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Project management frameworks in assessing factors and barriers to regional universities' competitiveness

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Abstract. Approaches to factor assessment of innovation environment at the stage of initiating projects and strategies to enhance competitiveness of higher education, under which regional governments and universities can cooperate to obtain additional federal resources, remain poorly investigated. The purpose of the article is to evaluate the development level of regional higher education systems using the case study of two constituent territories of the Russian Federation – the Novosibirsk and Nizhny Novgorod regions, as well as to identify barriers hindering the transfer of innovations from universities to regional economy. The work draws upon the institutional provisions of public strategic planning. The research methods include SWOT and PESTEL analysis, correlation analysis, content analysis of regulatory acts, etc. The information base covers data from a survey of 477 respondents on the influence of macro-environment factors on administrative staff of universities, as well as reports of the Ministry of Education and Science of the RF, the Federal State Statistics Service (Rosstat), and the Federal Service for Intellectual Property (Rospatent). Comparison of government regional programs for scientific and technological development in the two territories with the results of analysis of the innovation level and the state of higher education revealed imperfections in procedures for registration of intellectual activity results, as well as the lack of coordination between regional authorities' formal approaches to selecting indicators for stimulating R&D and actual activities to improve competitiveness and innovation activity of universities. The screening of the development level and the innovation environment of the two regional higher education systems, reinforced by the dynamics of statistical data and processed in Python with weighted coefficients, helped identify and rank five key factors having a potentially negative impact on the competitiveness of regional universities: a decline in the number of universities in the region; failure to meet federal project targets; reorientation of universities towards the secondary vocational education sector; critical wear of infrastructure; insufficient integration of university project management as a channel of interaction with the state. The enhanced methodological framework for factor assessment of the innovation environment provides greater authority for managerial decisions in setting goals, defining project measures, and formulating development strategies for universities based on identification of key barriers.

Keywords: strategic planning; project management; educational management; competitiveness of universities; innovation.

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Контуры проектного управления в оценке факторов и барьеров конкурентоспособности региональных вузов

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Аннотация. В научной литературе остаются недостаточно изученными подходы к факторной оценке инновационной среды на этапе инициирования проектов и стратегий повышения конкурентоспособности высшего образования, в рамках которых возможна кооперация региональных органов власти и вузов для получения дополнительных федеральных ресурсов. Исследование направлено на определение уровня развития региональных систем высшего образования на примере двух субъектов РФ – Новосибирской и Нижегородской областей, а также на идентификацию барьеров, препятствующих трансферу инноваций из вузов в экономику региона. Методология работы опирается на институциональные положения государственного стратегического планирования. Методы исследования – SWOT- и PESTEL-анализ, корреляционный анализ, контент-анализ нормативных правовых актов. Информационной базой послужили данные опроса 477 представителей административно-управленческого персонала вузов о влиянии макроокружения на их деятельность, а также отчеты Минобрнауки, Росстата и Роспатента. Сопоставление государственных региональных программ научно-технологического развития регионов с результатами анализа уровня инноваций и состояния высшей школы выявило несовершенство в процедурах регистрации результатов интеллектуальной деятельности, а также несогласованность формальных подходов региональных органов власти при выборе показателей для стимулирования НИОКР и фактических мероприятий для повышения конкурентоспособности и инновационной активности вузов. Скрининг уровня развития и инновационной среды региональных систем высшего образования, усиленный динамикой статистических данных и обработанный в Python с весовыми коэффициентами, позволил выявить и ранжировать пять ключевых факторов, оказывающих потенциально негативное воздействие на конкурентоспособность вузов: сокращение численности вузов в регионе;

отставание от целевых показателей федерального проекта; переориентация вузов в сектор среднего профессионального образования; критический износ инфраструктуры; недостаточная интеграция проектного управления вуза в качестве канала взаимодействия с государством. Усовершенствованные методические положения факторной оценки инновационной среды позволяют повысить обоснованность управленческих решений при формировании целей, мероприятий и стратегий развития вузов на основе идентификации ключевых барьеров.

