

Role of Transport Infrastructure in the Border Regions' Development

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Abstract—The present-day degree of transport infrastructure's influence on formation of national and regional economies is difficult to overestimate. Transport is becoming one of the most important communication factors for border regions both with the center of the country and with the neighboring states, having a significant impact on the living standards and the economy of the regions. This article provides a retrospective analysis of dynamics of transport infrastructure's share in certain indicators of the socio-economic development level. Indicators of transport infrastructure's direct and indirect impact on the regional economy are highlighted. As a result of the study, it was shown that in a number of regions of the Russian-Kazakhstan border the influence of transport infrastructure has noticeably decreased in 2010-2017, but some regions are actively using the existing transport potential.

Keywords—transport, transport infrastructure, regional studies, border regions.

I. INTRODUCTION

The border regions occupy a special position in the Russian Federation, as their socio-economic status affects not only the level of development of individual industries and the regional economy as a whole, but also the country's position in the international arena. In turn, the border regions located at the crossroads of global transport communications, providing international regional cooperation, can become a kind of growth points for creating a reproductive model of the country's economic system [1]. This factor is responsible for the steady growth of scientific interest in the problems of the state and development of border areas. In addition, in many cases, the barrier function of the border increases as a result of significant infrastructural restrictions: road quality, lack of direct communication between local border checkpoints in relative proximity to each other [2], inconsistencies in development of transport infrastructure in the border regions of neighboring countries.

II. LITERATURE REVIEW

Close cooperation between Russia and Kazakhstan has become the subject of many scientific studies in the field of economics of both domestic and foreign scientists [3-7]. As R.E. Sagindikov notes: "in many ways, the interrelation of the Kazakhstan' interests in Russia and Russia's interests in Kazakhstan is exceptional and has no analogues in the entire post-Soviet political space" [8].

The Russian Federation and the Republic of Kazakhstan are in close economic, foreign policy and social relations. Currently, both countries are part of the Eurasian Economic Union (EAEU), an international organization for regional economic integration, created with the goal of comprehensive modernization, cooperation and competitiveness of national economies and the creation of conditions for sustainable development in the interests of improving the living standards of the population of member states.

The group of territories with international relations with Kazakhstan includes 12 of 36 border (having a land border with neighboring states) regions of the Russian Federation: Altai Krai, Altai Republic, Astrakhan Region, Volgograd Region, Kurgan Region, Novosibirsk Region, Omsk Region, Orenburg Region, Samara Region, Saratov Region, Tyumen Region, and Chelyabinsk Region. These regions differ both in socio-economic indicators in general and in the current state, and in the prospects for the development of the existing transport infrastructure. The degree of communication contact between regional border sections varies. The sections of the Altai Republic and the Volgograd Region are considered the least contact, while the Tyumen Region (in terms of intense cross-border communications), Omsk Region (in a qualitative comparison of the border's length with intense communications), Chelyabinsk Region and Altai Krai (in the number of railways) are leaders in this parameter [9]. The differences in the existing transport infrastructure of the Russian regions and Kazakhstan are hindered by the joint development of international trade corridors and slow down the trends of integration processes.

It is important to understand that international relations of neighboring states can be realized mainly through transport infrastructure; therefore, its condition and growth prospects should be taken into account when making forecasts of joint socio-economic development of border regions.

III. RESEARCH METHODOLOGY

According to some authors, transport infrastructure has a direct and indirect impact on the economy of the region [10]. The direct influence of transport is realized through a change in cargo and passenger traffic indicators, which are integral elements of the infrastructure industry, and characterize the activity of cargo transportation and the mobility of the population of the border region. Indirect influence can be determined by changing the main indicators of related activities: economic, social, financial, environmental and

foreign economic, each of them has its own development criterion.

It is necessary to determine how efficiently the transport infrastructure functions in relation to the internal economy of the region. For example, how are the indicators characterizing the transport infrastructure of a particular region and its socio-economic indicators interconnected, how rationally the existing transport network is used, whether enterprises and the population of a particular region are adequately equipped with transport infrastructure, and whether inter-regional transport communication is developed. An analysis of the dynamics of the indicators of the existing transport infrastructure and the socio-economic development of the region, as well as the justification of their mutual influence, will allow us to identify the shortcomings of the existing transport system and suggest the main directions for its improvement.

Main indicators for assessing the direct and indirect impact of transport infrastructure on the socio-economic situation of the border region, and their designations are presented in Table I.

