TRANSPORT INFRASTRUCTURE DEVELOPMENT PERFORMANCE

MSc, PhD student, Oksana Skorobogatova
Dr.oec, prof., Irina Kuzmina-Merlino
Transport and Telecommunications Institut, Latvia

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 692426

Young Researchers' Seminar: Sustainable Transport Interchanges
20-21 October 2016, Riga, Latvia

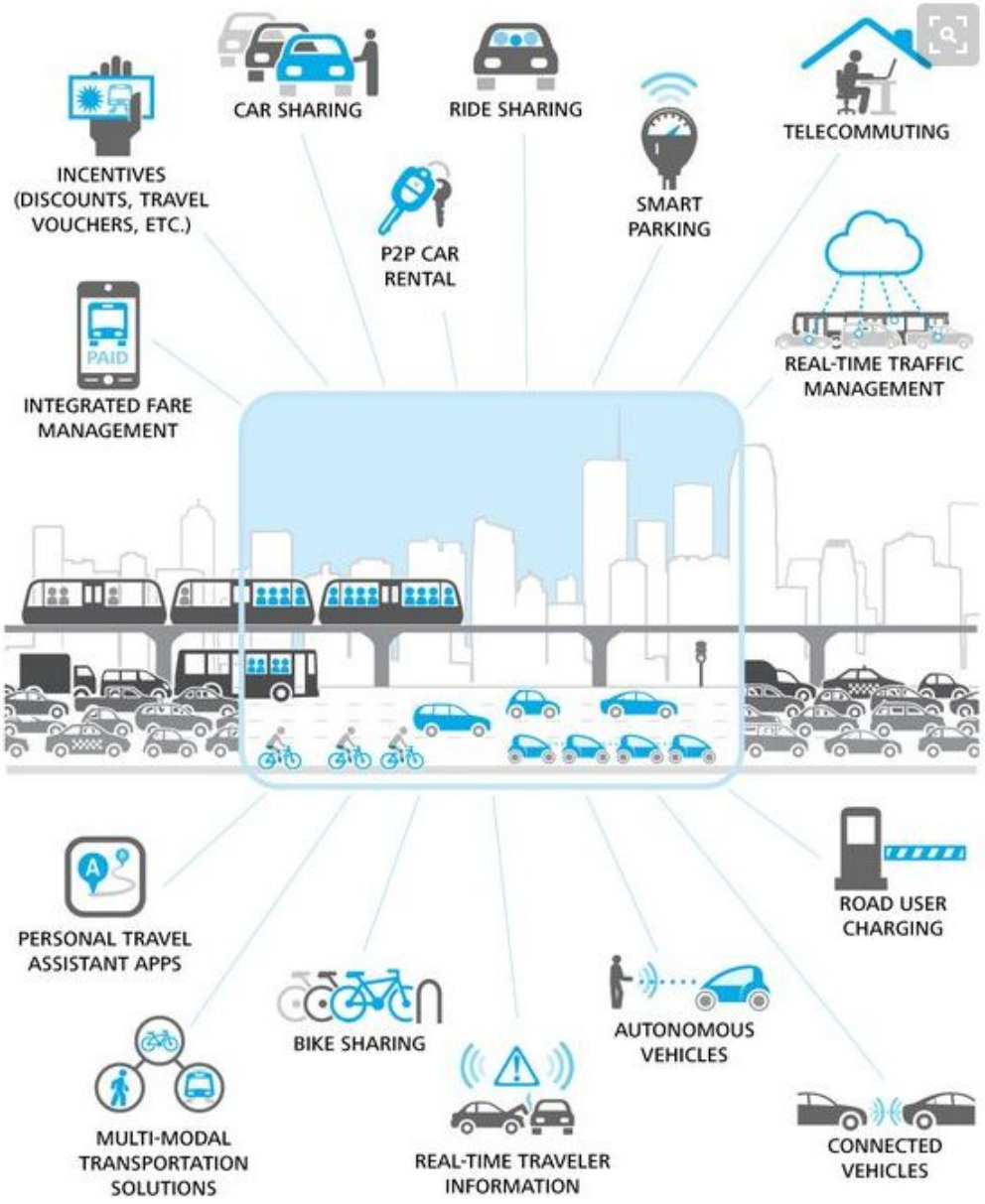
Outline

- The role of transport infrastructure in the transport system;
- Latvian transport infrastructure;
- Priority plans of development of Latvian transport infrastructure;
- Transport infrastructure development performance;
- The Global Competitiveness Index of Latvia;
- Logistics Performance Index of Latvia;
- Transport infrastructure and economic growth;
- Transport in an “ new era of change” – the road of the future

Background:

Next Generation
Urban Transport Systems

There's no silver bullet solution to the problem of gridlock—next generation urban transport systems will connect transportation modes, services, and technologies together in innovative new ways that pragmatically address a seemingly intractable problem.



