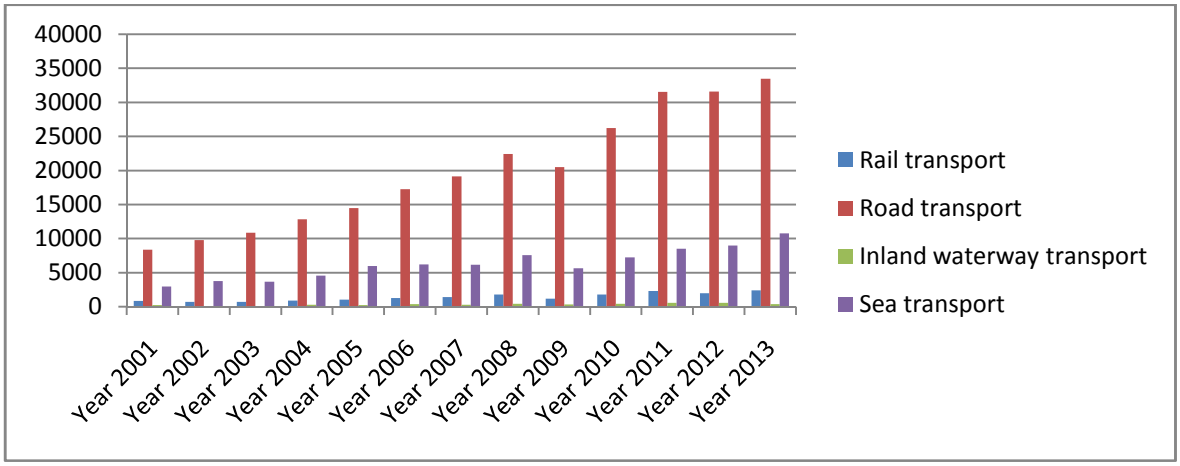


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Figure 3: Value of FOB exports