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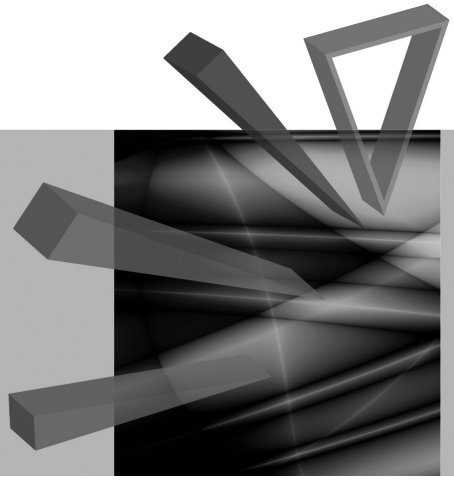
286

Regional Economy in Theory and Practice



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Publishing House of Wrocław University of Economics
Wrocław 2013

Copy-editing: Elżbieta Macauley, Tim Macauley, Marcin Orszulak

Layout: Barbara Łopusiewicz

Proof-reading: Barbara Łopusiewicz

Typesetting: Comp-rajt

Cover design: Beata Dębska

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Information on submitting and reviewing papers is available
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www.wydawnictwo.ue.wroc.pl

ISSN 1899-3192
ISBN 978-83-7695-345-8

The original version: printed

Printing: Printing House TOTEM

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PRACE NAUKOWE UNIWERSYTETU EKONOMICZNEGO WE WROCŁAWIU
RESEARCH PAPERS OF WROCŁAW UNIVERSITY OF ECONOMICS nr 286 • 2013

Regional Economy in Theory and Practice ISSN 1899-3192

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THE IMPACT OF TRANSPORT ON REGIONAL DEVELOPMENT

Summary: Transport (both infrastructure and services) can be an essential factor of sustainable development of a region. The effects of transport development for a region can be direct and indirect. From the point of view of the needs of sustainable development, it is important to create such a transportation system which will allow to achieve not only economic goals but also social and ecological ones. The authors of the paper proposed a very simplified and general model of direct and indirect effects of the development of a transport system of a region and their influence on its economic, social and ecological development. The model includes system relations.

Keywords: regional development, effectiveness of transport.

1. Introduction

The theory of the transport economy attributes to transport a significant role in the economic and social development of a country and its regions. It is interesting, however, how transport contributes to this development. The only analysis of the correlations between the data on, for example, expenditure for the development of transport and effects such as GDP growth, could not give an answer to this question. It is necessary to identify the relations between the impact of transport on specific social and economic effects. Identification should be systemic in nature, first, because of the large number of transport factors and its effects, and secondly, because of the relations between these effects. The goal of this article is to identify these links and present them in the form of a model.

2. Literature overview

For many years works of various kinds, both about the practical and theoretical impact of transport on economic and social development in general (e.g. in the whole country) have been published.

The methods used to assess the economic impact of transport projects have evolved over the years – mainly from the concentration on the economic benefits of saving time and travel costs for direct users to including a broader relationship with the environment. From a methodological point of view the classification into the direct and indirect is very important [Banister, Berechman 2000; *Impact of Transport Infrastructure...* 2002]. At present a wider range of factors is being included, such as the availability of transportation, the availability of the labor market, the impact on property values, changes in traffic flows, and the social and environmental effects (human life and health, social cohesion, noise, landscape) [Forkenbrock, Weisbrod 2001]. The conducted analyses show the complexity of the relationships, not just the effects and factors, but also the various effects on each other and the multidimensional nature of these effects. For example, transport, the factor of economic development, has an impact on the quality of the landscape, which is the effect of an environmental nature, and also has an impact on the economic development (the tourist attractions of the region).

In addition to the comprehensive analyses and models [Talley 1996; Weisbrod 2008], specific issues were analyzed, such as the value of travel time for passengers [Wardman 1998], the cost of congestion in cities borne by the company [Weisbrod, Vary, Treyz 2003]. As an alternative to the micro, macro and regional econometric models, the CGE model (computable general equilibrium) was proposed, which allows the meso-scale analyzes [Wing, Anderson, Lakshmanan 2008], taking into account the mechanisms of tracking the effects of adding infrastructure capacity (e.g. time-saving benefits to households and businesses).

