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CONTENTS

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СОДЕРЖАНИЕ

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Diversification of tourism and economic development of Kazakhstan

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ABSTRACT
The article aims to demonstrate how the economic conditions of Kazakhstan determine the need for horizontal diversification in the tourism industry by analyzing the correlations between the volume of tourism services and such indicators as the GDP, unemployment, tenge exchange rate, inflation and the number of small and medium-sized enterprises. The overview of the tourism industry in the republic and its development prospects shows that tourism has been playing an increasingly important role in the country's economy. The negative factors that hinder development of the tourism industry in Kazakhstan include the lack of transport and information infrastructure, the unstable banking sector and unaffordable business loans, the lack of qualified personnel in marketing, catering and hospitality spheres. A conclusion is made that the potential for the development of recreation, sport, cultural, ecological and religious tourism is not fully realized in the country and that a more diversified portfolio of tourism products is required. Moreover, it is necessary to enhance the country's economic growth, that is, to reduce its dependence on oil and gas, support the development of the banking sector and implement structural reforms. The results of this research can be used for designing state and regional tourism support programs in Kazakhstan.

KEYWORDS
Identification, diversification, tourism, economic development, Kazakhstan

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Диверсификация туризма и экономического развития Казахстана

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РЕЗЮМЕ
Целью статьи является демонстрация того, как экономические условия Казахстана определяют необходимость горизонтальной диверсификации в индустрии туризма путем анализа корреляций между объемом туристических услуг и такими показателями, как ВВП, безработица, обменный курс тенге, инфляция и количество мелких и средних предприятий. Обзор индустрии туризма в республике и перспектив ее развития показывает, что туризм играет все более важную роль в экономике страны. Отрицательными факторами, препятствующими развитию индустрии туризма в Казахстане, являются отсутствие транспортной и информационной инфраструктуры, нестабильный банковский сектор и недоступные бизнес-кредиты, отсутствие квалифицированного персонала в сферах маркетинга, общественного питания и гостиничного бизнеса. В статье сделан вывод о том, что потенциал развития рекреационного, спортивного, культурного, экологического и религиозного туризма в стране не полностью реализован и что требуется более диверсифицированный портфель туристических продуктов. Более того, необходимо усилить экономический рост страны, то есть уменьшить зависимость от нефти и газа, поддержать развитие банковского сектора и провести структурные реформы. Результаты этого исследования могут быть использованы для разработки государственных и региональных программ поддержки туризма в Казахстане.

КЛЮЧЕВЫЕ СЛОВА
идентификация, диверсификации, туризм, экономическое развитие, Казахстан

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Introduction

The travel and tourism industry is subject to a range of external pressures, such as political and economic instability in tourist destination regions as well as demographic processes in the countries where tourism companies are located [1]. Therefore, diversification of tourist packages, geographical markets, and tourism technologies is widely used in developed countries. In Kazakhstan, this can prove to be a viable solution for the problems the tourism industry is currently facing, making this sector more flexible and adaptable to change.

There is a vast body of research that deals with various aspects of diversification in tourism: for instance, the question of priorities in diversification on the level of individual enterprises [2–4], on the level of rural areas, regions and countries [5–8].

This paper aims to show how the current economic conditions in Kazakhstan determine the need to diversify the portfolio of tourism products in Kazakhstan to make the industry more efficient.

Methodology

Our methodology is based on dialectic, systemic, and descriptive approaches, which allow us to study the problem by adopting the method of scientific abstraction, logical analysis, comparison, cause and effect analysis. By applying these methods and approaches, we analyze the link between diversification in tourism industry and the country's economic development and identify the factors that influence the development of tourism in Kazakhstan. Therefore, we have chosen the following key economic indicators: GDP, unemployment, tenge exchange rate, inflation, and the number of small and medium-sized enterprises (SMEs). We also analyzed the data provided by international organizations' reports.

General characteristics of the tourism industry in Kazakhstan

Tourism is one of the main sectors of economy in Kazakhstan, crucial for the country's social, cultural and environmental development.

Although tourism is one of the world's largest industries, ranking third in terms of revenues after oil and gas industry and car manufacturing [9], in Kazakhstan, it accounts for only 0.9% of the GDP. According to *The Travel & Tourism Competitiveness Report* of the 2017 World Economic Forum, Kazakhstan ranks 81st among 136 countries[1].

In 2017, the government of Kazakhstan adopted the *Roadmap for Tourism Development in Kazakhstan*, which set the target of increasing the share of tourism in the GDP to 8% by 2025[2].

Current trends in the development of tourism in Kazakhstan can lead to the improvement of the situation in the future: for instance, while in 2000, 1.47 million of foreign tourists visited Kazakhstan, their number rose to 7.7 million in 2016[3].

At the same time, according to international experts, tourism in Kazakhstan still has a long way to go, despite the abundance of sites of outstanding natural beauty. The negative factors that are off-putting to tourists are the poor quality of services and the lack of developed transport infrastructure[4].

Research literature identifies three major types of tourism – inbound, outbound and domestic. As for the purpose of travel, we can distinguish cultural, ethnic, religious, sport, recreational, educational, exotic, ecological, transit, rural, adventure, medical, space, event and academic tourism [10].

Outbound tourism is the most developed type of tourism in Kazakhstan: the country's residents travel to Europe, America, Middle East, and South-Eastern Asia. In 2017, there were 23,524.9 thousand of tourists, out of whom 10,260.8 were outbound tourists; 7,701.2, inbound tourists; and 5,562.9, domestic tourists[5]. In this paper, we are going to focus on inbound and domestic tourism in Kazakhstan.

According to the Statistics Committee of the Ministry of National Economy, the structure of inbound tourism by trip purpose looks the following way (Table 1).

Out of 12,117 visitors arrived in Kazakhstan in June 2017, 46% came to see friends and family (which does not exclude other purposes); 20.6%, for recreation; and 24.6%, were business travellers. The remaining 8.8% had other purposes.

[1] *Kazakhstan Ranks 81st in the WEF Travel & Tourism Competitiveness Index*. Retrieved from https://informburo.kz/novosti/kazahstan-zanyal-81-mesto-v-reytinge-konkurentosposobnosti-v-sfere-turizma.html

[2] *Decree of the Government of the Republic of Kazakhstan of 30 June 2017 No 406 Roadmap for Tourism Development in Kazakhstan until 2023*. Retrieved from https://online.zakon.kz/Document/?doc_id=39370590

[3] *International Tourism, Number of Arrivals. Kazakhstan. Workbank. World Development Indicators.* Retrieved from http://mecometer.com/topic/international-tourism-number-of-arrivals

[4] *Summer Holiday in Kazakhstan? Astana Eases Visa Restrictions to Attract Tourists*. Retrieved from https://www.theguardian.com/world/2014/jul/17/kazakhstan-eases-visa-restrictions-attract-tourists

[5] Statistics Committee, Ministry of National Economy, Kazakhstan (2018) Key Indicators of Tourism. In: *Statistical Bulletin*. Astana.

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Table 1

Distribution of inbound travellers by the purpose of visit in June 2017

Purpose	Number of visitors
Leisure, recreation and holiday	2,498
Visiting friends and family	5,573
Education and professional training	336
Health and medical treatment	408
Religion and pilgrimage	110
Shopping	163
Transit	37
Business	2,992
Total	12,117

Source: Statistics Committee, Ministry of National Economy, Kazakhstan (2018) Distribution of Inbound Travellers by the Purpose of Visit. In: *Statistical Bulletin*. Astana.

It should be noted that diversification of tourist packages is insufficient, which makes the country unattractive for foreign tourists and is detrimental to the revenues of tourist companies. In 2017, the total volume of hospitality services in Kazakhstan was 108,359,760.4 thousand tenge, which accounted for 2.1% of the country's GDP. Art, entertainment and leisure accounted for 1.8%. Out of 7.7 million of inbound tourists, 1.3 million or 16.4% used the services of resort facilities, hotels, and facilities located in protected natural areas[6].

Tourism diversification and economic development in Kazakhstan

To analyze the connection between tourism diversification and characteristics of Kazakhstan's economic development we need to look at the key indicators (Table 2).

Table 2

Key indicators of macro-economic development in Kazakhstan in 2013–2017

Year	Indicator				
	GDP (million tenge)	Tenge exchange rate (USD/KZT)*	Unemployment (%)	Inflation (%)	The number of SMEs
2013	35,999,025.1	152.3	5.2	4.8	888,233
2014	39,675,832.9	179.19	5.0	7.4	926,844
2015	40,884,133.6	221.73	5.1	10.4	1,242,579
2016	46,971,150.0	342.16	5.0	8.5	1,106,353
2017	53,101,281.8	326	4.9	7.1	1,145,994

Source: Statistics Committee, Ministry of National Economy, Kazakhstan (2018) Key Indicators of Socio-Economic Development of the Republic of Kazakhstan. In: *Statistical Bulletin*. Astana; (*) *Average Official Foreign Currency Rates in the Period 2013–2017*. National Bank of the Republic of Kazakhstan. Retrieved from http://nationalbank.kz/?docid=763&switch=russian

[6] Statistics Committee, Ministry of National Economy, Kazakhstan (2018). Key Indicators of Tourism. In: *Statistical Bulletin*. Astana.

As Table 2 illustrates, there is a stable growth in the GDP in each period; the national currency is unstable (since 2013, the dollar-tenge exchange rate has changed by 138%); the level of unemployment is relatively stable; inflation is volatile, although it does not reach the critical values; the number of small- and medium-sized businesses (SMEs) is growing.

If we compare these indicators with the volume of services (Table 3), we will see the correlation between the development of tourism industry and the key economic indicators.

Table 3

Volume of services provided by accommodation facilities in different years (ths. tenge)

Year	Volume of services
2013	59,714,164.2
2014	72,401,941.1
2015	72,597,228.3
2016	82,853,434.6
2017	108,359,760.4

Source: Statistics Committee, Ministry of National Economy, Kazakhstan (2018). Volume of Services Provided by Accommodation Facilities. In: *Statistical Bulletin*. Astana.

The results of our calculations are shown in Table 4.

Table 4

Coefficients of correlation between macro-economic indicators and the volume of services provided by accommodation facilities

Pairs of indicators	Correlation coefficient
GDP – Volume of services	0.98
Tenge exchange rate	0.82
Unemployment – Volume of services	–0.90
Inflation – Volume of services	0.17
The number of SMEs – Volume of services	0.52

Note: based on the data from Table 2 and 3.

Thus, there is virtually no correlation between inflation and the volume of services provided by accommodation facilities. There is, however, a very strong inverse correlation between unemployment and the volume of services since the development of tourism means more jobs and is associated with the decreasing rate of unemployment. There is also a strong correlation between the GDP and the volume of services as both of these indicators have been growing steadily. We cannot be absolutely sure about the impact of the GDP on the growth of tourism or vice versa. The correlation between the volume of services and the two remaining indicators is more evident, though.

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For instance, the drop in tenge value caused an increase in the demand for services because foreign tourists were attracted by lower prices. Thus, the falling exchange rate of the national currency had a positive impact on inbound tourism. There is a weak correlation between the number of SMEs and the volume of services. Therefore, we can conclude that tourism accounts for an insignificant share in the overall increase in the number of SMEs in the country and that the influx of new companies in the tourism industry in Kazakhstan is comparatively small.

This fact is supported by the data of the Statistics Committee, which recorded a 9% decline in the sphere of inbound tourism. In the fourth quarter of 2017, Kazakh tourists preferred to travel abroad (63% of respondents against 49% in 2016). They were attracted by the better developed tourist infrastructure, better cost-quality balance, and the wider choice of accommodation facilities. At the same time, in Kazakhstan, there was a rise in demand for overseas tours and a decrease in the employment rate in the tourism sector in comparison with 2016. Business owners themselves pointed out that the decline in demand for tourist services had the biggest influence on the economic performance of their companies.

To gain a better understanding of the problem, let us look at the reports published by international organizations. The World Bank pointed out the three major risks faced by the country's economy: the weaker external demand, escalation of problems in the banking sector, and weak implementation of the structural reforms. Therefore, it is recommended that the government should make progress in deepening structural reforms aimed at diversification of economy and to enhance the country's economic potential in non-oil sectors. According to the report, the oil sector was the main driver of economic growth, as oil output increased by 12.5% in the first nine months of 2017 due to the launch of production at the off-shore oil field Kashagan[7]. Another factor contributing to this trend was the increase in oil prices by 24%. Additionally, the construction sector rebounded due to new large capacity expansion projects in the oil sector.

In other sectors, there is a growth in the production sphere, agriculture, transport and trade. Despite the rise of foreign trade, the volume of direct foreign investment has shrunk.

According to the World Bank's forecast, if Kazakhstan manages to implement its structural reforms successfully, it will help increase diversification and the potential of the country's economy. The *100 Concrete Steps* program and privatization are expected to reduce the role of the state in economy and enhance trade in sectors other than oil and gas. A robust fiscal and monetary policy can maintain the economic and price stability, which help attract more investment to the non-oil sectors. The government still needs to address such problems as the prevalence of state-owned companies in economy, the lack of qualified workforce, the macro-economic vulnerabilities, and the lack of interregional cooperation[8].

The decline in the real income of the population and the falling national currency, which make exchange transactions unprofitable, hamper the development of outbound tourism. At the same time the development of inbound and domestic tourism is difficult due to the underperforming national tourist companies, which fail to devise and promote tourist routes to destinations in Kazakhstan. Theoretically, it would be possible to stimulate companies through affordable business loans. This, however, seems problematic taking into consideration the unstable banking sector and the comparatively high refinancing rate in Kazakhstan.

Thus, Kazakhstan has potential for tourism development but finds it hard to realize it, both in terms of domestic and international tourism. As of 2016, there are 2,031 tourist companies operating in the country. There are 2,754 accommodation facilities with 128,062 beds, which is 16.6% more than in 2015. The occupancy rate in 2016 was 23.8%, that is, over 75% of beds were vacant at the same time[9].

According to the *Roadmap for Tourism Development in Kazakhstan Until 2023*, "accommodation prices in places with a high level of hospitality services are much higher than in their counterparts in other tourist destinations of the world. The average price for a standard room in a 5* hotel

[7] *World Bank Kazakhstan's Economy is Rising – It is Still All About Oil. Country Economic Update.* Retrieved from http://www.worldbank.org/en/country/kazakhstan/publication/economic-update-fall-2017

[8] *World Bank Kazakhstan's Economy is Rising – It is Still All About Oil. Country Economic Update.* Retrieved from http://www.worldbank.org/en/country/kazakhstan/publication/economic-update-fall-2017

[9] *Decree of the Government of the Republic of Kazakhstan of 30 June 2017 No 406 Roadmap for Tourism Development in Kazakhstan until 2023.* Retrieved from https://online.zakon.kz/Document/?doc_id=39370590

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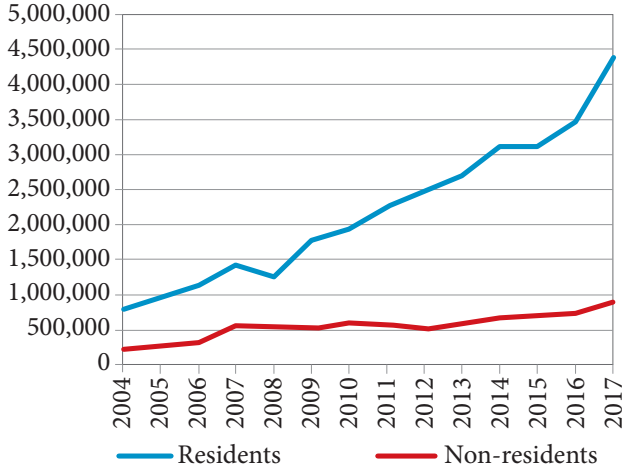
in Astana or Almaty is about 20% higher than the average price for a similar room in top European cities and tourist destinations"[10]. Exorbitant prices make tours to Kazakhstan even more expensive and are detrimental to the country's competitiveness on the global market.

Figure illustrates the demand for Kazakhstan as a tourist destination[11].



The number of tourists in Kazakhstan

This graph shows that the growth rates of domestic tourism exceed those of inbound tourism; the volume of domestic tourism is higher than that of inbound tourism; in general, there has been a growing demand for tourism, although 2007–2008 and 2014–2015 were the periods of recession. In 2014 and 2015, for instance, domestic tourism was in decline while inbound tourism failed to show any signs of growth. This slowdown was likely to be caused by the falling tenge, which mostly affected the country's residents.

The majority of tourists (82.8%) come from Kazakhstan; as for tourists from other countries, Russia accounts for the largest share of non-resident tourists (31.4%); China, 7.4%; the USA, 5.9%; Turkey, 5.9%; Germany, 4.5%; 2.9%, Italy; and 42% come from other countries[12].

As for the purpose of trips, business travellers prevailed (54.1%). 45.6% were holiday-makers. The majority were private tourists (75.4%) while business travellers accounted for 16.2%[13].

Therefore, we can conclude that tourism in Kazakhstan mostly relies on the country's residents and on business trips of non-residents, that is, the potential of recreational, sport, cultural, ecological and religious tourism is not fully realized.

International experience shows that in order to increase the share of tourism in the country's GDP, it is essential to attract more foreign holiday-makers[14]. For instance, Europe is overpopulated, which means that European tourists would welcome the opportunity to escape crowds of tourists and enjoy being along with nature[15].

Even though the tourism infrastructure has been improving in the recent years, high prices still discourage foreign tourists from choosing Kazakhstan as a place of destination. In this respect, Kazakhstan cannot cope with the competition from its neighbours – Uzbekistan and Kyrgyzstan[16]. It is possible to lower the prices and improve the quality of services only if there is healthy competition on the market. Therefore, a set of measures should be developed to attract more foreign investment, create a favourable investment climate and address other problems that impede the development of tourism in Kazakhstan.

As the country is now going through major structural changes, the following types of diversification in tourism seem to be the most promising: business, transit, ethnic, educational, event, and academic tourism. The rising share of SMEs in tourism (hostels and private tourist agencies) will make it possible to increase the price and product range.

