

Cooperative development of cities and universities of the Russian Federation in the new economic space

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Abstract. The importance of education, knowledge and science in today's world cannot be overstated. The competitiveness of an educational organisation depends on the development of the urban space in which it is located. Transformation processes in society have led to changes in the formats of interaction in the system "city-university" from the perspective of considering the city as a consumer of highly qualified personnel and commercialised innovations, and universities as an environment for creating innovations, knowledge and a source of highly qualified personnel, actualising the trend of their joint development in order to build up intellectual and innovative potential. Based on the comparative analysis and comparison of data from open scientific publications and the most famous world and Russian ratings, the paper studies Russian cities and universities, which occupy a leading position in the country in the field of education from the viewpoint of their attractiveness for education at the national and global levels. The peculiarities of the most attractive Russian cities for education are outlined. The necessity of stimulating the demand for innovative education on the part of urban business structures within the Triple Helix concept is highlighted.

Key words: Student city; Education; City; Cooperative development; University city; University competitiveness; Educational space.

1 Introduction

Human capital plays a key role in a post-industrial economy. Its formation takes place in the educational system, and to the greatest extent in universities. The quality of education and its compliance with the modern requirements of the economy determines the competitiveness of the human capital of the city, which is formed from university graduates. The city also influences the university and its popularity, through infrastructure, resources and other factors.

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In the modern world, the role of universities as sources of knowledge is so great that they are seen as full-fledged actors in the socio-economic life of society in their presence territory, becoming a guarantee of successful economic development of a city and its attractiveness for young people wishing to receive a prestigious education. There is a close relationship between the cities and the universities located in their space - universities, forming a system of various interactions with the urban environment [1], contribute to the growth of the economy and social sphere of the city, in terms of forming an attractive investment image, creating new jobs, attracting young people, etc. Effective joint development of cities and universities consists in ensuring their balanced interaction, taking into account the priorities and needs of both parties in a changing economy. The development should be aimed at generating promising innovative projects and developments ready for implementation and use in the economy and business environment of the city [2]. Since cities and universities are socio-economic systems of increased complexity, the relationships and interactions between them are also complex systems formed under the influence of a set of factors, conditions and constraints that require research and detailed analysis in order to work out a strategy for joint sustainable development in the innovation economy [3].

With this in mind, the authors have defined the purpose of this study: to characterize the level of joint development of Russian cities and universities in the new economic space. Achieving the goal required solving the following tasks: to determine the position of Russian student cities in the global educational system; to analyze the dynamics of the position of Russian cities and universities in the educational space of Russia and the world in terms of attractiveness and prestige of education; to identify key features of joint development of cities and universities in the space of Russian cities - leaders in education.

2 Literature review

The scientific community has a keen interest in the interconnected development of cities and universities. Researchers around the world are actively studying various aspects of this issue. The influence of universities on the competitiveness and development of the economy and social sphere of cities is considered [3-6], their role as participants in the innovation systems of cities, along with such stakeholders as public authorities and the business community, is determined [7], a significant contribution of universities in providing a sustainable level and comfort of living is justified [8].

Modern economic conditions predetermine the necessity of introducing and using campus solutions aimed at transforming the educational organization through the use of innovative technologies that increase the efficiency of management decisions [9]. Researchers carry out a comprehensive analysis of the development of Russian and global science cities, where high-tech and knowledge-intensive industries, research institutes, laboratories and design bureaus are concentrated, and innovation infrastructure is highly developed [10].

A number of scientific papers [11-13] investigate the position of Russian universities and offer recommendations to improve their position and competitiveness in the most famous world rankings, among which we can highlight two British ones - World University Rankings (QS) [14] and World University Rankings (THE) [15] and Shanghai Academic Rankings of World Universities (ARWU) [16].

Of particular interest in solving the tasks set in this paper are the studies devoted to the "Triple Helix" model, according to which universities play a leading role in the interaction of government, science and business in transforming urban space into an innovation ecosystem [17-18]. Scientists also analyze the modern models of universities in the context of their impact on the development of the territory [19]. Scholars also study the various effects of the joint development of cities and universities, so we can highlight the studies on the improvement of higher education in China by increasing scientific innovation [20-23] to

eliminate social inequalities [24], improving the quality of universities to achieve technical efficiency and improve productivity [25] and others.

