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To cite this article: N Roslyakova 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **272** 032139

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The Spreading of the Indirect Effects as the Condition for the Realization Public Interests of Regional Development

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Abstract. Currently, the search for the mechanisms of increasing regional economic growth based on domestic factors became relevant. One promising source such growth is the transport infrastructure. The development of the road network infrastructure and transport centers can become a significant source of quality of life and economic activity, because transport infrastructure has the ability to spread of positive indirect effects. Indirect effects of transport infrastructure will be to the expansion of effects from enterprises embedded in interregional and international production chains to the local level. In the article due to econometric models author shows the relationship between regional economic growth and transport infrastructure level of development. At the same time, institutional terms and practices of strategic management can limit the opportunities of regional growth through these mechanisms. On the example of some socio-economic and infrastructural development programs of the Leningrad region of the Russian Federation one shows inconsistency in the infrastructure and socio-economic development guidelines. The proposed models allow to compare of strategic guidelines of different programs and makes it possible to justify some adjustments. These adjustments are necessary to achieve the benchmarks of socio-economic development. Generally, on the basis of the analysis it becomes possible to propose measures to improve the structure and content of socio-economic and infrastructural development programs of territories, which would allow more fully take into account the indirect effects which appeared in the development of transport infrastructure.

1. Introduction, Relevance and Literature Review

The key document that defines the major vectors of the transport infrastructure development of the Russian Federation is the Transport strategy of the RF for the period up to 2030 (TS RF) [1].

Despite the fact that the management of a most areas of development of transport infrastructure is carried out on the Federal level, the regional authorities also have powers and responsibilities in this area. Article 37 of the Law on strategic planning [2] provides the possibility to elaboration regional programs of transport infrastructure in the presence of the Federal program. Changes in the Budget Codex of the Russian Federation (BC RF), which changed the conditions of inter-budget transfers for road construction and repair activities, contributed to the activation the process of elaboration regional programs of transport infrastructure development [3; 4; 5]. The new principle of funds distribution between regional budgets has been formed, which gives the Federal authorities some freedom. This created a basis for each regions interests lobbying. In this regard, the presence of a regional program is a kind of justification for the allocation of funds, which reflects the areas of financing and establishes some responsibility of regional heads.



At the municipal level authorities are obliged to elaborate such program (by part 5.1 of article 26 of [6]). Moreover, the document [7] approved the requirements for such programs. These requirements include safety, quality and efficiency of transport services to the population and the economy in the municipality, the development of transport infrastructure in accordance with their needs.

At the municipal level is defines the indicators of customer satisfaction of the transport infrastructure quality. But, in turn, there is no list of indicators of production and economy satisfaction. This fact is often the cause of difficulties in the process of elaboration of program, which author shows in [8]. At the municipal level often is no idea of the infrastructural needs of economic system. One of decision is to transfer of guidelines and indicators from the Federal programs. As an illustration, can be given the planning of parking spaces in rural settlements, despite the fact that for this rural area such a problem does not exist [9].

An important scientific and management task is to determine the parameters and conditions of the transport infrastructure functioning, which are required to stimulate the growth and development of a particular economic system. The conditions and the list of indicators that could reliably describe the required state of the transport infrastructure essentially depend on the current economic structure. The above-outlined problems of regional policy for the development of transport infrastructure make it relevant to improve the complex transport programs methods of formation at both regional and municipal levels, a similar opinion can be found in the sources [10; 11; 12]. The same problems had china's municipal authorities. As long as the large-scale infrastructure development meets only needs of commercial capital, it forms large social losses. Appearance the public interests' priority allows to decrease such losses [13; 14]. M. Ndlovu argues the need for a coherent regional policy focused on territorial development, rather than the growth of individual sectors of the economy. In work it was proved that local economic development strategies implemented in significant inequality conditions often reproduce and strengthen the formed economic and socio-spatial inequality [15]. The improvement of methods will allow to develop mechanisms for concordance transport programs with the socio-economic development programs of territories and to realize the goals of including transport infrastructure in the complex of socio-economic growth and development sources [16; 17].