The most significant problems that need to be dealt with are the poorly developed transport and information infrastructure, the unstable banking sector and unaffordable business loans, hamper-

[10] *Decree of the Government of the Republic of Kazakhstan of 30 June 2017 No 406 Roadmap for Tourism Development in Kazakhstan until 2023.* Retrieved from https://online.zakon.kz/Document/?doc_id=39370590

[11] Statistics Committee, Ministry of National Economy, Kazakhstan (2018). Economic Activity of Enterprises in Kazakhstan. In: *Statistical Bulletin*. Astana; Statistics Committee, Ministry of National Economy, Kazakhstan (2018). The Number of Domestic Tourists using Tourist Accommodation Facilities (Residents). In: *Statistical Bulletin*. Astana.

[12] *Decree of the Government of the Republic of Kazakhstan of 30 June 2017 No 406 Roadmap for Tourism Development in Kazakhstan until 2023.* Retrieved from https://online.zakon.kz/Document/?doc_id=39370590

[13] *Decree of the Government of the Republic of Kazakhstan of 30 June 2017 No 406 Roadmap for Tourism Development in Kazakhstan until 2023.* Retrieved from https://online.zakon.kz/Document/?doc_id=39370590

[14] *Web-Site of Business Portal Kapital.kz.* Retrieved from https://kapital.kz/economic/71242/kakie-nishi-privlekatelny-dlya-investicij-v-turizm.html

[15] *Web-Site of Business Portal Kapital.kz.* Retrieved from https://www.zakon.kz/4450912-turizm-v-kazakhstane-glazami.html

[16] *Web-Site of Business Portal Kapital.kz.* Retrieved from https://kursiv.kz/opinions/2018-07/turizm-kazakhstana-itogi-2016-perspektivy-2017-goda

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ing the development of private entrepreneurship, the lack of qualified personnel in the sphere of hospitality, marketing and catering. With its current level of prices and services, Kazakhstan as a tourist destination is unable to compete with its international counterparts. Taking into account all these considerations, the main form of diversification in Kazakhstan should be horizontal, that is, the search for new markets.

Conclusion

Our analysis leads us to the following conclusions:

1. Diversification of tourism, that is, enhancement of the diversity of markets, products and services within the industry, is an important process influenced by different external factors. Tourist companies are heavily dependent on the available infrastructure, on natural, cultural and political conditions.

2. Only a very small share of inbound and outbound travellers in Kazakhstan are tourists; the majority are business travellers. The fact that Kazakhstan attracts few tourists can be explained by the poor quality of the existing transport infrastructure, the poor quality of services and high prices, which means that the country's tourism market is unstable and undeveloped and that its potential is largely underrealized.

3. Diversification may spur the development of recreational, sport, cultural, ecological and religious tourism.

4. To ensure sustainable economic development, Kazakhstan needs to reduce its dependence on the oil and gas sector, provide sufficient support for its banking sector and conduct effective structural reforms. Kazakhstan should also attract more foreign investment (for example, the case of the Chinese infrastructure project *Western Europe – Western China*).

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Spatial demographic inequalities and regional development in Serbia

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ABSTRACT
The study provides a comprehensive data analysis of demographic and socio-economic characteristics in Serbian regions as factors of uneven regional development. The data were provided by the official population censuses from 1953 to 2011. The study uses the following demographic indicators: population; the index of population change; population density; the share of migrants in the total population; the share of 65+ population; and the average age of the population. The indicators of the regions' socio-economic development were as follows: the level of development of cities and municipalities; the share of uneducated population; the share of the population with secondary and higher education; the share of welfare recipients; the share of employed population; the share of computer illiterate persons; and the share of the unemployed. The research results have shown significant regional discrepancies: Belgrade, Kosovo and Metohija regions are economically prosperous regions, attractive for migrants from other parts of Serbia, the situation is quite the opposite in Southern and Eastern Serbia, characterized by the outflow of the population and economic underdevelopment, especially in the border areas. The other two regions are within the two extremes, Vojvodina being closer to Belgrade and Šumadija and Western Serbia, to Southern and Eastern Serbia.

KEYWORDS
demographic indicators, socio-economic indicators, NUTS2 region, regional disparities, Serbia

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Региональные демографические различия и региональное развитие в Сербии

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РЕЗЮМЕ
В исследовании содержится всесторонний анализ данных демографических и социально-экономических характеристик сербских регионов, рассмотренных как факторы неравномерного регионального развития. Данные были предоставлены официальными переписями населения с 1953 по 2011 г. В исследовании используются следующие демографические показатели: население; индекс изменения численности населения; плотность населения; доля мигрантов в общей численности населения; доля населения старше 65 лет; и средний возраст населения. Показатели социально-экономического развития регионов были следующими: уровень развития городов и муниципалитетов; доля необразованного населения; доля населения со средним и высшим образованием; доля получателей пособий; доля занятого населения; доля граждан, не умеющих пользоваться компьютерами; и доля безработных. Результаты исследования показали значительные региональные различия: регионы Белград, Косово и Метохия являются экономически процветающими регионами, привлекательными для мигрантов из других районов Сербии, ситуация в Южной и Восточной Сербии является совершенно противоположной, характеризующейся оттоком населения и экономической недоразвитостью, особенно в приграничных районах. Остальные два региона находятся в двух крайностях: Воеводина находится ближе к Белграду, в то время как Шумадия и Западная Сербия – к Южной и Восточной Сербии.

КЛЮЧЕВЫЕ СЛОВА
демографические показатели, социально-экономические показатели, регион NUTS2, региональные различия, Сербия

БЛАГОДАРНОСТИ
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ДЛЯ ЦИТИРОВАНИЯ
Lović Obradović S., & Matović S. (2018) Spatial demographic inequalities and regional development in Serbia. *R-economy*, 4(3), 88–94. doi: 10.15826/recon.2018.4.3.013

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Introduction

The Republic of Serbia has diverse geographical and socio-economic characteristics such as the uneven distribution of the population caused by geographical, social and historical factors. Apart from the pronounced geographical differences, the regions also have different demographic and socio-economic characteristics. The geographical factors had prevailed until the end of the Second World War, and then social factors took over as industrialization led to intensive migration from rural areas to cities. Before that, Serbia had mostly been an agricultural country [1]. The demographic determinant only emphasized the existing differences resulting in significant regional disrepancies. Thus, it is necessary to address the issues of unbalanced population distribution in order to ensure sustainable development of all parts of Serbia [2].

Uneven regional distribution of the population in Serbia is not a new phenomenon. Historically, it goes back to the post-war period of industrialization, when the intensive economic and demographic growth of Belgrade region began. In the same period, southern and eastern Serbia experienced the demographic and economic decline caused by the major disproportions in the country's regional development [3].

Disparities in population concentration and excessive population growth of primary regions can have a negative impact on the country's overall economic development. Therefore, these issues need to be addressed through policies aimed at redirecting the population to other regions; policies promoting investment in infrastructure, marketing, and development of small and medium enterprises [4].

Theoretical framework

In order to design an adequate policy for balancing regional development it is essential to understand the nature of regional disparities resulting from the unequal distribution of investment and demographic resources. The vast body of literature on the problem of regional disparities and its causes reveals the complexity of this phenomenon. Regional disparities are also among the priority issues in the European Union's policies; most schemes for development and integration of nation states within the EU seek to address this problem as considerable regional disparities are considered to be detrimental for the success of supra-national integration projects (Crudu) [5].

Vorauer (1997) defines regional disparities as a deviation in socio-geographic, economic, social and environmental development within a particular spatial/administrative division resulting in different living standards and unequal economic potential [6]. Kutscheraur et al. (2010) approach regional disparity as a divergence or inequality of characters, phenomena or processes with a specific territorial allocation, occurring in at least two entities of the territorial structure [7]. Tegenu (2011) lists various factors that lead to regional disparities: agro-ecological factors (such as rainfall amount, soil quality, topography and altitude); demographic factors (population density, level of urbanization, reproductive behavior of the households); infrastructure development; income and property; patterns of private investment; and so on. The researcher also points out that the lack of detailed regional studies and inter-regional analysis may contribute to the lack of attention paid to the problem of regional imbalances [8]. However, there is still no generally accepted answer to the question about the origins of regional disparities [9].

Demography places population in the center of research on regional disparities. Vojković (2003) considers that regionalization is a complex phenomenon, which means that population must be viewed in the more general context: we need to look at historical demographic trends, territorial organization of the population, its demographic structure and in particular at the spatial laws which determine the demographic development of a certain area [10]. Population growth can stimulate economic growth, which may attract more migrants, while the loss of population damages the region's economy, thereby reducing the resorces for its further development [11].

Research Methodology and Data

This study uses the data of seven successive censuses, starting from the first post-war census in 1953 to the last official census in 2011, conducted on the territory of Serbia. In this paper, we provide a comparative overview of the basic demographic indicators for the period of fifty-eight years, placing a special emphasis on the last census. The aim was to point out the complexity of demographic phenomena and processes within the given period. For Kosovo and Metohija, only the data until 1991 were available for analysis as Serbia's Official Statistical Office did not provide official data for this region after 1991. Indicators of regional disparities were divided into two classes – demo-

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graphic and socio-economic. In our analysis we used the following demographic indicators: population; the index of population change; population density; the share of migrants in the total population; the share of 65+ population; and the average age of the population. To assess the socio-economic development of the region we used the following indicators: the level of development of cities and municipalities; the share of uneducated population; the share of the population with secondary and higher education; the share of welfare recipients; the share of the employed population; the share of computer illiterate persons; and the share of the unemployed.

The indicators were analyzed at the NUTS2 level: in 2011, the Government of the Republic of Serbia adopted the Decree on the Nomenclature of Statistical Territorial Units, which defines the Nomenclature of Statistical Territorial Units, as well as the criteria for grouping of subdivisions of countries on three levels – NUTS 1, NUTS 2 and NUTS 3 (NUTS1 corresponds to groups of regions; NUTS2, regions; and NUTS3, districts). The criteria for NUTS grouping are established according to the EU standards: the population size, geopolitical position, natural potential, the existing territorial organization, and cultural and historical heritage [12]. According to the Decree, Serbia is statistically divided into two large units – Serbia-North and Serbia-South (NUTS 1); five regions (Vojvodina, Belgrade, Šumadija and Western Sebia, Southern and Eastern Serbia and Kosovo and Metohia (NUTS 2)); and 25 districts (NUTS 3) (Figure) [12].

NUTS 2 and NUTS 3 regions in Serbia

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Discussion

Demographic determinants of regional disparities

Population size. The available data on the country's population show that the most populated region in Serbia in the given period was Šumadija and Western Serbia. This region is one of the largest in Serbia, which explains its population size (see Table 1). On the other hand, the smallest number of inhabitants was recorded in Belgrade, which is also the smallest. Indices of population change and the data on population density give us a more precise demographic picture of the regions.

Serbian regions are characterized by a diversity of demographic trends. More prosperous municipal centers attract migrants from other regions, which results in unbalanced spatial distribution of the population across Serbia, as the last official census in 2011 showed.

The most economically successful region is Belgrade, which attracts people from all other parts of Serbia. Belgrade is the only region in Serbia in which the share of settled population exceeds 50% (51.8%), while the smallest share is found in Southern and Eastern Serbia (41.2%). Belgrade attracts the working age population and the reproductive-age population. Although this region shows the highest recorded fertility rates (10.7%), there is also a negative natural increase with a rate of –1.5%. The increase in the number of inhabitants is therefore provided by the positive migration balance.

According to the latest 2011 census, there were 968 settlements with less than 100 inhabitants, and there were also 11 deserted settlements. Serbia is characterized by distinct spatial differentiation in the number of settlements with the population of less than 100 inhabitants. Only one such settlement was found in Belgrade (0.6%); in Vojvodina, 12 (2.6%); in Šumadija and Western Serbia, 128 (14.7%); in Southern and Eastern Serbia, 827 (25.7%). In the latter region there were also 9 deserted settlements.

Population by age. As in most European countries, in Serbia, for several decades, the birth rates have been insufficient to ensure simple reproduction of the population, which causes depopulation and demographic aging and reflects the consequences of the demographic transition [13]. As far as the number of the elderly is concerned, Serbia is classified as one of the oldest states not only in Europe, but also in the world. Life expectancy rates are increasing and there are much more elderly people than young and active,

Table 1

Population by regions

Region	Population								Index of population change, 1948 = 100						
	1948	1953	1961	1971	1981	1991	2002	2011	1953	1961	1971	1981	1991	2002	2011
Belgrade	634,003	731,837	942,190	1,209,360	1,470,073	1,602,226	1,576,124	1,659,440	115.40	148.60	190.70	231.90	252.70	248.60	261.70
Urban	437,053	521,114	721,183	990,272	1,206,235	1,310,920	1,274,924	1,344,844	119.20	165.00	226.60	276.00	299.90	291.70	307.70
Other	196,950	210,723	221,007	219,088	263,838	291,306	301,200	314,596	107.00	112.20	111.20	134.00	147.90	152.90	159.70
Vojvodina	1,640,599	1,698,640	1,854,971	1,952,560	2,034,782	2,013,889	2,031,992	1,931,809	103.50	113.10	119.00	124.00	122.80	123.90	117.80
Urban	655,831	699,575	826,200	978,115	1,095,256	1,115,562	1,152,674	1,146,731	106.70	126.00	149.10	167.00	170.10	175.80	174.90
Other	984,768	999,065	1,028,771	974,445	939,526	898,327	879,318	785,078	101.50	104.50	99.00	95.40	91.20	89.30	79.70
Šumadija and Western Serbia	1,776,544	1,902,934	2,006,793	2,111,855	2,243,885	2,266,428	2,136,881	2,031,697	107.10	113.00	118.90	126.30	127.60	120.30	114.40
Urban	242,679	305,669	419,233	614,981	829,608	946,535	956,586	963,548	126.00	172.80	253.40	341.90	390.00	394.20	397.00
Other	1,533,865	1,597,265	1,587,560	1,496,874	1,414,277	1,319,893	1,180,295	1,068,149	104.10	103.50	97.60	92.20	86.10	76.90	69.60
Southern and Eastern Serbia	1,743,691	1,828,910	1,874,293	1,929,140	1,980,506	1,940,252	1,753,004	1,563,916	104.90	107.50	110.60	113.60	111.30	100.50	89.70
Urban	249,836	297,476	391,056	574,370	744,504	841,681	834,295	816,749	119.10	156.50	229.90	298.00	336.90	333.90	326.90
Other	1,493,855	1,531,434	1,483,237	1,354,770	1,236,002	1,098,571	918,709	747,167	102.50	99.30	90.70	82.70	73.50	61.50	50.00
Kosovo and Metohija	732,746	815,798	963,715	1,243,811	1,584,440	1,956,196	...	...	111.30	131.50	169.70	216.20	267.00	...	...

Source: Statistical Office of the Republic of Serbia (2014). *2011 Census of Population, Households and Dwellings in the Republic of Serbia. Comparative overview of the number of population in 1948, 1953, 1961, 1971, 1981, 1991, 2002 and 2011.* Vol. 20. Belgrade: Statistical Office of the Republic of Serbia. Retrieved from: http://pod2.stat.gov.rs/ObjavljenePublikacije/Popis2011/Knjiga20.pdf

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which makes the pension burder heavier [14]. The smallest share of the population older than 65 was recorded in Belgrade and Vojvodina (16.3%); a slightly higher share was in Šumadija and Western Serbia (17.7%); and the largest, in Southern and Eastern Serbia, where almost a fifth of the population were older than 65 (19.4%). In Belgrade, the share of the population aged 65 and older is higher in cities while in other regions, this share is higher in rural areas (Table 2).

The lowest average age of the population was recorded in Belgrade and Vojvodina (41.8 years old); the average age is slightly higher in Šumadija and Western Serbia (42.3 years old); and the oldest population is in Southern and Eastern Serbia (43.3 years old) (see Table 2).

Socio-economic determinants of regional disparities

GDP per capita. The most economically developed regions in Serbia are Belgrade and Vojvodina with the GDP per capita above the national average. Šumadija and Western Serbia, Southern and Eastern Serbia with Kosovo and Metohija have the GDP level below the national average, and belong to the group of underdeveloped regions.

Education. The level of education shows regional disparities. Belgrade has the smalest share of uneducated people in the total population (1.2%) and at the same time the largest share of population with secondary and higher education (27.8%). Southern and Eastern Serbia is characterized by the largest share of uneducated population (12.5%) and the smalest share of the population with secondary and higher education (3.8%) (see Table 2).

Social welfare and employment. There are considerable regional disparities in the share of welfare recipients and in the share of employed people. The lowest share of the former is in Belgrade, while the largest share of the latter is characteristic of Southern and Eastern Serbia (see Table 2).

Table 2

Demographic and socio-economic indicators

Region	The share of migrants (%)	The share of population 65 and over (%)	Average age	The share of uneducated population (%)	The share of population with secondary and higher education (%)	The share of welfare recipients (%)	The share of employed population (%)	The share of computer iliterate population (%)	The share of unemployed population (%)
Belgrade	51.8	16.4	41.8	1.2	27.8	0.9	35.3	38	7.8
Urban	–	16.5	41.9	0.9	32.1	0.8	36.2	33.9	8.9
Other	–	15.8	41.4	2.46	9.3	1.3	31.2	56	6.8
Vojvodina	46.2	16.4	41.8	2.3	14.1	2.6	30	49.3	9.2
Urban	–	15.8	41.4	1.58	19.1	2	32	42.1	10.8
Other	–	17.3	42.3	3.41	6.7	3.4	27.1	59.7	7.7
Šumadija and West Serbia	41.3	17.7	42.3	3.4	11.7	2.1	30	57.4	9.2
Urban	–	14.5	40.6	1.6	18.6	2	32	44.3	10.1
Other	–	20.6	43.7	4.9	5.5	2.1	27.1	69	8.3
South and East Serbia	41.2	19.4	43.3	3.7	12.5	2.3	28.5	58.7	11
Urban	–	15	41	2.1	20.8	2.6	30	46.3	12.1
Other	–	24.1	45.7	5.5	4.9	2.3	27.2	72	9.9

Source: Statistical Office of the Republic of Serbia (2013). *2011 Census of Population, Households and Dwellings in the Republic of Serbia. Educational Attainment, Literacy and Computer Literacy*. Vol. 3. Belgrade: Statistical Office of the Republic of Serbia. Retrieved from: http://pod2.stat.gov.rs/ObjavljenePublikacije/Popis2011/Skolska%20sprema,%20pismenost%20i%20kompjuterska%20pismenost-Educational%20attainment,%20literacy%20and%20computer%20literacy%20.pdf; Statistical Office of the Republic of Serbia (2013). *2011 Census of Population, Households and Dwellings in the Republic of Serbia. Migrations.* Vol. 9. Belgrade: Statistical Office of the Republic of Serbia. Retrieved from: http://pod2.stat.gov.rs/ObjavljenePublikacije/Popis2011/Knjiga%209_Migracije-Migrations.pdf; *lgrade: Statistical Office of the Republic of Serbia*. Retrieved from: http://pod2.stat.gov.rs/ObjavljenePublikacije/Popis2011/Knjiga20.pdf; Statistical Office of the Republic of Serbia (2014). *2011 Census of Population, Households and Dwellings in the Republic of Serbia. Population. Economic activity*. Vol. 19. Belgrade: Statistical Office of the Republic of Serbia. Retrieved from: http://pod2.stat.gov.rs/ObjavljenePublikacije/Popis2011/Knjiga%207_Ekonomska%20aktivnost-Economic%20activity.pdf

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Computer literacy and economic activity. When it comes to the share of computer illiterate people and the share of unemployed in the total population, the smalest share of people of both categories is in Belgrade, and the largest, in Southern and Eastern Serbia (see Table 2).