The study of publicly available scientific publications of scientists from different countries has shown that the study of the theoretical basis of the phenomenon of joint development of cities and universities has formed a solid theoretical basis to justify the feasibility and necessity of joint development of science, business and urban environment in which they interact in order to achieve a synergistic effect. Also, the scientific literature describes a set of different models of urban development and universities implemented in different countries, which require scientific systematization. This study aims to fill the knowledge gap in terms of identifying and studying the factors and conditions of the new economic reality that activate and constrain the development of cities and universities remains insufficiently studied; this task seems particularly relevant for the Russian Federation in order to expand the number of student cities and increase their competitiveness in the global educational space to provide the country with highly qualified personnel in demand in the new economy.

3 Materials and methods

The solution of the set range of tasks required the use of such general scientific methods of knowledge as comparison, comparison, analysis and synthesis. Individual tasks were solved by applying the method of overview analysis, generalisation and systematisation. Work with analytical data required the use of aggregation method and graphical interpretation and visualisation of data.

The research materials used include scientific publications by international scientists on the problems of joint development of cities and universities, data from the ratings of the best universities [14] and the best student cities in the world [26] from Quacquarelli Symonds for 2018-2022 and data from the RAEX-100 rating of the best universities in Russia for 2022 [27].

4 Results

Education Attractive Cities, or student cities, are cities with a highly developed educational environment and infrastructure, offering a wide range of educational opportunities that meet the demands of a modern economy and a wide range of personal development opportunities, with a large proportion of their population being students and academics.

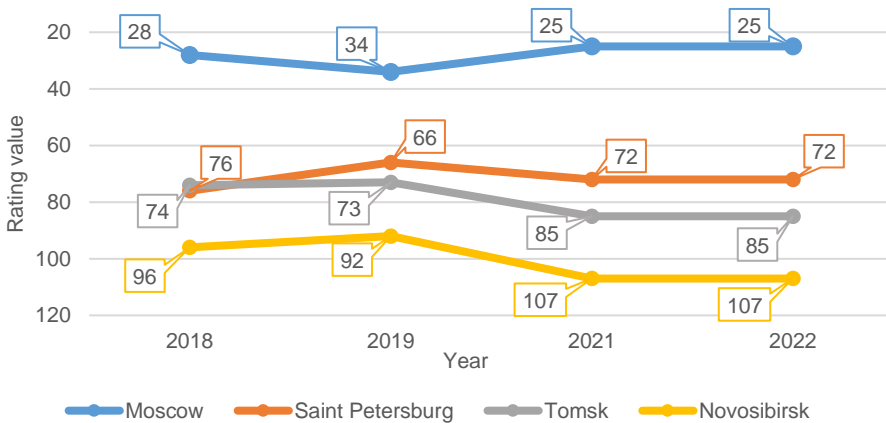
The British consulting company Quacquarelli Symonds carries out an annual survey "Best Student Cities Ranking" [26] dedicated to cities with the most attractive conditions for education, development and living [26], dedicated to the cities with the most attractive conditions for education, development and living, and the study "World University Rankings" [14], dedicated to the best world universities. The top 5 cities most attractive for students and their best universities are presented in Fig 1. London retains the global leadership among student cities throughout the study period.

1 London (England)	<ul style="list-style-type: none"> • Imperial College London / 6; • University College London / 8; • King's College London / 37; • The London School of Economics and Political Science (LSE) / 56.
2 Munich (Germany)	<ul style="list-style-type: none"> • Technical University of Munich / 49; • Ludwig-Maximilians-Universität München / 59.
2 Seoul (South Korea)	<ul style="list-style-type: none"> • Seoul National University / 29; • KAIST - Korea Advanced Institute of Science and Technology / 42; • Yonsei University / 73; • Korea University / 74.
3 Zurich (Switzerland)	<ul style="list-style-type: none"> • ETH Zurich / 9; • University of Zurich / 83.
4 Melbourn (Australia)	<ul style="list-style-type: none"> • University of Melbourne / 33; • Monash University / 57.
5 Berlin (Germany)	<ul style="list-style-type: none"> • Free University of Berlin / 118; • Humboldt University of Berlin / 131; • Technical University of Berlin / 158.