2. Theoretical model and information specifics

In our article we will consider the transport center (TC). TC is a transport infrastructure element which forms the material basis for trade sphere functioning. The specificity of the element is in ensuring of absorption the cargo flow of consumer goods by distributing them in space. To evaluate the impact of the auto road infrastructure on the development of the trade industry we used regression models. As exogenous indicator of infrastructure we used road length in different years (l_{auto}). Wholesale (Y_W) and retail trade (Y_R) are endogenous variables. The assumption about the nature of the relationship between the two variables should come from theoretical concepts and analysis of real data. Also, on the basis of data on the dynamics value of trade and the length of roads, the average elasticity can be evaluated through the power function of the form. The general view of the models is presented in the formulas (1)-(2).

$$Y = df(l_{avto}) \quad (1)$$

$$Y = A l_{avto}^B \quad (2)$$

where A – a free term of the equation that reflects the influence of all noninfrastructure factors; B – degree of returns from increment exogenous variable (length roads). If B more than 1 there are increasing returns, if less than 1 – decreasing returns.

It should be noted that in order for the regression model reflects the impact of infrastructure factors on the resulting variable, it is necessary to adjust the trade data. Most often it is presented in current prices. The evaluates derived from such data will include both infrastructure and price impacts. Therefore, it is important to exclude price effects through the price eliminating procedure, that is, bringing all the value indicators (Y_W and Y_R) into a comparable form (to the prices of one year). Statistics on real trade amount of 1995-2015 are taken from the source [18].

The St. Petersburg and the Leningrad region are very interesting in this respect (see fig. 1).

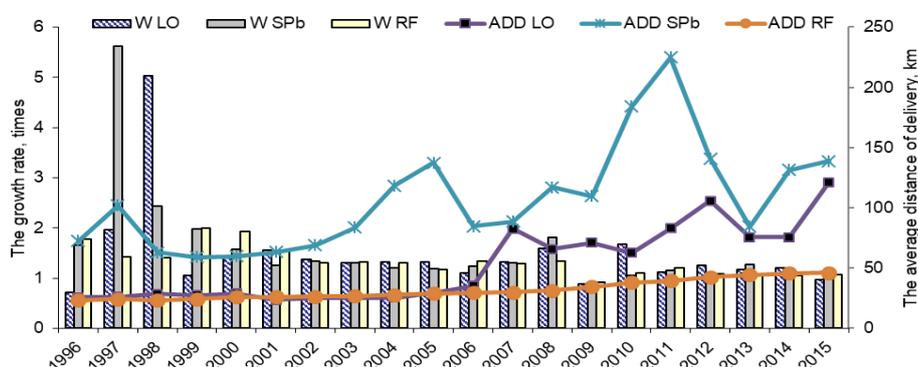


Figure 1. The Wholesales (W) and average distance of delivery (ADD) dynamic of Leningrad region (LO), Saint-Petersburg (SPb) and Russian Federation (RF) in 1996-2015.

Back in the 1990s this territory was provided on higher level with roads [19]. The transformation to a market economy system gave this territory an impetus for the implementation and development of the transport center potential. The impulse affected in the growth of the use of existing transport infrastructure. At fig. 1 you can see that the distance of delivery on average in Russia remains at the same level throughout the period. While St. Petersburg and the Leningrad region demonstrates the growth of delivery distance. In parallel, the process of trade sector development begins, associated with the creation of a powerful terminal and ware-house infrastructure.

3. Estimation and conclusions

For Leningrad region was found the following regression models (see tab. 1).

Table 1. The Leningrad region dependence of trade on the length of roads 1995-2015.