Conclusion

Since there is a correlation between spatial/regional inequalities and economic growth, more attention should be paid to the question about the connection between the demographic and economic forms of regional inequality as well as other forms, such as social, ethnic, political, religious, and so on [15]. Drawing upon the available census data, this paper sought to examine the influence of spatial demographic inequalities on regional development. While Belgrade, Kosovo and Metohija (till 1981) are economically prosperous regions, attractive for migrants from other parts of Serbia, the situation is quite the opposite in Southern and Eastern Serbia, characterized by the outflow of the population and economic underdevelopment, especially in the border areas. The other two regions are within the two extremes, Vojvodina being closer to Belgrade, and Šumadija and Western Serbia closer to Southern and Eastern Serbia.

In the given period, Belgrade and Kosovo-Metohija were singled out as growth poles. In Belgrade, however, the population increase is largely determined by the positive migration balance: as the city is a political, administrative, educational and economic center, it attracts migrants from all other parts of Serbia. The increase in the number of inhabitants in Kosovo and Metohija was due to the positive natural increase. Southern and Eastern Serbia was a negative pole of growth, with a marked demographic decline, as the last two censuses have demonstrated. A significant decline in population, especially in other (rural) settlements, shows that the old mechanisms of demographic growth are no longer effective. Given the negative demographic trends, which are reflected in the negative natural increase and emigration, as a consequence of the historically determined unfavorable age structure of the population, a further decline in the population is expected.

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The determinants of budget revenues of Russian regions

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ABSTRACT
This paper discusses the determinants of regional budget revenues and evaluates their impact on the level of budget provision of Russian regions. We used the panel data on 80 Russian regions in 2006–2014 embracing average population, GRP disaggregated by main economic activities, tax revenues both collected and allocated at the regional level, intergovernmental aid and total budget revenues of consolidated budgets. We applied the least-squares methods with fixed and random effects to estimate the regressions between the structure of employment in main economic activities and the collected tax revenues in Russian regions. The constructed model allowed us to distinguish activities with positive and negative influence of employment on the general tax level and to determine the elasticity of the collected tax revenue per capita with respect to the shares of employees engaged in various economic activities. Further we applied the weighted least-squares method to estimate the model, demonstrating dependency of the budget revenue per capita in Russian regions on the collected tax revenue per capita, the level of tax absorption and the share of intergovernmental transfers in consolidated regional budgets. The constructed model demonstrated high elasticity of budget provision of Russian regions with respect to the general tax level, and even more with respect to the level of tax absorption. Nevertheless, the inter-budgetary transfers showed a very slight positive impact on the dispersion of the regional budget revenue per capita over the given period. Our findings are applicable to the management of budget revenues at the regional level and to the improvement of the Russian model of fiscal federalism.

KEYWORDS
region; budget revenue, determinants, economic activities, GRP per capita

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Детерминанты бюджетных доходов российских регионов

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РЕЗЮМЕ
В данной статье обсуждаются детерминанты доходов региональных бюджетов и оценивается их влияние на уровень бюджетной обеспеченности регионов Российской Федерации. Мы использовали данные по 80 регионам России за 2006–2014 годы, включающие среднее население, ВРП с разбивкой по основным видам экономической деятельности, налоговые поступления, как собранные, так и оставшиеся на уровне регионов, размер межправительственной помощи и общие доходы консолидированных бюджетов субъектов РФ. Мы применили метод наименьших квадратов с фиксированными и случайными эффектами для оценки регрессионных зависимостей между структурой занятости в основных видах экономической деятельности и собранными налоговыми поступлениями в российских регионах. Построенная модель позволила выявить, занятость в каких видах экономической деятельности оказала положительное, а в каких отрицательное влияние на общий уровень налоговых поступлений и определить эластичность собранных налогов на душу населения относительно долей занятых в различных видах экономической деятельности. Далее мы применили взвешенный метод наименьших квадратов для оценки модели, демонстрирующей зависимость доходов бюджетов на душу населения в российских регионах от собранных налоговых поступлений на душу населения, уровня абсорбции налогов и доли межбюджетных трансфертов в консолидированных бюджетах субъектов РФ. Построенная модель продемонстрировала высокую эластичность бюджетной обеспеченности регионов России к общему уровню налогообложения и еще большую эластичность – к уровню абсорбции налогов. В то же время межбюджетные трансферты оказали незначительное положительное влияние на снижение разброса среднедушевых доходов региональных бюджетов в рассматриваемом периоде. Наши выводы могут быть использованы для управления доходами бюджетов на региональном уровне и улучшения российской модели фискального федерализма.

КЛЮЧЕВЫЕ СЛОВА
регион; доходы бюджета; детерминанты; виды экономической деятельности; ВРП на душу населения

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Introduction

Russia occupies a vast territory spread over different climatic zones. A variety of natural conditions predetermine the diversity of economic structures of Russian regions and levels of their development. Moreover, the spatial location of regions, their proximity to the center and to economically advanced or, on the contrary, poor territories play a significant role in their development. The conditions of regional economies are also influenced by their previous paths of development, the functions that were attributed to these regions earlier in the centrally planned economy, the authority of regional leaders and their interrelationship with the federal center.

There were substantial disparities in the levels of development and budget provision of Russian regions during the entire period of market transition, although these disparities were steadily decreasing until recently. Indeed, in 2009, the gap in the GRP per capita between the most prosperous region, Nenets Autonomous District, and the most lagging region, the Republic of Ingushetia, amounted to 67.1 times, while the national average was 224.2 thousand rubles per capita. In addition, in 2009, the interregional population-weighted coefficient of variation of the GRP per capita was .84. In 2014, the gap in the GRP per capita decreased noticeably – up to 39.5 times, while the coefficient of variation declined slightly and reached 0.81. After 2014, the opposite tendency was observed: the gap in the GRP per capita grew up to 54.5 in 2016 while the coefficient of variation decreased slightly to the level of 0.786. Despite these changes, both the top and the bottom regions in the ranking remained the same in 2016 as in 2009.

Regarding the budget provision of Russian regions, the situation was much better due to the active redistribution policy of the state. The interregional inequality in budget provision of Russian regions was considerably lower compared to the above-described regional disparities in the GRP per capita but still significant and growing in recent years. Thus, in 2011, the gap between the revenue per capita of the consolidated budget of the most prosperous region, Nenets Autonomous District, and the revenue of the most lagging region, the Republic of Dagestan, amounted to 12.1 times. The interregional population-weighted coefficient of variation of budget provision of Russian regions was .55 in 2011. By 2015, the gap between Chukotka Autonomous District, ranked first by budget revenue per capita, and the Republic of Dagestan, which ranked last, had increased to 15.7 times, and the interregional coefficient of variation reached .61.

In our study we assume that the sectoral structure of the country's economy plays a decisive role in budget provision of regional economies. It determines the level of the tax revenue that can potentially be collected there. Indeed, the largest level of tax return in the inter-crisis period of 2009–2013 was found in the mining industry, where the ratio of the collected tax revenue to the gross added value amounted to 53.7%, followed by the manufacturing industry (21.3%). The lowest level of the tax return rate was in agriculture (2.3%). At the same time, the tax rules in Russia are set in such a way that the least evenly distributed taxes, namely the mineral extraction tax and the value added tax, are fully allocated at the federal budget level. Consequently, the tax revenues of more productive sectors, such as the extractive industry, are shared with the federal center in a larger proportion compared to tax revenues of other sectors. This partially mitigates the influence of the sectoral structure of economy on the budget provision of regions. In addition, the regional level of the tax return within economic activities varies significantly, which is mainly due to the differences in structures and conditions of these activities in regions, and, regarding the mining and quarrying industry, different quality of fields and different stages of their extraction.

The distribution of tax returns in Russian regions is influenced not only by the sectoral structure of regional economies, but also by differences in the application of tax exemptions and privileges. For instance, preferential tax regimes in special economic zones of some manufacturing regions significantly affects their level of tax returns. Moreover, the amount of collected taxes in regions depends on behavioral practices of the population and enterprises in these regions, the levels of tax discipline, tax compliance and tax evasion, and the quality of tax administration.

The distribution of intergovernmental transfers from the federal center to regions increases their financial resources and supports the alignment of regional budget provision. In addition to the equalization of budget revenues per capita, the system of intergovernmental aid in Russia is aimed at other purposes: balancing of regional budgets, funding of social mandates delegated to the sub-federal level from the higher authorities, and stimulation of investment activity in the regions. To achieve these goals, various types of budgetary

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assistance were elaborated, including subsidies, subventions, grants and other inter-budgetary transfers. Meanwhile, some of these objectives may be in conflict with others. Thus, stimulation may contradict equalization.

In this research, we examine the determinants of regional budget revenues per capita related both to the sectoral structure of regional economies and to the institutional features of the tax and budgetary systems in Russia.

Literature Overview

In research literature, different approaches are applied to studying regional budget revenues. First of all, there are papers that analyze the impact of macroeconomic factors (the exchange rate, oil prices, economic growth and inflation) on the total revenue of the budgetary system [1] or more specific factors such as tax revenues, interbudgetary transfers and so on. Some researchers have developed the ways to exclude the combined influence of macroeconomic factors on budget revenue [2]. Other authors examined the problems of sub-federal budgets in Russia in their relation to the current geopolitical situation, the impact of mutually imposed sanctions and the high dependence of Russian economy on the global energy market condition [3].

Castro and Camarillo [4] analyzed the impact of economic, structural, institutional and social factors on tax revenues in OECD countries in 2001–2011. They found that tax revenues as a percentage of GDP in these countries were positively related to GDP per capita, the industry value added as a percentage of GDP and civil liberties, whereas they were inversely dependent on the agriculture value added as a percentage of GDP and the share of foreign direct investment in gross fixed capital formation.

Other authors focused on institutional and behavioral factors affecting budget revenue and budget deficit of sub-federal entities in federal states. For example, Breuille and Vignot [5] modeled the impact of redistribution policy on financial behavior and fiscal discipline of the recipient regions. The authors concluded that such policy can encourage the regions to create overlapping schemes that could exacerbate the problem of a soft budget constraint. Huber and Runkel [6] developed another theoretical model simulating the relationship of the federal center and regions with different rates of time preference. The authors showed that the asymmetry of information can lead to ineffective redistribution of resources in favor of recipients. They proposed to establish differentiated institutions for two types of regions within the fiscal constitution: weak debt limits for contributors and strict debt limits for recipients. Such institutions should allow the federal center to overcome the information asymmetry through self-selection of regions.

In the context of our research, we should also mention the works on short- and long-term effects of redistribution of financial resources through the budgetary system. There are studies pointing out that the efficiency of inter-budgetary aid for development of a territory and the subsequent increase of its level of budgetary provision depends on how the received funds are spent. For instance, Kappeler, Solé-Ollé, Stephan and Välilä in their study [7] found that the use of intergovernmental transfers for production of public goods and investment in infrastructure of regional economies can stimulate economic growth.

It should be emphasized that a considerable part of inter-budgetary transfers in Russia is aimed at equalization of budgetary provision of regions, balancing sub-federal budgets according to the specific needs and the cost of living in regions, and financing the so-called social mandates, which are delegated from the federal center to the regional level. Based on the econometric models of various specifications, the researchers came to contradictory conclusions about the efficiency of inter-budgetary aid in Russian economy. For example, Yushkov [8] found that intergovernmental transfers positively affected economic growth in Russian regions in 2005–2012. At the same time, Isaev [9] demonstrated that inter-budgetary transfers from the federal centre to Russian regions had a negative impact on their economic growth in 2005–2014. Meanwhile, Martinez-Vasquez and Timofeev [10] found that intraregional budget transfers, distributed among municipalities for equalization of their budgetary provision, positively affected regional economic growth in 1999–2008.

However, centralized funding of large investment projects aimed at regional development has been a prevalent trend. Some researchers studied the consequences of allocation of financial resources within the framework of national projects. Belov [11] showed that investment from sub-federal budgets is more conducive to growth and development of Russian regions than investment from the federal budget. Therefore, the author came to the conclusion that the transfer of investment funds

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from the federal center to Russian regions should foster regional economic development.

Other researchers applied the deterministic factor analysis to study sub-federal budget revenues in the Russian Federation. A multiplicative model of the regional budget revenues was used to measure the changes in budgetary provision of Russian regions at consequent stages of budgetary process such as collection of tax revenues in regions, tax sharing with the federal center, attraction of non-tax revenues in regions, intergovernmental transfers and the regions' borrowing from other levels of the budgetary system and outside it [12]. In addition, the changing level of regional disparities in sub-federal budget provision was evaluated and the conclusion was drawn about the efficiency of various stages of the budgetary process in addressing interregional inequality. In yet another study [13], the author proposed an additive model of sub-federal budget revenues in Russia and carried out decomposition of the general inequality in the provision of regional budgets by various tax and non-tax sources.

Some authors analyzed the interrelationship between sectoral structures of regional economies and their budget revenues [14]. In particular, Paredesa and Rivera [15] found that in countries with a high share of mining, in GDP the mineral extraction tax can displace other taxes. The regression model constructed for Russian regions in [16] showed that more specialized economies had a higher level of tax return, while more diversified economies showed a higher degree of its stability.

In this study, we apply the panel data of Russian regions in 2006–2014 to econometric modeling of regional budget revenues. The purpose of this research is to select and substantiate exogenous factors that have a complementary impact on the level of the per capita revenue of the consolidated budgets of Russian regions. We also intend to show the connection between the budgetary provision of Russian regions, their economic structures, and the peculiarities of their participation in inter-fiscal interactions. We are also going to construct alternative econometric models and interpret their results.

Data and Methods

The study is based on the pooled spatial-temporal sample covering 747 observations on 83 Russian regions in 2006–2014. The initial data are provided by the Federal State Statistic Service and the Federal Tax Service of Russian Federation.

We tested a set of the following independent variables presumably influencing the budget revenue per capita in Russian regions:

1. Variables related to the sectoral structure of regional economies:

– the gross value added in main economic activities per capita;

– the labor productivity in main economic activities calculated as the ratio of the gross value added to employment in these activities;

– the share of economic activities in the total gross value added;

– the share of economic activities in total employment;

2. Variables related to the state of the tax and budgetary systems and interbudgetary relationships:

– the general level of taxation (determined as the ratio of the collected tax revenues to GRP and to constant population of regions);

– the level of tax absorption – the share of tax revenues remaining in the consolidated regional budgets after the distribution of the total tax revenues collected in the regions between the levels of the budgetary system;

– the share of remittances transferred to regional budgets from the federal center in the total revenue of regional budgets.

To bring the nominal values of these variables in various years to a single scale of prices, we calculated their real values. For this purpose, we used the cumulative GDP deflator indices determined on the accrual basis. Since we constructed the regressions of the logarithmic type, individual observations with negative and zero values were omitted.

The selection of independent variables for regression was carried out on the basis of the correlation matrix, taking into account both the relationship of these variables with the dependent variable and the absence of multicollinearity. We tested models of different specifications, including the models with fixed and random effects to which the least squares method was applied. The significance of the models was estimated on the basis of the Fisher criterion, and significance of its coefficients – on the basis of the Students tests. We also checked the models for the presence of heteroscedasticity using the White test.

Results and Discussion

Figure 1 shows a wide dispersion of the budgetary provision of Russian regions in real terms on average in 2006–2014.