Ключевые слова: стратегическое планирование; проектное управление; менеджмент образования; конкурентоспособность вузов; инновации.

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INTRODUCTION

The studies by various researchers, including the laureates of the Nobel Prize in economics Romer [Bloom et al., 2013], Acemoglu and Robinson [2022] have demonstrated the significant positive influence of higher education system as an institution on the development of human capital, raising not only the level of GDP per capita, but also its innovative potential [Kuzyk, Simachev, 2025; Baranov, Slepenkova, Tagaeva, 2020; Edler et al., 2023]. An internal strategic planning mechanism is applied in order to ensure the mobilization of resources and effective coordination of institutions and organizations to develop R&D and higher education in the Russian Federation [Feng, 2022].

To increase the competitiveness of the RF economy and strengthen technological sovereignty, in 2024 the RF President Vladimir Putin issued a decree to adopt the new Strategy for Scientific and Technological Development of the RF[1] (hereinafter called the S&T Strategy). The document establishes the direction of the country's strategic development until 2030 through increasing and making the most effective use of the intellectual capital of the regional higher education system, training at least 1 million highly qualified professionals and young scientists to ensure the entry of the RF in the world's top 10 countries in terms of the volume of scientific research. In addition, the Presidential decree of May 12, 2023 no. 343[2] provides for the reform of the higher education system by combining the best practices of the USSR and successful elements of the Bologna system.

In 2025, on the basis of the Presidential decree of May 7, 2024 no. 309[3], the RF Government introduced the new Strategy for Spatial Development of the RF[4] (hereinafter called the Spatial Strategy). It provides a common framework for managing programs and projects in the country, creating mechanisms for innovative regional development, including through the transfer of scientific knowledge from the regional system of higher education to the real sector of economy. Competitive higher education institutions (HEIs) are considered as a mechanism for stimulating innovation[5], science and technology[6] in the regions, which ensures the cluster development of the RF economy[7]. Thus, stimulating regional science through increasing the competitiveness of local HEIs can ensure technological progress in the RF.

Since the implementation of the S&T Strategy, the RF positions in the Global Knowledge Index and the Higher Education Index have fallen threefold[8]. At the same time, the analysis of regional strategies reveals a systemic gap between federal directives and their implementation on the ground, which manifests itself in the creation of ineffective intermediate institutions and solutions [Volchik et al., 2025; Gatiyatov, Safiullin, Gataullina, 2025; Kryukov et al., 2023]. Moreover, according to a number of academicians of the Russian Academy of Sciences, inflation targeting policies, high key interest rates and the structure of budget regulation over the past decade have suppressed funding in R&D and higher education [Aganbegyan, 2024; Glazyev, 2022; Kryukov, Kolomak, 2025].

[1] Decree of the President of the Russian Federation of February 28, 2024 no. 145 "On the Strategy for Scientific and Technological Development of the Russian Federation".

[2] Decree of the President of the Russian Federation of May 12, 2023 no. 343 "On certain issues in improving the higher education system".

[3] Decree of the President of the Russian Federation of May 7, 2024 no. 309 "On the national development goals of the Russian Federation for the period until 2030 and for the future until 2036".

[4] Resolution of the Government of the Russian Federation of December 28, 2024 no. 4146-r "On the Strategy for Spatial Development of the Russian Federation".

[5] At the instruction of the President, the Russian Government has submitted a bill to the State Duma expanding the powers of regions to develop federal universities. http://government.ru/news/42375/. (in Russ.)

[6] Deputy Chairman of the Government of the Russian Federation D.N. Chernyshenko and Minister of Science and Higher Education of the RF V.N. Falkov spoke at the conference "Priority 2030 – Technological Leadership", recognizing universities as a major and modern tool for the development of science, R&D, and higher education in the Russian Federation. Ministry of Science and Higher Education of the Russian Federation. 2025. https://minobrnauki.gov.ru/press-center/news/novosti-ministerstva/98897/. (in Russ.)

[7] The Report of the Ministry of Science and Higher Education of the Russian Federation. 2024. https://minobrnauki.gov.ru/press-center/news/nauka/83784/. (in Russ.)