In Poland it can be observed that interest in this field is increasing. A very interesting example is the work of Rosik and Szuster [Rosik, Szuster 2008], which is an attempt to examine this issue. As the authors state, transport infrastructure is not the only and not the most important factor of economic development – more important may be taxes, education and innovation. One can even argue that it is not the development of transport that affects economic development, but that richer countries or regions can afford to invest in transportation. After that, investments in transportation are needed to sustain this growth. The impact of the transport development on the development of the region depends on various factors, including the nature of the region and the level of socio-economic development.

Such thesis have long been posed by authors from other countries. A contribution to the development of the research on the issue was the view of F. Voigt [Voigt 1973], which assigned space transportation systems with different creation power of influence into regions, followed by the distinguishing of three types of regions: growth regions, underutilized regions and indifferent regions.

The earliest studies of a theoretical and empirical character showed that, depending on the industry, the improvement of the functioning of transport in varying degrees impacts on business costs (including transport costs) and the size

of the labor market [Weisbrod, Vary, Treyz 2003, pp. 98–106]. First of all, it is noted that infrastructure investments can have a direct, as well as a complementary, impact on economic production. A growing economy needs additional investment to meet the transport needs [Talley 1996]. In order that accessibility of transport could bring the expected results other conditions should also exist.

Nowadays, at the beginning of the new century, the thesis of the importance of transport infrastructure to the economy and society is rarely called into question. Rather, it gives new features, such as the impact on the development and prioritization of territories, the impact on living standards, impact on the value of the property [Stanchev, Merat 2010], creation of mobility [Biała Księga Transportu 2011].

Analyses of the impact of regional development, generated by the transport, on the development of the country can be very cognitive. The economic development of the region does not have to contribute to the development of the whole country. A region may be more attractive than others and attract investment and human resources. In this case, we are dealing with the effect of redistribution between regions rather than economic growth in the whole country. Increasing transport accessibility for weaker regions can lead to the draining of resources by taking employees and exposing them to stronger competition [Banister, Berechman 2000].

3. Benefits for a region from transport development

Regional development involves the economic, social and spatial phenomenon. The measures of this development are effects like, for example, improving the competitiveness of businesses and the level of life, the potential of regional economic growth, the improvement of their availability.

The factors of regional development can be: demographic resources, the regional ecosystem, infrastructure, regional economy, the space region, exogenous factors (globalization, integration, macroeconomic conditions), the factors determining the region's ability to respond to changes in the macro-surrounding (flexibility of the region’s economy, internal equity options, activity and the openness of the region) [Stahl (ed.) 2006, pp. 13, 16–18]. The important factors in the development of the region should also include transport, which allows the achievement of the economic, social and environmental objectives. There is extensive empirical evidence that proves the existing relations between transport and positive economic and social regional effects.

For example, the conducted research on the effects of congestion in the US State of Portland on its economic development has shown that it has a significant impact on the region's ability to sustain economic growth. The conclusions (selected) set out in the report of the study are as follows [Economic Development Research Group 2005, pp. 3–5]:

1) competitiveness of Portland as a center of commerce, was largely dependent on efficient transport. In particular, increased congestion posed a threat to the further development of the region. Entrepreneurs claimed that congestion already caused an increase in the cost of doing business;

2) failing to take action to improve the state of infrastructure might result in the loss of 844 million USD a year by 2025, which is 782 USD per household and 6,500 jobs. This was the equivalent of 28 hours of travel time per household per year;

3) it was estimated that every US dollar spent on transport investment would bring a 2 USD benefit.

Empirical data can be helpful in formulating the overall relationship between transport and regional development. It should be remembered, however, that the effects of the development of transport may be different in different regions. The focus of transport problems depends on the nature of the region. For example, in a region with one center (a large dominant city), it is important to have access to this centre. Accessibility is also important for regions, where tourism plays a key role in promoting economic growth.

OECD reports show that there are many different types of direct and indirect benefits for the development of the region, arising from the development of transport [*Impact of Transport Infrastructure*... 2002, pp. 20–21].

Direct effects are mainly travel time, cost and safety, which represent benefits of direct users of transport. Time savings are still quite widely regarded as the greatest economic benefit. According to M. Wardman, costs resulting from the extra time of transport has two components: the opportunity cost of time spent on traveling and the loss resulting from the non-use of the time for other activities (work, business or non-business purposes) [Wardman 1998, pp. 285–316]. On the other hand, however, these effects, especially the latter, are relatively difficult to estimate. Security improvement can take the form of reducing accidents and their consequences (death, loss of health, loss of property, the cost of health care insurance).