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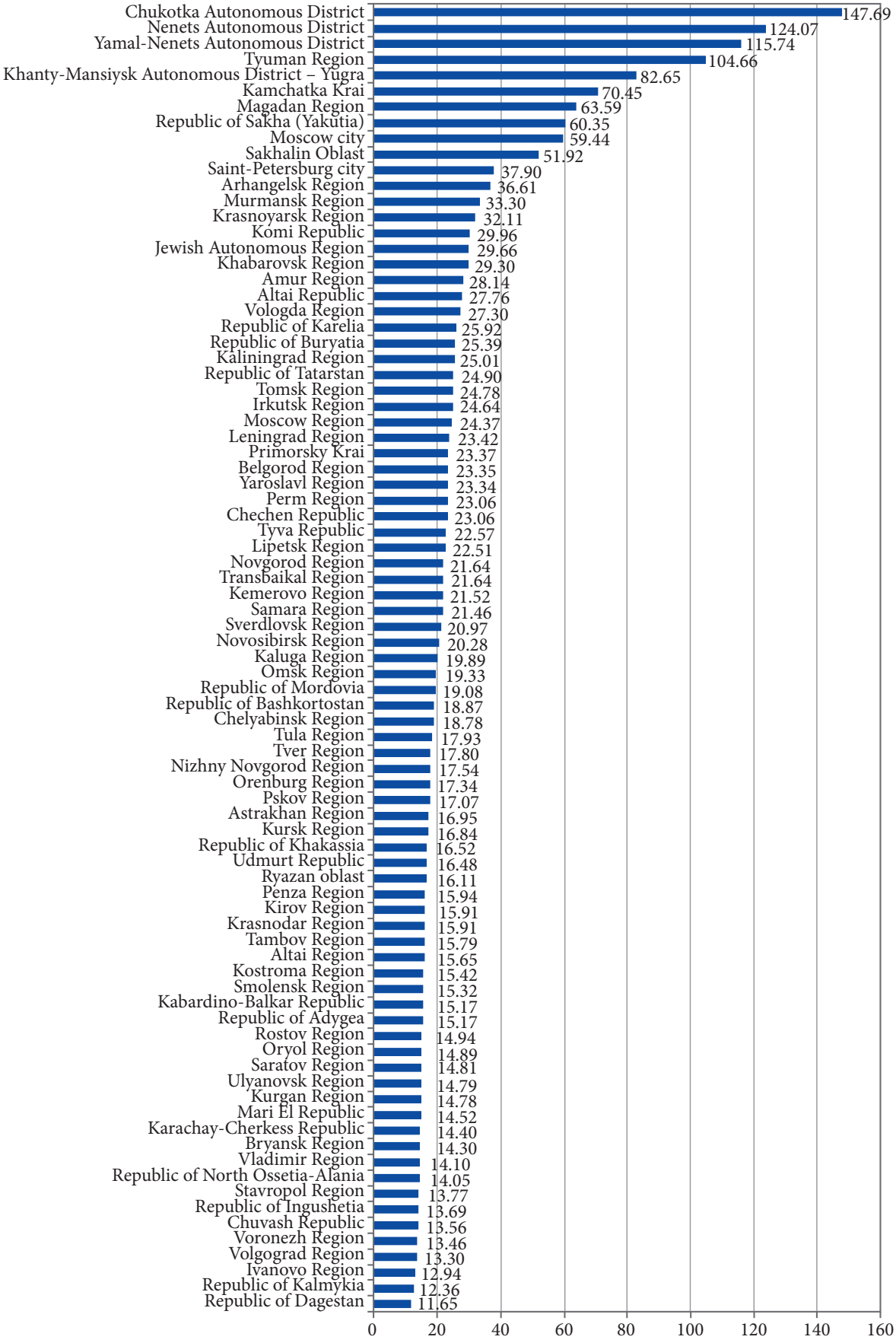

Russian regions' annual average budget revenue per capita in 2006–2014 in constant prices of 2005, thousand deflated rubles

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According to the results obtained, the budget revenue per capita in the richest region (Chukotka Autonomous District) was 12.7 times higher than that of the poorest region (Dagestan). Only in 17 out of 83 regions the level of budget provision exceeded the country average. The ratio of the median value to the mean value of budgetary provision was 70.6%, which indicated a left bias in the distribution of this variable. It should be noted that the deflation of indicators in time series reduced the level of interregional inequality of budget provision. However, we did not take into account the initial distribution of prices and differences in the cost of living in the base period of study, which could decrease the measured inequality to a greater extent.

Among the leaders by the level of budgetary provision, we can primarily find the regions specialized in extractive industry and characterized by the relatively low population density (namely, Nenets Autonomous District, which is a part of Arkhangelsk region; Khanty-Mansiysk and Yamalo-Nenets Autonomous Districts, which are parts of Tyumen region; Chukotka Autonomous District, Kamchatka Krai, the Republic of Sakha, Magadan and Sakhalin regions, all situated in the Far Eastern Federal District). A high position by the level of budget revenue is also occupied by the capital city of Moscow, where a large number of state agencies and financial institutions are located.

Among the laggards, we see the regions deprived of any comparative advantages of both natural and artificial origin, such as the Republic of Kalmykia, Ivanovo region and the Chuvash Republic. Moreover, almost all North Caucasian republics (except for the Chechen Republic) are lagging behind as well as Stavropol region.

This situation in Russian regions is the result of many processes. The budgetary provision is affected by the volume of the collected tax revenue, which is shared with the federal budget, non-tax revenues (income from public and municipal property and sale of tangible and intangible assets etc.) and availability of inter-budgetary aid. Meanwhile, the initial level of budgetary provision in each region is predetermined by the tax revenue collected on its territory, the amount of which depends to a large extent on the sectoral structure of regional economy.

Table 1 compares the following three sectoral structures of regional economies: the distribution of employed persons, production of GRP and collected taxes in main economic activities. It indicates the outstanding role of the mining sector in tax revenues. In this sector, both the labor productivity and the tax return level were 3.7 times higher than the national average. As a result, the tax revenue per employee in mining and quarrying exceeded the average level in all sectors by almost 14 times. At the same time, an increased

Table 1

Structural parameters of tax revenues in Russian regions in 2006–2014, %

Economic Activities	Share in total employment			Share in total GRP			Share in collected tax revenue		
	MV	SD	CV	MV	SD	CV	MV	SD	CV
Agriculture, hunting and forestry (A)	11.4	5.9	0.52	9.3	6.3	.68	.6	2.0	3.29
Fishing, fish farming (B)	.4	1.2	2.83	1.1	6.7	6.11	.1	2.3	16.26
Mining and Quarrying (C)	2.3	4.3	1.86	8.7	15.1	1.73	32.5	23.0	.71
Manufacturing (D)	14.5	6.3	.44	18.4	11.3	.62	18.1	19.9	1.10
Electricity, gas and water (E)	3.4	1.5	.44	4.5	2.7	.61	2.8	4.3	1.53
Construction (F)	7.5	2.5	.33	7.9	4.1	.52	4.9	4.6	.94
Wholesale and retail trade; repair (G)	15.9	3.6	.23	16.7	7.0	.42	11.5	13.6	1.19
Accommodation and food service activities (H)	1.7	.5	.30	0.9	.5	.52	0.6	.5	.82
Transport and telecommunications (I)	8.0	1.9	.24	11.7	4.9	.42	8.1	7.1	.88
Real estate, leasing and services (J)	1.3	.5	.41	0.2	.5	2.22	5.2	4.6	.88
Financial activities (K)	6.3	2.4	.38	7.4	3.1	.43	9.9	4.8	.48
Public administration and defense	6.8	2.3	.33	4.8	3.0	.63	1.7	5.6	3.19
Education	9.5	2.3	.24	3.4	1.8	.52	1.4	2.0	1.40
Health and social services	7.3	1.3	.18	3.8	1.8	.46	1.1	1.9	1.65
Public utilities	3.7	.7	.19	1.2	.5	.43	1.3	.9	.66

Note: MV — interregional mean value, *SD* — interregional standard deviation, *CV* — interregional coefficient of variation, which is the ratio of *SD* to *MV*.

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level of labor productivity in certain spheres (fishing, fish farming; transport and telecommunications; manufacturing; electricity, gas and water; finance) and a higher level of tax return in some other spheres (real estate, leasing and services; finance) ensured greater profitability of the tax system. Thus, the contribution of economic activities to overall tax revenues in regions and in the country as a whole depended on their share in employment and production.

Due to the fact that economic structures in the regions differ, their tax revenue levels also differ, which is evident from the corresponding standard deviations and coefficients of variation in activities. Thus, according to the distribution of employment, the regions are the most diverse in mining and quarrying, fishing and fish farming. By the share in GRP, they differ more in the aforementioned two activities, as well as in real estate, leasing and services. Finally, the share of regions in tax revenues varies most in fishing, fish farming, as well as in agriculture, hunting and forestry.

Our selection of structural variables that presumably shape the tax revenue per capita in regions was based on the criteria specified in the methodological part of the work. We proposed a model of the following specification:

$$\ln(TRpc_{it}) = \beta_0 + \sum_{i=1}^{n} \beta_i \ln(X\ emp_{it}) + \varepsilon_{it},$$

where $TRpc_{it}$ is the tax revenue per capita and $Xemp_{it}$ is the share of the corresponding activity in the total employment of the ith region in the period t. The model was estimated by means of three alternative methods presented in Table 2.

The constructed models are significant according to the Fisher criterion; the significance of their parameters (except for the intercept term) is confirmed by the Students test. In addition, they do not have multicollinearity and the residuals of the models are normally distributed.

According to the results obtained, those regions whose population is employed mainly in the sectors of mining and quarrying; electricity, gas and water production; construction; transport and telecommunications; real estate, leasing and services and finance had a higher level of collected tax revenues per capita on average. At the same time, those regions whose employment concentrated mainly in agriculture, hunting and forestry; manufacturing; wholesale and retail trade, repair;

Table 2

Models: dependent variable ln($TRpc_{it}$)

Variable	Coefficient of regression (Standard error), significance		
	Model 1: Pooled OLS regression	Model 2: OLS with fixed effects	Model 3: GLS with random effects
const	–1.154 (.836)	.129 (.789)	–.591 (.795)
Ln(A_emp)	–.250 (.029) ***	–.242 (.031)***	–.245 (.029)***
Ln(C_emp)	.073 (.014) ***	.058 (.015)***	.068 (.014)***
Ln(D_emp)	–.097 (.042) **	–.122 (.044)***	–.106(.042)***
Ln(E_emp)	.300 (.077) ***	.306 (.076)***	.354(.073)***
Ln(F_emp)	.269 (.079) ***	.325 (.082)***	.279 (.079)***
Ln(G_emp)	–1.287 (.088) ***	–1.207 (.089)***	–1.290 (.088)***
Ln(H_emp)	–.125 (.059) **	–	–
Ln(I_emp)	.653 (.097) ***	.605 (.098)***	.602 (.094)***
Ln(J_emp)	.188 (.071) ***	.275 (.075)***	.211 (.070)***
Ln(K_emp)	.627 (.085) ***	.669 (.091)***	.626 (.085)***
Ln(L_emp)	–.878 (.088) ***	–.811 (.095)***	–.894 (.088)***
Ln(M_emp)	–.470 (.135) ***	–	–.425 (.134)***
Ln(N_emp)	–.531 (.170) ***	–.689 (.156)***	–.510 (.170)***
Ln(O_emp)	–.540 (.104) ***	–.761 (.109)***	–.609 (.099)***
Adjusted R-squared	.822	.821	–
Durbin-Watson statistic	1.810	1.962	–
Number of observations	693	693	693

Note: * means that the coefficient is significant with $p < .1$; ** means that the coefficient is significant with $p < .05$; *** means that the coefficient is significant with $p < .01$.

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accommodation and food service activities; public administration and defense; education; health and social services and public utilities have a lower level of the collected tax revenues per capita on average. The coefficients of regressions show the elasticity of tax revenues with respect to the share of employment in the corresponding activity.

The second step of our research was modeling the interrelationship between budget revenues per capita as a dependent variable and the general level of taxation, the level of tax absorption and the share of transfers in regional budget revenues as independent variables. Table 3 shows the descriptive statistics of the explained and explanatory variables.

Table 3

Descriptive statistics of the parameters related to the consolidated budgets of the Russian regions in 2006–2014, %

Variable	Note	MV	SD	CV
Budget revenue per capita, thousand deflated rubles	$BRpc_{it}$	28.11	36.99	1.32
General level of taxation, thousand deflated rubles	*TRpc*	34.16	79.72	2.33
Level of tax absorption	*Selt*	.74	.20	.26
Share of transfers in total budget revenues	*Transf*	.34	.19	.54

Note: MV is the mean value; *SD*, the standard deviation; and *CV* is the coefficient of variation.

The general tax level turned out to be a statistically significant parameter that positively affected the average budget revenues, which was completely correspondent with the logic of economic processes. The linear coefficient of the correlation between the tax revenue per capita and the budget revenue per capita in Russian regions in the given period equaled .57. However, the strong heteroscedasticity in this dependency was observed even visually.

The relationship between the level of tax absorption in regions and the total budget revenues per capita appeared to be slightly negative. Indeed, the Pearson correlation of these variables was only –.13. At the same time, we found a significant negative relationship between the collected tax revenues per capita and the share of taxes left in regional budgets after their distribution among the levels of budgetary system. The dependency between the general tax level and the level of tax absorption was described by the power function of the following specification:

$$Self_{it} = 7.6 TRpc_{it}^{-2.036},\ R^2 = 0.47.$$

As for transfers, we did not obtain any strong evidence showing their connection to the level of budget provision, albeit the inverse dependency was expected. We identified several reasons for this phenomenon. First of all, significant and diverse inter-budgetary transfers received from the federal budget by some lagging regions, for example, the republics of Chechnya, Tyva, Altai, in fact, raised their level of budgetary provision even higher than the national average. Secondly, when determining the needs of regions in intergovernmental transfers, fiscal authorities take into account not only the available regional budget revenues, but also the necessary expenses, which depend on the cost of living and on the specific needs of each particular region. Hence, some seemingly more affluent regions of the Far Eastern Federal District, such as Chukotka Autonomous District, Magadan region and Kamchatka, receive significant transfers from the center, which further increases their level of budget provision.

Despite the ambiguity of some dependencies, we proposed a regression of the following specification:

$$\ln(BRpc_{it}) = \beta_0 + \beta_1 \ln(TRpc_{it}) + \beta_2 \ln(Self_{it}) + \\ + \beta_3 \ln(Transf_{it}) + \varepsilon_{it}.$$

To cope with the heteroscedasticity and abnormality of the distribution of residues, we estimated this model using the weighted least-squares method, which means that the natural logarithm of GDP per capita was treated as a weight parameter. Moreover, in the estimation of the regression we used robust standard errors. The resulting model is presented in Table 4.

Table 4

Model: dependent variable $\ln(BRpc_{it})$

Variable	Pooled WLS regression
const	1.652 (.063) ***
$\ln(TRpc_{it})$	.649 (.029) ***
$\ln(Selt_{it})$	.809 (.074) ***
$\ln(Transf_{it})$	.063 (.017) ***
Adjusted R-squared	.705
Number of observations	747

Note: *** means that the coefficient is significant with $p < .01$; **, the coefficient is significant with $p < .05$; * the coefficient is significant with $p < 0.1$.

In this regression, all exogenous variables are statistically significant and the directions of relationship between the exogenous and endogenous variables are completely consistent with the logic of economic processes. Indeed, the higher the lev-

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el of taxation, the level of tax absorption and the aid received from the federal center, the higher is the level of budget provision of Russian regions. Despite the concerns about possible multicollinearity, the VIF test did not confirm its existence in this model.

The estimated coefficients of the model can be interpreted as indicators of elasticity of the tax revenue with respect to the examined factors. For example, an increase in the tax revenue per capita collected in Russian regions by 1% leads to an increase in the budget revenue of the regions by .65% on average. The elasticity of budget provision with respect to the level of tax absorption has proven to be even higher compared to the level of tax collection. Eventually, inter-budgetary transfers demonstrated the weakest impact on the changes in the budget revenue per capita in regions over time. It evidenced the diminishing role of intergovernmental aid in equalization of Russian regions' budget provision.

Conclusion

In this study, we analyzed the factors that influenced the revenues of consolidated regional budgets by using the panel data of Russian regions in 2006–2014. In the theoretical part of our paper, we studied the influence of the sectoral structure of economy, macroeconomic conditions, institutional features of the tax and budgetary systems, and public behavior on the level of average budget revenues of states and their constituent entities. In the empirical part of the paper, we selected the most relevant variables and constructed the models related to the two stages of budget revenue formation. In the first step, using ordinary least-squares methods with fixed and random effects, we built the dependency of the tax revenue per capita in real terms on the shares of economic activities in total employment in Russian regions. It allowed us to reveal the positive impact of employment in certain sectors (e.g. mining and real estate activities) and the negative impact of employment in other sectors (e.g. agriculture, trade and social sphere) on the general tax level in Russian regions. In the second step, by means of the weighted least-squares method, we constructed a regression model of the logarithm type, which demonstrated a positive impact of the general tax level, the level of tax absorption and the share of inter-budgetary transfers in consolidated budgets of Russian regions on their budget revenue per capita. We demonstrated the greatest influence of the level of tax absorption and the smallest effect of transfers on the reduction of regional disparities regions by budget provision.

The results obtained are basically consistent with some of our previous findings [12; 13] and develop approaches to modeling regional differences on the level of budgetary provision. For further research, it is necessary to improve the methods of construction of regression models based on spatial-temporal data and to provide a more precise specification of the basic model by including proxy variables for institutional parameters of budgetary and tax systems as well as general public behavior.

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The Danube inland waterway transport and its role in Serbia's economic development

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ABSTRACT
The Danube river waterway, i.e. the Pan-European Corridor VII, is considered as one of the most significant transport corridors in Europe. It runs through ten countries, including Serbia (the Serbian part of the river is 588 km long), which is why it is one of Serbia's priorities to develop inland water transport. The system of waterways provides a viable alternative to roads and rail systems. Moreover, it is crucial for regional development. The Danube River offers excellent opportunities for freight, passenger and tourist inland water transportation. However, the navigability potential of the Danube River still remains largely underrealized in Serbia: despite the high quality of waterways, inland water transport accounts for only 4.7% of the total transport. This paper deals with the advantages of inland navigation and the major characteristics of the Danube waterway in Serbia. In Serbia, the Danube is mainly used for freight and passenger transportation and for the development of nautical tourism. There are a number of important projects that are currently being implemented in Serbia, such as the construction of new port facilities and marinas. The paper also discusses the negative factors impeding regional development in the sphere of waterways and water transport in Serbia, primarily the lack of funding for maintenance and improvement of the river's navigability.

KEYWORDS
Danube, inland waterway, Serbia, transport, sustainable regional development, tourism

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Дунайский национальный водный транспорт и его роль в экономическом развитии Сербии

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РЕЗЮМЕ
Дунайский водный путь, т. е. Паневропейский коридор VII, считается одним из самых значительных транспортных коридоров в Европе. Он проходит через десять стран, включая Сербию (сербская часть реки составляет 588 км), и поэтому является одним из приоритетов Сербии по развитию внутреннего водного транспорта. Система водных путей является жизнеспособной альтернативой дорожным и железнодорожным системам. Более того, это важно для регионального развития. Река Дунай предлагает прекрасные возможности для грузовых, пассажирских и туристических внутренних водных перевозок. Однако потенциал судоходства в реке Дунай по-прежнему реализован в Сербии не полностью: несмотря на высокое качество водных путей, внутренний водный транспорт составляет лишь 4,7% от общего объема перевозок. В этом документе рассматриваются преимущества внутреннего судоходства и основные характеристики водного пути Дуная в Сербии. В Сербии Дунай в основном используется для грузовых и пассажирских перевозок и для развития водного туризма. В настоящее время в Сербии реализуется ряд важных проектов, таких как строительство новых портовых сооружений и пристаней для яхт. В статье также обсуждаются негативные факторы, препятствующие региональному развитию в сфере водных путей и водного транспорта в Сербии, в первую очередь отсутствие финансирования для поддержания и улучшения судоходства реки.