[8] The United Nations Development Programme and Mohammed bin Rashid Al Maktoum Foundation. The Global Knowledge Index (GKI). 2024. P. 498. Dubai-United Arab Emirates. https://www.undp.org/arab-states/publications/global-knowledge-index-2024.

Thus, insufficient integration of regional HEIs into strategic planning projects is a complex problem in the RF due to their limited resources, ineffective management approaches to identifying barriers to their projects and strategies, as well as insufficient institutional mechanisms for stimulating R&D at HEIs. At the federal level, this is recognized[1] by the update of the S&T Strategy and the revision of the Spatial Strategy, which are the general documents for strategic planning at the level of goal-setting in the RF, in accordance with the Federal Law no. 172-FZ[2], as well as the Presidential decree no. 343 on reforming the higher education system. This allows us to propose the following hypotheses based on the main objectives of strategic planning, i.e., determining internal and external conditions, trends and problems[3] and consolidating the interests of participants and the state within the project:

H1a: The reason for the destructive trends in the technological development of the RF is the low competitiveness of regional HEIs;

H1b: The reason for the low competitiveness of regional HEIs is barriers to their innovation;

H1c: The reason for the low competitiveness of regional HEIs is the insufficient resource base of higher education;

H2: The RF legal regulations on strategic planning implicitly predetermine that, in order to be included in federal initiatives, the project should demonstrate the closeness of interests between the state, HEIs, and the development of the territory, which is substantiated through an assessment of trends, factors, and conditions.

At the project initiation stage, an assessment of HEI-government interaction trends is conducted (PESTEL), along with an analysis of the HEI's strengths and weaknesses and the regional context (SWOT) using dynamic statistics. This creates a chain of verifiable data for the project's measurable indicators and the idea of a regional project solution, which formulates a socio-economic problem, including one that unites the interests of stakeholders.

The RF is committed to developing science, technology and R&D across the regions, so their HEIs are both a target and an instrument for these transformations. Under modern threats, in academic literature there has been only small consideration of tools for integrating regional HEIs, including factor screening that constrains HEIs to become the region's R&D driver, into the system of state strategic planning, program and project management to obtain resources, as well as tools for diagnosing these factors that meet government requirements. It would be appropriate to assess innovation and the state of higher education in the Novosibirsk and Nizhny Novgorod regions, which are among the top five regions in the institutional S&T Development Ranking, which was developed on behalf of the RF`s President, who carries out the management of state policy in the sphere of strategic planning.

The research idea is to apply an institutional approach, which in theory will confirm the type of factor assessment most understood by the state at the stages of project initiation and planning to improve the competitiveness of HEIs, and also demonstrate such an assessment, because it may increase the likelihood of such projects in federal funding programs to modernize HEIs' infrastructure.

The aim of the study is to determine the state of regional higher education systems, screen barriers and improve the methodological provisions for assessing factors affecting these systems that will allow adjusting the processes of strategic planning in HEIs as part of their development projects. This entails the following tasks: to conduct a systemic and structural analysis of the existing legal framework to determine the contours of factor assessment and the place of the program-targeted approach in the strategic planning system; to evaluate the current state of regional HEIs and the innovation environment using the case study of two regions leading in the S&T Development Ranking, namely the regions of Novosibirsk and Nizhny Novgorod; to identify and classify barriers to the program-targeted approach and innovation in regional higher education; to reveal and interpret formal norms and requirements for factor evaluation in legal and regulatory acts of the Russian Federation; to propose methodological recommendations for improving the factor assessment of regional HEIs' environment.

