Transport Infrastructure Influences on the Regional Development

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Abstract: The scope of this work is to analyze the influence of transport infrastructure, on regional development. Moreover, it aims to illustrate the major influences of the economic, social and ecological factors on transport infrastructure development. In that respect, starting by analyzing the current views on national and international levels regarding these items, the work propose to go further, by supplement these theories with some new elements, requested by the current and future society's evolution. Thus, for the analysis of the relationships between transport infrastructure and the regional development, we propose a new scenario, based on the sustainable development principles. This approach, again, is given in the paper, through research investigations carried out, both, in terms of theory and practice, using actual Development Regions of Romania data. Finally, the work findings highlight several solutions that could be included in the further socio-economic-ecological development strategies of The Romanian Development Regions, according with the sustainable transportation concept. The work is useful for the academic specialists and decision-makers, offering an extended support for regional and infrastructural policies.

Keywords: modal infrastructure; regional development; sustainable transportation; policy measures

JEL Classification: R40; Q56; R11; L91

1. Actual Transport Particularities, At National and International Levels, That Could Influence the Regional Development

In the last years have appeared two major topics of debate, regarding the relations between the society development and transportation.

The first one is based on the idea that the transportation main development indicators must be "disconnect" with those that characterize the socio-economic development of the entire society.

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In other words, it is underlined the idea that the transportation indicators rhythm and evolution direction (negative or positive) must not, automatically, correspond with the rhythm and direction of those that characterize the socio-economic development of the society. More directly speaking, transportation must be analyzed separately, and not as an emblematic element of society socio-economic growth.

The second debate theme seems to appear along with the need for dimensioning of the investment in transport infrastructure. If we increase or modernize the transport supply we, automatically, obtain economic growth? It is obvious, in other words, that, if we invest money today in the development or modernization of the transportation infrastructure, tomorrow we receive, without any doubts, economic profit?

Only one conclusion after these two topics: in the development process of the entire society, transport infrastructure importance is undeniable, but the influence intensities and magnitudes are different from case to case.

In Romania's case, is generally recognized that transport infrastructure is not in the best conditions, this thing being one of the most important obstacle in the country positive economic evolution over, at least, the past two decades.

Current network infrastructure, designed, developed and modernized over several past centuries is fairly balanced, spatially speaking, covering the national territory. Almost every rural or urban locality has a transport connection with others. Unfortunately, there are some negative results of the last period of transport infrastructure development, at national and regional levels, like:

- Regarding the current and future society requirements, the share of modernized infrastructure routes is small. This creates a discomfort and a decrease in the attractiveness of economic investments. For example, from the total length of roads, in 2012, they were modernized only 32%, and from the total length of railways, less than 38% were electrified;
- Maintenance and development of the infrastructure network (especially railways) are deficient made, in favor of funding preferentially the motorways construction, some of them not being economically justified. It is almost obvious that, for example, the *Sun Highway* (Bucharest-Constanta) is unprofitable. Profitability could be achieved only if the economic activities in the Black Sea and Danube areas (especially those with Constanta Harbor connections) will increase substantially, which means an improvement in the naval infrastructures, which is not considered a priority at this time for the decision makers and politicians;
- Gain obtained through the past development of the national railways network, as premise of sustainable transportation achievement, is losing every year. This is due to the fact that in the last twenty years, has been supported by public funds only roads development, in particular the motorways, which means that railways

and other transportation infrastructures modes, such as naval or multimodal ones, was under funding. Even so, due to the lack of funds, Romania, at present, has no proper developed motorways network. In the same time, the other infrastructure transport modes were permanently damaged, leading to a critical state of the art;

- Political reasons exceeded in the approval process of the infrastructure projects in preference to economic justifications. In our opinion, the most illustrative example is the construction of the navigable channel Danube-Black Sea, developed with huge material and human efforts, and almost unused at present;
- There are zones in Romania which are endowed with natural naval transport infrastructures (particularly, the south and southeast areas), but this advantage was, and is use in a very small measure.

Unfortunately, even now, these major problems seem to be uninteresting for the decision makers. They support, again, only the motorways development or/and other economically unviable or non-priority programs. The most illustrative example, in the last period of government, is given by the SOP-T[1] program, where the scope, only on paper, is to support the sustainable transportation development. In fact, no project of that program has that orientation. Moreover, the government document highlights the wrong idea that, the sustainable achievement could be reached mainly by motorways network development.

2. Interdependencies between Socio-Economic Development and Transport Infrastructure, At Regional Level

Qualitative and well-dimensioned transport infrastructure network could be the support for efficient economic activities, and for meeting the goods and population mobility needs.