КЛЮЧЕВЫЕ СЛОВА
Дунай, внутренний водный путь, Сербия, транспорт, устойчивое региональное развитие, туризм

БЛАГОДАРНОСТИ
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Introduction

The Danube River has always played a significant role in human geography, serving men as a pathway in migration, trade, and war. Nowadays the Danube is a popular transport route connecting Central and Eastern Europe. The river flows through the regions of intensive industrial and agricultural production, densely populated areas with substantial development potential. Prior to the construction of the Suez Canal, the role of the Danube had been extremely important due to the fact that the shortest route connecting Europe and Asia went through the Black Sea. Over sixty of the Danube's tributaries are navigable, which contributes to the transportation importance of the river. The role of the Danube was enhanced by the construction of the Main-Danube canal, which connects the Northern Sea and the Black Sea and creates a 3,500 km waterway [1].

The Republic of Serbia lies at the crossroads of the most important Pan-European traffic routes, such as the road and railway Corridor X and waterway Corridor VII (the Danube navigable corridor), which has a great significance for the country as it links north and south, east and west. The Danube with the total length of 1,600 km is the backbone of inland waterways in Serbia [2]. In addition, there are the Danube's large tributaries, the Tisza and the Sava Rivers, and the navigable canals within the hydrosystem Danube-Tisza-Danube. All these navigable routes are connected to the Danube River and are a part of the Trans-European Corridor VII waterway from Rotterdam to Sulina.

High population density also reflects the importance of the Upper Danube Basin in Serbia. The total population in municipalities located near the Danube River is 2,013,646 people or 28.8% of the total population of Serbia. Population density in this area is 150 inhabitants per km², which is twice as many as the country's average (80.5 inhabitants per km²)[1].

The Danube River is crucial for the development of trade, services and tourism in Serbia [2; 3]. The Serbian part of the Danube is navigable and is actively used for freight transportation. The level of the river traffic varies from country to country and depends on the political and economic situation. Political stability and closer economic ties have had a positive impact on the development of the transport system in former Yugoslav republics such as Serbia and Croatia. For instance, there has been a tenfold increase in freight traffic on the Danube as compared to twenty years ago. Yet, the transport capacity of the river is still underused, especially we if compare it to that of the Rhine, which is ten times higher[2] [4]. In the Serbian part of the Danube, the lack of investment into the maintenance of waterways and the lack of careful planning has led to deterioration of river and canal navigation in such spheres as freight and passenger transportation and nautical tourism.

Inland Navigation through the Danube Waterway in Europe and Serbia

The Danube has a great significance for all the countries which it flows through: Germany (14.54%), Austria (8.82%), Slovakia (4.34%), Hungary (10.49%), Croatia (3.47%), Serbia (14.82%), Romania (27.1%), Bulgaria (11.87%), Moldova (0.01%) and Ukraine (4.54%). 1,070.9 km of the river (or 37% of its total length) are state borders. Four countries: Croatia, Bulgaria, Moldova and Ukraine are positioned on only one riverbank[3].

There are numerous ways to use the Danube River for freight transport, hydropower generation, industrial and residential water supplies, irrigation, and fishing. Navigation and freight transport play the greatest role in economic development, especially after the construction of the canals such as the Danube-Black Sea Canal and the Main-Danube Canal. The water of the Danube is used in industry, but also in agriculture, especially for irrigation[4]. River transport has a number of advantages such as cost effectiveness and profitability: as Jean Pierre Rissoan (1994) said, "river-sea transport pollutes less and can also provide an alternative to congested roads and railways. Door-to-door journeys by river-sea transport seem destined for future growth" [5]. According to the Economic Commission for Europe (1996; 2011), some of the advantages of inland waterway transportation include cost effectiveness; the lowest propulsion energy consumption; navigation safety; reduced pollution, and so on[5].

[1] Republic Statistical Office. 2012. *Census of Population, Households and Dwellings in the Republic of Serbia*, 2011, Vol. 2, Age and Gender, data by settlements, Belgrade.

[2] Danube Navigation Statistic for 2009–2010; *Encyclopedia Britannica*. Retrieved from http://www.britannica.com/

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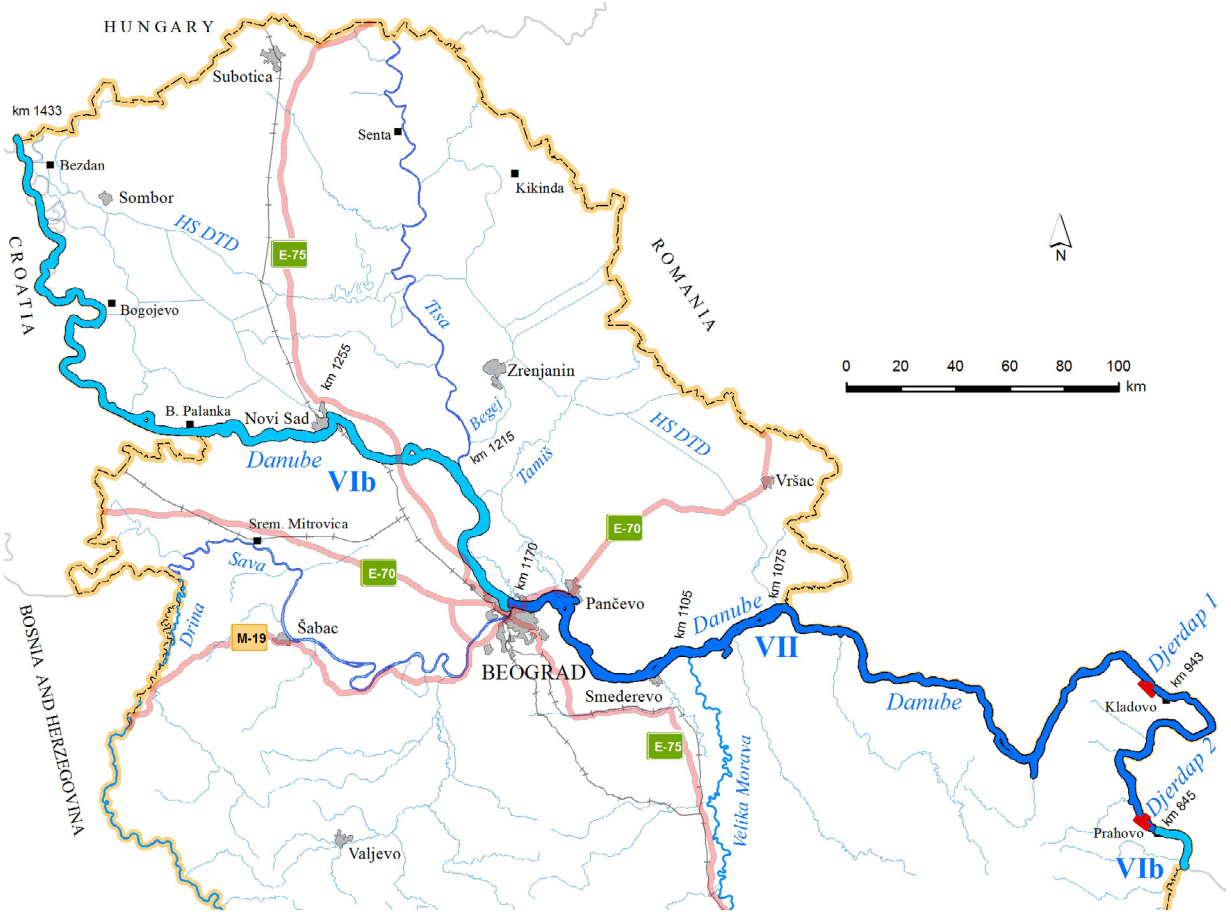

Figure 1. *The Danube River in Serbia (Corridor VII)*
Source: Base map source (Global map V2). Retrieved from http://www.iscgm.org/gmd/

The Serbian part of the Danube is a typical lowland river 400–1,200 m wide, approximately 19 m deep with the water speed of 3.5–4.0 km/h. Prior to the building of the hydroelectric power plant and navigation system *Djerdap*, the Danube had had the characteristics of a mountain river (approximate speed of 18 km/h) in *Djerdap* sector. The construction of the above-mentioned system significantly reduced the river's speed to only 0.3 m/s or 1.1 km/h.

The Danube is the most important element of the inland waterway system in Serbia. With the Sava and the Tisa rivers, it creates a network of waterways 1,680 km long [2].

Serbia was one of the seven countries that established the Danube Commission in 1948, thus accepting the obligation to maintain and improve navigation conditions of the river. One of the most significant recommendations of the Danube Commission is to assure the minimum depths of 2.5 m and fairway widths of 180 m at low water levels.

The Danube's section in Serbia (588 km) is navigable for all types of river ships; it may be divided into four sectors, corresponding to two waterway classes (European Conference of Ministers of Transport, 1992)[6]:

– the sector between the Hungarian border (km 1433 + 000) and Belgrade (km 1166 + 000) has hydrologic and hydraulic regime characteristics;

– the sector between Belgrade (km 1166 + 000) and the dam *Djerdap* I (km 942 + 000) is slowly moving canalled water and corresponds to the waterway class VII;

– the sector between the dam *Djerdap* I (km 942 + 000) and *Djerdap* II (km 863 + 550) was also canalled corresponding to the highest waterway class VII;

– downstream the dam *Djerdap* II (km 863 + 550) up to the Bulgarian border (km 845 + 000), the Danube's course is regulated by various constructions. The maximum vessel dimensions are similar to those in the upstream sectors. However,

[6] European Conference of Ministers of Transport (1992). *Resolution No. 92/2 on New Classification of Inland Waterways* (report). Retrieved from http://www.internationaltransportforum.org/IntOrg/acquis/wat19922e.pdf

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there is a serious threat for the navigation as there are about 200 sunken WWII ships, some of them still loaded with explosive substances, which also endangers VIb waterway class in this sector.

Fleet

According to the Danube Navigation Statistics, from 1962 (3,142 vessels) to 1990 (5,754 vessels), the fleet size grew steadily. In 2000, there was a considerable decrease in the number of vessels. Afterwards, the number of vessels fluctuated insignificantly (Figure 2). However, despite the fluctuations, there was a general upward trend in the number of vessels from 1962 to 2013; the ships' loading capacity increased as well.

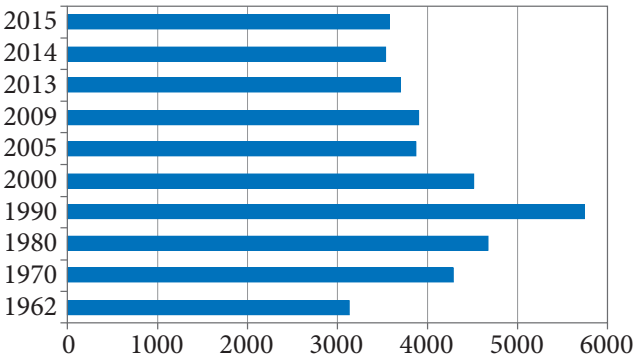

Figure 2. *The total number of vessels of the Danube countries (1962–2015)*

Source: Danube Navigation Statistics for 2009–2010, 2012–2013, 2014–2015

Most vessels in the Danube fleet are used in Germany, Austria, Romania and Ukraine. The number of vessels in Serbia, Croatia and Moldavia is 5% lower than the total number of vessels on the Danube.

Regarding the tonnage of ships on the Danube, Romania ranks first with its share of 40%, then follows Ukraine with 21%, Serbia with 13%, whereas Croatia and Moldova have the smallest shares, 2.5% and 1% respectively[7].

The priority areas for the development of the Danube fleet are as follows[8]: modernisation of the fleet; introduction of new logistics systems; implementation of the River Information Services and introduction of new transport technologies.

Table 1

Fleet, its structure and main types of vessels in Serbia in 2015

Indicator	Motorized vessels	Tugs	Pusher vessels	Towed barges	Pushed barges	Total
Number of units	97	94	65	228	180	664
Total power (kW)	37,929	24,768	55,388	–	–	118,085
Total carrying capacity (t)	88,066	–	–	294,001	169,101	551,168

Source: Danube Navigation Statistics for 2014–2015.

According to the Danube Navigation Statistics for 2014 and 2015, the total carrying capacity of vessels in Serbia is 551,168 tonnes, whereas the total power is 118,085 kW.

Port infrastructure

According to the Danube Commission data, there are 91 commercial ports on the Danube River and its tributaries, out of which 11 ports are situated in Serbia. There are 8 international ports in the Serbian sector of the Danube: Apatin, Bezdan, Bačka Palanka, Novi Sad, Beograd, Pančevo, Smederevo and Prahovo, the remaining three national ports are Titel, Veliko Gradište and Kladovo. According to the Danube Navigation Statistics for 2014–2015, the port Pančevo is one of the largest ports on the Danube, belonging to the group of ports with the annual cargo turnover of more than 1 million tonnes (Figure 3).

Ports in Serbia have significant capacity but they are also technologically outdated, due to the lack of financial support for their maintenance and development. The usage of port capacities reaches only 30% on average due to the lack of transhipment goods. Low capacity utilisation occurs for several reasons, such as the outdated technical equipment in ports; flawed systems for combined and intermodal transport; and declining industrial production in Serbia. The development of intermodal transport and the promotion of combined transport are crucial for future development of transport in Europe [6]. Most ports in Serbia are connected to the main rail and road traffic routes in the country. Only the ports in Pančevo and

[7] European Conference of Ministers of Transport (1992) *Resolution No. 92/2 on New Classification of Inland Waterways* (report). Retrieved from http://www.internationaltransportforum.org/IntOrg/acquis/wat19922e.pdf; *Inventory of Data on the Strategic Inland Waterway Projects.* 2011. PLATINA. Retrieved from http://www.naiades.info/repository/public/article_downloads/file/422_d5-5_24-03-2011_(final_web_version).pdf

[8] *The White Paper on Efficient and Sustainable Inland Water Transport in Europe.* Retrieved from http://www.unece.org/fileadmin/DAM/trans/main/sc3/publications/WhitePaper_Inland_Water_Transport_2011e.pdf

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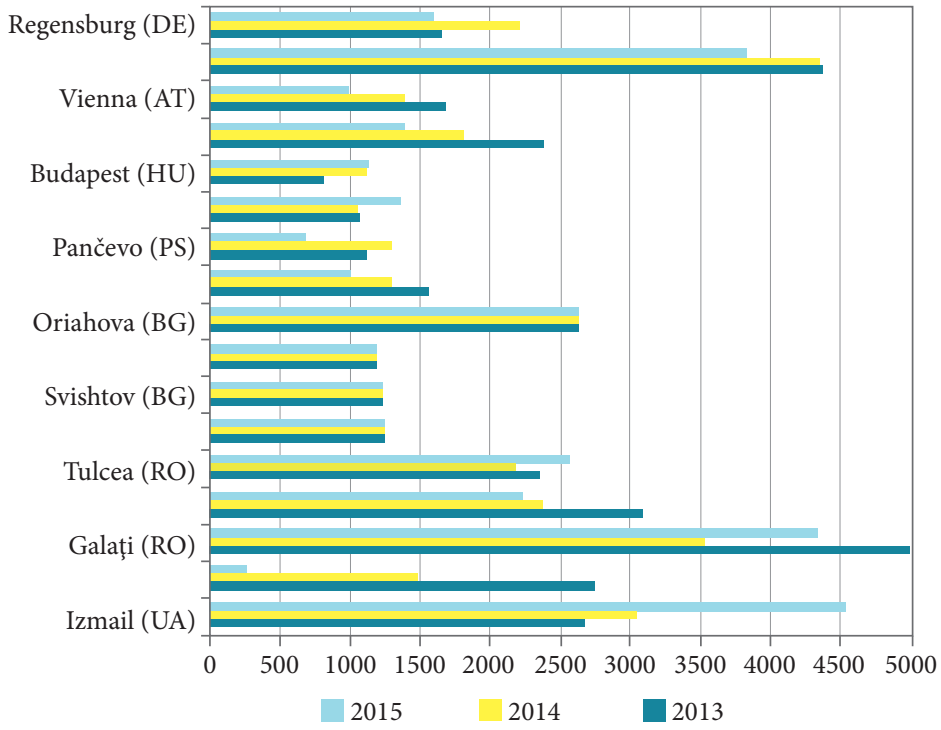

Figure 3. *Major ports on the Danube with cargo turnover of more than 1 mln.t (2013; 2014; 2015)*
Source: Danube Navigation Statistics for 2012–2013 and 2014–2015

Belgrade have container terminals and none of the ports have Ro-Ro terminals, which is a serious drawback. Ro-Ro transport and Ro-Ro terminals could be used not only for domestic lorry carriers, but also for foreign ones (from Turkey, Bulgaria, and Macedonia), which would make it possible to transport lorries by ship and thus cut transportation costs. The project for constructing multimodal facilities in port *Dunav* in Pančevo is already well under way. This project has turned out to be successful as it requires minimum investment (primary infrastructure, ground preparation)[9]. In addition to commercial ports, in line with the latest trends in nautical tourism, a new marina has recently been built in Apatin, which is the first international marina on the Danube in Serbia, out of the seventeen planned, and it offers berths for 400 (120 for large yachts) vessels and dry-docking covering the area of 2,500 m².

The Development of Freight and Passenger Transportation and Nautical Tourism in Serbia

Until the mid-twentieth century, the Danube waterway in Serbia was primarily used for transportation of passengers and goods. The development of road and railway transport somewhat reduced the passenger traffic on the Danube, although this trend was partially compensated for by different forms of nautical tourism. Nowadays, this waterway is mostly used for transportation of goods and tourism.

Heavy load transport

Despite the favourable conditions for the operation of inland waterway transport in Serbia, there are a number of impediments to its development such as the bad infrastructure. The most important ports are Belgrade, Pančevo, Smedervo and Prahovo and they enjoy a very good connection with surface roads. Ports Belgrade and Pančevo have container terminals.