Source: compiled by the authors according to Quacquarelli Symonds: Best Student Cities Ranking 2022. URL: <https://www.qschina.cn/en/city-rankings/2022> (accessed 10 May 2023) and World University Rankings 2022. URL: <https://www.topuniversities.com/university-rankings/world-university-rankings/2022> (accessed 10 May 2023).

Fig 1. Top-5 best student cities in the world.

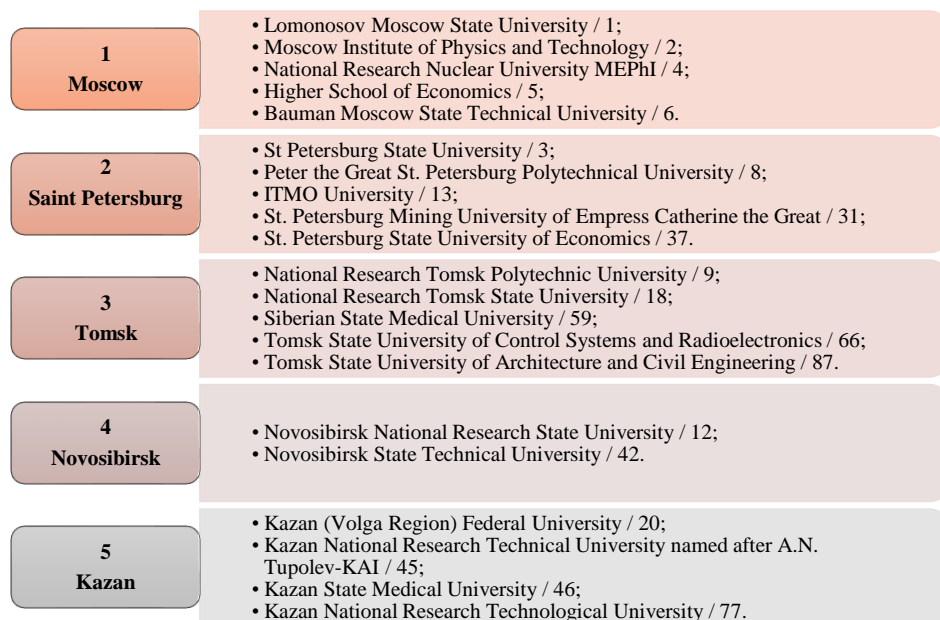
Over the past 5 years, from 2018 to 2022, four Russian cities - Moscow, St Petersburg, Tomsk and Novosibirsk - have been included in the global ranking of the most attractive student cities. Kazan entered the ranking in 2022, taking 102nd place. The dynamics of the position of Russia's most attractive cities for education, shown in Fig. 2, show a decline in the attractiveness of most Russian student cities; only the capital Moscow has improved its position, ranking 25th.



Source: compiled by the authors according to Quacquarelli Symonds: Best Student Cities Ranking 2022. URL: <https://www.qschina.cn/en/city-rankings/2022> (accessed 10 May 2023).

Fig. 2. Russia ranks among the world's best student cities.

In Russia, the most popular study to assess the prestige of universities is the RAEX-100 rating, presented annually by the rating agency RAEX-Analytics [27]. Fig. 3 shows a sample of Russian leading student cities according to the QS ranking [26] and leading universities located on their territory according to the RAEX-100 ranking [27].



Source: compiled by the authors according to Ranking of the best universities in Russia RAEX-100 for 2022. URL: https://raex-rr.com/education/russian_universities/top-100_universities/2022/ (accessed 10 May 2023).

Fig 3. Top-5 best student cities in Russia.

There is a correlation between the places in the rankings occupied by cities and their leading universities. The universities of the two Russian capitals - Moscow and St. Petersburg - are at the top of this rating, which is due to the capitalization of financial and intellectual resources in the country's leading megacities, as well as their transport accessibility and the development of educational infrastructure and cultural environment. These cities have the highest concentration of universities per one hundred thousand inhabitants [28].