The use of modern railways, roads, inland waterways, ports or airports networks analysis shows us some of the interdependences within several influence factors of the transport market (Stoica, 1997). A transport network that is trying to avoid services dysfunctions has some influences, firstly, on the economic demand and secondly, on the supply. From the supply point of view, is important to mention that providing adequate infrastructural capacities (qualitative and well-adapted on demand) it is possible to "subsidize" some economic activities by reducing their final production costs.

Therefore, we can underline one important item: the existence of a transport network has many and important influences on the region that it cross. However, not all the influences go to positive directions. Unfortunately, a part of those are

[1] POS-T is the Sectorial Operational Programme "Transport" for 2007-2013 (Romanian Government - The Transport Ministry (2006)).

quite negative, if we are taking about more and more land occupation, phonic or chemical pollution due to transport activities supported, obviously, by the specific infrastructures.

It is also interesting to underline the effects of transport infrastructures on the regions, where these exist. In that respect, we can establish two major types of effects: direct and indirect. Direct effects have two large subdivisions (Vikermann, 1991): a) quantifiable effects, such as those that influence the manufacturing activities results, by reducing the transport costs and b) subjective effects, such as the changing perception of a particular region, crossed by an adequate and well-maintained transport infrastructure.

Regarding the indirect effects, the analysis can be orientated through the assessment of the changes, made by some new transport infrastructure construction, to the socio-economic development level of the region, changing its relative competitiveness, production capacities or regional income level.

Besides these two main categories, the European Commission's Directorate General for Mobility and Transport has introduced a third category, the so-called *effects of catalytic converters,* with significant impacts on some socio-economic policy instruments, or regional development (European Commission, 1996).

Integration of the various types of effects produced by quantitative and qualitative development of transport infrastructure changes, in one of these three main categories, must be analyzed together with some spatial, temporal and/or economic characteristics. The transport demand being not transferable means that, a global transport infrastructure supply cannot be assessed by itself, but only in relation to network topology and geography of the territory. Usually, the regional economy is analyzed mainly through the incomes balance, due to the existing natural resources, the production factors or the existing technologies. Nevertheless, one improper transport infrastructure supply could lead to syncope in overall development of the regions, by the existence of entry barriers in the movement of goods and persons, with negative effects on economic activities and employment. At the same time, it is generally accepted that favorable socio-economic regional development is closely related to the size and quality of transport infrastructure in those areas. Transport quality parameters are associated to each stage of infrastructure development/modernization.

It is no guarantee of the regions favorable economic evolution if there is a development process of transport networks. Moreover, from a certain level, due to the negative effects on the environment and human health, the development of such transport infrastructure networks could be considered inefficient. One research study made in 2000 underline that (Goodwin, 2000):

- There are no automatic benefits in economic and employment areas by developing transport infrastructure projects and even so, one of them could be harmful;
- For projects that produce positive economic effects, them real dimensions must be carefully evaluated, because there are situations where the negative effects, produced upon the entire society, may exceed the benefits;
- Using the cost-benefit analysis, in this particular case, could be a wrong idea, because of the imperfect assessment of the infrastructure network economic impact;
- In our analysis, we must broke the link between the economic generally development and the transport activities, especially in those situations where it aims to adopt instruments for correcting some markets distortions.

Based on these arguments, we suggest being prudent when design and develop transport infrastructure plans at regional level. It is not obviously at all that it could be attempt favorable economic evolution of the regions by only developing transport infrastructure networks. For this reason, we must make a more detailed analysis to understand better the effects produced by the transportation infrastructure on regions economic development.

In this respect, the analysis could be based on three main scenarios (Botric, Sisinacki, Skuflic, 2006):

- regional development through a surplus of infrastructure;
- regional development through a deficit of infrastructure;
- regional development through a balanced developed infrastructure;

Along with these, in the current stage of society evolution, we strongly recommend a new scenario, the fourth one in our presentation, based on sustainable development principles:

- regional development through sustainable transportation infrastructure.

This new type of approach is required by the last society evolutions, where damages due to transportation (infrastructure and activity) made on environment and human health are important. In many cases, these negative effects are more important than the benefits received, on regional level. This is why, over the past few decades, the modernizations or the developments of the transport infrastructures are encouraged to be made, notably in Europe, on sustainable transportation concept. In our opinion, we consider sustainable transportation: "that complex system designed to meet the need for mobility requirements of present generations, without damaging the environmental factors and human health, while improving the efficiency of the energy consumption, so that will be possible to satisfy the mobility needs of future generations". (Fistung, 1999)

In this respect, at regional level, we must reconsider the transport infrastructure modernization or development projects, so the external negative costs due to transportation could be minimized or, why not, eliminated. It is necessarily, according to that, to support the development of the less pollutant infrastructure networks such as multimodal and railways.