A detailed analysis of the direct effects leads to certain conclusions. Firstly, that all of them, not only costs, have both social and economic dimensions. Secondly, they are not tied only with transport factors. but there are also relations between themselves. An additional conclusion resulting from the first two is that there is the need for a systemic approach, in which the basic tool would be the Cause – Effect Analysis. The system approach is all the more needed, that from direct ones wider and indirect effects result.

Both direct and indirect effects relate to the following areas:

– accessibility of a region,
– employment,
– effectiveness of business processes,
– social inclusion,
– environment.

In addition to the above, other social and economic effects of transport investments are also featured: effects relating to the level of economic development, noise, landscape quality, etc. [Forkenbrock, Weisbrod 2001, p.6].

An improvement of access to transport can increase the accessibility to the markets in which companies operate. This in turn leads to the increased centralization of activities (economies of scale, agglomeration benefits), greater attractiveness of the region and improvement of competitiveness. This can be a factor encouraging settlement and preventing migration and exodus from the region.

The effectiveness of business processes achieved through transport development is relatively easier to identify in freight transport. Savings of time and costs, and the improvement of the accessibility and reliability of products allows increasing productivity in manufacturing and logistics, which in turn leads to improved profitability. Similar effects can however also relate to passenger transport. Improved accessibility can reduce the time spent on commuting. This can result in increased productivity of the workforce if the saved time can be then used in manufacturing. The second benefit is the increased geographical size of the labor market in the region (the increased range of options for employees and employers). This allows for specialization in regional labor markets through the better matching of skills (competences) offered and expected in these markets.

The influence of access to the region on its development, however, can be different in different regions and even negative in some cases. The best results can be achieved in regions lagging behind in development. The greater the attractiveness of the area, the greater the exposure of local economic centers to the competitive pressure from the center of a region. Consequently, the impact on the level of employment can also be double-edged. Increased transport accessibility may contribute to the creation of jobs, but it can also lead to the reallocation in the region thanks to the ability to commute from remote cities.

The decreasing accessibility of transport as a result of, e.g. closing rail or bus lines, can lead to social exclusion, which in turn can result in social phenomena such as unemployment, low level of literacy and income, poor housing, poor access to education, high level of crime, bad health and family breakdown. Social inclusion, as the opposite of social exclusion, can be the result achieved by increasing the transport accessibility and mobility. It is difficult to determine whether the improvement in the functioning of transport is able to restore the proper functioning of the community. Certainly, it creates the necessary conditions. Again, it should be stressed that these problems have, to some extent, not only a social but also an economic character. Greater accessibility to social capital can contribute to economic growth.

The environmental effects or the quality of air, water, noise, use of natural resources, etc., also depend on transport solutions in a region. However, the relationship of these results with others, especially with the efficiency of transport processes, is interesting and worthy of further examination. This means that the same factors which result in lower costs of enterprises can also contribute to lower external

costs. The relations between transport, business and environment are even more complex. A region can be an attractive place for investment and settlement thanks to its environmental values.

4. Model of impact of transport on the development of a region

Based on the information given earlier, the authors have attempted to synthesize the effects of transport development in the form of the model of the impact of transport on the sustainable development of the region. This model is presented graphically in Figure 1. The intention was to capture the complex and multifaceted relationship between the effects. The sustainable development of the region is expressed by considering three aspects: economic, social and environmental.

Improvements in the transport system of the region, both in terms of infrastructure and services (freight and passenger transport) result in specific parameters of the system in the form of travel time, cost, and safety of transport processes. As a result, congestion has been distinguished, although it is strongly associated with time, but it is a broader issue than just the length of travel time and has wider implications.