According to the Statistical Office of the Republic of Serbia, the tonnage carried via the Serbian part of the Danube abruptly decreased after 1990. The period of decline coincided with the period of political instability and economic recession in the country. Afterwards, there was a period of growth, which reached its peak in 2005. Since then, there has been a decline and this indicator's values have never got back to the 2005 level (Figure 4).

[9] *Regional Development Strategy of the Republic of Serbia for the period 2007–2012* (2005). Government of Republic of Serbia, Belgrade.

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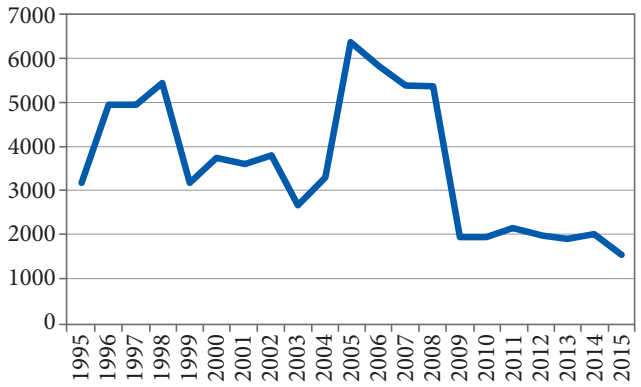

Figure 4. *The total tonnage carried on the Danube in Serbia in 1995–2015 (thousands of tons)*

Source: Statistical Office of the Republic of Serbia. Transport, Storage and Connections Bulletin 2004, 2010 and 2016

Out of the total tonne-kilometres handled in inland waterways in Serbia, the Danube accounts for 97%. Inland traffic makes up over 50% of goods turnover; transit only has a small share, while the transport of goods between foreign ports is almost negligent (see Figure 5).

The goods transported via the Danube are very diverse: iron ore (25.6%); processed and unprocessed metals (22.7%); coal (9.1%); oil and oil derivatives (8.5%); cement (7.5%); grain goods (6%); processed metals of metal industry (5.4%); wood (4.3%); coloured metals ores (3%); finished metal products (2.7%); and agricultural goods such as fodder (1.6%) [7]. The Inventory of Data on the Strategic Inland Waterway Projects (2011)[10] demonstrates that the transportation of agricultural, industrial, chemical and metal products will continue to grow due to the improvement in the infrastructure between Budapest and Belgrade, between Romania and Bulgaria and in the area of Vienna. The increase is to be expected in East Europe, including Serbia.

Passenger transport

The Danube holds a lot of potential as a waterway for passenger transport. This potential, however, is largely underused, as only a few countries in the Danube region have strategies for water transport development. According to the data of the Danube Commission, the highest number of registered passenger ships was recorded in Hungary, Germany, Ukraine and Romania in 2010. These are also the leading countries in terms of domestic passenger-kilometres, whereas the largest number of international passengers is recorded in Ukraine and Germany. Furthermore, according to the Danube Commission, the total passenger kilometres on the Danube in all countries is 21,047 km in national transport and 22,404 km in international transport[11].

Domestic passenger transport virtually does not exist in Serbia and is mostly tourism-oriented. About seventy years ago, passenger ships were travelling along the Danube not only from Novi Sad to Sremska Kamenica, but also to Vienna, Regensburg and Constanca. Hydrowing ships were running regularly between Belgrade and Novi Sad thirty years ago. At that time, passenger ships

[10] *Inventory of Data on the Strategic Inland Waterway Projects*. 2011. PLATINA. Retrieved from http://www.naiades.info/repository/public/article_downloads/file/422_d5-5_24-03-2011_(final_web_version).pdf

[11] *Danube Commission*. Retrieved from http://www.danubecommission.org/

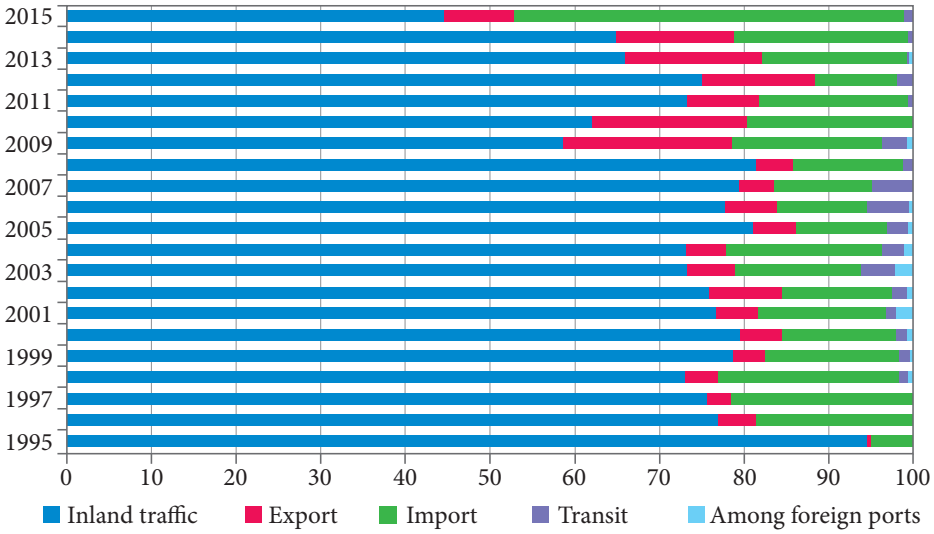

Figure 5. *Share of goods transported through the Danube waterway in Serbia between 1995 and 2015, %*

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were operating on the Tisza River, too. Small ships ran from Novi Sad to Bečej several times a day (on the Danube from Novi Sad to the mouth of the Tisa, then on the Tisa to Bečej), and three times per week from Belgrade to Senta (on the Danube from Belgrade to the mouth of the Tisa, then on the Tisa to Senta).

There have been attempts to revive this form of transport lately. For instance, the water taxi is very popular in Budapest (Hungary): it runs at the speed of 50 km/h and transports passengers from southern districts to the centre and to the north of the city. Similarly, there is daily transport service between Regensburg, Deggendorf, Passau, Linz and Vienna[12].

Nautical tourism

Nautical tourism has been developing worldwide due to the boom of cruise industry in the last four decades. The main forms of nautical tourism include individual navigation of vessel owners, boat charter (renting of ships and sailboats) and river cruises (international tourist cruises). According to the Strategy of Tourism Development in the Republic of Serbia[13], nautical tourism in Serbia uses the strategic potential of the Danube, the leading river cruising destination in Europe. Furthermore, according to the same source, the main spheres for the development of nautical tourism in the country are individual navigation (this segment is mostly based on local demand); charter (this segment requires the appropriate infrastructure and is underdeveloped at the moment); and river cruising (this segment is very popular and is enjoying explosive growth).

As for individual cruises on the Danube, most of the vessels currently in use are old and the equipment is outdated, which explains the low demand for ship berths in marinas. The current number of vessels used for recreational purposes on the Danube in Serbia is negligible (for example, in Apatin it is less than ten vessels a year). It is expected that old vessels will soon be replaced by new ones and that the number of vessels will be increasing together with the development of nautical tourism in Serbia. It has been estimated that the demand for ship berths in marinas on the Danube (domestic vessels) is unlikely to increase by more than 20% in the following years. The well-equipped nautical route on the Danube and the excellent offer of marinas and other tourist products in Serbia are expected to attract approximately 30% of the estimated number of vessels to marinas annually. According to the study of marina network in Vojvodina Region, the total number of vessels using marinas is likely to reach 4,100. Moreover, it is expected that Vojvodina (16 of 28 municipalities on the Danube in Serbia) would need about 500 berths for foreign vessels in marinas on the Danube by 2025.

The Serbian sector of the Danube has been suffering from the lack of investment. Until recently, there have not been any marinas, i.e. the nautical tourism infrastructure still leaves much to be desired. This problem could be addressed through the reconstruction of the existing piers and ship berths, which could be converted into marinas. A case to illustrate this solution is the marina in Apatin opened in 2009, which is the only Serbian marina on the Danube. Lately, more investment has been made in pier reconstruction in Belgrade and Novi Sad[14] [8].

Cruise industry, which has been growing dynamically, has a powerful impact on the world economy. Cruises generate over 450,000 jobs with total salaries of about 15 billion US dollars. In 1998, the World Tourist Organisation described five types of tourism types that would be in most demand in the next two decades: tourist cruises, cultural tourism, event-based tourism, eco-tourism and thematic tourism. The highest increase in tourism cruises demand is expected in the Danube region countries: Hungary, Romania, Slovakia, Croatia, and Serbia. The target markets are the USA, Germany, France, Great Britain, and Austria.

Serbia holds considerable potential for the development of nautical tourism that needs to be realized [3]. This fact has been confirmed by the constant increase in the number of cruise ships arriving in Belgrade and other ports in Serbia (Figure 6). According to the data of the Danube Tourist Commission, over 10,000 tourists cruised along the lower Danube[15] and about 119,000, along the middle and upper Danube in 2002. By October 2004, over 22,000 tourists from cruise ships visited Novi Sad, over 43,000 Belgrade, and

[12] *Donauschiffahrt WURM+KOECK*. Retrieved from http://www.donauschiffahrt.de/en/

[13] *Strategy of Tourism Development of the Republic of Serbia for the Period 2015–2025* (2015). Ministry of Traffic, Tourism and Telecommunications, Belgrade.

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[15] *Danube Tourist Commission*. Retrieved from *http://www.danube-river.org*

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over 60,000, the Danube Delta. In 2004, the turnover on the Danube was 150,000 tourists. The data indicate significant increase in the demand for cruises in the lower Danube. The number of tourists buying river cruises increased by 26.1% in 2004 (compared to 2002) (Figure 6).

Therefore, we can conclude that there was a dramatic increase in the demand for cruises in the lower sector of the Danube [9–11]. Moreover, there are two national parks located on the right bank of the Danube – Fruška Gora and Djerdap, which could potentially attract large number of visitors in the future [12; 13].

Priority projects for the improvement of the Danube waterway in Serbia

The Republic of Serbia aims to improve its system of inland waterways, provide their maintenance and ensure safe navigation. The pending Law on Navigation Safety and Ports would regulate navigation on the rivers; modernisation of ports and piers, application of River Information Services, and so on.

The European Strategy for the Danube encompasses a number of projects for the development of infrastructure, transport, logistics and tourism on the Corridor VII. The focus is on three priority areas: mobility and multimodality (road, rail, and air routes, inland waterways); promotion of sustainable energy; and promotion of culture and tourism. In line with the Strategy, Serbia's is now implementing the following priority projects on the Danube River[16]:

[16] *General Master Plan for Transport in Serbia. Annex III* (2009). Transport on Inland Waterways, Belgrade.

– major overhaul of the navigation lock at Djerdap I and Djerdap II (the works on Djerdap I are already in progress);

– removal of World War II sunken vessels near Prahovo;

– removal of the old bridge and construction of the new railway bridge in Novi Sad (in progress);

– hydro-technical works;

– implementation of the River Information Services (RIS implementation project on the Danube river in Serbia, started in 2009, reached its final phase).

The key projects for improvement of tourism infrastructure on the Serbian part of the Danube are as follows:

– marina on the Danube River near Novi Sad;

– establishment of the Information Centre for Nautical Tourism and smaller information points on the Danube;

– pier in Zemun;

– *Marina OASA* (Belgrade).

Their realization would contribute to safe and efficient navigation on the Danube and would set higher ecological standards on the Serbian section of the Corridor VII. Most of the above-mentioned projects have already been launched, except for the project for removal of sunken vessels and unexploded bombs near Prahovo, which is being delayed due to the lack of funds.

Conclusion

Serbia's location at the crossroads of the major European transport corridors (water, road, rail, and air) provides it with opportunities

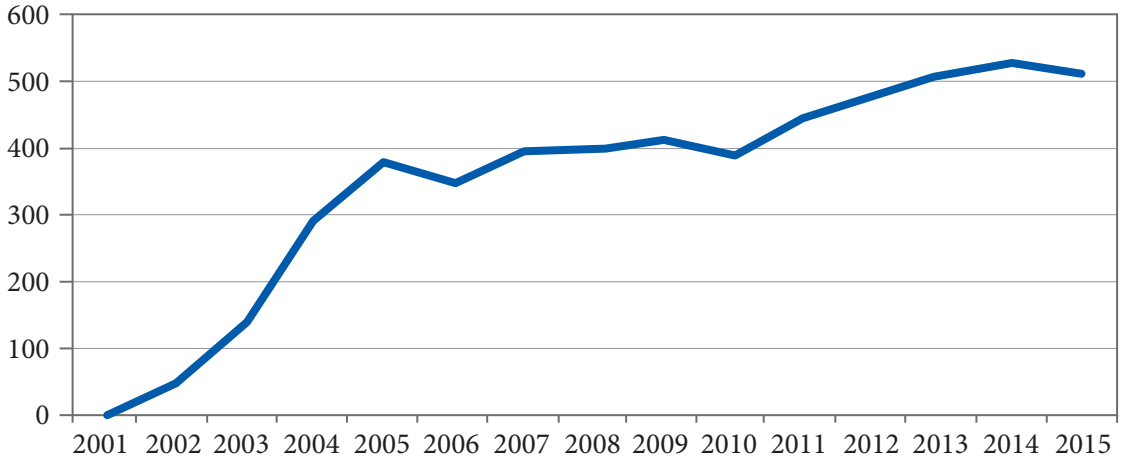

Figure 6. *The total annual number of river cruisers in Belgrade in 2002–2015*

Source: Official data of the port of Belgrade

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for sustainable economic development, which makes the Danube or the Corridor VII crucial for the country's prosperity. However, despite the advantages the Danube offers, its navigation potential remains underrealized for a number of reasons, primarily economic ones. Although Serbia accounts for 13% of the ship tonnage in the Danube region, it's fleet is old and outdated and on average only 30% of the port capacities due to the lack of goods for transhipment. As Serbia is currently in the process of joining the EU, it has become evident that modernization and maintenance of its fleet are required as the country is likely to receive more foreign investment and engage in international cooperation projects. Furthermore, the Danube Strategy has been adopted with the aim of synchronizing the activities of the Danube region countries for sustainable development.

Improvement and stimulation of water transport development are crucial for economic prosperity of the region as water transport is a good alternative to road and rail transport, it is also energy efficient and environmentally safe. According to the General Transport Master Plan of the Republic of Serbia (2009), the aim is to increase of the share of water transport in cargo and freight transportation and to modernize the river fleet. Hence, it is extremely important to implement the system of the River Information Services that would cut transportation time and make transportation more cost effective.

Intermodal transport development is recognised as yet another factor contributing to sustainable economic development of Serbia. The Danube in particular has several high priority projects which could finally improve the condition of the navigation: for example, removal of the sunken German ships and unexploded bombs left from World War II near Prahovo. Another key project is the reconstruction of the ship locks Djerdap I and Djerdap II and construction of a new bridge near Novi Sad.

Surprisingly, in our research we faced difficulties when gathering data on the use of the Danube inland waterways: the statistical data provided by official sources are often inaccurate, moreover, such data are often hard to obtain. For instance, cruise tourists are excluded from the data on the overall tourist turnover by the Statistical Office, although they on average spend 2–3 days in national waters.

This study has provided evidence that more attention should be devoted to trans-border cooperation in the Danube region. Further research is necessary into the problem of inadequate communication between border regions, particularly if such regions share renewable energy resources.

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Significance of drone technology for achievement of the United Nations sustainable development goals

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ABSTRACT
The drone technology, which originated in military applications, is now widely used for commercial, professional, industrial and private purposes. Applications of Unmanned Aerial Vehicles (UAVs), commonly known as *drones*, include different sectors of economy, for example, agriculture, transport, infrastructure, entertainment, and telecommunications. Not only are drones eco-friendly gadgets that allow to reduce the amount of carbon dioxide emissions, but they are also time- and cost-efficient. Thus, drones can prove to be a major force for good as they hold massive potential for being used to meet the sustainable development goals (SDGs) set by the United Nations Organization and adopted in 2015. Developing countries, for instance those of Sub-Saharan Africa, are facing famine, epidemic diseases, poverty and other challenges. All these problems can be addressed with the help of the drone technology. The main objective of this paper is to identify the sectors that are most likely to be influenced by the drone technology and to highlight the scenarios in which this technology can influence the achievement of the SDGs. One of the most promising spheres in this respect is the usage of drones as delivery vehicles in agriculture, e-commerce, and health care. Moreover, drones can be effective for monitoring and surveillance in international and domestic law enforcement, wildlife preservation and scientific research.

KEYWORDS
drone technology, unmanned aerial vehicles, sustainable development goals, United Nations, agricultural drones, drone applications, drone risks

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Значимость технологии дронов в достижении целей устойчивого развития ООН

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РЕЗЮМЕ
Технология беспилотных летательных аппаратов, созданная военными, в настоящее время широко используется в коммерческих, профессиональных, промышленных и частных целях. Беспилотные летательные аппараты (БПЛА), широко известные как «дроны», используются в различных секторах экономики, например, сельском хозяйстве, транспорте, инфраструктуре, развлечениях и телекоммуникациях. Дроны не только экологичны и позволяют сократить количество выбросов углекислого газа, но они также экономичны в терминах времени и финансовых затрат. Таким образом, беспилотные летательные аппараты могут оказаться серьезной силой, поскольку они обладают огромным потенциалом для использования в целях достижения целей устойчивого развития (SDG), установленных Организацией Объединенных Наций и принятых в 2015 г. Развивающиеся страны, например, страны, расположенные к югу от Сахары, сталкиваются с голодом, эпидемическими заболеваниями, нищетой и другими проблемами. Все эти проблемы можно решить с помощью технологии беспилотных летательных аппаратов. Основная цель этой статьи – выявить сектора, на которые, скорее всего, повлияет технология беспилотных летательных аппаратов, и выделить сценарии, в которых эта технология может повлиять на достижение целей устойчивого развития. Одной из наиболее перспективных сфер в этом отношении является использование дронов в качестве средств доставки в сельском хозяйстве, электронной торговле и здравоохранении. Более того, беспилотные летательные аппараты могут быть эффективными для мониторинга и наблюдения в международных и внутренних правоохранительных органах, охране дикой природы и научных исследованиях.

