

# SOCIO-ECONOMIC DEVELOPMENT STRATEGY

DOI: 10.15838/esc.2018.2.56.2

UDC 338.47+332.1, LBC 65.37+65.9(2Rus)

© Bardal' A.B.

## The Transport Complex of the Far East: Development Trends and Economic Role



**Anna B. BARDAL'**

Economic Research Institute Far Eastern Branch of the Russian Academy of Sciences

Khabarovsk, Russian Federation, 153, Tikhookeanskaya Street, 680042

E-mail: leyla.natsun@yandex.ru

**Abstract.** The mutual influence of transport and economic development has been the focus of scientific research for a long time. Despite this, to date there has not yet formed a single point of view; the results of different authors' assessments are contradictory. Russian Far East is a region whose transport complex importance is difficult to overestimate. The additional relevance of this research area at the present stage is determined by the use of new forms and tools of the region's state policy, as well as the emergence of new promising areas of foreign economic cooperation in the field of transport. The purpose for the present study is to analyze the performance of the role of transport in the economy of the Russian Far East during 2000–2016, as well as to study the factors affecting the significance of transport in the regional economy at the present stage. The methodological research framework lies in the system approach and methods of system-functional and statistical analysis. Estimates of the contribution of the transport complex to the overall economic performance are obtained by applying the method of structural changes. The paper presents the calculations of decomposition of incremental employment indicators and the average annual value of fixed assets of the transport complex of the Far East (with decomposition broken down by Russia's constituent entities in the Far Eastern Federal District (FEFD)) during 2000–2016 into three components: national, regional and sectoral. It is noted that while maintaining transport as a specialization sector of the economy of the Far East (localization factors by employment, investment and fixed assets exceed 1), there is a decrease in the number of employees in this region's sector. The obtained negative estimates of the regional component of employment performance indicate "unrealized" employment in

---

**For citation:** Bardal' A.B. The transport complex of the Far East: development trends and economic role. *Economic and Social Changes: Facts, Trends, Forecast*, 2018, vol. 11, no. 2, pp. 24–36. DOI: 10.15838/esc.2018.2.56.2

Russia's constituent entities of the FEFD due to negative regional make-up of the transport complex. Analysis of the average annual value of fixed assets has determined the positive impact of the sectoral and regional components. Further research on assessing the role of transport complex in the economy of the region, as well as study of the impact of new factors on the development of transport in the Far East will become a relevant research area.

**Key words:** regional economy, transport complex, transport economy, Russian Far East, transport development factors, method of structural changes.

### Introduction

The presence of a transport complex functioning according to the needs of economy in a certain territory is one of the basic development conditions. The revealed non-linear relations between the change in transport parameters (transportation costs) and the change in the range of economic activity, the performance of its structure and location of production facilities, which followed from the postulates of the new economic geography, has confirmed the idea of a close correlation between economic and transport development [1; 2]. Further theoretical research and analysis of practical cases of the current economic situation in world's national economies and individual regions, state the increasing role of transport in the economic development of countries and international trade<sup>1</sup>.

At the same time, within the framework of separate national economies there are specific features both in terms of formation of transport development factors and in regional peculiarities of the transport complex performance for a certain territory. In connection with the above, the study of the role of the transport complex, factors determining its importance in the economy, as well as specific features of transport development in a certain region, the performance of the transformation

of the transport complex parameters, etc., is an important research area.

The purpose for the present study is to analyze the performance of the role of transport in the economy of the Far East. At the same time, the main research objectives include the study of theoretical approaches to assessing the role of transport in the economy and review of factors affecting the significance of transport in the regional economy at the present stage.

The Russian Far East<sup>2</sup> is presented as a research object. The research period covers 2000–2016.

Research publications in the framework of this issue consist of several content blocks. The study of interrelations between transport (its separate types) and economy, specification of factors determining the degree of the transport complex development in individual countries seems to be more general in terms of the scope of objectives. The conclusions in the works of this block are not firm. Thus, A. Ansar et al. [3] argue that there is no positive correlation between investment in the transport infrastructure development and economic growth. The author used a cost-benefit assessment method for 95 projects (roads, including bridges; railway lines excluding high-speed railway) in China. As a result, it was concluded that the benefits from a major part of projects under consideration were significantly

<sup>1</sup> *World Development Report 2009: Reshaping Economic Geography*. World Bank. Available at: <https://openknowledge.worldbank.org/handle/10986/5991>; *World Development Report 1994: Infrastructure for Development*. World Bank. Available at: <https://openknowledge.worldbank.org/handle/10986/5977>.

<sup>2</sup> Hereinafter, the Russian Far East is considered within the borders of the Far Eastern Federal District (FEFD).

overestimated, while the costs and risks were underestimated. This resulted in the absence of a long-term positive effect from transport infrastructure investment (the positive effect in most of the studied projects was generated only during the construction period due to increased number of jobs and involvement of related sectors). Moreover, the author notes the negative aspects for the economy manifested due to the implementation of transport projects: the diversion of significant resources to inefficient projects; the growing debentures arising from accumulation of financial resources for the implementation of projects; increased money issue. Risks of transport projects implementation include incomplete consideration of traffic safety issues in the operation of facilities and underestimation of environmental damage in construction and operation. The work by Xueliang though presents positive estimates of the elasticity of infrastructure development in relation to economic growth for Chinese provinces during 1993–2009, however, argues that “the theories of Western countries suggesting that investment in transport contribute to regional economic growth turned out to be wrong for many developing countries” [4, p. 24-25].