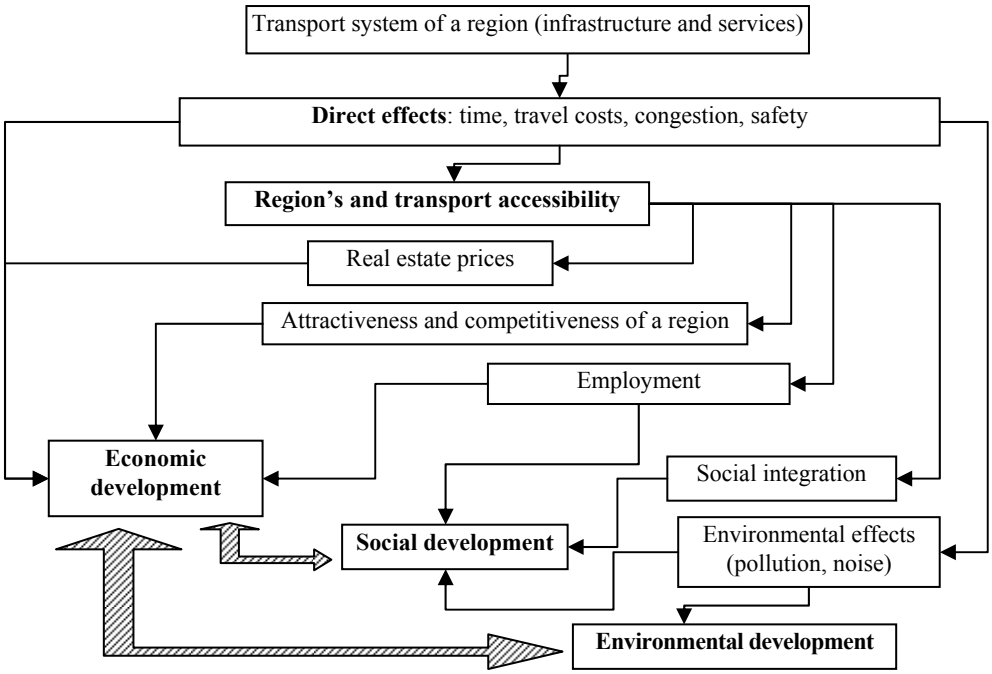

Figure 1. Systemic relationship of effects of regional transport development in the context of sustainable development

Source: own elaboration.

Direct effects (time and costs) in turn have an impact, on the one hand, on the environmental effects, on the other hand the accessibility of transport, which in turn impacts on the price of the property, the attractiveness of the region, employment and social integration. These effects determine the level of economic, social and environmental development, among which different relations are also found. Among the objectives of the development of the region, there may be contradictions, that is, such growth is realized with an increase in social and environmental costs. On the other hand, economic development enables a region to incur expenditure on the implementation of the social or environmental objectives. Social integration can contribute to improving the economic potential of the region. Local values can also improve the attractiveness of the region and indirectly contribute to its economic development.

5. Conclusions and recommendations

As some authors rightly point out, although research material is abundant, however it does not allow to formulate clear conclusions, primarily because of the very different effects of measures taken in the area of transport.

It is necessary, therefore, to continue research on the relations of transport with socio-economic development. A very important issue is, for example, whether as a result of improvements in the transport system new values are created, or there is simply a redistribution of benefits. Improvement of transport accessibility creates new jobs in the region, although it is often not clear whether it can be considered as an additional advantage of improvements in transport or simply the reallocation of activity. The effects can also be quite the opposite (even greater centralization and marginalization of already marginalized areas).

The model presented in the paper, identified relations between transport developments and its effects aimed at proving that actions taken in the field of transport should be evaluated with the use of a relatively broader analysis. Thus the model indicates directions in searching for the effects of transport development. This can be the starting point for a more concrete model, even in mathematical form, which could be a decision – making tool in formulating a proper transport policy. There are, however, some conditions that have to be met.

First of all a very detailed analysis should be conducted. The concrete case studies of transport improvements in regions should be analyzed, taking into account not only the results of these improvements but also the reasons for their occurrence. The goal of this analysis would be to measure the links between transport decisions and their effect in economic categories (costs).

Secondly, if it is possible, the obtained data should be synthesized in order to generalize these relations.

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WPŁYW TRANSPORTU NA ROZWÓJ REGIONALNY

Streszczenie: Transport (zarówno jako infrastruktura, jak i usługi) może być istotnym czynnikiem zrównoważonego rozwoju regionu. Wpływ rozwoju transportu dla regionu może być bezpośredni lub pośredni. Z punktu widzenia wymogów zrównoważonego rozwoju ważne jest, aby stworzyć taki system transportu, który pozwoli osiągnąć cele nie tylko ekonomiczne, lecz także społeczne i ekologiczne. Autorzy zaproponowali bardzo uproszczony i ogólny model bezpośrednich i pośrednich skutków rozwoju systemu transportowego w regionie i ich wpływu na jego rozwój ekonomiczny, społeczny i ekologiczny. Model uwzględnia relacje systemowe.

Słowa kluczowe: rozwój regionalny, efektywność ekonomiczna transportu.