КЛЮЧЕВЫЕ СЛОВА
беспилотная техника, беспилотные летательные аппараты, цели устойчивого развития, Организация Объединенных Наций, сельскохозяйственные беспилотные летательные аппараты, применение беспилотных летательных аппаратов

ДЛЯ ЦИТИРОВАНИЯ
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Introduction

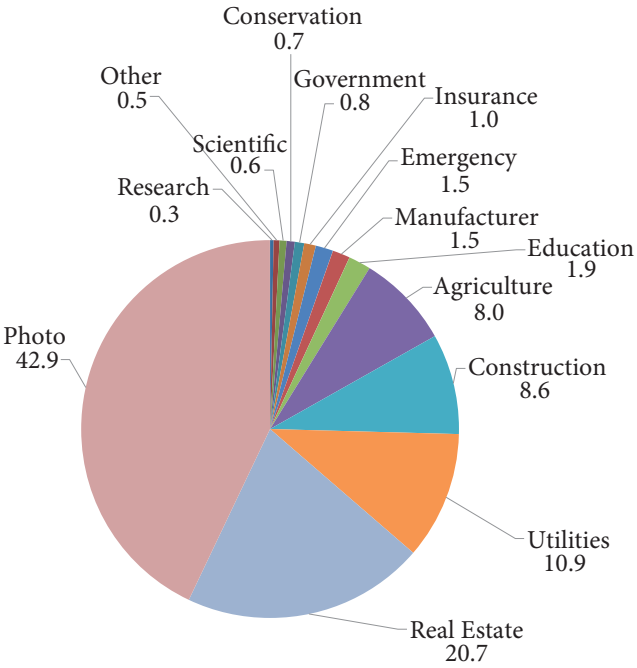
Developing countries, in particular those located in Sub-Saharan Africa, have for a long time been facing severe famine, epidemic diseases, poverty and malnutrition issues [1; 2]. Social and economic development in Africa is affected by high mortality rate [3; 4] and poor health which are a result of malnutrition. In addition to environmental issues, the rapidly growing human population leads to an increased poverty rate, which still remains the highest in the world as of 2012 [5].

So far approaches to combating hunger and malnutrition have mostly focused on increased food production and food security paying less attention to the water scarcity problem. Water has a vital role in ensuring food security as 70% of the population [6] in Sub-Saharan Africa depends on agriculture for survival and more than 90% of this agriculture is sustained by direct rain. Therefore, agriculture still remains the major response to addressing hunger and malnutrition.

In 2015, the international community adopted seventeen global goals for sustainable development (SDGs) to improve people's lives by 2030. These SDGs comprise 169 targets [7–9] measured on local, national, regional and global levels and across various sectors. The SDGs place greater demands on the scientific community to address climate change, renewable energy, food, health and water provision. Great emphasis has been put on the need for social inclusion, economic development, and environmental sustainability and on outreach for marginalized groups [10]. "Sustainable development is the development that meets the needs of the present without compromising the ability of the future generations to meet their own needs" [11]. This study aims to provide a brief overview of the role that drone technology may play in meeting the SDGs.

Potential Usage of Drones to Achieve SDGs

Recently, there has been a rapid growth in the popularity of Unmanned Aerial Vehicles (UAVs) commonly known as *drones* on the civil market. Although originally drones were used in the military sector, they are now widely used both in civil and commercial domains for parcel deliveries and other purposes [12]. Regardless of the fact that drone technology is still at its infant stage in terms of commercial usage, its current and speculated commercial applications have already shown the potential to dramatically alter several industries in terms of reducing on workload and general costs of production, time saving, increase on work efficiency and productivity and also bridge gap between urban and rural areas. Various stakeholders and actors, including governmental bodies, such as law enforcement agencies, commercial firms, scientific institutions [13] and private individuals, have realized the benefits inherent in the use of drones. Hence, in the coming years, the adoption of drone technology will undoubtedly turn into a great trend as more and more industries are embracing the technology (Figure).



Top industries influenced by the drone technology in 2015

Source: FAA, The Verge Drone Project, 2015

Let us now consider some of the SDGs put forward by the United Nations and the potential usage of the drone technology to meet these goals. One of such goals is to end hunger, achieve food security and improved nutrition and promote sustainable agriculture. Drone technology can be used in agricultural sector [14] in a number of ways, for example, to survey farm fields [15], to ensure product delivery [16] and to spray pesticides. Rather than spraying the entire field, the pesticide can be delivered to the right spot, only in the quantity needed, which means reduction in pesticides used, reduction in collateral damage to wildlife and also enhanced cost-efficiency [17]. The case of Japan provides a good

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illustration for such applications of the drone technology. Since the 1970s, this country has accumulated significant experience in this sphere. Nearly 2,000 UAVs are being used in Japan today for agricultural spraying and planting operations [18]. Furthermore, drones can connect farmers to markets and thus ensure that everyone has access to affordable nutritious food. Chinese retail giant JD.com uses drones for e-commerce shipments to remote areas as well as to small towns or cities. It also transports farm equipment, fertilizers and seeds.

Apart from the agricultural usage of drones, they can also be successfully employed as delivery vehicles as they are able to traverse difficult landscapes and reach remote areas [19]. For instance, company *Zipline* in Rwanda has been delivering medical supplies to rural areas since 2016 by using drones and dropping off blood parcels attached to parachutes [29]. Over 50 deliveries are made daily, thus saving thousands lives. This experience has already drawn attention of other countries such as Canada and Tanzania seeking to adopt this practice [21]. Moreover, drones can be employed in emergency situations as ambulances to provide first aid to patients prior to being admitted to the hospital. In remote areas, medical services often take long to respond and to reach a patient with cardiac arrest or similar conditions [22]. In case of natural disasters, such as mudslides, earthquake, floods, explosions and wild fires, immediate and swift medical attention is needed as lives some survivors depends on it. So drones can be used to quickly scan the area and locate the victims with the help of on-board cameras providing real-time data [23].

Another promising sphere for drone usage is scientific research: as drones can withstand extreme conditions and are expendable, which makes them perfect research of diseases, pollution levels in regions with extreme weather conditions, radioactive areas and so on [24].

Another important goal set forth by the UN is to ensure sustainable economic growth, full and productive employment and decent work for all. In this respect, the drone technology promises diverse and attractive possibilities and is bound to reshape a number of business sectors whilst creating enormous employment opportunities [25]. Among other things, drones have the potential to restructure the delivery market and open new business opportunities for small businesses such as local stores, pharmacies, fast-foods as well as large international and national businesses and government entities.

Drones also hold a lot of potential for the development of tourism. Video cameras are attached to drones that can record and capture picturesque aerial views of different places such as historical and natural sites. These aerial views and videos can be used to promote tourism [26], once they are shared or uploaded to any social network. Moreover, drones can be used for virtual tourism: a tourist may be sitting at home and receiving live videos on the phone or computer in 3D format from a drone flying over places of interest [27].

One more significant advantage of drones is that they are a safe and environmentally sound technology. Deploying drones for last-mile delivery reduces the amount of carbon dioxide emissions which would have been produced if the goods were delivered by other means of transport [28]. Moreover, drones have proven to be an effective alternative to fireworks, which can spark off wildfires. Therefore, drones were used for this purpose in California, Colorado, and Arizona in the USA, which suffered from wildfires. Thus, these states decided to use a fleet of 500 Intel star drones to dance to patriotic music on 4th July celebrations.

Gas sensors and cameras can be mounted on drones and thus flown over volcanic areas, seas, forests among other places to monitor the situation. Drones can detect natural disasters prior to their occurrence, thus alerting the citizens of a particular area and enabling them to evacuate [29].

Another sphere in which drones can play an important role is surveillance of wildlife: for instance, Kruger National park in South Africa is known as the world's number one poaching site for rhino [30]. Having a fleet of drones with cameras providing real time data and hovering all over the park will help the authorities to fight poaching.

Drones have proven instrumental in the utilities and energy sector to perform long-range aerial inspections of energy infrastructure, including pipelines and electric wires that can run for thousands of miles. Power line maintenance and repairs can be very expensive and dangerous for workers. Electric companies can use drones to access damaged power lines or structures and transmit pictures and information that can facilitate working on solutions more quickly, hence ensuring the achievement of sustainable development.

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The UN have also set the target to significantly increase access to information and communications technology and to provide universal and affordable access to the Internet in the least developed countries by 2020. Mark Zuckerberg has recently announced his plans to provide Internet access to remote parts of the world by launching an initiative that involves the usage of solar-powered drones, capable of staying airborne for years and acting as movable wireless access points [31].

The UN's SDG to ensure peace, justice and strong institutions can be met through efficient law enforcement, for which drones have proven to be indispensable. Drones can be deployed to pursue suspects in vast, open areas and areas that are inaccessible or difficult to access for human officers [32]. Moreover, drones can be an effective technological solution for border patrol as they are capable of scanning wide areas, *see* through walls and track individual movements from the sky. Thus, drones can be used to monitor the movements of illegal migrants.

Risks of Using Drones

Despite the obvious advantages of drones described above, the potential misuse of the drone technology grows proportionally to its popularity. Drone operation can pose a threat to both public and national security, which explains why most legal authorities seem to be in two minds about making fully legalizing this technology. There is ongoing communication between the different regulating bodies in different countries such as the Federal Aviation Administration (FAA), the European Aviation Safety Agency (EASA), Transport Canada and Civil Aviation Authority (CAA), and others. It should be noted here that most of the countries have used the FAA's guidelines for their drone regulations. To balance safety and innovation, international cooperation is required to enable countries work towards the common goal and ensure the maximum safety of drone usage. Drone regulations set by the European Aviation Safety Agency [33] were adopted by 27 member states (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, and the UK).

Conclusion

It is evident that drones are going to make a great contribution to the achievement of the SDGs. Drone technology not only has a promising robust influence in the agricultural sector, but in a number of other sectors. Despite all the above-described advantages offered by the development of the drone technology, legal regulations in some countries, Russia in particular, impede efficient use of drones. Full legalization of drone operations is required in all sectors of economy. Countries, such as China, Rwanda, Japan and the USA, have taken steps in this direction. Therefore, it can be concluded that it is only a matter of time until drones are fully legalized for civil and commercial use. In the context of SSA, the drone technology might turn out to be the ultimate path to finally reducing or completely eliminating hunger, poverty and malnutrition problems.

In future studies, we intend to analyze and compare practices of drone operation in SSA and in Russian regions, for example, in the Urals and in Yakutsk, in order to show the potential for the achievement of SDGs on these territories.

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Evaluation of economic security in the Ural region in the context of development of small and medium-sized enterprises

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ABSTRACT

Enhancing economic security of regions is crucial for the development of the whole country, which is what makes research in this sphere particularly important. This study aims to analyze and compare the economic security data on the regions constituting the Ural Federal District (Russia). In contrast with current studies in the field, we are conducting detailed analysis of the factors that affect the development of small and medium-sized enterprises (SMEs) and business climate in the regions. The conceptual framework of this research relies on entrepreneurship theories and theoretical approaches to analysis and evaluation of regional economic security. We develop methodology based on sets of quantitative and qualitative indicators and apply analytical, comparative and statistical methods as well as the method of expert evaluation. The data are provided by the regional statistic services and business support foundations. We also analyze regional support programs for small and medium-sized businesses. We found that all regions of the Ural Federal District are characterized by the medium (acceptable) level of economic security and moderate risk. In the economic security ranking, Tyumen region is at the top while the second place is occupied by Sverdlovsk region; Chelyabinsk and Kurgan regions are at the bottom.

KEYWORDS

region, regional economic security, small and middle-sized enterprises, entrepreneurship, business support programs, Ural Federal District

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Оценка экономической безопасности в уральском регионе в контексте развития малых и средних предприятий

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РЕЗЮМЕ

Укрепление экономической безопасности регионов имеет важное значение для развития всей страны, что делает исследования в этой сфере крайне важными. Данное исследование направлено на анализ и сравнение данных экономической безопасности в регионах, входящих в Уральский федеральный округ (Россия). В отличие от текущих исследований в данной области, мы провели детальный анализ факторов, влияющих на развитие малых и средних предприятий (МСП) и делового климата в регионах. Концептуальные рамки этого исследования основаны на теориях предпринимательства и теоретических подходах к анализу и оценке региональной экономической безопасности. Мы разработали методологию на основе наборов количественных и качественных показателей и применили аналитические, сравнительные и статистические методы, а также метод экспертной оценки. Данные предоставлены региональными службами статистики и поддержки бизнеса. Мы также анализируем региональные программы поддержки малого и среднего бизнеса. Мы обнаружили, что все регионы Уральского федерального округа характеризуются средним (приемлемым) уровнем экономической безопасности и умеренным риском. В рейтинге экономической безопасности Тюменская область находится на вершине, а второе место занимает Свердловская область; Челябинская и Курганская области находятся внизу.

КЛЮЧЕВЫЕ СЛОВА

регион, региональная экономическая безопасность, малые и средние предприятия, предпринимательство, программы поддержки бизнеса, Уральский федеральный округ

ДЛЯ ЦИТИРОВАНИЯ

Vlasova, N. Yu., Kalganova, O. O. (2018) Evaluation of economic security in the Ural region in the context of development of small and medium-sized enterprises. *R-economy*, 4(3), 121–129. doi: 10.15826/recon.2018.4.3.017

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Introduction

Global economic instability has made the question of regional economic security crucial for the prosperity of countries. In its turn, economic security of regions depends on multiple factors and conditions, which include the quality of the human capital, the general level of economic development and associated processes, the quality of the infrastructure, the availability and diversity of resources, political stability and so on. The region's attractiveness for investment and the level of entrepreneurial activity are also important factors for its economic security.

The vast majority of studies confirm that small and medium-sized businesses (SMEs) are among the key drivers of economic growth. There is also evidence that not only does SME development positively affect the general economic performance of the region, but also has a significant social impact, which is crucial for regional and local economy. SMEs contribute to the development of entrepreneurship and improve business climate, moreover, they help the government tackle the problem of *welfare mentality* by encouraging people to look after themselves. Small and medium-sized businesses are essential for innovation-driven sectors of economy as it is primarily in such enterprises that new products and technologies are created and tested. Therefore, the development of SMEs and self-employment is an important factor that determines the region's economic security. There is, however, a lack of adequate methodology to evaluate the impact of SME development on the level of economic security and our study is going to address this issue.

Theoretical framework

This research is based on two groups of theoretical approaches. The first group comprises theories on economic security in regions. These theories mostly focus on threshold values of various economic and social indicators that are crucial for stable regional development. The second group includes theories of entrepreneurship, especially the ones that deal with small- and medium-sized businesses.

There is a vast body of research literature discussing the problems of economic security in regions. A thorough retrospective analysis of these problems was conducted by the Ural research school [1]. In general terms, economic security on the regional level is seen as "a complex of conditions and factors that characterize the current state of regional economy, its stability and progressive growth as well the degree of its independence in the processes of integration with federal economy" [1, p. 29].

The following methods are applied in Russian studies to evaluate the level of economic security:

a) monitoring of the key macroeconomic indicators, especially when their values approach the threshold values [2];

b) expert evaluation and ranking of regions according to the level of security threat [3];

c) evaluation of the consequences of security threats by measuring the damage [1].

Mingaleva and Gershanok show the connection between the region's stability, its competitiveness and the level of economic security [4]. In some studies, economic security of small-sized businesses is seen as an important factor and as a criterion for evaluating economic security of the region and the whole country [5; 6].

Undoubtedly, the more active local business life is, the stronger is the positive effect that SMEs have on regional economy [7]. Therefore, we should have a good understanding of the factors and conditions that influence the entrepreneurial climate in the region, for example, by analysing policies aimed at supporting entrepreneurship and evaluating their efficiency [8–12]. Some studies focus on specific forms of such support that target small businesses. For instance, Korchagina analyzes the state policy of stimulating the development of clusters of small and medium-sized enterprises [13]. Other studies question the long-term efficiency of such policies and emphasize the fact that the quality of human capital, population mobility and density are much more important [14; 15].

A big group of studies analyze SME support programs in transitive economies [16–18].

Data and Methodology

Our methodology for economic security evaluation relies primarily on the indicators of SME development.

The methodology comprises both quantitative and qualitative parameters. For the former we used the official statistical data while the latter require additional research and expert evaluations.

Economic security implies stability that ensures sustainable growth of the region's economy, which means that, in order to evaluate its current state, we should be focusing on the ongoing trends and patterns of regional development.

Online ISSN 2412-0731

We estimate the parameters by applying a ten-point scale with the higher values corresponding to better performance: if the current values are lower than the target value, the region scores 0. If the current values are closer to the average value, the region scores 5. If the current values meet the target values, then the region scores 10.

The indicators used to evaluate regional security with the focus on SME development are shown in Table 1.

Table 1

Indicators of regional economic security (with the focus on SME development)

Quantitative indicators	Qualitative indicators
The number of SMEs The number of employees in SMEs The share of SME turnover in the GRP The amount of taxes paid by SMEs to the budget Funds for SME support from the federal and regional budgets The number of financial support recipients The number of non-financial support recipients The number of jobs created by support recipients Capital investment	The quality of SME support infrastructure Efficiency of SME support programs Red tape (registration and re-registration procedures for businesses) The level of entrepreneurial activity Attitude of local inhabitants towards entrepreneurship Access to information about the market, its potential and resources, production facilities and equipment Opportunities for further development of SMEs

Let us now consider these indicators and their impact on regional economic security in more detail.

