

# Analysis of the border regions of the siberian federal district of Russia on the level of social and economic development (for example Republic of Tuva)

## Abstract

The article presents the results of cluster analysis of 36 cross-border regions of Russia divided into six border zones: Far Eastern, Mongolian, Kazakh, Caucasian, Ukrainian, Belarusian and European. The analysis used 14 indicators in terms of socio-economic development, divided into two groups: economic and social. The first group included 10 economic indicators, and the second - 4 main social indicators that reflect the level and quality of life in the region. The analysis of indicators of social and economic development received a taxonomic dendrogram 36 border regions of Russia. Revealed that the most developed in terms of socio-economic development of the border regions correspond to Kazakhstan and the European zone of the border, and less developed correspond to the Mongolian and Caucasian regions. A significant factor in the development of Kazakhstan borderland area is a well-developed transport infrastructure created during the Soviet era and the neighboring states membership in the Customs Union. A development of the European area is defined with the development of the adjacent territories of our country. The border regions of Siberian Federal District heterogeneous and dispersed in different taxa of the development of the Novosibirsk region to deeply depressed republics of Altai and Tyva. All subjects of the Siberian Federal District of the border than the Republic of Tyva, the Trans-Baikal Territory and part of the Altai Republic are Kazakhstan area. Mongolia for the Republic of Altai and Tyva acts a barrier to the diffusion of economic activity between China and the Siberian Federal District of Russia.

**Keywords:** border region, socio-economic development of the Siberian Federal District, cluster analysis, factor space.

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## The purpose and methodology of the study

The aim of the research is to study the phenomenon of differentiation of regions in terms of socio-economic development in the context of their inclusion in the borderland areas on the example of the Republic of Tuva, Siberian Federal District. Under the border regions in the framework of this study we mean the subject of the Russian Federation, which has a land perimeter of the site coincides with the state border of the Russian Federation. Republic of Crimea in the analysis does not take part due to the absence of certain data included in the official statistics at the end of 2016. Indicators for measuring the level of socio-economic development. Typological classification of 36 border regions of Russia in terms of socio-economic development carried out in the following 14 indicators (at the end of 2016 at the beginning of 2017):

### Economic

- The gross regional product (GRP) per capita, thous. Rub .;
- Percentage of manufacturing a GRP%;
- The share of mining in GRP,%;
- The share of agriculture in GRP,%;
- The share of NACE "Transport and Communication" in the GRP,%;
- Investments in fixed capital per capita, rubles .;
- Investments OKVED "Transport" per capita, rub .;

- The length of paved roads per 1000 people. population, km;
- The volume of exports per capita of the population, USD .;
- Energy consumption GRP kg. conventional fuel by 10 thousand. rub .;

### Social

- Per capita cash income of the population, rub .;
- Living area in square meter per person, Apt. m;
- Unemployment rate, %;
- Number of places in kindergartens for 1000 children places.

The classification performed by cluster analysis. Methodology and calculation features described in the relevant specialist literature.<sup>1-5</sup> This method eliminates the subjective factor in determining the boundaries between the groups of homogeneous regions. Traditionally, the statistical method used in archeology and biology and other natural sciences, in which there are classification problems, for example, the designation of a unknown animal to the presently known species of its morphological or other characteristics. All figures are comparable, that is, given either in percentage terms or in relation to population. In addition, indicators are standardized with respect to the mean values (vertical standardization). It is important for cluster analysis and allows for the grouping in the 14-dimensional space to do so objectively despite the different units of measurement, and bit numbers. Use your ability to package Excel and Statistica applications.

