Available online at www.sciencedirect.com

ScienceDirect

Procedia Engineering 187 (2017) 135 – 142

Procedia Engineering

www.elsevier.com/locate/procedia

10th International Scientific Conference Transbaltica 2017:
Transportation Science and Technology

Road Traffic as a Factor of Regional Development: Case of Saint Petersburg Region, Russian Federation

Elena Efimova, Semen Mikhaltsov*

Saint Petersburg State University, Russia

Abstract

The primary aim of the paper is to evaluate the influence of road transportation on the basic regional indicators. Using official statistics, the authoritative theoretical and methodological proven methods we discovered that high traffic volume and traffic congestion together lead to extra spending of car-owners. In the paper we are working out the formula to evaluate these 'losses' and apply it to the transport system of Saint Petersburg. We determine the interrelatedness of socio-economic indexes and transport system indicators. The study proves the relevance of transport strategy development in Saint Petersburg.

Peer-review under responsibility of the organizing committee of the 10th International Scientific Conference Transbaltica 2017

Keywords: transport system, Saint Petersburg, road infrastructure, traffic congestions, air pollutants, road safety

1. Introduction

Transport system and infrastructure are both important issues for every country and region in the world. In particular, transport plays a crucial role in large cities with high concentration of production facilities, capital and population. Saint Petersburg is a perfect case of the urban territories. With its gross regional product of 2625.1 billion RUB and 5.2 million inhabitants in 2015 Saint Petersburg holds the fourth place in Russian regions' ratings. The city is the top-3 region in terms of loaded/unloaded goods volume, with total value of 2283.1 billion RUB [1].

It goes without saying that in order to make the regional economy work under the conditions of high urban density the city should have a rationally and effectively built transport network. Hence developing the local

* Corresponding author.
E-mail address: mikhaltsov.sa@gmail.com

Peer-review under responsibility of the organizing committee of the 10th International Scientific Conference Transbaltica 2017
doi:10.1016/j.proeng.2017.04.359

transport infrastructure is the primary goal of Saint Petersburg's government. Currently officials and experts elaborate the 'Strategy of transport system development in Saint Petersburg and Leningrad region for the period until 2030'. Policy makers face many challenges linked to road infrastructure designing. They need to forecast a demand for road expansion, to think over the way of integration the regional road system is into federal one, to take into consideration any potential dangers for the environment and local societies *et cetera*.

The main goal of the paper is to investigate regional road infrastructure studies. To reach the goal we put some objectives. First, any research project or policy measure in terms of transport system requires theoretical background. Hereafter we are going to consider a number of theories connected with transport infrastructure notion. Than we studied methodologies used by the officials and specialists to implement state and regional transport programs. Primary databases helped us to find interdependencies between regional transport and social indicators.

Key findings are depicted in conclusion.

2. Urban transport system: theoretical approaches

Transport plays a significant role in the modern economy. However, along with the obvious benefits to society, it generates economic, social and environmental costs. Transport planning requires simultaneous consideration of environmental, social, political and economic factors. These issues are being actively discussed in the scientific literature over the past quarter of a century.

We took the New Economic Geography (NEG) approach as the theoretical base of our research. Fujita et al. [2] cover some relevant issues of city road traffics. Firstly, the authors pay attention to urban systems having "landscape" and "market potential" in focus. Secondly, they started the research from the evaluation of transportation costs. In case of Saint Petersburg, it is more relevant for cargo road traffic. To apply NEG theory to our case-study we consider passenger traffics as labor mobility. Thirdly, for explanation and estimation of pendulum mobility in Saint Petersburg region the most suitable way is the consideration of population growth linked to city formation.

Kahn [3] evaluates the economic impact of environmental factors on the development of separate regions. The research can be considered as a fundamental study, which assesses methodologically thoroughly and accurately the interdependence of ecological and economic development of regions.

International legal or scientific definition of sustainable transport has been not recognised yet. Litman and Burwell [4] distinguish narrow and broad definitions of sustainable transport. The first approach is realized in individual technological solutions. A broader definition result in integrated solutions, such as institutional reforms. They evaluate transportation impacts on sustainability, consider sustainable transport decision making. Based on economic, social and environmental indicators researchers show that sustainable development focused on a few resource consumption issues. Banister [5] connects sustainable cities and sustainable transport concepts. He believes technological innovations have to be accompanied by institutional changes. Black defines sustainable transportation as 'one that provides transport and mobility with renewable fuels while minimizing emissions detrimental to the local and global environment and preventing needless fatalities, injuries, and congestion' [6].

Schiller et al. [7], Black [6] consider planning sustainable transport. These researches are devoted to fundamental changes in the mechanism of transport planning. The authors consider integrating the concepts of long-term development and sustainable transport, the use of quantitative and qualitative methods for a comprehensive evaluation of the functioning of transportation systems, application of tools for intermodal transport planning, mobility management and adoption of innovative solutions to transportation problems. The authors have in focus the availability of various elements of the transport and mobility of passengers and goods, emphasize the need to expand the temporal and functional range analysis and provide practical tools to determine the best solution to the transport problems faced by the community. They pay great attention to the decision operation of highway passenger transport in cities and the smooth functioning of global production systems, and to the economy of the transport system of a city/region to improve transport planning and formation of investment strategy of region's transport development as well.

Holden et al. [8] suggest an assessment method based on four equally important main dimensions: safeguarding long-term ecological sustainability, satisfying basic human needs, and promoting intra- and intergenerational equity.