The ambiguity of the idea about the positive impact of the transport infrastructure development on the economic development is noted in a number of papers based on the study of the specification of particular projects. Thus, the work by Cheng, Loo and Vickerman [5] provides comparative analysis of building high-speed railways in the EU (the North European road network linking major cities in several countries) and China (national road network linking coastal and inland cities). The author concludes that there is no universal approach to the development of transport infrastructure, as the very fact of construction of new roads does not guarantee a positive impact on the

economic processes. Additional factors such as network configuration, the possibility of developing the territories included in the service area of new routes, the state’s targets when creating new infrastructure elements, etc., are becoming decisive. Later Cheng and Vickerman [6], considering the impact of constructing high-speed railways on the economic structure of urban agglomerations in China and the UK, noted the dependence of the resulting effects from the initial type of economy and its degree of development. The author concludes that building a HSRN (High Speed Rail Network) in the region with a more developed economy to a greater extent contributes to convergence between agglomerations associated with the new infrastructure, as well as increases the region’s economic attractiveness to the production sector of adjacent territories. The region with a less developed economy may demonstrate increased sectoral specialization resulting in an increase in convergence of total productivity, rather than economic structure.

In foreign scientific literature there is a number of significant publications related to the assessment of the impacts of transport infrastructure development on the economic parameters of the region or national economy with the use of the “cost-benefit” approach. Works by Eliasson [7], Borjesson et al. [8], Eliasson et al. [9], Annema et al. [10], Torsen and Torsen [11], etc. assess the efficiency of investment in the transport infrastructure taking into account both traditional – reduced time period and direct costs for transportation, expanded market access for producers, etc. – and additional factors: changes in competition terms at markets for goods and labor, changes in the value of time distribution for the population and increase in labor efficiency while reducing transportation time, etc.

Some authors, while recognizing the value of the input-output approach, note that it is

applied less frequently and, in this regard, analyze its drawbacks and opportunities for improvement. Thus, Jones et al. [12] in their work consider the “bottlenecks” of the method related to inaccurate (upward) assessment of the transport flow forecast, the underestimated cost of the project, inaccurate estimates of the time saved for transportation with the use of the new infrastructure, underestimated risks of accidents and life assessment, difficulties in assessing the distribution of effects from the project at the local, regional and national levels, etc. Laird at al. [13] also emphasize the need to develop the “input-output” method when analyzing the infrastructure projects which cause significant changes in conditions of transport accessibility for the population and producers. The study by Lakshmanan [14] is related to the assessment of a wide range of effects from the infrastructure development, which the author classifies by level of their manifestation (local, regional, global) and time periods (short-term, long-term and “very long”).

Works by Russian researchers devoted to the assessment of the impact of transport on the economy hardly ever apply the method of “input-output”. They research the correlation between the transport complex parameters with separate macroeconomic indicators of national or regional economy (GDP, GRP, population’s monetary income, etc.). A similar approach is used in works by Macheret D.A. et al. [15], Sherbanin Yu.A. [16], Vakhrameev I.I. [17], Galskaya Yu.N. and Kuznetsova I.A., [18], Lapidus B. M. [19] etc. A number of works are related to the application of input-output balance sheet to assess the interaction of transport with other economic sectors: Pozamantir E.I. [20], Ivanter V.I., Uzyakov M.N., Shirov A.A. et al. [21]. The issues of studying the specific features of regional transport development, including factors determining it, analysis of

key transport indicators performance as part of the regional economic system are covered in works by Ivanova O. [22], Petronevich M. [23], etc.

### Research methodology

The author’s methodological framework in this research includes the system approach, as well as methods of system-functional and statistical analysis. The application of these methods helps analyze the transport complex as part of the regional economic system, receive quantitative indicators of changes in the role of the transport complex in regional economy in the breakdown of separate indicators (employment, fixed assets).

Assessment of the contribution of a particular industry to the overall economic performance can be obtained by various methods. One of the methods widely used in regional research is the method of structural changes. It analyzes the relative performance of the regional indicator against the background of the national performance. The method of structural changes includes the expansion of the regional indicator into three components, including the national and regional components and the component of the sectoral structure [24].

Using this approach we analyzed the performance of separate indicators of the Far Eastern transport complex (as well as Russia’s constituent entities included in it) for the period from 2000 to 2016 in the context of these three components. The national component of the transport complex ( $NS_{ir}^t$ ) is defined as:

$$NS_{ir}^t = E_{ir}^{t-1} \frac{E_N^t}{E_N^{t-1}}.$$

The national component characterizes a part of the regional indicator increment (employment, investment, etc.) of the transport complex performance in proportion to the all-Russian indicator increment.

The regional component of the transport complex performance ( $RS_{ir}^t$ ) determines the deviation between the actual and potential growth values (if the regional transport complex grew at a rate corresponding to the national transport complex):

$$RS_{ir}^t = E_{ir}^{t-1} \left( \frac{E_{ir}^t}{E_{ir}^{t-1}} - \frac{E_{iN}^t}{E_{iN}^{t-1}} \right).$$

The sectoral component ( $MS_{ir}^t$ ) shows what the increase in the corresponding indicator of the regional transport complex would be if it grew up at a rate corresponding to the national one:

$$MS_{ir}^t = E_{ir}^{t-1} \left( \frac{E_{iN}^t}{E_{iN}^{t-1}} - \frac{E_N^t}{E_N^{t-1}} \right), \text{ where}$$

$E_{ir}^{t-1}$  – characterizes the state of the regional transport complex in the base period (2000);

$E_{ir}^t$  – characterizes the state of the regional transport complex in the current period (2016);

$E_{iN}^{t-1}$  – characterizes the state of the national indicator in the base period (2000);

$E_{iN}^t$  – characterizes the state of the national indicator in the current period (2016).