## The results of research

As a result of analysis following taxonomic dendrogram obtained (Figure 1): Comparison Taxonomy dendrogram and simple ranking data leads to the following can be relatively homogeneous taxonomic groups (clusters) (Table 1): It should be noted that this analysis has carried out 6 years ago.<sup>6</sup> Despite the fact that the composition of indicators varies considerably with the analysis of 6 year old system is identical to the overall picture. This indicates a high persistence of regional development. Table 1 shows that the most developed

border regions correspond to the Kazakhstan and the European zone of the border. The least developed border regions correspond to the Mongolian and Caucasian regions. Currently, objectively the most “profitable” neighborhood with Kazakhstan and European states. In the case in Kazakhstan, probably plays a role, first, the membership of the neighboring state in the Customs Union, and secondly, there are Soviet-era transport corridor from the south-eastern and central parts of Asia. In the case of Europe probably plays the role of a relatively high level of development of adjacent territories and, consequently, a higher cross-border business activity.

**Table 1** Distribution of taxonomic groups of the border regions of Russia by conditional zones of the border

	Frontier areas					
	Kazakhstan	European	Far East	Ukraine-Belarus	Mongolian	Caucasian
Highly developed Tyumen region	■					
Developed Murmansk region, Chelyabinsk region, Leningrad region, Rep. Karelia	■	■				
Khabarovsk kr., Novosibirsk region, Krasnodar kr.	■		■	■		
Moderately developed Kaliningrad region, Voronezh region, Belgorod region		■		■		
Orenburg region, Astrakhan region.	■					
Primorsky kr., Amur region, Jewish aut. region			■			
Omsk region, Rostov region, Volgograd region	■			■		
Pskov region, Smolensk region, Saratov region, Bryansk region	■	■				
Underdeveloped Kursk region, resp. North Os.-Al.				■		■
Altai kr., Kurgan region.	■					
Depressive Transbaikal kr., Resp. Buryatia					■	
Deeply depressed Rep. Tyva, Chechen Rep., Resp. Ingushetia Kar-Cherk. Resp., Resp. Altai, Kab.-Bal. Rep. Dagestan	■				■	■

Regions of the Siberian Federal District are heterogeneous and dispersed in different taxa of development (Novosibirsk region) to deep depression (Tuva, Altai). All subjects except for the Republic of Tyva and Altai Republic in part can be attributed to the zone of Kazakhstan. Mongolia, one might say, are an obstacle to the diffusion of economic activity between China and the SFO in Tuva and Altai. Message to the economic centers of China are currently at the data inside the territory of Russia is carried out through logistic hubs: Kazakhstan and Novosibirsk.

It is known that a key role in the transit of goods from China to the SFO and back through Kazakhstan played by road transport.<sup>7,8</sup> On one of the sites of the Siberian economic forum Union forwarders, transport and logistics Siberia<sup>9</sup> voiced the proposal on the possibility of diversifying automotive transportation corridor alternative route directly to China via the Altai Republic. It has been reported that the

proposal was not supported by the population of the Altai Republic in view of environmental risks. In our opinion, in this case, we can not exclude the objection of affiliation with the economic interests of Kazakhstan. It is known that in the border Kosh-Agach district of the Altai live fairly significant number of Kazakh diaspora. Anyway, the question of the passage of the transport corridor from the SFO in China, for example, through the Republic of Tuva,<sup>10,11</sup> Mongolia affects the interests of all neighboring states and may require lobbying at the international level solutions. We can not do only the infrastructure, but must be even and customs benefits, essential for Siberian carriers compared with the Kazakh transit.

The study objectively, and in some cases, hidden links between existing development indicators on a variety of subjects of the Russian border requires a multivariate factor analysis. This method makes it possible to form a similar taxonomic groups from a previous

analysis of the “clusters”, some objectively existing structure, but only among the development indicators. This method is also widely used in biology and other natural sciences, but not for the purpose of classifying the species themselves, and to identify patterns in the process of their genesis and development, for example, of an animal

or plant. The advantage is the ability to detect hidden unobvious connections between various characteristics of the object being studied. As a result of multivariate factor analysis revealed the following factors are grouped around itself in varying degrees of tightness ties 14 elementary indicators (Table 1).