№ of model	Specification	R ²	t-statistic	F-statistic
1	$Y_R = 57955.3 + 2.916 l_{avto}$	62%	0.01, for both	0.01
2	$Y_R = 979.075 l_{avto}^{0.48}$	61%	0.01, for both	0.01
3	$Y_W = 5.350 l_{avto}$	87%	0.01	0.01
4	$Y_W = l_{avto}^{1.17}$	89%	0.01	0.01

The model (1) shows that the retail trade volume by the value of about 58 billion rubles (in 2005 prices) is determined by other (not infrastructure factors). Each kilometers of roads increases the retail trade by 3 million rubles. The length of roads in the Leningrad region in 2015 was about 22 thsd. km. Then according to (1) the total retail trade of the region to 65 billion rubles. The effect in retail trade created by the road infrastructure exceeds the effect of all other factors. Given that prices dynamics in the Leningrad region since 2005 (the base year) shows the growth by 99.7%, the retail trade in current prices of 2015 is about 317 billion rubles (which is 2% deviates from the really achieved volume of 311 billion rubles [18]).

The model (3) shows that the wholesale trade is mainly determined by the infrastructure factor. Each kilometer of roads provides an increase in wholesale trade by more than 5 million rubles. Evaluation of the level of wholesale trade in 2015 according to the specification (3) is 119.3 billion rubles (in 2005 prices), which is equivalent to the amount of more than 307 billion rubles in 2015 (the real value of wholesale trade is 303 billion rubles [18] and 1% higher than the evaluated). The model (4) shows that the increase the length of roads provides acceleration of growth only for wholesale trade (B more than 1). For retail trade model (2) reflects a reduction of growth per each new kilometer of road.

The evaluation in 2015 according to specifications (2) and (4) is 123.8 and 126.9 billion rubles (in 2005 prices), respectively. In the prices of 2015, the wholesale and retail trade exceeds the real amount by 8% and 2% [18]. These facts confirm acceptable prognostic ability of models (1)-(4).

The identified relationships of the Leningrad region trade development allow to compare the transport infrastructure development with the guidelines of socio-economic development. Lack of such coherence often obstacles to use the TC element as the mechanism of territorial development.

According to the [20] there are estimates from the Forecast of socio-economic development of the Leningrad region for the period up to 2030 about the population growth and development of the retail market [21]. Assuming: the length of regional and local roads will increase in accordance with [20]; the length of the Federal road will remain at the level of 2015-2016; the prices dynamics until 2017 is actual, from 2018 is forecast from [21], you can get the following model estimations for the retail market development (see table 2).

Table 2. The Leningrad region trade growth forecast in 2015-2022 according to models (1)-(4).

№ of model	Specification	The growth 2015-2022 from ΔI_{avto}	The growth 2015-2022 from all factors
1	$Y_R = 57955.3 + 2.916 I_{avto}$	1%	36%
2	$Y_R = 979.075 I_{avto}^{0.48}$	1%	36%
3	$Y_W = 5.350 I_{avto}$	2%	34%
4	$Y_W = I_{avto}^{1.17}$	3%	38%

All models calculated the trade forecast level show that existing plans of transport infrastructure development in the Leningrad region provides only 1-3% of growth. The other part of growth (to level 36-38%) are provided by price dynamics. At the same time, the forecast of retail trade development [21] assumes an accelerating growth and in different scenarios variety from 10% to 15% (in comparable prices) in 2015-2022. This fact illustrates the gap in region planning documents. It can be argued that, with the planned intensity of the transport infrastructure development it is not able to provide forecast guidelines for the trade and socio-economic development. It cannot act as a driver of regional development.