The application of the method of structural changes within the framework of this study helps assess the regional features of the transport complex performance in the Far East and in FEFD constituent entities, which may be more or less effective compared to the national performance of the transport complex.

### Research results

The development of the transport infrastructure has become one of the priorities for the Eastern regions of Russia at the present stage. Since 2000, various transport projects have been or are being implemented in the Far East. The most significant of them include: the construction of Kuz'mino specialized

oil loading port, the construction of bridge crossings over Zolotoy Rog Bay to Russky Island, the reconstruction of Knevichi Airport, the construction of the railway connecting the airport with Vladivostok in Primorsky Krai; the reconstruction of the railway at Sakhalin Island; the construction of the second order of the railway bridge across the Amur River, a highway bridge to Bolshoy Ussuriysky Island, the reconstruction of the Kuznetsovsky railway tunnel and the construction of a new tunnel in Khabarovsk Krai; the development of the road network and continued construction of the Amur-Yakutsk railway in The Sakha (Yakutia) Republic, etc.

The implementation of large-scale projects (large-scale including in terms of investment capacity, timing, the technological component) has obviously led to a change in the region's transport complex characteristics. In this regard, the performance of key the transport complex functioning indicators can serve as a tool for determining the vectors of changes in the macroeconomic role of transport, as well as be used to indirectly assess the real impact of transport and infrastructure projects implemented in the East of the country on the economy.

At the same time, the choice of approaches and adequate assessment methods remains debatable. The latter depend on a variety of factors: the unequivocal attitude to the internal content of the transportation process, the objectives of analysis, the scale of the objects under review, the informational framework of the study, etc.

In this paper, we consider transport as one of the spheres of material production<sup>3</sup>, using indicators within the framework of available official statistics on within the Far Eastern

<sup>3</sup> Excluding the consideration of transport as an element of the service sector. See details in [25].

Federal District (with specification of individual indicators and processes in the context of individual constituent entities of the Russian Federation in the Far Eastern Federal District).

Transport has traditionally been classified as one of the Far East primary economic sector. Assessing the localization index calculated as the ratio of shares of the corresponding indicator (employment, investment, value of fixed assets) and the transport complex of the Far East and Russia, we note that during 2000–2016 the situation has not changed fundamentally (*Tab. 1*).

The calculation of transport localization indices indicates that remains one of priority economic in the Far East<sup>4</sup>. At the same time, there was a relative decrease in the index in

terms of employment rate and an increase in the localization index of the value of fixed assets.

However, the Far East is significantly differentiated in economic terms. Realizing this, we perform a decomposition in the breakdown of Russia's constituent entities in the Far Eastern Federal District and consider the components of the changes noted during the study period in more detail.

*Employment.* Transport has always been one of the main economic sectors in terms of attracting labor resources of the Far East. However, during 2000–2016 the number of people employed at transport enterprises decreased by 15.9 thousand people (5.1%), in absolute terms (*Tab. 2*).

Table 1. Localization indices of FEFD transport

Indicator	2000	2010	2016
Employment	1.5	1.3	1.3
Fixed investment	1.2	1.5	1.3
Fixed assets	1.2	1.3	1.7*

\* – data for 2015.  
Compiled from: *Russian regions. Socio-economic parameters, 2015*. Moscow: Rosstat, 2015. 1266 p.; *Russian regions. Socio-economic parameters, 2017*. Rosstat. Available at: [http://www.gks.ru/bgd/regl/b17\\_14p/Main.htm](http://www.gks.ru/bgd/regl/b17_14p/Main.htm) (accessed: 20.12.2017); *Transport and communication in Russia – 2016*. Rosstat. Available at: [http://www.gks.ru/bgd/regl/B16\\_5563/Main.htm](http://www.gks.ru/bgd/regl/B16_5563/Main.htm) (accessed: 20.12.2017).

Table 2. Performance of employment at transport enterprises

Administrative-territorial unit	Change in the number of employed at transport enterprises, 2000–2016		Share of employed at transport enterprises in total employment, %	
	thousand people	%	2000	2014
Russia	938.5	22.7	6.4	7.0
FEFD	-15.9	-5.1	9.6	9.2
Sakha (Yakutia) Republic	-2.8	-5.9	10.0	9.2
Kamchatka Krai	-1.5	-12.2	6.6	6.5
Primorsky Krai	13.7	16.3	8.9	9.9
Khabarovsk Krai	1.2	1.9	9.1	9.2
Amur Oblast	-23.3	-39.5	13.5	9.0
Magadan Oblast	-5.4	-45.8	10.6	6.9
Sakhalin Oblast	2.3	9.8	8.4	9.1
Jewish Autonomous Oblast	0.4	7.0	8.0	8.8
Chukotka Autonomous Okrug	-0.5	-17.9	8.6	7.2

Compiled from: *Russian regions. Socio-economic parameters, 2015*. Moscow: Rosstat, 2015. 1266 p.; *Russian regions. Socio-economic parameters, 2017*. Rosstat. Available at: [http://www.gks.ru/bgd/regl/b17\\_14p/Main.htm](http://www.gks.ru/bgd/regl/b17_14p/Main.htm) (accessed: 10.12.2017).