Source: cdn.dupress.com

The goal & objectives

- *to examine existing approaches of performance measurement of transportation industry activity, especially for transport infrastructure, basing both on the analysis of the scientific and academic publications, and on the official publications of internationally recognized professional institutions working on the subject of the study.*

To achieve the goal of the research, the following **objectives** have been stated:

- to describe the role of transport infrastructure in the economy of Latvia;
- to determine is there an appropriate methodology to measure the development performance of the transportation industry, especially transport infrastructure;
- to identify are there any general indicators of transport infrastructure and economic growth that could be implemented systematically.

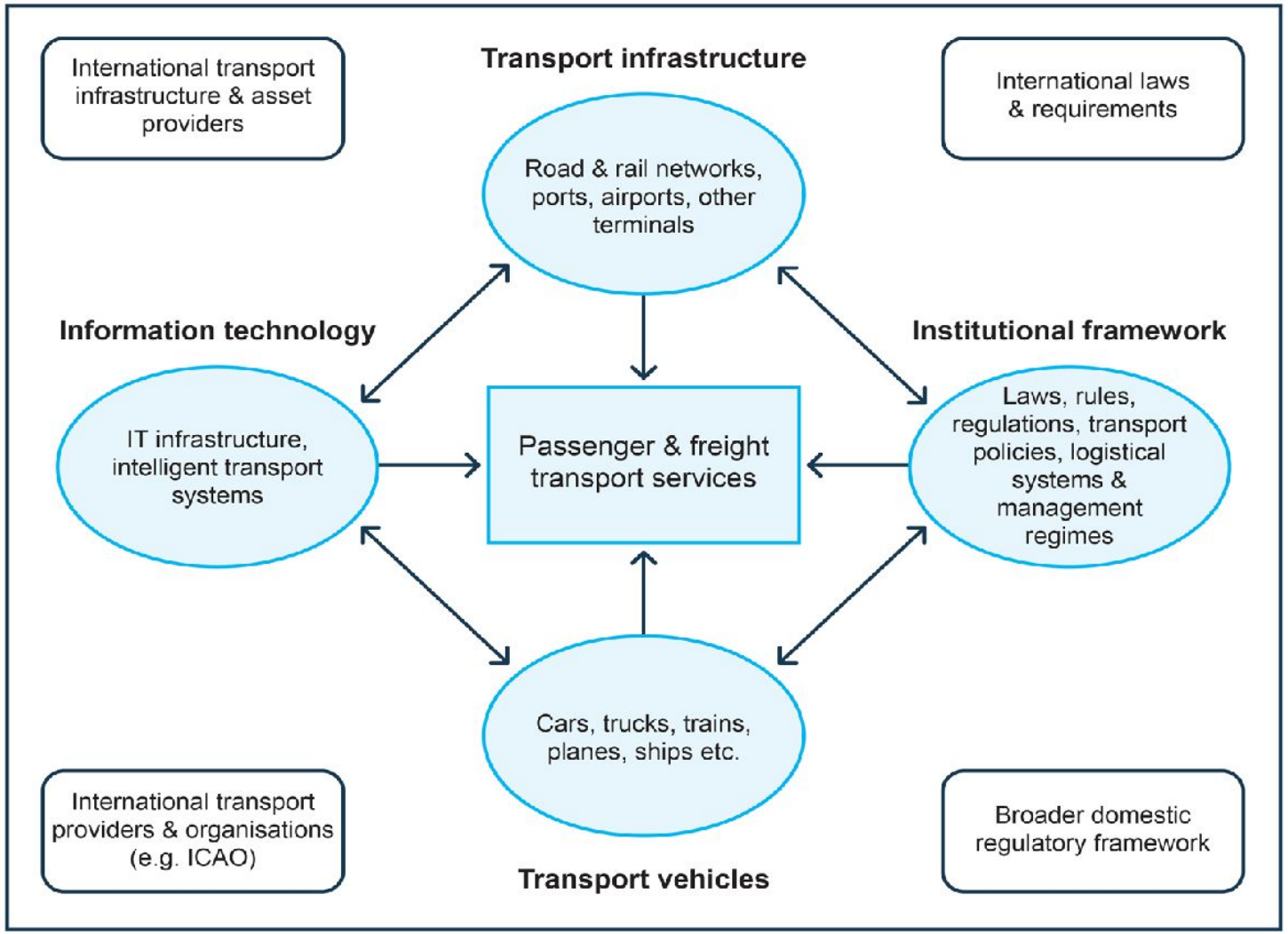
Opinion:

“a certain type of capital demonstrating the specific social character, manifested in transport infrastructure ability to bring to the region the benefits with not only economic, but also with socio-cultural characteristics, and conditioning the synergistic effect of its implementation”

(Rudneva and Kudryavtsev, 2013).