It is also true that, at the least developed regions, if the capacity of transport infrastructure exceeds demand, are created favorable conditions for the development of the region. This approach could be possible by cutting the transportation costs and enabling the reduction in production costs. Based on that, it is possible to obtain increased profits, which in turn, can become attractive for new investments in the region.

However, this situation is, in many cases, not realistic and that is why it could not be a safe and favorable assumption for the development of the regions.

In the opposite situation, intensive economic activities require increased capabilities of transport infrastructure, which needs, in many cases, the development of new infrastructures or the improvement of the existing ones. This situation is found, in particular, for the economic well-developed regions.

According to the very high value of investments in the case of transport infrastructures, it is necessary that the supply be dynamically adapted to the demand. This function, regarding the steps evolution of infrastructure capacity, must be adapted as much as possible, to the necessary capacity development (Raicu, Olaru, 1996). By that, we can reduce the time when capacity increases, developed by infrastructure investment projects, can be gradually assimilated. Because of the long period between the start and the end of an investment in the transport infrastructure development (several years or decades, in general), there are not excluded situations of over or sub dimensioned capacities, due to some unconfirmed traffic forecasts. This is why, even if the balanced developed infrastructure is the optimal solution, according to the particular demands of the socio-economic activities, that situation is very difficult to be attempt.

In conclusion, we can underline that, at regional level, the processes regarding upgrading and modernization of transport infrastructure must take into account that:

- Transport infrastructures is needed for the socio-economic development of the region, but the mere existence of it does not lead, automatically, to obtain benefits;

- The projects for the development/modernization of transport infrastructure should be carried out on medium or long periods, so that capacity supply can cover the actual and further mobility demands;

- The development of sustainable transportation, as the European Union supports it, implies the internalization of negative externalities due to specific activities and infrastructures. This can be reach by implementing specific policies (economic and administrative) and by supporting the multimodal and the environmentally friendly transport modes, in preference to the most polluting modes.

3. Some of the Links between the Regional Development and the Transport Infrastructure, Specific for Romania

A proper transport infrastructure offers mobility opportunities and supports the economic growth, as we have seen before. In this context, the Fifth Report on Cohesion of the European Commission go further with that idea and underline that, in terms of quality and availability, weak infrastructure can inhibit this support (European Commission, 2010).

Unfortunately, in the case of Romania today, accessibility to modern infrastructure is strongly differentiated from one region to another, from one city to another. Social development tends to be higher in villages near major cities than in the distant ones or in surrounding localities "on the major road axes", compared with rural localities who have access only to communal or county roads. In fact, a major cause of disparities of inter and intra regional development is given by the different ways of access of regions to county, national and international transport infrastructure, as well as its inadequate quality. (Romanian Government, 2006)

A survey made on almost 90% of the 3181 Romanian rural und urban localities indicate that the most developed localities are large cities, located near important transport infrastructures, with strong attractiveness for working commuters. The most relevant regions, from this point of view are in Banat, Transilvania or Dobrogea, no taken into consideration Bucharest and its neighborhoods. (Sandu, 2013)

Bucharest-Ilfov, Central and South are the main beneficiaries to a proper transport infrastructure. Among regions with limited access to transport infrastructures is the North East region, an example being the Botosani county, which has 16,8% impracticable roads.

At intra regional level, the inadequate transport infrastructure prevents the development of small and medium-sized cities, communes and villages. Many areas have very weakly developed road networks between cities, like villages from Danube Delta, Apuseni Mountains or Mehedinti Plateau, causing their economic involution or even their isolation.

If we investigate the transport infrastructure network and the development level for the Romanian Regions, we can highlight some interesting aspects. In this respect,

in the table no. 1, we present the evolution of some important regional economic development and road infrastructure indicators. The analysis takes into consideration recent periods, each between six and eight years. The targeted indicators are:

- Roads density, for 100 km^2 of territory (ROADS in table no.1);
- Regional GDP;
- The amount of direct foreign investments, made at regional level (INVESTMENTS in the table no.1).

We use these indicators because:

- The development of the road infrastructure was the main financially supported in the last decades, in Romania;
- The road infrastructure is the most important transport network for Romania, mainly at regional or county levels;
- The regional economic evolution could be well defined within the GNP trends;
- The Regions attractiveness (from economic and social points of view) is well shown by the foreign investments level. In addition, the foreign investments are more important than the national ones for the regional development, especially in difficult economic moments such as financial crisis.