4. References

- [1] The Order of the RF Government of 22.11.2008 №1734-p "On approval of the Transport strategy of the RF for the period up to 2030" <http://docs.cntd.ru/document/902132678> last accessed 2018/06/26
- [2] The Federal Law "On strategic planning in the RF" of 28.06.2014 №172 <http://legalacts.ru/doc/FZ-o-strategicheskoy-planirovaniy-v-Rossiyskoj-Federacii/> last accessed 2018/06/26
- [3] The Budget code of the RF of 31.07.1998 № 145, <http://docs.cntd.ru/document/901714433> last accessed 2018/06/26
- [4] The Federal Law "On amendments to the Budget code of the RF and recognition of certain provisions of legislative acts of the RF" of 30.11.2016 №409 <http://docs.cntd.ru/document/420384183>, last accessed 2018/06/26
- [5] The Federal Law "On amendments to the Budget code of the RF and article 30 of the Federal law "On amendments to certain legislative acts of the RF in connection with improvement of legal status of state (municipal) institutions" of 04.10.2014 №283 http://www.consultant.ru/document/cons_doc_LAW_169419/, last accessed 2018/06/26
- [6] The town-planning code of the RF of 29.12.2004 №190 <http://docs.cntd.ru/document/901919338>, last accessed 2018/06/26

- [7] The Resolution of the RF Government of 25.12.2015 №1440 "On approval of requirements for the programs of complex development of transport infrastructure of settlements, urban districts" <http://base.garant.ru/71296074/> last accessed 2018/06/26
- [8] Roslyakova N 2018 Institutional contradictions in the documents of regional development In: Kolbachev E, Pakhomova A (eds.) *Conference 2018, Globalization of the economy and Russian manufacturing enterprises* pp 197-201 SRSMTU, (Novocherkassk)
- [9] The Resolution of the Ust-Luga rural settlement administration of 25.12.2017 №342 "On approval of the program of integrated development of transport infrastructure of the municipality "Ust-Luga rural settlement" <http://усть-лужское.рф/?p=5886> last accessed 2018/06/26
- [10] Andrianov Yu, Komarov V 2016 Legal and methodological bases of transport infrastructure development *Transport of the Russian Federation* **2-3** (63-64) 11-13
- [11] Vishnevskiy D, Demyanenko A 2010 Macroeconomic zoning as a method of strategic analysis: the Russian far East *Spatial Economics* **4** 6-31
- [12] Schniper R, Novoselov A, Leksin V et al. 1984 Local complex programs *Science, Novosibirsk*
- [13] Leontiev R, Orlov A 2015 Strategy of development of transport systems of Russia and China *Customs policy of Russia in the far East* **2** (71) 26-35
- [14] Zeng S, Ma H, Lin H et al. 2014 Social responsibility of major infrastructure projects in China *International journal of project management* **33** (3) doi: 10.1016/j.ijproman.2014.07.007
- [15] Ndlovu M, Makoni E N 2004 The globality of the local A decolonial perspective on local economic development in South Africa *Local economy* **29** (4-5) 503-518
- [16] Koryakova E 2013 Methodological support of programs of development of transport complex of the region *Problems of modern economy* **2** (46) 218-221
- [17] Frolova A 2014 The ways of improving the efficiency of program financing expenditures of the Federal budget for transport infrastructure development *MID (Modernization. Innovations. Development.)* **4** (20)88-93
- [18] Official statistics of St. Petersburg and Leningrad region: electron. data base <http://petrostat.gks.ru/> last accessed 2018/06/12
- [19] Roslyakova N 2017 The economic effects generated by the transport center of Saint-Petersburg and Leningrad region In: Sovershaeva L *Regional economy and development of territories* pp 211-217 SUAI, St. Petersburg
- [20] The Resolution of the Leningrad region government of 14.11.2013 №397 "On approval of the state program of the LR "Development of roads of the LR" <http://docs.cntd.ru/document/537949105> last accessed 2018/06/26
- [21] The Resolution of the Leningrad region government of 18.09.2015 №360 "On approval of the Forecast of social and economic development of the LR for the period up to 2030", <http://waste.lenobl.ru/programm/socekonprognoz> last accessed 2018/06/26