The place of transport infrastructure in the transport system

Stylized diagram of the transport system

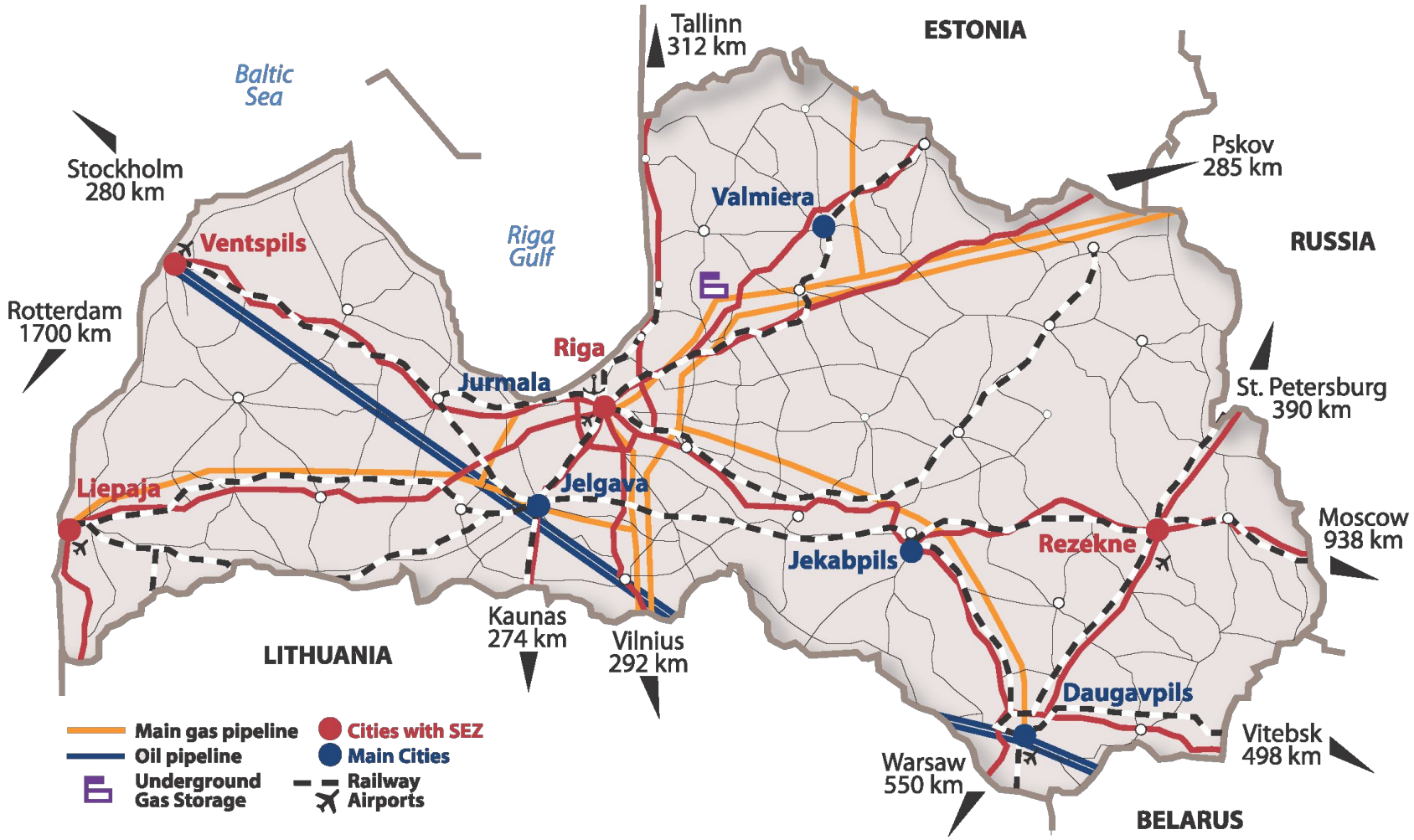


(adapted by Ministry of transport of the New Zealand in 2014 from Lakshmanan and Anderson, 2002)

Latvian transport infrastructure

allian

Transport & logistics



Source: cdn.dupress.com

The main elements of the Latvian transport infrastructure comprise:

- Riga international airport;
- Free port of Riga and other ports in Ventspils and in Liepaja;
- Railway transport;
- 33 international coach terminals;
- City public transport;
- Dense and functional networks of roads which are connected with the EU and CIS networks and Latvian ports;
- Special high-capacity railway corridor that connects Latvian ports with Russia and the Far East.