<sup>4</sup> The criterion for inclusion in the priority sector is the value of the localization index greater than 1. Source: [24, p. 16].

The performance of employment at transport enterprises in the breakdown of administrative-territorial entities in the study period was uneven (*Fig. 1*).

The decline in employment was due to various reasons. For example, in the Magadan Oblast, the overall population decline led to a gradual change in the system of passenger transportation accompanied by the reduction in employment, including in the transport sector. In the Amur Oblast, in the framework of cost optimization at OAO Russian Railways a number of railway transport enterprises (Shimanovskaya railroad shed, Blagoveshchensk railway station, etc.) were closed down.

In some Russian regions of the Far East, the number of employed in transport in the period under review increased. For example, in Primorsky Krai, the number of workers employed by transport companies increased by 13.7 thousand people. It should be noted that in Primorsky Krai in 2000–2016 a number of

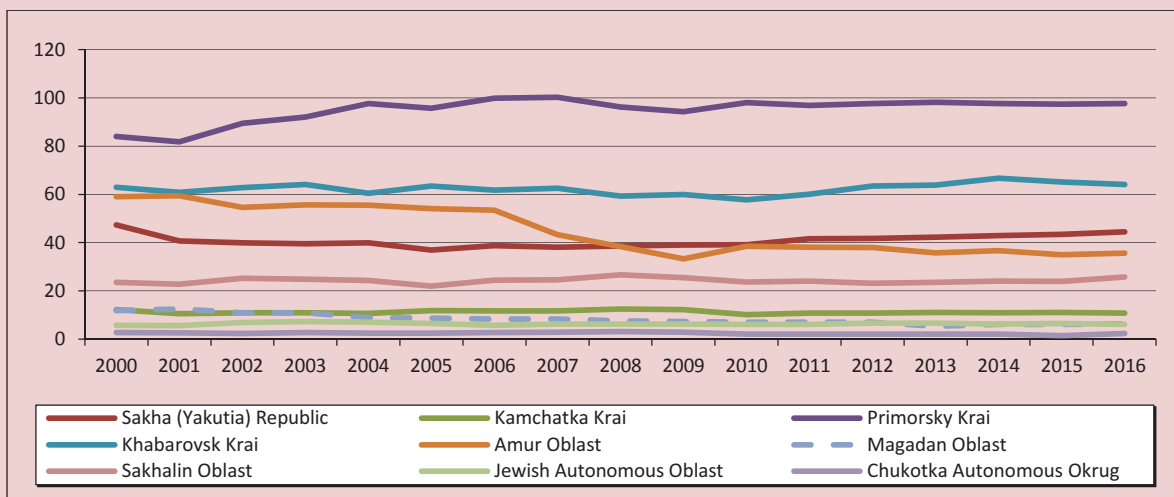
projects to build a new transport infrastructure generating positive effects in the labor market: Kuz'mino specialized maritime oil loading port and a railway connecting the airport and the city of Vladivostok has been built, etc.

The share of transport in the overall employment structure during the period under study decreased in most Russian regions included in the Far eastern Federal District. The greatest decrease was observed in the Amur Oblast where the share of employed in transport enterprises decreased from 13.5 to 9.0%.

For a more detailed analysis of indicators of employment in transport we used calculations using the method of structural changes (*Tab. 3*).

The national component in this case characterizes employment at transport enterprises in the Far East (and Russia's constituent entities in the Far East), which could be formed in the case of compliance with proportionality related to the national rate of changes in employment in the economy. At present, the actual employment at transport

Figure 1. Performance of employment at transport enterprises of the Far East, thousand people



Compiled from: *Average annual number of employed in the economy*. Rosstat. EMISS. Available at: <https://fedstat.ru/indicator/43216> (circulation date: 20.03.2018); *Transport in Russia (2002–2009)*. Rosstat. Available at: [http://www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/publications/catalog/doc\\_1136983505312](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1136983505312) (accessed: 20.03.2018).

Table 3. Performance of components of employment in transport in the Far East (2000–2016, thousand people)

Administrative-territorial unit	Sectoral component	Regional component	National component
FEFD	32.9	-86.0	346.5
Sakha (Yakutia) Republic	5.0	-13.5	53.0
Kamchatka Krai	1.3	-4.3	13.8
Primorsky Krai	8.9	-5.3	94.1
Khabarovsk Krai	6.7	-13.1	70.5
Amur Oblast	6.3	-36.7	66.1
Magadan Oblast	1.3	-8.1	13.2
Sakhalin Oblast	2.5	-3.0	26.3
Jewish Autonomous Oblast	0.6	-0.9	6.4
Chukotka Autonomous Okrug	0.3	-1.1	3.1

Compiled from: *Russian regions. Socio-economic parameters, 2015*. Moscow: Rosstat, 2015. 1266 p.; *Russian regions. Socio-economic parameters, 2017*. Rosstat. Available at: [http://www.gks.ru/bgd/regl/b17\\_14p/Main.htm](http://www.gks.ru/bgd/regl/b17_14p/Main.htm) (accessed: 14.12.2017).

enterprises in all constituents excluding Primorsky Krai is lower than the calculated values of the national component. The greatest discrepancies are noted for the Magadan (52%) and Amur (46%) oblasts.