Table 1. Comparison between the Evolutions of Some Specific Indicators Regarding Road Infrastructure and Regional Development[1], in Romania

-%-

Region	Period	ROADS 2004-2011	GDP 2004-2009	INVESTMENTS 2005-2010
North East		102.2039	176.4949	158.8
South East		102.381	169.5534	146.7
South		105.7471	198.5436	131.1
South West		103.6313	173.8898	77.6
West		102.5157	185.6274	142.8
North West		104.0346	185.0339	174.9
Central		106.734	187.0654	79
Bucharest-Ilfov		102.0877	235.8281	140.3

Source: Data Processing after Statistical Yearbook of Romania, 2006, 2007, 2011, 2012

[1] In the analysis was taken into consideration the Romania's Development Regions structure for 2011

4. Some Analysis Conclusions:

Transport infrastructure had a small and positive trend of evolution for all the Romanian Regions, with higher values registered only in both the South and Centre of the country (without South East Region);

The regional GDP has grown sizable in the analyzed period, in all the Regions, reaching near double value. This can evidence, if we do not take into consideration the exchange rate evolution that we will have to do with an intensification of economic activities. From this point of view, the highest rate of evolution was registered in the South and West Regions;

The foreign direct investments have increased in all Regions, with the exception of Central and South-West Regions.

Based on these conclusions, we can affirm that theoretical aspects presented above are mainly confirmed, in the case of development regions in Romania. Thus, in regions where transport infrastructure development was more sustained (in Central Region, for example), foreign investments has been less than in other Regions (Figure 1). In the same time, Regions with similar trends for the road infrastructure development (like the North West Region, for example), received greater direct foreign investments, what was found in a high level of regional GDP.

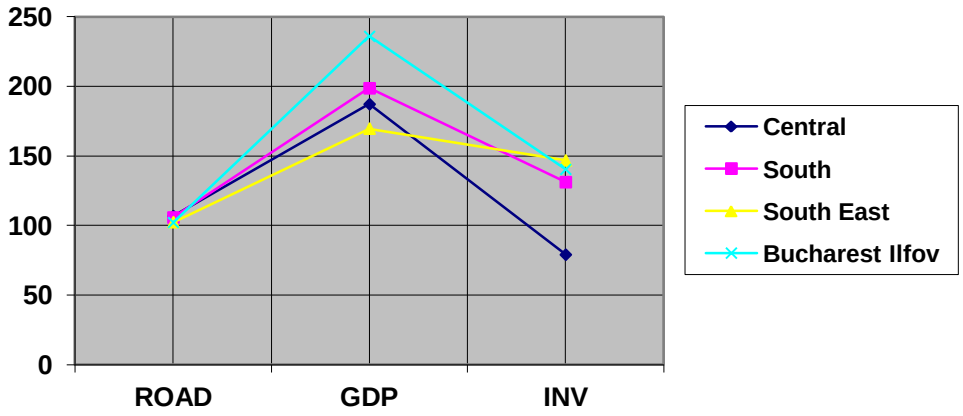

Figure 1. Evolutions of the Road Infrastructure and Economic Development Indicatorsf Some of the Romania's Development Regions

A special situation exist in the Bucharest - Ilfov Region, where the GDP growth was the most intense at national level, but the direct foreign investments and the roads development are smaller than in other Regions. This situation is due to the quality of the transport infrastructure that covers, quite well, the demand for mobility of persons and goods. Nevertheless, if we take into consideration the

economic and social development tendencies for this Region, the actual situation will change in the future, because it will be necessary to improve and modernize the transport infrastructure, in order to attract larger economic investments, especially in Bucharest and neighborhoods.

The major conclusion after the analysis made for Romania's Development Regions: for reaching a better socio-economic development of Regions and for covering the increasing mobility needs, both persons and goods, and taking into consideration the current low degree of modernization level of transport infrastructure, it is necessary to implement some priority actions. In this respect, we can point out:

- To really support, the development of a sustainable transport system. In this context it is necessary to internalize the external costs due to transportation and permanently encourage the environmentally friendly transport modes;
- To reassign the public funds from motorways to the development and modernization of European, national and county road networks. We can underline that the modernization of the entire Romania's current roads network at high quality standards, is equivalent to 2.000 km motorways network construction. It is true if we take into consideration that the construction of one km of motorways road needs as minimal value, two million Euro, and for the modernization of one national/county road km is necessary as medium value, 300.000 Euro (Fistung, Miroiu, Popescu, Şerbulescu, 2008). This policy could also improve the employment national rate by offering many working places, in roads modernization activities, all over the country;
- To develop high capacity transport networks with reduced negative effects on environment and human health, in those Regions where this is possible;
- To create some economic facilities for the development of some "business incubators" which will financial support the development/ modernization of the transport infrastructure at regional level.

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