Priority plans of development of Latvian transport infrastructure

Special development perspectives:

Category	From (2010)	2030
Number of inhabitants (mill.)	2,26	>2,02
Gini coefficient	38	< 30
Motorways with black asphalt from regional state motorways (%)	75.4	100
Number of foreign tourists who are staying for 4 days and more (mill., per year)	0,4	>1,5
Freight turnover in ports of Latvia (mill. of tons per year)	63,6	>130
Passenger circulation in public transport (mill. of passenger kilometres of scheduled traffic buses per year)	2487	2850
Number of the serviced air traffic passengers in the airport Rigall (mill., per year)	3,69	>10
Passenger circulation in railway transport (mill. passenger kilometres per year)	951	1150
Number of the services passengers in the Riga Port (thous., per year)	503,6	>1500

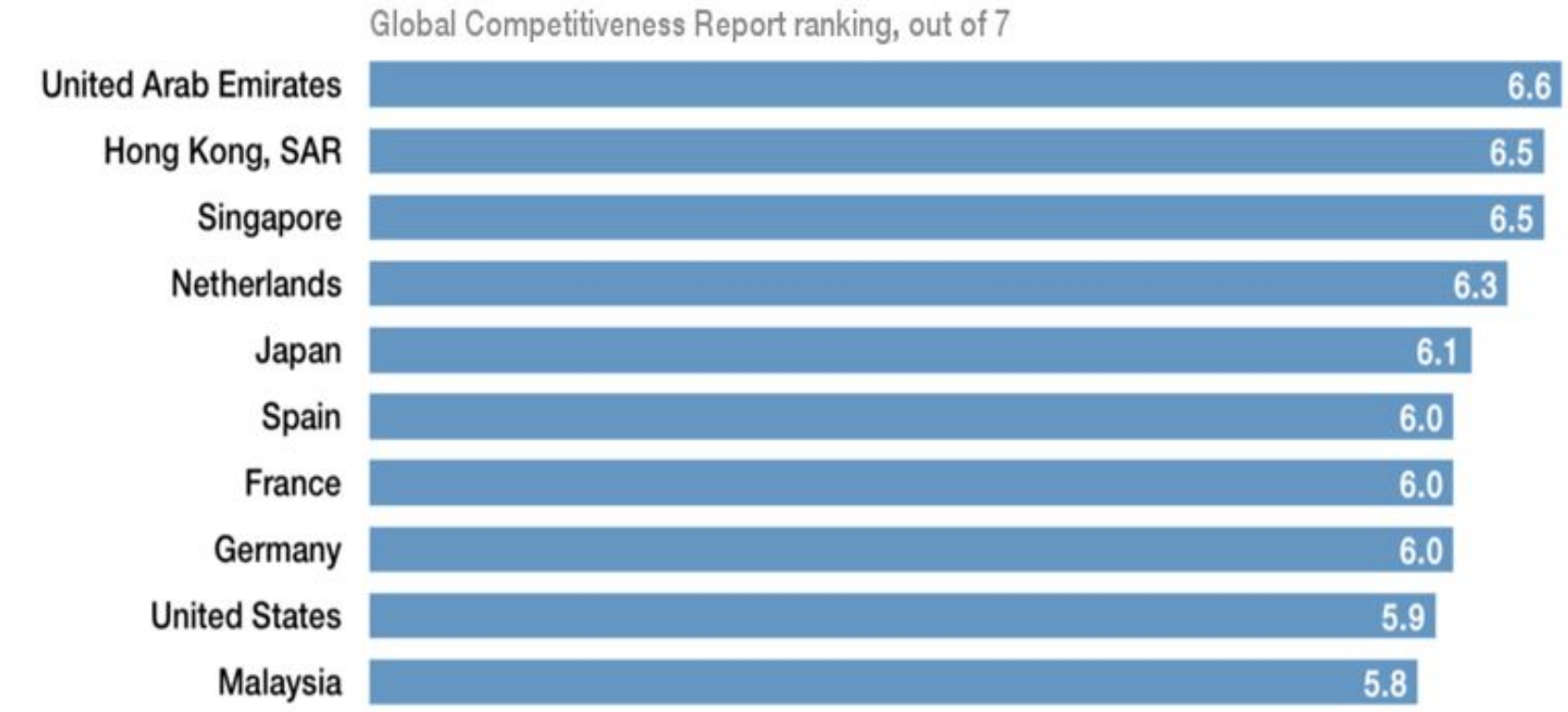
Source: Saeima 2010, page 101

Transport infrastructure development performance

The Global Competitiveness Index

The Global Competitiveness Index (GCI) measures the level of competitiveness of an economy, which is defined as the set of institutions, policies, and factors that determine the level of productivity of an economy. Measurement of the level of transport infrastructure is one of the parts of total evaluation of the GCI.

The best transport infrastructure:



Source: World Economic Forum, Global Competitiveness Report 2015-16

assesses roads, railroads, ports and air transport, as well as the airline seat kilometers available per week

Score: 1 = extremely underdeveloped—among the worst in the world;

7 = extensive and efficient—among the best in the world

The Global Competitiveness Index 2014–2015: Infrastructure:

Country/Economy	Rank	Score
Germany	8	6.09
Finland	19	5.60
Denmark	21	5.59
Sweden	22	5.55
Estonia	38	4.85
…	…	…
Lithuania	43	4.73
Poland	63	4.24
Latvia	**47**	**4.61**

Source: Schwab, 2015

allian

Calculation of the GCI:

- institutions,
- infrastructure (including transport infrastructure),
- macroeconomic environment,
- health and primary education,
- higher education and training,
- goods market efficiency,
- labour market efficiency,
- financial market development,
- technological readiness,
- market size,
- business sophistication,
- innovation

The Global Competitiveness Index of Latvia in detail:

INDICATOR	VALUE	RANK/144
Quality of overall infrastructure	5.0	40
Quality of roads	3.1	108
Quality of railroad infrastructure	4.1	30
Quality of port infrastructure	5.2	31
Quality of air transport infrastructure	5.4	35
Available airline seat km/week, millions	69.3	94

Value: 1 = extremely underdeveloped—among the worst in the world;
7 = extensive and efficient—among the best in the world