The negative values of the regional component estimate the decrease in employment in transport in the Far East and all constituent entities of the Russian Federation due to lagging growth rates of the regional transport complex in relation to the national transport complex. These are the assessments of “unfulfilled” employment in Russia’s constituent entities in connection with the negative regional specific features of the transport sector development.

The sectoral component characterizes the increase in regional employment at transport enterprises during 2000–2016 explained by the peculiarities of the sectoral structure of the regional economy. It assesses the potential importance of employment in transport in the Far Eastern Federal District and its constituent entities, which would exist if the region’s transport complex region was changing at a rate corresponding to the national economy as a whole.

*Fixed assets.* Next we consider the performance of the average annual value of fixed

assets of the transport complex. This indicator with a certain time lag reflects investment activity in this economic sector (*Fig. 2*).

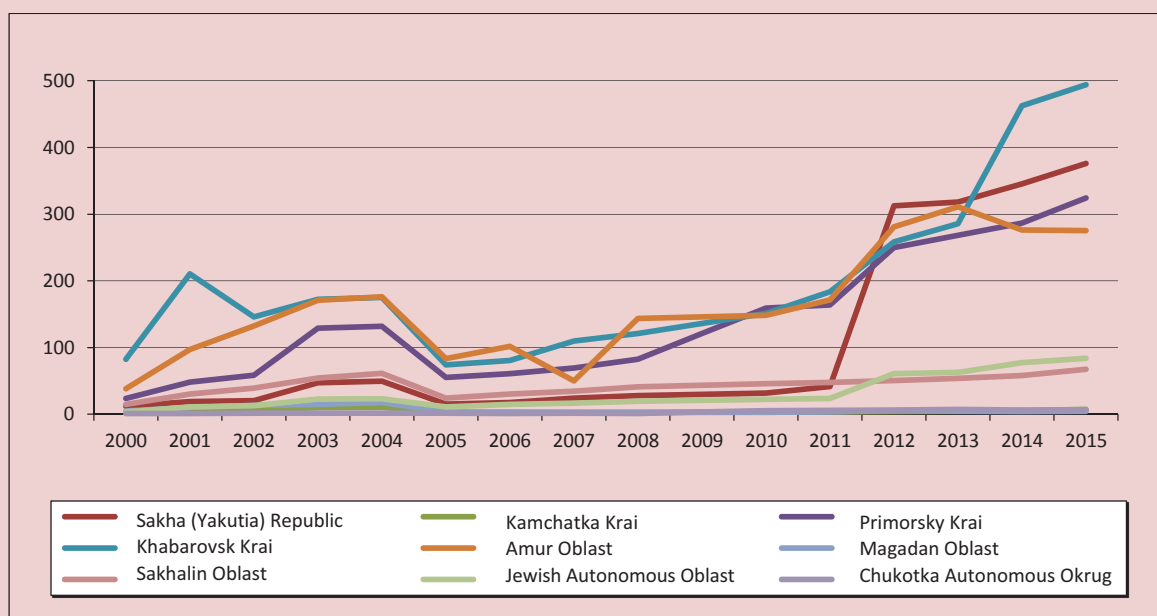
There is a clear increase in activity with regard to the transport infrastructure development in the Far East during 2008–2015 expressed in particular: in the development of the transport network of Primorsky Krai (in the framework of preparation for 2012 APEC Summit), large-scale road construction in the Sakha (Yakutia) Republic, the (re) construction of the railway and road infrastructure in Khabarovsk Krai and the Amur Oblast. Similar to the previous subsection, we consider the impact in the context of three components<sup>5</sup> (*Tab. 4*).

In this case, there is a positive effect of the sectoral structure on fixed assets: the obtained negative estimates show what the value of fixed assets performance of region’s transport complex (and Russia’s constituent entities) would be if this figure changed at a rate corresponding to the national economy as a whole. The greatest effect according to the estimates is generated in Khabarovsk Krai.

<sup>5</sup> The most relevant currently available are data on the value of fixed assets of transport organizations for 2015. In this regard, analysis was necessarily limited to this period.



Figure 2. Performance of the value of fixed assets of transport enterprises in the Far East, billion rubles



Compiled from: *Transport in Russia (2002–2009)*. Rosstat. Available at: [http://www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/publications/catalog/doc\\_1136983505312](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1136983505312) (accessed: 20.03.2018); *Transport and communication in Russia (2012, 2014, 2016)*. Rosstat. Available at: [http://www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/publications/catalog/3e4fc4004e3423529616fe18bf0023dd](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/3e4fc4004e3423529616fe18bf0023dd) (accessed: 20.03.2018).

Table 4. Components of the performance of the value of fixed assets in the transport complex of the Far East (2000–2015, mln.)