TABLE I. INDICATORS FOR ASSESSING THE TRANSPORT INFRASTRUCTURE'S IMPACT ON THE SOCIO-ECONOMIC SITUATION OF THE BORDER REGION

Specifics	Indicator	Designation
<i>Direct impact</i>		
Activity of cargo traffic (A)	Transported by rail	A.1
	Transported by road	A.2
Population mobility (B)	Passengers transported by rail	B.1
	Passengers transported by road	B.2
<i>Indirect impact</i>		
Economic Growth (C)	Share of transport in GRP	C.1
	Revenue of transport organizations	C.2
	Number of transport organizations	C.3
Standard of living (D)	Number of employees in transport	D.1
	Average monthly salary of employees	D.2
	Volume of public transport services	D.3
	Transport's share in the consumer spending structure	D.4
Investment activity (E)	Volume of investments in fixed assets	E.1
	Financial investments of transport organizations	E.2

TABLE II. GROWTH RATES DYNAMICS OF INDICATORS OF THE TRANSPORT INFRASTRUCTURE'S IMPACT ON THE SOCIO-ECONOMIC IMPACT OF THE RUSSIAN-KAZAKHSTAN BORDER REGIONS

Indicator	Altai Krai	Altai Republic	Astrakhan Region	Volgograd Region	Kurgan Region	Novosibirsk Region	Omsk Region	Orenburg Region	Samara Region	Saratov Region	Tyumen Region	Chelyabinsk Region
A.1	-0.6	0	-4.8	-0.6	4.2	1.2	-1.8	-1.5	-2.1	-1.2	3.8	3.3
A.2	-0.3	-0.4	-0.3	0.3	0.1	-1.0	0.1	-1.1	-3.0	-0.4	7.8	-1.9
B.1	-1.7	0	-0.2	0.1	-1.3	6.4	1.2	-1.3	1.8	-1.7	0.4	-3.6
B.2	0.6	-0.1	-0.9	2.6	-0.5	-3.7	0.3	1.1	3.9	1.3	0.5	-5.2
C.1	2.0	0.2	-3.6	-2.8	-3.6	3.9	-0.2	-1.8	-3.2	-2.6	-0.4	-2.1
C.2	-3.5	-2.7	-5.1	-2.0	-3.7	16.7	5.6	-0.2	8.3	1.2	0.5	-2.9
C.3	4.8	1.0	1.9	2.7	3.3	5.5	5.0	1.2	4.8	4.5	6.0	4.5
D.1	0.2	-3.3	-0.8	-0.5	-1.2	-1.7	-0.7	-0.9	-0.3	-1.1	-1.1	-1.4
D.2	1.1	0.1	-1.2	2.3	-0.9	-14	2.4	-0.2	-8.6	-4.3	0.3	-18.8
D.3	-0.2	0.1	-0.4	-3.4	-0.9	2.2	0.6	-0.8	-4.3	2.0	3.3	1.9
D.4	-3.0	-2.0	-5.4	2.7	5.7	2.6	0.1	13.3	-0.5	1.4	7.3	3.2
E.1	1.5	-21	-18	1.1	6.7	-2.9	2	-10.1	1.2	3	-10.8	0.6
E.2	-0.1	-0.2	0	3.9	-0.1	0	0	-0.1	0	0	5.2	0.98
F.1	0.5	-2.1	-1.4	-6.3	0	0	0	-1.3	0	-7.5	-1.7	3.4
G.1	1.8	0.0	1.3	0.6	0.0	3.2	-7.6	2.3	0.4	0.9	-9.0	6.0
G.2	-1.3	-0.2	-1.7	-4.4	-1.0	-6.9	-1.8	-6.4	-0.8	-1.5	24.4	-7.8
Total	1.8	-30.6	-40.6	-3.7	6.8	11.5	5.2	-7.8	-2.4	-6.0	36.5	-19.8

Environmental state (F)	Air pollutants	F.1
Foreign economic activity (G)	Transportation of goods exported from Russia	G.1
	Transportation of goods imported to Russia	G.2

In general, transport, to one degree or another, is used in the implementation of almost any type of work and services, so it was important to single out precisely those types of economic activity that had a key role. The developed transport infrastructure directly contributes to reducing the cost of transporting products, increasing the mobility of the population, and ensuring the accessibility of remote areas of the region. The indirect positive impact of the extensive transport network is associated with the growth of most indicators of related sectors of the economy (trade, services, manufacturing), increased access to social assistance and public services, the development of tourism, etc.

IV. RESULTS

Corresponding statistical indicators of the regions of the Russian-Kazakhstan border in the period 2010-2017 were analyzed. Calculation was based on the total amount of data for all regions of the Russian-Kazakhstan border for indicators A.1, A.2, B.1, B.2, D.3, G.1, G.2: for example, as the selected border regions have a mutual border with the Republic of Kazakhstan, the share of each of them in the total volume of export and import operations was studied. Indicator D.2 was calculated as the level of average monthly salary in transport in relation to the average monthly salary of the region as a whole. For the remaining groups, the indicator of the share of transport among the main types of economic activity was analyzed.

Table II presents the results of calculating the growth rates of indicators of the transport infrastructure's impact on the socio-economic impact of border regions (highlighted cells show the maximum and minimum value of regions in terms of these indicators). It is worth noting that for a number of indicators of individual regions were not possible to find reliable data; therefore, they are represented in the table by a zero value.