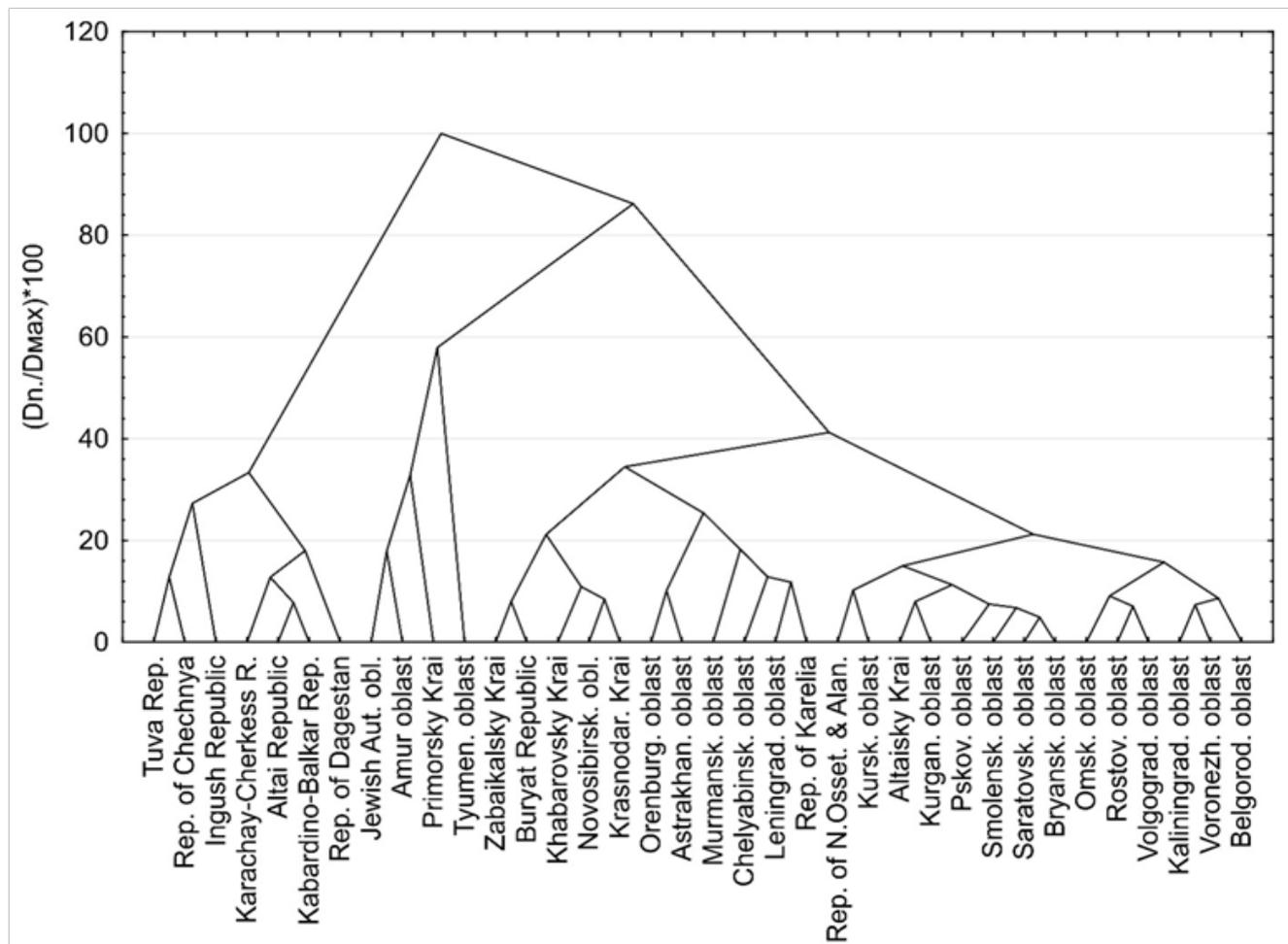


Figure 1 A dendrogram of 36 cross-border regions of Russia, classified according to 14 indicators of socio-economic development.