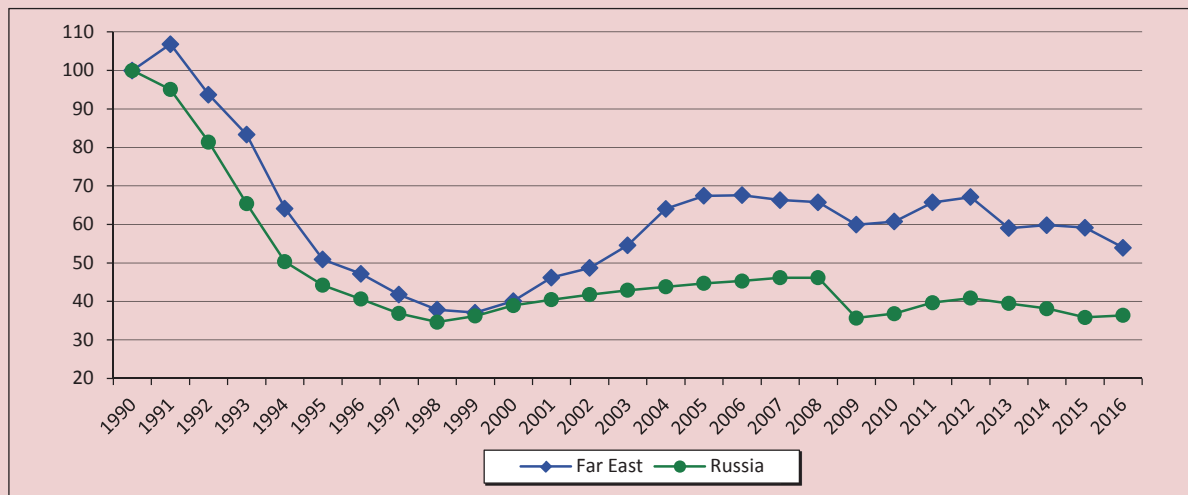
Administrative-territorial unit	Sectoral component	Regional component	National component
FEFD	-367.2	320.2	1686.6
Sakha (Yakutia) Republic	-23.5	291.5	108.1
Kamchatka Krai	-6.4	-15.8	29.5
Primorsky Krai	-47.0	155.5	215.8
Khabarovsk Krai	-165.2	-99.3	758.8
Amur Oblast	-76.6	0.1	351.9
Magadan Oblast	-10.1	-31.9	46.2
Sakhalin Oblast	-29.7	-39.4	136.4
Jewish Autonomous Oblast	-7.0	58.7	32.1
Chukotka Autonomous Okrug	-1.7	0.7	7.7

Compiled from: *Russian regions. Socio-economic indicators. 2015*. Moscow: Rosstat, 2015. 1266 p.; *Russian regions. Socio-economic indicators, 2017*. Rosstat. Available at: [http://www.gks.ru/bgd/regl/b17\\_14p/Main.htm](http://www.gks.ru/bgd/regl/b17_14p/Main.htm) (accessed: 20.12.2017); *Transport and communication in Russia – 2016*. Rosstat. Available at: [http://www.gks.ru/bgd/regl/B16\\_5563/Main.htm](http://www.gks.ru/bgd/regl/B16_5563/Main.htm) (accessed: 20.12.2017).

Positive values of the regional component for the majority of Russia's constituent entities in the Far East describe the positive difference between the real and perceived increase in the value of fixed assets in transport, if the figure was growing at a rate corresponding to

the growth rate of the value of fixed assets in transport. Negative estimates of this component (competitive effect), according to calculations, were obtained for the Northern territories of the Far East: the Sakhalin, Magadan oblasts, and Kamchatka Krai. The Sakha (Yakutia)

Figure 3. Performance of the index of freight transportation in the transport complex o Russia and in the Far East, %



Note: excluding pipeline transport.

Source: Bardal A.B. Russia's transport complex during the reform period: far eastern perspective. *Spatial Economics*, 2017, no. 4 (52), pp. 100-129.

Republic, which is actively implementing the program for the transport system development (the length of paved roads network has increased over the period 2000–2016 by 4.5 thousand km, or 60%), has the most significant assessment for this component.

Considering the factors affecting the development of the transport system in the Far East, we note that their range is rather wide. Traditionally, there are geographical (location, terrain, climate), economic and historical (features of the settlement system, established economic ties), economic and political (foreign economic relations, state sectoral policy), socio-economic factors (scale of economic activity, demographic potential, population density and structure, demand for transport services, competition on transport markets, sectoral structure of the economy, region's specialization, natural resource potential, scientific and technological progress), etc. [26; 27; 22].

All these factors to varying degrees affect the development of the transport complex in the Far East. However, the specific features of

transport in the region is determined largely by the border position (China, North Korea, Japan, the USA), focal system of settlement and localization of economic activity, low population density, predominance of bulk cargo transit in the transportation structure (fuel and raw materials from Eastern Siberia). It is under the influence of these factors that the existing structure of the transport network and the transportation structure and scale has formed (Fig. 3).

After the initial decline of the 1990-s, during 2000–2006 the transport complex in the Far East stabilized and began to improve. The transformational shock for the region's transport system was mitigated by the re-focus of the geographical structure of markets and transportation lines. The strengthening of foreign economic relations, the restoration of relations with China, the removal of restrictions from part of the previously closed areas of the region led to an increase in the structure of export-import cargo. The Far East has become a transit territory for cargo flows from Siberia, the Urals and Central Russia. The financial and

economic crisis that began in 2008 interrupted the revival in the transport sector. Temporary stabilization at the end of the crisis was soon replaced by a new recession after 2013. In general, the period from 2007 to 2016 is characterized as a period of weak stagnation.