Source: Schwab, 2015

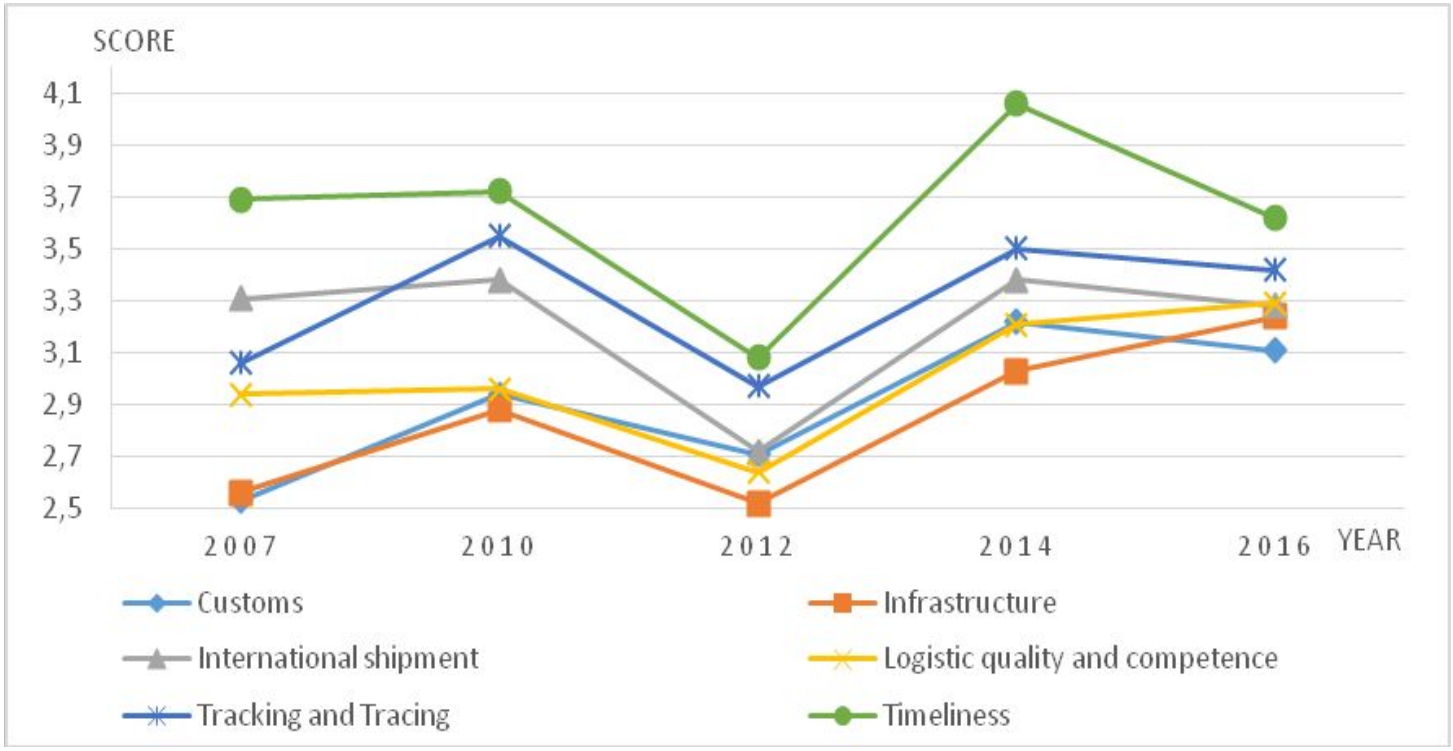
Logistics Performance Index

The Logistics Performance Index (LPI) analyses differences between countries in terms of customs procedures, logistics costs and the quality of the infrastructure for overland and maritime transport.

Calculation of the LPI:

- efficiency of the clearance process by customs and other border agencies;
- quality of transport infrastructure and information technology;
- ease and affordability of arranging international shipments;
- competence and quality of logistics services;
- ability to track and trace international shipments;
- timeliness of shipments in reaching destination

Scores of Latvia in different components in the Logistic Performance index 2007-2016:

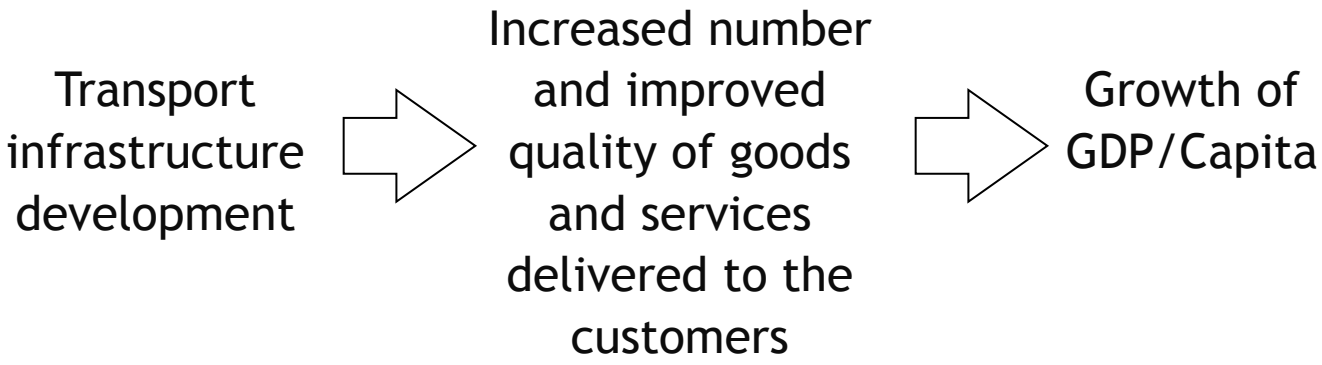


(developed by the authors based on the World Bank data)