Each factor is assigned a name in accordance with the names of the attributes that have the greatest load therein.

The first factor is called conditionally “Economy and Investments”. The second factor - “Social welfare”. The third factor - “Transport infrastructure”. The fourth factor - the “Energy Efficiency” as this factor is formed from the indicator “energy intensity” with a negative sign. All four factors explain 69.9% of the variance. For clarity and convenience of interpreting results obtained correlation factors and their behavior in the space (the coordinates) of elementary metrics consider them in pairwise combinations in a 2-dimensional coordinate space. We consider it appropriate to exclude from consideration the 4<sup>th</sup> factor “Energy efficiency” because it has no clear links with any of the basic indicators except for energy intensity.

We get the following space.

It should be noted that economic prosperity in the border regions

of Russia is connected primarily with the mining industry, which in turn is linked to the vast majority of investment in fixed assets. The extensive development of the economy through the production sector is not sustainable due to the development of export and transport infrastructure. Moreover there is no clear evidence to suggest that the model of development based on the production somehow solves the problem of unemployment. Despite the fact that the border regions are located in most countries on the southern borders of the GRP is in opposition to the development of agriculture.

The graph shows that the incomes of the population in most associated with the natural rent. The notion of “extensive development”, ie the development of resource-based production justifies its characterization of the example of lack of communication with key performance factor 2 “Social welfare”. If it can be argued that social welfare is closely linked with the development of the sector of manufacturing industries (Figure 2).