In our opinion, the priorities among the development factors in the Far East at the present stage are changing. Foreign economic and economic and political are becoming the most significant. The former are related to potential expansion of cooperation with China set by: a) a unique situation of countries' co-ownership of Bolshoy Ussuriysky Island; b) expanded cooperation within the regional implementation level of China's The Silk Road Economic Belt initiative.

The latter – economic and political factors – are determined by the use of new economic techniques and forms of state development of the Far East, which require, inter alia, the establishment of an appropriate transport infrastructure: the territory of advanced socio-economic development, the Far Eastern hectare, the free port zone. Studying the opportunities and limitations to the development of the region's transport complex associated with the manifestation of new development factors can be one of the areas of future research.

### **Conclusion**

The study of the transport complex performance and its impact on the territory's economic development can be carried out through various methods. One of the most common is currently the method of cost-benefit analysis which assesses the impact of the implementation of a specific infrastructure project or a set of projects on the economy. The use of this method in modern conditions is complicated by limited available statistics annually reduced by Rosstat at the level of Russia's constituent entities. The application of the method of structural changes makes

it possible, taking into account all data limitations, evaluate the components of a certain indicator performance.

We analyzed the main elements of the employment performance and production potential (value of fixed assets) in the transport complex in the Far East during 2000–2016 in terms of their contribution to the overall economic performance against the background of national trends. As a result, we note a decrease in employment in the transport complex in the Far East, which contradicts the all-Russian trend in this economic sector. The provided calculations of the employment performance component have identified a negative impact of the regional component, characterizing the decrease in employment during the studied period, on transport in Russia's constituent entities in the Far East, incurred due to the negative regional development trends in the transport sector. Examples of regional manifestations in the transport complex of the Magadan and Amur oblasts are presented in the article.

Given the region's specific features – a large area, low population density and focal settlement system, border position stimulating active foreign economic cooperation (requiring an adequate level of transport links development) – a decreased number of people employed in the Far East transport complex beyond optimal parameters can have negative consequences for the economy. In this regard, further research of the transport sector in terms of employment performance, analysis of prospects and consequences of the ongoing changes is relevant.

The second indicator under review is the performance of the value of fixed assets in the transport complex in the Far East during 2000–2016. Estimates of this indicator analyzed in the breakdown of three components – sectoral, regional and national – indicate positive trends in all three reviewed components. It

is confirmed by the active state policy on the development of the transport complex in the Far East. Within its framework, a number of major investment transport projects have been implemented since 2000.

The development of the transport infrastructure in the East of Russia still continues. Projects related to Eastern railways modernization, development of the railway network in the Sakha (Yakutia) Republic and towards the Pacific coast, the development of seaports terminal capacities and road network – all these projects can completely change the region's transport landscape. Assessment of the impact of the implementation of such large-scale investment projects to labor markets, changing the boundaries of commodity markets, production costs, increased budget revenues, etc. – is one of the most urgent objectives of future research in this area.

One more relevant area of scientific and applied research is the study of new factors in the region's transport complex development

presented in the paper. Potential cooperation within the framework of the Silk Road Economic Belt initiative has not yet been assessed. The development of transport cooperation between Russia and China within the borders of the Far East is characterized by both mutual interest and certain contradictions when considering particular issues. Research in this area can help find mutually acceptable solutions and improve the efficiency of the ongoing processes.

Scientific and research support is also necessary when applying new forms of development in the Far East, which are being actively implemented at the state level, including in the transport complex. The evaluation of effectiveness of applying various mechanisms, the development of approaches to the definition of criteria and boundaries of specific tools for transport development – all these should first of all become the object of research with the result laying the grounds for effective action.

## References

1. Krugman P.R. Increasing Returns and Economic Geography. *Journal of Political Economy*, 1991, vol. 99 (3), pp. 483-499.
2. Krugman P.R., Obstfeld M., Melitz M.J. *International economics: theory & policy*. Harlow: Pearson Education, 2012. 731 p.
3. Ansar A., Flyvbjerg B., Budzier A., Lunn D. Does infrastructure investment lead to economic growth or economic fragility? Evidence from China. *Oxford Review of Economic Policy*, 2016, vol. 32, issue 3, pp. 360-390.
4. Xueliang Z. Has transport infrastructure promoted regional economic growth? With an analysis of the spatial spillover effects of transport infrastructure. *Social Sciences in China*, 2013, vol. 34(2), pp. 24-47.
5. Cheng Yuk-Shing, Loo B.P.Y., Vickerman R. High-speed rail networks, economic integration and regional specialization in China and Europe. *Travel Behaviour and Society*, 2014, vol. 2, issue 1, pp. 1-14.
6. Chia-Lin C., Vickerman R. Can transport infrastructure change regions' economic fortunes? Some evidence from Europe and China. *Regional Studies*, 2017, vol. 51, issue 1, pp. 144-160. DOI: 10.1080/00343404.2016.1262017
7. Eliasson J. *International Comparison of Transport Appraisal Practice*. Sweden country report. University of Leeds, UK, 2013. 12 p. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/209534/annex-4-sweden.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209534/annex-4-sweden.pdf)
8. Borjesson M., Eliasson J., Lundberg M. Is CBA Ranking of Transport Investments Robust? *Journal of Transport Economics and Policy*, 2014, vol. 48, part 2, pp. 189-204.
9. Eliasson J., Borjesson M. Does Benefit–Cost Efficiency Influence Transport Investment Decisions? *Journal of Transport Economics and Policy*, 2015, vol. 49, part 3, pp. 377-396.
10. Annema J. A., Frenken K., Koopmans C., Kroesen M. Relating cost-benefit analysis results with transport project decisions in the Netherlands. *Letters in Spatial and Resource Sciences*, 2017, vol. 10, issue 1, pp. 109-127.