In general, we cannot speak of any single trend in the change of indicators: some indicators are growing for the studied regions, while others are decreasing. On the one hand, the number of organizations in the transport sector has grown markedly, that is, we can talk about increasing the size of the transport and passenger transportation market. On the other hand, the salaries of transport employees and investment in fixed assets decreased significantly, and the share of transport costs in the overall structure of consumer spending increased. Transport infrastructure interests investors to a much lesser extent than, for example, the mining and manufacturing sectors, and the increase in the cost of gasoline leads to an annual increase in costs from both transport companies and the public. As a positive change in the indicator, it is worth noting the reduction in the volume of harmful emissions into the atmosphere from transport: this was facilitated by the development of environmental monitoring tools and the systematic work to reduce pollutants in the air. It is worth noting that the share of transport in the GRP structure of the studied regions also decreases: mainly due to an increase in the share of extractive and manufacturing activities, which creates a clear bias towards the raw materials-dependence of the national economy.

Calculated sum of the dynamics indicators values allowed us to form 4 main groups of border regions, depending on how much the transport infrastructure has affected their socio-economic indicators (Fig. 1).

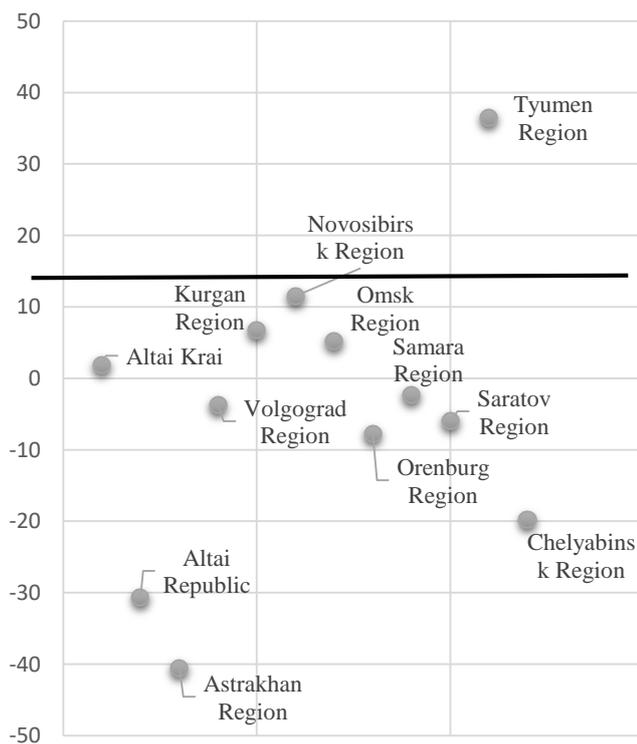


Fig. 1. Vira Formation of groups of border regions according to the level of transport infrastructure's impact on socio-economic development

The first (I) group included only one region – the Tyumen Region: from the presented analysis, we can conclude that the transport infrastructure of this region is developed to a sufficiently high degree, which allows it to actively influence the ongoing processes of socio-economic development. The second (II) group includes regions whose transport infrastructure, according to the analysis of indicators of 2010-

2017, had a generally positive impact on the economy: Altai Krai, Kurgan, Omsk and Novosibirsk Regions, the latter showing significantly higher rates in almost all studied characteristics. The third (III) group includes regions in which the influence of transport infrastructure significantly decreased in 2017 compared to 2010: Volgograd, Orenburg, Samara and Saratov Regions. These regions show a steady decrease in indicators of activity of cargo flows and population mobility, as well as the share of transport in the volume of GRP. Separately, it is worth noting indicator D.4 (the share of transport in the structure of consumer spending) for the Orenburg region: in 2017, it increased by 13.3% compared to 2010, and transportation costs for the population began to exceed 25% in the total structure household expenses. The fourth (IV) group includes regions in whose territory the transport infrastructure shows a significant decrease in the level of impact: the Altai Republic, Astrakhan and Chelyabinsk Regions. A decrease in the volume of cargo and passenger traffic, a significant reduction in the level of wages in transport and a decrease in the level of investments in transport infrastructure have a negative impact on the socio-economic situation of these regions. It is necessary to study the state and prospects of the development of the transport industry for this group in more detail, take urgent measures to optimize it with respect to current trends.

V. CONCLUSION

Among the main issues of the Russian-Kazakh border regions, it is worth highlighting the following: the imbalance between development of regional economies and existing transport infrastructure; the attraction of transport networks to the largest regional agglomerations simultaneously with low road density of the territories' periphery; insufficient use of the potential of available modes of transport; high degree of deterioration of transport infrastructure objects; non-transparency of cargo traffic in certain regions due to monopolization of the market.

To eliminate existing issues and increase the efficiency of using current transport infrastructure, it is necessary to develop a set of measures aimed at developing economic activity and infrastructure in the border areas in order to suspend the process of depopulation and the degradation of their economic activity, to create a social base in these areas for self-development and economic benefits from border position [11]. The main role of strengthening the socio-economic situation of the border regions should be assigned to transport infrastructure [12], as the basis for the formation of international channels of interaction.

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