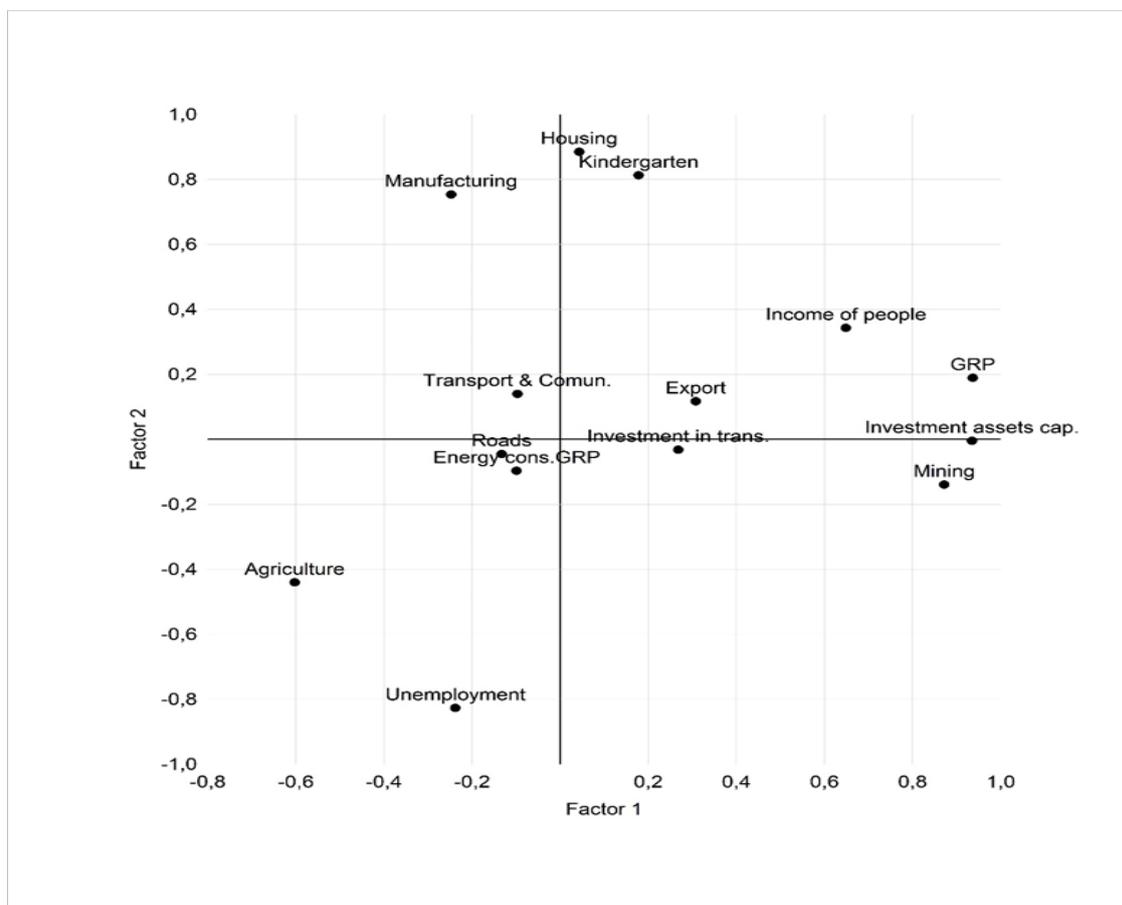


Figure 2 A factor space: x-axis “Economy and investment”, the y-axis of “Social welfare”.

Based on the graph in Figure 3 it can be concluded that the extensive economic well-being of the social indicators has a certain reflection on the incomes of the population. With other social indicators, it is practically not related. The main conclusion about the factor “Transport infrastructure” consists in the fact that it is not associated with the economy or the social sphere, it has some kind of an isolated entity. The only indicator that is closely linked to the development of transport infrastructure is exports. This may be a characteristic that the export potential of the region is easier to implement close to major transportation hubs, which, by definition, one way or another come to the major customs points in the country. The paradoxical conclusion from these graphs is that the development of transport infrastructure in no way affiliated with any of the sectors (mining, manufacturing, agriculture) except as a purely “own” NACE “Transport and communications”. There is little agreement with the factor of “social welfare” in terms of incomes and places in kindergartens. But other factors, “transport infrastructure” neutral.

### Findings recommendations

Identified above laws are systemically category “border regions of Russia.” This means that we identify common patterns that may not reflect directly the nature of a particular subject of the federation, but nevertheless give information about features specific to their overwhelming majority. Based on the nature of the relationship factors

and behavior of elementary indicators in their spaces, it follows that the border regions of Russia is developing logic and integrated systems mechanisms. That is logical and seemingly do not require proving mechanisms as, for example, economic growth in the region must necessarily lead to a cash income growth, housing, kindergartens, schools in the observed case, do not work. One of the possible reasons for this pattern of analysis may be the so-called “principle of progressive segregation” when the elements within the subsystem are losing touch in mind the establishment and development of the other links in the system-wide level. For example, the effect of economic development in the region is not directed at solving its social problems, and is directed to the consolidation of similar flows from other regions to address some issues of national level. A social development in the region is mediated through the national level. It should be noted that it is more typical for unitary states and to a lesser extent for states having federal structure. Our state has a de facto unitary centralized past and, at the moment, although there is de jure as a federal, nevertheless, de facto, in our opinion, The objectives of the study does not include evaluation of good or bad, it is possible to determine the validity and appropriateness of the federal administration level (Figure 4 & 5).

But for the Republic of Tyva, as well as the Republic of Altai currently would be to achieve direct access to the Chinese markets (the new “Shchelkovo way”) and earn perhaps to maintain the traffic flow of the SFO regions in China and vice versa. Another direction of

the efforts should be focused on getting from the federal government exclusive preference for the development of manufacturing industries. If we compare the obtained data with the sector manufacturing and

production sector, figuratively speaking, is first “cure” as will start the self-mechanisms, and second in terms of existing system will only “anesthesia” without treatment.