1. **Quantitative indicators** (better performing regions score 10; if no significant changes are registered, 5; and if the trend is negative, 0):

a) *the number of SMEs*, that is, the number of legal entities operating in the region as of the end of the financial year. The growth in the number of SMEs signifies that the region's economic security is improving as enterprises are participating in social and economic development of the region by contributing to its stability and prosperity;

b) *the number of employees in SMEs*. The rising number of employees working for small, medium-sized and micro-enterprises has a positive impact on economic security as it means more jobs. SMEs perform a vital social function as they reduce the level of unemployment and relieve social anxiety;

c) *the share of people employed by SMEs*. In the way similar to the previous indicator, its growth is beneficial for regional economic security. We apply the following formula to calculate it:

$$\begin{matrix}\text{The share}\\ \text{of people}\\ \text{employed}\\ \text{by SMEs}\end{matrix} = \frac{\begin{matrix}\text{The number}\\ \text{of SME employees}\end{matrix}}{\begin{matrix}\text{The Workforce}\\ \text{Number in the Region}\end{matrix}} 100\%. \quad (1)$$

d) *the turnover of SMEs*. An increase in the turnover of SMEs shows that the needs of the regional population for products and services are fully (or to the fullest extent possible) satisfied and that the contribution of SMEs to the GRP is increasing;

e) *the share of SME turnover in the GRP*. An increase in the share of SME turnover indicates an increase in the GRP per capita. According to some experts, in order to make businesses and the region competitive and to achieve the necessary level of economic security, the share of SME turnover must be 60%. We apply the following formula to calculate it:

$$\begin{matrix}\text{The share of SME}\\ \text{turnover in the GRP}\end{matrix} = \frac{\text{SME turnover}}{\text{GRP}} 100\%. \quad (2)$$

f) *the total amount of tax paid by SMEs*. An increase in the total amount of taxes paid by SMEs also reflects improved economic security in the region;

g) *funds spent on SME support from the federal and regional budgets*. A decrease in the amount of funds spent on SME support is detrimental to SME development as some of the businesses would then find themselves struggling to survive;

h) *the number of recipients of financial support*, which include both non-repayable subsidies and grants) and repayable assistance (guarantees, microloans, subsidized loans). An increase in this indicator should enhance entrepreneurial activity (the number of SMEs, the number of employees in SMEs, SME turnover, and so on);

i) *the number of recipients of non-financial support*, which includes consulting, training, and so on. This kind of support helps entrepreneurs deal with the lack of the relevant skills and knowledge. A competent entrepreneur is crucial for the success of his or her business and for ensuring economic security of the region;

k) *the number of jobs created by support recipients*. An increase in the number of jobs shows the efficiency of support programs, which in the long run affects the region's economic performance and economic security;

l) *capital investment*. A business can grow if it receives enough investment, which allows it to

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modernize its equipment and production facilities and launch new product lines. Through capital investment SMEs enhance the quality of their production and services, which positively affects the consumer demand.

2. **Qualitative indicators**: if the value of an indicator is high, the region scores 10; if low (unsatisfactory), 0:

a) The region's *SME support infrastructure* is evaluated by looking at the number of business support organizations. Development and improvement of the SME support infrastructure shows the level of regional economic security;

b) *Efficiency of SME support programs* is evaluated by comparing indicator values with the total amount of spending on SME support in the region (state programs realized on different levels). To analyze the region's performance in this indicator we need the data provided by the program implementation reports. If 80–100% of the program's objectives and targets are met, then the region scores 10; if 50–79%, 5; and if less than 50%, 0.

c) *Red tape and administrative barriers*. Complexity of the procedure of registration or re-registration can prove to be a serious impediment to the development of SMEs discouraging people from starting up a new business. The more complex these procedures are, the harder it is to start a business, which causes a decline in the number of SME turnover in the GRP and is detrimental for economic security and vice versa, the simpler the procedure is, the higher the region scores in this indicator;

d) *the level of entrepreneurial activity*. The growing number of people willing to start their own business means that more new companies will be created in the region and that their contributions to the region's economic security will be more substantial;

e) *social attitudes towards entrepreneurship*. If local inhabitants demonstrate a positive attitude towards private business, it is beneficial for the socio-economic and political situation in the region.

f) *Access to information about the market and its resources, the available production facilities and equipment* is vital for the success of a business. If entrepreneurs are well-informed about the available resources, they have more opportunities to contribute to economic development and economic security of the region.

g) *opportunities for SME development*. This indicator corresponds to the region's attractiveness for investment and the overall level of economic activity.

Thus, our methodology comprises eighteen indicators: 11 quantitative and 7 qualitative. In each indicator, the region can score from 0 to 10. The maximum total score is 180; the minimum, 0.

Ranking scores:

a) the score of 121–180 corresponds to *A* ranking or a high level of economic security. The main indicators of SME development show positive dynamics; there is a growth in the number of local businesses. The contribution of SMEs to the GRP is increasing as new jobs are created and businesses pay more taxes to the budget. The region is in a riskfree zone.

b) the score of 61–120 corresponds to *B* ranking, which is a medium (acceptable) level of economic security. The main indicators of SME development remain stable and may show insignificant (positive or negative) changes. SMEs are enjoying sustainable growth; the state support is efficient although not to the fullest extent. The region is thus in the zone of acceptable risk, which should be monitored in case the situation deteriorates.

c) the score of 0–60 corresponds to *C* ranking, which is a low (disastrous) level of economic security. The main indicators of SME development show negative dynamics: enterprises shut down, their turnover falls and so is the number of their employees. The production of SMEs is no longer in demand. The SME sector is in recession and support measures are ineffective. The region is subject to severe risk, which requires the authorities to take urgent measures to lower the risk level.

Results

Let us now look at the level of economic security in Sverdlovsk region in 2016 by focusing on SME development indicators. The scores for each indicator are shown in Table 2.

The exponential growth in the turnover of SMEs in 2016 in comparison with 2015 was determined by the actual turnover growth but also by the changes in the criteria of classifying businesses according to their size and annual revenues (see the Decree of the Government of the Russian Federation No 702 of 13.07. 2015).

The workforce number in Sverdlovsk region in 2015 was 2,293.1 thousand people and in 2016, 2,230.1 thousand. Thus, by applying formula (1), we have calculated that the share of people employed in SMEs in the region was 18.8% in 2015 and 19.6% in 2016 of the total workforce.

Online ISSN 2412-0731

Table 2

Quantitative indicators of economic security in Sverdlovsk region

Indicator	2015	2016	Absolute change	Score
Number of SMEs	8,589	4,601	–3,988	0
Number of employees in SMEs (ths people)	233.01	134.26	–98.75	0
Share of employees in SMEs (%)	10.16	6.02	–4.14	5
Turnover of SMEs (bln rbs)	546.55	530.32	–16.23	5
Share of SME turnover in the GRP (%)	29.98	26.81	–3.14	5
Total amount of tax paid by SMEs, ths rbs	23,952,263	26,536,719	+2,584,456	10
Funds spent on SME support (from federal and regional budgets) (mln rbs)	815.3	640.7	–174.6	0
Number of financial support recipients	744	922	+178	10
Number of non-financial support recipients	10,352	8,665	–1,687	0
Number of jobs created by support recipients	2,532	2,438	–94	5
Capital investment (mln rbs)	9,335.5	7,172.4	–2,163.1	0
Total score				40

Source: Based on the data of Sverdlovsk Regional Business Support Foundation. Retrieved from https://sofp.ru/

The GRP in Sverdlovsk region in 2015 was 1,822.8 billion roubles and in 2016, 1,978.1 billion. By applying formula (1), we can calculate that the SME turnover accounted for 60.2% in 2015 and 73.4% in 2016. For a region to be competitive, this value should exceed 60%.

The state SME support program is a part of the subprogram *Impetus for Business* of the state program *Enhancement of Sverdlovsk Region's Attractiveness for Investment Until 2024* approved by the decree No 1002-ПП of 17.11.2014 of the Government of Sverdlovsk Region. Federal spending cuts caused cuts in financial support for SME development.

Sverdlovsk region enjoys a well-developed multi-level infrastructure for SME support. The core of this infrastructure is Sverdlovsk Regional Foundation for Business Support, created in 2002. Therefore, the region scores high in this indicator – 10.

The efficiency of SME support programs in Ekaterinburg was 87%, which means that the region is quite successful in this indicator and scores 10.

Analytical centre *Expert-Ural* has studied the current state and problems of SME development in Sverdlovsk region and found that only 11.8% of entrepreneurs surveyed complained about regulatory and administrative barriers, in particular the complicated procedure of registration and re-registration. Since the registration procedure is neither simple nor fast, in this indicator the region scored only 5.

As for the level of entrepreneurial activity, the introduction of a tax holiday in the region has proven to be efficient (see the law *On Setting Tax Rates and the Introduction of Simplified Tax Compliance Procedures for Specific Categories of Tax Payers in Sverdlovsk Region*). Not only did this measure stimulate entrepreneurial activity but it also led to the creation of new jobs, according to the data provided by the press service of the region's legislative assembly.

Recent studies have shown that the popularity of entrepreneurship has been increasing among local inhabitants. Potential businessmen are able to receive timely and quality access to information about the SME support system in the region. There is also a complex of measures being realized to stimulate youth entrepreneurship, for example, career guidance services and entrepreneurial training.

As for the access to information about the market, its resources, production facilities and equipment, it does not seem to be a serious problem for regional entrepreneurs. According to the study of *Expert-Ural*, the majority of business managers (58.3%) are well informed about the market resources. The information is provided through on-line sources, governmental agencies and municipal services.

The key factors contributing to the development of SMEs in Sverdlovsk region are the internal market, large enterprises, and comparatively high purchasing power. In *Expert RA* ranking, Sverdlovsk region has been classified as having a high investment potential combined with the moderate level of risk. Entrepreneurs themselves evaluate the economic situation in their target markets until 2020 the following way: 48.6%, as

Online ISSN 2412-0731

quite favourable; 36.3%, as *favourable* (the data of *Expert-Ural*). Thus, in this indicator the region scores 10.

The total region score, both in qualitative and quantitative indicators, is 100. In 2016, Sverdlovsk region ranked in the category *B*, that is, the medium (acceptable) level of economic security. The values of the main SME-related indicators remained virtually unchanged, that is, the negative/positive changes were insignificant. Even though the support programs are not fully effective, they manage to provide stable SME development and the region is in the zone of acceptable risk. Even with an insignificant improvement in the SME-related indicator values the region is likely to go up in the ranking by reaching *A* category or a high level of economic security.

Table 3 shows qualitative indicators used for evaluation of economic security in Sverdlovsk, Chelyabinsk, Kurgan and Tyumen regions.

The *Strategy of Socio-Economic Development of the Ural Federal District Until 2020* considers SMEs as one of the key instruments for using human, innovation and investment potential to raise the living standards and ensure sustainable development of this area.

Table 4 shows quantitative indicators of economic security in Chelyabinsk, Kurgan and Tyumen regions. We analyzed the official statistical data for the federal and regional levels and implementation reports for state SME support programs. According to Rosstat's data on the workforce in Chelyabinsk region, in 2015 there were 1,856.9 thousand people and in 2016, 1,850.2 thousand. In Kurgan region, in 2015, 424.6 thousand and in 2016, 411 thousand. In Tyumen region, in 2015, 1,934.1 thousand people and in 2016, 1,956.6. By applying formula (1), we can calculate the share of employees in regional SMEs from the total number of workforce.

According to Rosstat's data, in 2015, the GRP in Chelyabinsk region was 1,209.2 billion roubles; in 2016, 1,260.7 billion. In Kurgan region, the GRP in 2015 was 179.4 billion roubles and in 2016, 193.9 billion. In Tyumen region, in 2015, the GRP was 5,851.6 billion roubles and in 2016, 5,922.1 billion. By applying formula (2), we can calculate the share of the SME turnover in the GRP of these regions.

Since 2009, a SME support foundation has been operating in Chelyabinsk region. The SME support infrastructure in this region also includes the Regional Integrated Centre; the state-funded *Innovation Business Incubator of Chelyabinsk Region*, the Foundation for Industrial Development of Chelyabinsk Region, and the Engineering Centre of Chelyabinsk Region. In 2017, an organization called *Business Territory* was created that united all the existing SME support structures. Thus, we can conclude that Chelyabinsk region has a well-developed SME support infrastructure and it scores 10 in this indicator.

Kurgan region has a guarantee fund and a microfinance fund as well as organizations for non-financial support of SMEs – four business incubators, a techno-park, Kurgan Regional Export Support Centre, Centre for Youth Innovation, Centre for Cluster Development of Kurgan Region, and municipal business consulting centres. Therefore, Kurgan region also scores 10 in this indicator.

Tyumen region has the following SME infrastructure support organizations: foundation *Investment Agency of Tyumen Region*; a microfinance fund; a guarantee fund; Centre for Entre-

Table 3

Qualitative indicators of economic security in Ural regions in 2016

Indicator	Score			
	Sverdlovsk region	Chelyabinsk region	Kurgan region	Tyumen region
SME support infrastructure	10	10	10	10
Efficiency of SME support programs	10	10	5	10
Red tape (registration and re-registration of businesses)	5	5	5	10
Level of entrepreneurial activity	10	5	5	10
Social attitudes towards entrepreneurship in the region	10	5	5	5
Accessibility of information about the market, its potential and resources for development; about the available production facilities and equipment	5	5	5	5
Potential for further SME development	10	10	10	5
Total score	60	50	45	55

Note: Based on expert evaluations.

Online ISSN 2412-0731

preneurship Support; Centre for Coordination of Export-Oriented SME Support; state-funded *Regional Business Incubator*, which has offices in Tyumen, Tobolsk and Ishim; techno-park *Western Siberian Innovation Centre of Oil and Gas*. Thus, Tyumen region also scores 10.

Our calculations have shown that in 2016, the efficiency of the subprogram *SME Support and Development in Chelyabinsk Region in 2016–2019*, which is a part of the larger state program *Economic Development and Innovative Economy of Chelyabinsk Region in 2016–2019*, was 84% (0.844).

As for the implementation of the SME support model, Tyumen region is the top perfromed by reaching the level of 98%.

According to the SME organization *Opora Russia*, in Chelyabinsk region starting a new business is difficult rather than easy while the situation in Tyumen region is the opposite: it is easy rather than difficult. Both Tyumen and Chelybinsk regions have created favourable conditions for business development, which means that they both score 10 in this indicator. As for Kurgan region, it scores lower in all the rankings.

Table 4

Quantitative indicators of economic security in Chelyabinsk, Kurgan, and Tyumen regions

Indicator	Chelyabinsk region				Kurgan region				Tyumen region			
	2015	2016	Absolute change	Score	2015	2016	Absolute change	Score	2015	2016	Absolute change	Score
Number of SMEs	4,185	3,142	–1,043	0	1,111	913	–198	0	4,185	5,804	+1,619	10
Number of employees in SMEs (ths people)	135.61	124.44	–11.17	0	38.46	34.94	–3.52	5	135.61	164.04	+28.43	10
Share of the population employed in regional SMEs (%)	7.3	6.7	–0.6	5	9.1	8.5	–0.6	5	7.0	8.4	+1.4	5
Turnover of small enterprises (bln rbs)	312.80	308.83	–3.97	0	44.76	43.02	–1.74	0	312.80	547.82	+235.02	10
Share of SME turnover in the GRP (%)	25.9	24.5	–1.4	5	24.9	22.2	–2.7	5	5.3	9.3	+4	10
Total amount of tax paid by SMEs, mln rbs	15,863.5	15,612.8	–250.7	0	2,489.5	2,612.5	+123	5	112,769.1	124,455.7	+11,686.6	10
Funds spent on SME support (from federal and regional budgets) (mln rbs)	411.1	302.5	–108.6	0	301.9	114.8	–187.1	0	319.8	172.0	–147.8	0
Number of financial support recipients	96	120	+24	10	3,968	1,245	–2,723	0	–	–	–	–
Number of non-financial support recipients	18,230	18,250	+20	5	–	–	–	–	5,191	–	–	–
Jobs created by recipients of SME support	120	363	+243	10	2,100	2,800	+700	10	1,204	733	–471	0
Capital investment (bln rbs)	8306.4	5604.3	–2702.1	0	1860.6	1495.2	–365.4	0	1641.5	1753.0	+111.5	5
Total score				35				30				60

Source: Based on the data of the Report on the Implementation of State Program Comprehensive Support for SME Development in Chelyabinsk Region in 2015–2017 as of 2015; Report on the Implementation of State Program Economic Development and Innovation Economy of Chelyabinsk Region in 2016–2019 as of 2016; Report on the Implementation of State Program in Tyumen Region Development of SMEs and the Knowledge-Intensive Sphere Until 2020; the Decree of 16 June 2015 No 3817 on the information of Tyumen government about the implementation of the law On SME Development in Tyumen Region; Annual Report on the Implementation and Efficiency Evaluation of State Program in Kurgan Region On SME Development and Support in Kurgan Region in 2014–2020 as of 2016; Report on the Performance Results and Key Activity Areas of the Economic Development Department of Kurgan Region in 2018–2020 as of 2017; No 1-HM Form Report on Taxies and Levies Paid to the Budget System of the Russian Federation (Federal Tax Service).

Online ISSN 2412-0731

The business information agency *Rankings and News* ranks Tyumen higher than Chelyabinsk and Kurgan, which ranked almost identically, in terms of entrepreneurial activity. Thus, Tyumen region scores 10 in this indicator while Chelyabinsk and Kurgan, only 5.

Conclusion

The economic security ranking of the Ural Federal District looks the following way: Chelyabinsk region, 85; Kurgan region, 75; and Tyumen region, 115. All the regions in our analysis were classified as 'B' regions, which means that they have a medium (acceptable) level of economic security. The risk level is also acceptable but it should be under constant monitoring. The development of SMEs in these regions is stable and the state support in this sphere is efficient.

The ranking of the regions according to their economic security levels looks the following way:

1. Tyumen region (115).
2. Sverdlovsk region (100).
3. Chelyabinsk region (85).
4. Kurgan region (75).

On average, the Ural Federal District scores 92.5 and is characterized by a medium (acceptable) level of economic security. Tyumen region, which also includes the Khanty-Mansiysk Autonomous District and the Yamal-Nenets Autonomous District, is the top performer in this respect. In this region, purchasing power is quite high and the same can be said about the factor endowments. Risks are comparatively low and are compensated for by the region's significant economic potential.

Sverdlovsk region enjoys such advantages as a well-developed internal market, large enterprises and comparatively high purchasing power of the population. These are the key factors contributing to the development of SMEs in this region. Improved indicators in SME development will signify that the region has achieved a higher level of economic security and will allow Sverdlovsk region to rise in the ranking.

As for Chelyabinsk region, there is a whole set of problems that need to be addressed in order to enable the region to make any short-term improvements in its economic security. Moreover, both Sverdlovsk and Chelyabinsk regions are heavily dependent on federal subsidies. Kurgan region is characterized by a rather low level of development of local market outlets, of the factor endowments and, therefore, has to deal with considerable risks.

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