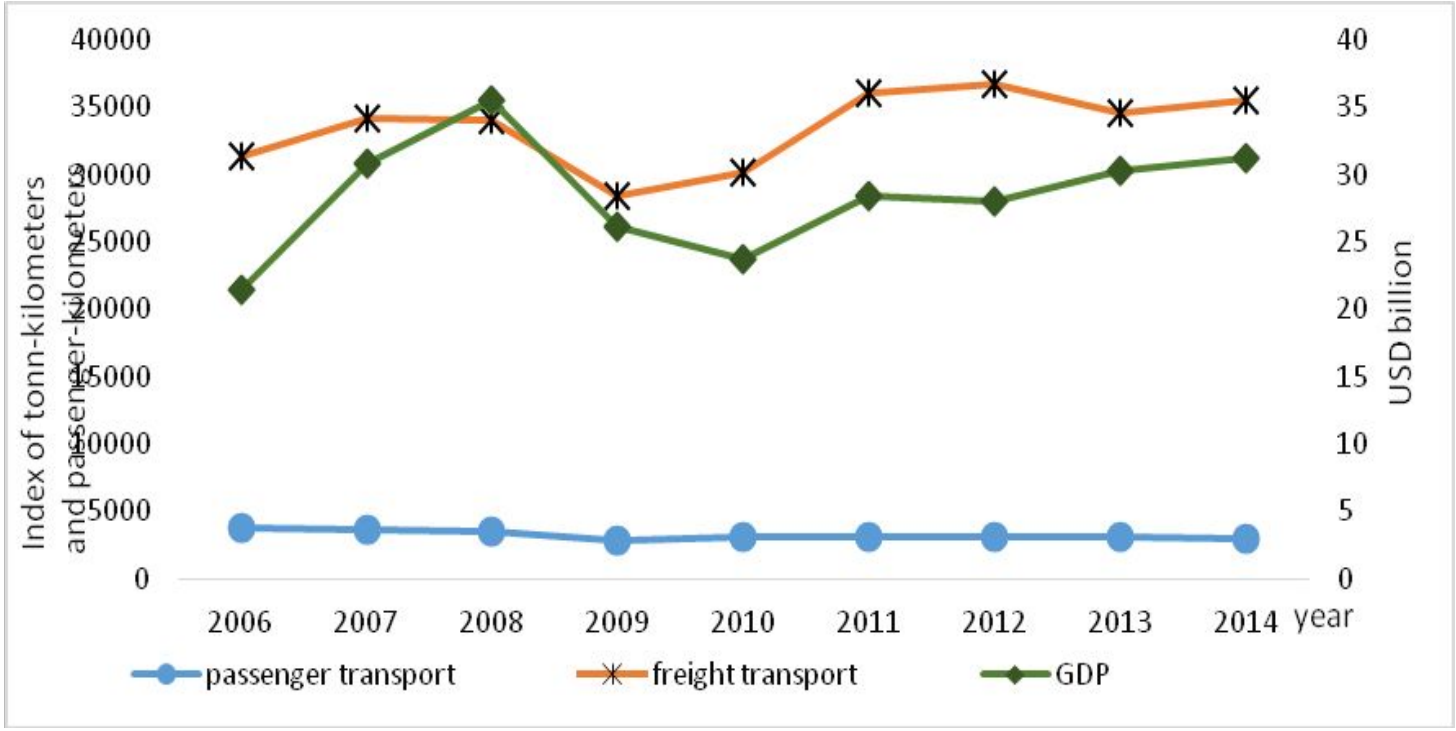
Transport infrastructure and economic growth

According to American Professor Ishaq Nadiri (1997), who is considered as a pioneer in the study of this question, infrastructure investment "had dramatic impact on the rate of economic growth".

Transport infrastructure and economic growth:



Transport trends against GDP: Latvia 2006-2014:



(developed using methodology of SACTRA, Source: Central Statistical Bureau of Latvia)

Opinion:

…“we are far from having an accepted, comprehensive model of the key relationships and how they work" (Madric, 1996).

Despite the fact that mentioned article ‘Transportation Police Studies, Economic Return from Transportation Investment’ was published 20 years ago, it is still on the official web page of the Federal Highway administration of the United States. The above findings confirm the topicality of the investigated question.

Conclusions (1/2):

1. Transport is a priority direction of development of the Latvian economy.

2. Transportation has substantial direct and indirect effects on economic efficiency and economic growth.

3. Approaches based on the calculation of the Global Competitiveness Index (GCI) and the Logistics Performance Index (LPI), applied at the international level, characterize the overall situation in a particular country and in a particular aspect; it is assessed in the context of globalization and allows tracing changes over time. However, the indices GCI and LPI cannot be applied within a country for measuring the productivity effects of transport infrastructure activity and for measuring the return on transport infrastructure investments.

Conclusions (2/2):

4. The analysis of trends in GDP and indicators of development of the transport sector confirmed the existence of relationships between economic growth and transport industry development.

5. Transport infrastructure performance depends on the kinds of performance measurement. The development of the methodology of performance measurement remains significantly important for national economic development.

The road of the future

Road Of The Future

DYNAMIC PAINT

Expected: 2013

Trialled in: Brabant, Netherlands

Symbols that appear on the road surface, that can indicate whether the temperature is hot enough or cold enough to affect driving conditions.