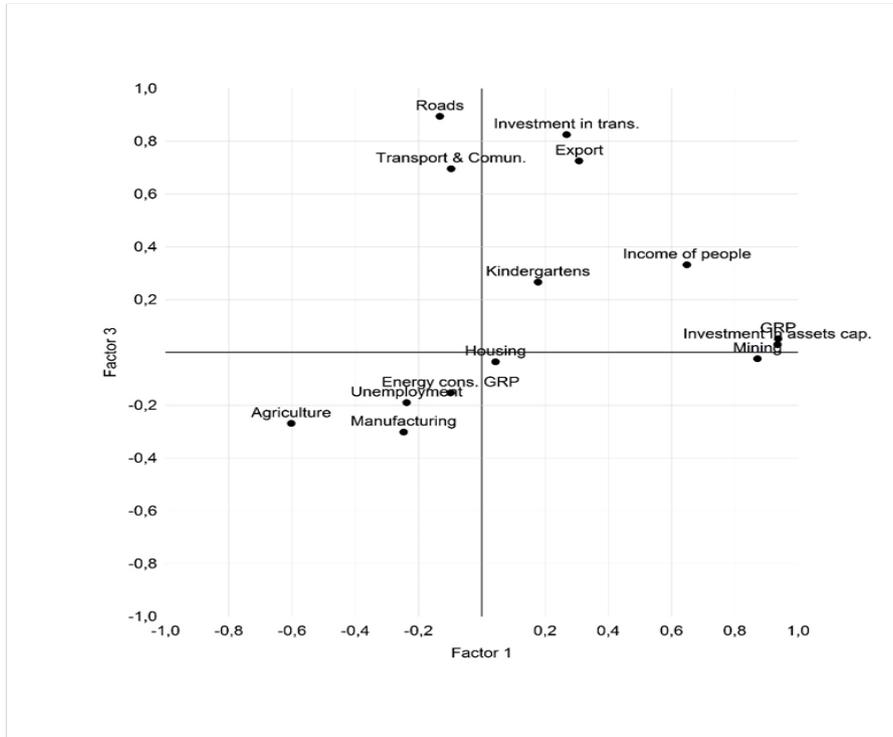


Figure 3 A factor space: x-axis “Economy and investment”, the y-axis “Transport infrastructure”.