LITERATURE REVIEW

Barriers to a program-targeted approach to developing innovation and higher education in the regions. A number of studies extend the concept of developing national innovation systems to the level of stimulating them through regions [March, Schieferdecker, 2023]. The development of innovation and standardization in the regions is possible with financial instruments [Dvoryadkina, Kuklinova, 2024; Sukharev, 2024]; however, such a tool is very cumbersome as it requires political initiative and the will of the federation, while the result is needed now. In theory, new public management for the development of regions and higher education is possible by improving the level of service and transparency of reporting in the R&D sectors, but this approach has been criticized because the race for figures leads to the formal implementation of reports based on indicators that do not always reflect the desired outcome [Volchik, Maskaev, Tsygankov, 2024]. The theory of innovation development in specific territories was confirmed in a number of works

[1] "If everything were normal, there would be no need to make changes and formulate new guidelines in the monetary policy and ensure sovereignty": Statement by the RF President Vladimir Putin at the informal CIS summit (December 25, 2024). Official website of the Administration of the President of the Russian Federation. http://www.kremlin.ru/events/president/transcripts/75942. (in Russ.)

[2] Federal Law of June 28, 2014 no. 172-FZ "On strategic planning in the Russian Federation" (as amended on July 13, 2024).

[3] Ibid.

[Fujita, Krugman, 2004; Golubeva, Kanunnikova, Volkov, 2024], taking into account their specialization and higher education through clustering regions as key elements of the economy as a whole. Balatsky and Ekimova [2021], while criticizing the methods of public administration in the development of R&D and S&T based on predictive documents, propose new approaches through directive design, but, on the other hand, it contradicts the existing structure of strategic planning and again requires initiatives from the federal legislator. Byvshev and Pisarev [2024] point out that due to the lack of key regional strategic planning documents in most Russian regions, there is uncertainty of state authority in the management of R&D and S&T. With a comparable number of HEIs, in two federal projects and two federal programs of the RF only 12% HEIs are included [Sorokin, Yu, 2024], while 24 federal initiatives in the PRC cover 76% HEIs [Zhang, Ji, 2021]. There was established a close link of competitive HEI and investments in its infrastructure with the number of graduate students and thesis defence, but over the past 9 years, the RF has increased its contribution to R&D by 61.7%, and during this same period, the Russian national currency, for various reasons, has been devalued by 300%, meaning that R&D expenditures have remained at the 2013 level [Sorokin, Yu, 2024].

The principles of the program-targeted approach in regional HEIs, which would improve the quality of managerial decision-making in the development of strategies and projects aimed at enhancing competitiveness, remain unclear, and no theory explains how regional HEIs can increase their chances of getting the federal institute to approve their projects and strategies at the initial stage. The blocking of innovation development in the territory is measured through patents, results of intellectual activity, funding of scientific organizations and HEIs linked to policies and objectives of the region [Feng, 2022; Peng, Yan, 2024].

The relationship between SWOT and PESTEL analyses with the program-target approach in the theoretical architecture of strategic planning documents. An analysis of China's twenty-year experience has shown that the combination of a well-developed higher education system and a near-zero Central Bank rate stimulates a rise in government spending on R&D programs and projects in the regions, which leads to a multiple increase in the country's economic competitiveness and GDP growth [Glazyev, 2022; Zhang et al., 2024]. Under the influence of sanctions, the PRC entered the twenty-first century as an economically closed agrarian system that is oriented to the public sector with average salaries of 46 dollars, and only three HEIs were included in international rankings. Over the past 20 years, the PRC has become a workshop of peace due to sustainable open institutions and accelerated investments in HEIs as R&D centres, which secured the third place among all the countries by the number of HEIs that occupy the top 300 places in THE[1] and QS[2] rankings, as well as improved the country's position in the innovation ranking from 106th to 10th place in the world, and the RF's position declined from 39 to 60 [Liu, White, 2001; Lo , Liu, 2021; Zhao, He, 2024]. The increase in R&D funding has been proven to have a significant impact on providing effective project management at the level of HEIs and regions [Zhao, He, 2024]. It would be appropriate for the RF to study the experience of the PRC in order to make the system of state institutions of strategic planning more understandable and transparent for HEIs, since at the end of the last decade of the 20th century the RF's higher education coverage was 27 times higher than in the PRC[3]. Glazyev and Sukharev [2024] were among the first to establish national projects as the main mechanism for enhancing the potential of the domestic economy and designed a program for the socio-economic development of the RF, integrated with monetary policy and higher education. A number of authors [Mariotti, 2025; Wu, Xie, 2025; Zhang, 2022] formulated methodological recommendations for government programs that ensure the development of proprietary technologies to maintain sovereignty through strategic planning and the intellectual capital system of higher education. Kleiner [2024] identifies the program-target approach in the classification of management models. The enhancement of the country's competitiveness through its regions was conceptualized by Kvint and Seredyuk [2025] in the methodology and practical implementation of science and technology strategies in the regions for their innovative development using indicators that include, among other things, an assessment of patent activity. The basic SWOT analysis model, without statistical data interrelationships, was used in dissertations on economics for the development of socio-economic systems and international strategizing [Melnikov, 2021; Wang, Yang, 2022]. Kudrin [2018] proved that the program-targeted approach is a form of allocation of 85% of government expenditures that are subordinated to budget revenues, and not an instrument of economic development.