11. Thorsen H., Thorsen I. Effects of transportation barriers on geographic asymmetries in labour markets. *Research in Transportation Economics*, 2017, vol. 63, pp. 27-37.
12. Jones H., Moura F., Domingos T. Transport Infrastructure Project Evaluation Using Cost-benefit Analysis. *Procedia - Social and Behavioral Sciences*, 2014, vol. 111, pp. 400-409.
13. Laird J., Nash C., Mackie P. Transformational transport infrastructure: cost benefit analysis challenges. *Town Planning Review*, 2014, vol. 85, issue 6, pp. 709-730.
14. Lakshmanan T. R. The broader economic consequences of transport infrastructure investments. *Journal of Transport Geography*, 2011, vol. 19, issue 1, pp. 1-12.
15. Macheret D.A., Ryshkov A.V., Beloglazov A.Yu. Macro-economic evaluation of the transport infrastructure development. *Vestnik nauchno-issledovatel'skogo instituta zheleznodorozhnogo transporta=Bulletin of Railway Transport Research Institute*, 2010, no. 5, pp. 3-10. (In Russian).
16. Shcherbanin Yu. A. Transport and economic growth: correlation and influence. *Evrasiiskaya ekonomicheskaya integratsiya=Eurasian economic integration*, 2011, no. 3(12), pp. 65-78. (In Russian).
17. Vakhrameev I.I. The influence of the transport infrastructure in the sectoral development of the region's economy. *Vestnik Zabaikal'skogo gosudarstvennogo universiteta=Bulletin of Transbaikal State University*, 2014, no. 8 (111), pp. 85-91. (In Russian).
18. Gol'skaya Yu.N., Kuznetsova I.A. Estimation of transport influence on social and economic development of regions. *Izvestiya Irkutskoi Gosudarstvennoi Ekonomicheskoi Akademii= Bulletin of Baikal State University*, 2010, no. 5, pp. 61-65. (In Russian).
19. Lapidus B.M. On the contribution of OAO RZhd to the country's GDP and the company's economic goals amid tariff barriers. *Vestnik nauchno-issledovatel'skogo instituta zheleznodorozhnogo transporta=Bulletin of Railway Transport Research Institute*, 2014, no. 1, pp. 3-7. (In Russian).
20. Pozamantir E.I. *Vychislimoe obshchee ravnovesie ekonomiki i transporta (Transport v dinamicheskom mezhotraslevom balanse)* [Computable overall economic and transport balance (Transport in dynamic input-output balance)]. Moscow: POLI PRINT SERVIS, 2014. 160 p.
21. Ivanter V.I., Uzyakov M.N., Shirov A.A., Mikhailov V.V., Pekhterev F.S., Zamkovi A.A., Shestakov P.A., Popova E.V., Leshchev M.V. *Ispol'zovanie metoda mezhotraslevogo balansa dlya nauchnogo obosnovaniya strategicheskogo razvitiya zheleznodorozhnoi sistemy Rossii* [Applying the method of input-output balance to scientifically substantiate the strategic development of Russia's railway system]. Moscow: UP Print, 2015. 208 p.
22. Ivanova O. *The Role of Transport Infrastructure in Regional Economic Development*. Institute of Transport Economics, Oslo, 2003. 160 p. Available at: <https://www.toi.no/getfile.php/139223/Publikasjoner/T%C3%98I%20rapporter/2003/671-2003/671-2003.pdf>
23. Petronevich M. The influence of railroad network modernization on the regional differentiation of Russia's economy. *Ekonomicheskaya politika=Economic policy*, 2008, no. 5, pp. 67-83. (In Russian).
24. Mikheeva N.N. Structural factors in regional dynamics: measuring and assessment. *Prostranstvennaya ekonomika=Spatial economics*, 2013, no. 1, pp. 11-32. (In Russian).
25. Bardal' A.B. Transport availability for the population of the Russian Far East. *Regional'naya ekonomika: teoriya i praktika=Regional economics: theory and practice*, 2015, no. 46 (421), pp. 42-53. (In Russian).
26. Jara-Diaz S. *Transport Economic Theory*. Oxford: Elsevier Science, 2007. 140 p.
27. Sandakova N.Yu. Issledovanie faktorov, vliyayushchikh na razvitie transportnoi infrastruktury regiona. *Infrastrukturnye otrasli ekonomiki: problemy i perspektivy razvitiya=Infrastructural economic sectors: problems and development prospects*, 2014, no. 6 pp. 21-26. (In Russian).
28. Bardal' A.B. Russia's transport complex amid reforms: the Far Eastern perspective. *Prostranstvennaya ekonomika=Spatial economics*, 2017, no. 4 (52), pp. 100-129. (In Russian).

### Information about the Author

Anna B. Bardal' – Candidate of Sciences (Economics), Associate Professor, Senior Researcher, Economic Research Institute Far Eastern Branch of the Russian Academy of Sciences (153, Tikhoookeanskaya Street, Khabarovsk, 680042, Russian Federation; e-mail: Bardal@mail.ru)

Received February 02, 2018.