GLOW IN THE DARK ROAD MARKINGS

Expected: 2013

Trialled in: Brabant, Netherlands

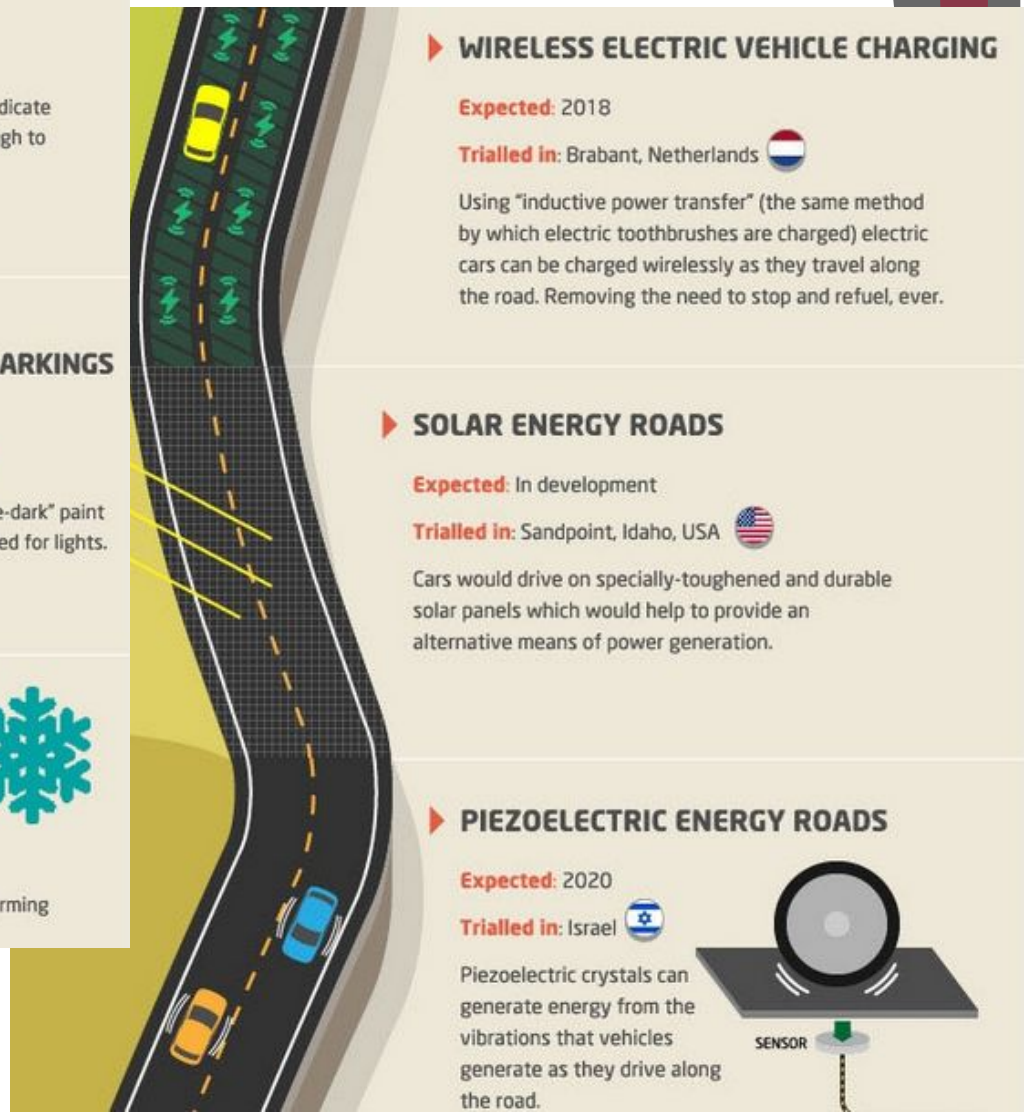
Road markings painted with "glow-in-the-dark" paint so that they can be seen without the need for lights.

ANTI-ICING ROADS

Expected: 2013

Trialled in: Crandon, Wisconsin, USA

Road surfaces containing naturally reactive de-icer (such as SafeLane) that prevent ice from forming on roads.



WIRELESS ELECTRIC VEHICLE CHARGING

Expected: 2018

Trialled in: Brabant, Netherlands

Using "inductive power transfer" (the same method by which electric toothbrushes are charged) electric cars can be charged wirelessly as they travel along the road. Removing the need to stop and refuel, ever.

SOLAR ENERGY ROADS

Expected: In development

Trialled in: Sandpoint, Idaho, USA

Cars would drive on specially-toughened and durable solar panels which would help to provide an alternative means of power generation.

PIEZOELECTRIC ENERGY ROADS

Expected: 2020

Trialled in: Israel

Piezoelectric crystals can generate energy from the vibrations that vehicles generate as they drive along the road.

Thank you for your attention

MSc, PhD student, Oksana Skorobogatova

Dr.oec, prof., Irina Kuzmina-Merlino