Currently, the Russian Federation's national goals until 2036 are being implemented through 40 federal programs and their constituent federal and regional projects[4].

[1] The International University Ranking System. THE World University Rankings 2024, UK. https://www.timeshighereducation.com/world-university-rankings.

[2] The International University Ranking System. QS World University Rankings 2025, UK. https://www.topuniversities.com/university-rankings?ysclid=mkm5nzwwrd297201232.

[3] Higher education enrolment rate. 1990–1999 dataset. UNESCO, United Nations Educational and Scientific Organization. https://apiportal.uis.unesco.org/bdds/api/data?dataflow=EDULIT_DS&lastNObservations=1&format=sdmx-json&filter=EDULIT_DS..GER_3T8T..2021..RUS+CHN&startPeriod=1990&endPeriod=1999&locale=en.

[4] The unified plan for achieving national development goals of the Russian Federation until 2036. The Government of the Russian Federation.2025.http://static.government.ru/media/files/ZsnFICpxWknEXeTfQdmcFHNei2FhcR0A.pdf. (in Russ.)

One of the main documents of the Government of the RF on program-project management defines the principles and components of the project presented in the form of a passport, which provides, among other things, for indicative target, forecasting, planning and managing of the result or product of the project, based on the status of the socio-economic object being strategically implemented within the project[1].

Within the framework of strategic planning, projects are linked to federal targeting that includes measurement and justification of project objectives at different levels.

The Presidential decree no. 633[2] forms a fundamental methodological basis, which consolidates strategic planning as a mechanism of strategic management of the RF with interconnected algorithms laid down in the institutional model in the Federal Law no. 172-FZ[3]. Based on items 3 and 27.1 of the public administration system and the hierarchical relationship of strategic planning documents, the project ensures the achievement of objectives, results and priorities corresponding to the level of the public program, which, in turn, should be linked to federal guidelines. In accordance with the Federal Law no. 172-FZ, the President of the RF directs state policy in the field of strategic planning, establishes goals and priorities and ensures coordination at the level of industries and regions. This law describes the contours of operation and tasks of strategic planning in the RF, within the framework of which the Spatial Strategy and the S&T Strategy are anchored in common documents on strategic and spatial development. The law lacks the abbreviations *SWOT* and *PESTEL* analyses, but it does reflect their main characteristics: 1) definition of and priorities in the strategy, program and project, taking into account the public interest and objectives at the federal and regional levels – based on Chapter 3, item 8, par. 3; 2) the use of program-targeted tools for socio-economic development and the relationship of project initiatives with the S&T Strategy, the Spatial Strategy, S&T Development government program[4], the government program "Priority 2030", the federal projects "R&D" and "Campuses" – based on Chapter 3, item 7; Chapter 4, item 18; Chapter 5, item 19; 3) the need for a well-founded factor assessment of the dynamics and indicators at the initiation stage of the strategy, program, project – based on Chapter 12; Chapter 1, item 3, par. 23; 4) identification of internal and external conditions, trends, disproportions, imbalances at the stage of goal setting and planning – based on Chapter 3, item 8, par. 2; Chapter 5, items 3–5, 24; Chapter 12, item 40, par. 2. The components of the factor assessment are provided in Appendix no. 2 to the set of measures of the RF Government on the implementation of the Decree of the RF President Vladimir Putin[5]. Factor assessment is laid down in the methodological provisions of the Ministry of Economic Development of the RF[6], which is responsible for proposing and implementing measures of the socio-economic development, as well as evaluating projects of the main state mechanism for their financing through public-private partnership[7] to ensure the Spatial Strategy and the S&T Strategy. To obtain an expert opinion from the development institute on the inclusion of strategic planning objects in funding under the government programs, federal projects require a statistical, expert assessment that allows evaluating the dynamics of the state as the object itself and the innovation profile of the region in which it is located[8]. Project management standards, SWOT and PESTEL analyses are fixed to assess the object's condition in par. 6[9] at the national level, as well as in par. 4.3[10], par. 1.2 and par. 3.2[11] at the international level.