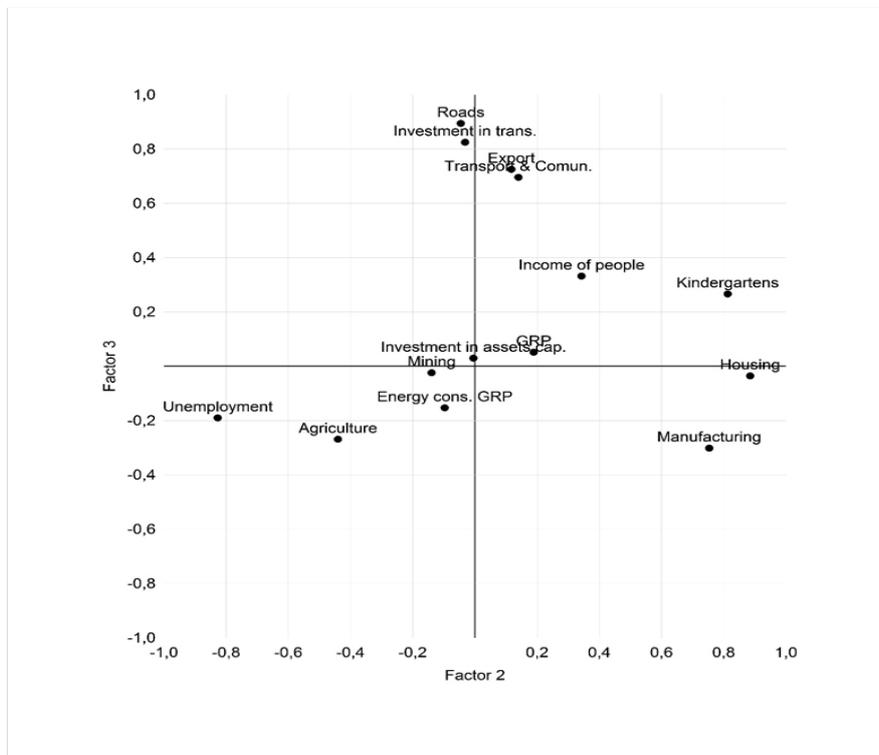


Figure 4 A factor space: x-axis “Social welfare”, the y-axis “Transport infrastructure”.

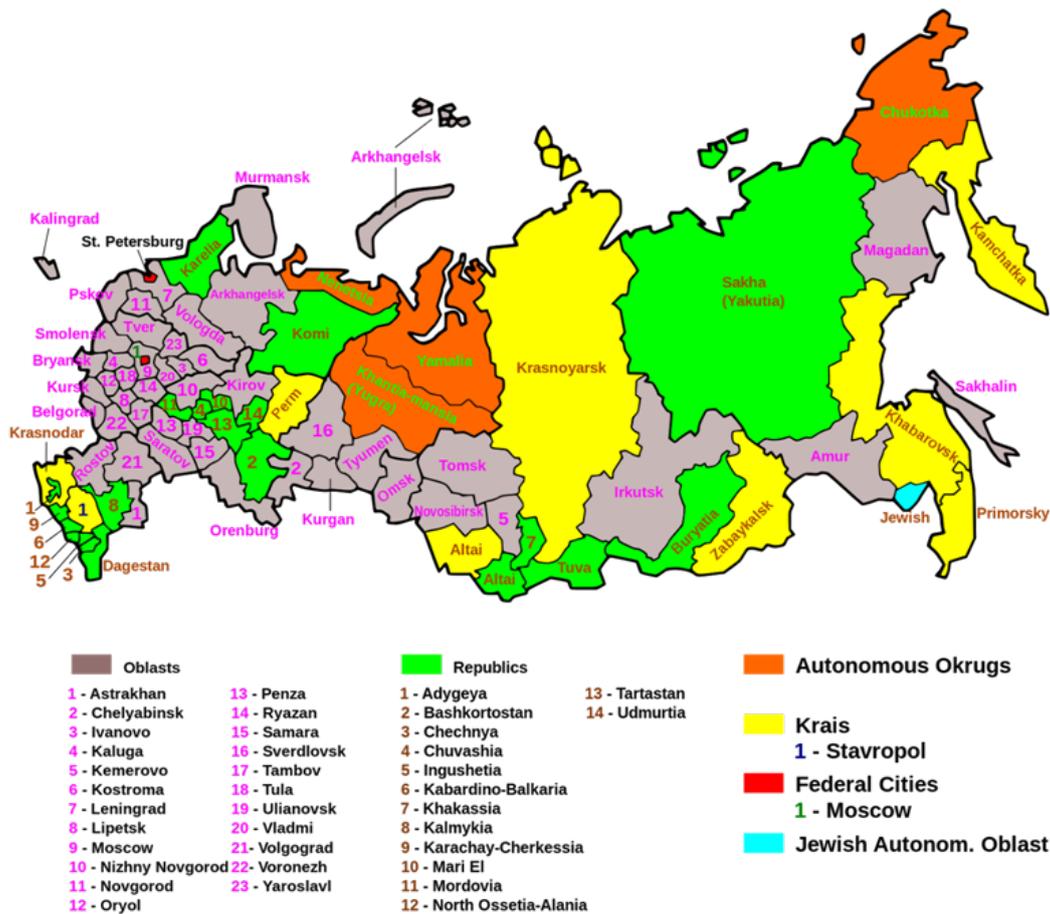


Figure 5 Map of regions and regions of Russia.

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## Conflicts of interest

The authors declare that there is no conflict of interest.

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