Moscow is attractive to students due to the fact that most universities and other educational organisations in the country are concentrated in the capital, which increases the accessibility of education. Apart from its educational potential Moscow possesses a rich cultural heritage represented by a variety of museums and historical monuments, art and cultural institutions. In 2022 in Moscow there will be 759 thousand people studying at institutes of higher education, in relative figures this means 60 students per one thousand inhabitants [28] (Table 1).

Table 1. Number of students in the top 5 student cities in Russia per 1,000 inhabitants, in 2022.

City	Number of students per 1000 inhabitants	Population in the city on January 1, 2022, thousand people
Moscow	60	12 635.4
Saint Petersburg	59	5 377.5

City	Number of students per 1000 inhabitants	Population in the city on January 1, 2022, thousand people
Tomsk	56	577.3
Novosibirsk	35	1 621.5
Kazan	36	1 312.0

Source: compiled by the authors according to Ministry of Education and Science of the Russian Federation. URL: <https://minobrnauki.gov.ru/opendata/9710062939-svedeniya-o-chislennosti-studentov-obrazovatelnykh-organizatsiy-osushchestvlyayushchikh-obrazovateln> and Rosstat data URL: <https://rosstat.gov.ru/compendium/document/13282> (accessed 10 May 2023).

St. Petersburg ranks second in terms of attractiveness of the educational environment. 316 thousand people study in the northern capital, which is 59 students per one thousand inhabitants [28] (Table 1). Moreover, St. Petersburg is called the cultural capital of Russia because the city is a concentration of cultural heritage from different epochs of the Russian state, there are many architectural and artistic monuments, more than 200 museums and parks, unique buildings and bridges.

The other two cities of Tomsk and Novosibirsk are scientific, educational and innovative centres of the country with historically established priorities of science and education, while the cost of tuition, living and rent in these cities is much lower than in Moscow and St Petersburg, which is attractive to students from remote regions of Russia.

Tomsk has historically been a stronghold of science in Siberia, specialising in the development of its innovative and intellectual potential through its rich scientific and educational heritage. There are 56 students per thousand inhabitants in Tomsk [28] (Table 1). The city's six supporting universities are the most attractive for education, ranking third in the country's top universities (Fig. 3) after Moscow and St Petersburg.

Novosibirsk attracts students with its numerous research institutes, research centres and universities, its high availability of higher education, and the city's rich historical heritage. In relative terms, Novosibirsk has 35 students per thousand inhabitants [28] (Table 1).

Kazan is a centre of higher education and a leader in innovation and scientific and technological development, while also possessing a rich cultural, historical and ethnic heritage that attracts talented young people. Kazan possesses high scientific potential, it offers prestigious modern education, there are research institutes, scientific centres and universities, as well as a rich cultural and historical potential. There are 141 thousand students studying higher education in Kazan, that is 36 students per one thousand inhabitants [28] (Table 1).

Leading Russian universities have concluded international agreements on mutual recognition of documents, thanks to which diplomas of Russian universities are recognised in other countries, allowing graduates to find employment abroad [29].

5 Conclusion

Summarizing the results of the survey, we should note the following: Russian cities and universities, which occupy leading positions in education in the country, are far from being as prestigious in the global educational space and occupy distant positions from the leading countries, which indicates an insufficient level of competitiveness and attractiveness of Russian universities and cities for foreign students and low popularity in the global educational space. To ensure the competitiveness of Russian cities and universities in the global educational system, it is important to take into account factors and conditions of their joint development, as well as economic development trends in terms of innovation, technology and staffing needs. On this basis, the most promising direction for joint development of Russian cities and universities is the involvement of business in the

development process, in the framework of the "Triple Helix" model [30], successfully proven in other countries, in which the business community plays the key role of innovation consumer, universities - generators of innovative projects, technologies and developments, and the city provides the environment, infrastructure and resources to create an effective innovation ecosystem in the urban space to improve the level and quality of life.

Acknowledgments

The work was performed in accordance with the Research Plan of the Institute of Economics of the Ural Branch of the Russian Academy of Sciences.

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