A practical example that comes from one of the constituent entities of the RF is the establishment of a HEI as a centre for innovation and social development, which

[1] Resolution of the Government of the Russian Federation of October 31, 2018 no. 1288 "On organization of project management technology in the Government of the Russian Federation".

[2] Decree of the President of the Russian Federation of November 8, 2021 no. 633 "Fundamentals of state policy in the sphere of strategic planning in the Russian Federation".

[3] Federal Law of June 28, 2014 no. 172-FZ "On strategic planning in the Russian Federation" (as amended on July 13, 2024).

[4] Resolution of the Government of the Russian Federation of March 29, 2019 no. 377 "On approval of the state program of the Russian Federation *Scientific and Technological Development of the Russian Federation*" (as amended on February 15, 2025).

[5] The unified plan for achieving national development goals of the Russian Federation until 2030 and for the period up to 2036. Official website of the Ministry of Economic Development of the RF. https://www.economy.gov.ru/material/dokumenty/edinyy_plan_po_dostizheniyu_nacionalnyh_celey_razvitiya_rossiyskoy_federacii_na_period_do_2024_goda_i_na_planovyy_period_do_2030_goda.html?ysclid=maci1tu65u449560855. (in Russ.)

[6] Order of the Ministry of Economic Development of the RF of March 23, 2017 no. 132 "On approval of methodological recommendations for the development and adjustment of the strategy for the socio-economic development of a constituent entity of the RF and the action plan for its implementation" (as amended on June 28, 2024); Order of the Ministry of Economic Development of the RF of April 14, 2014 no. 26R-AU "On approval of methodological recommendations for the implementation of project management in executive authorities".

[7] Federal Law of July 13, 2015 no. 224-FZ "On public-private partnership in the Russian Federation" (as amended on November 13, 2024).

[8] Order of the Government of the Russian Federation no. 1393-r "On the establishment of an autonomous non-profit organization *The Agency for Strategic Initiatives to Promote New Projects*" (as amended on April 4, 2025).

[9] State Standard of the Russian Federation no. R 57189-2016 "Quality management systems. Guidelines for the application of ISO 9001:2015". The guidelines are set out in the Federal Law of June 29, 2015 no. 162-FZ "On standardization in the Russian Federation", Article 26.

[10] The International Organization for Standardization. (2022). ISO 21504. Project, programme and portfolio management – Guidance on Project Portfolio Management, Geneva. https://www.iso.org/standard/82867.html.

[11] OECD Development Policy Papers, 2019. Decentralised Development Co-Operation – Unlocking the Potential of Cities and Regions. https://www.oecd.org/content/dam/oecd/en/publications/reports/2019/12/decentralised-development-co-operation_38b6d23d/e9703003-en.pdf.

is confirmed in the main document of the region's strategic planning at the goal-setting level[1]. Currently, within the framework of the government program "Priority 2030" work is being carried out to improve the competitiveness of 143 HEIs in the Russian Federation, which provides funding for the modernization of their infrastructure, etc. [Sorokin, Yu, 2024]. Application for "Priority 2030" includes a development project or a HEI strategy that should be managed and linked to the actual conditions of the particular territory[2], as well as a dynamic assessment of regulatory and external factors on HEIs in these territories[3]. The scientific community has not provided recommendations and justifications for a factor evaluation of such projects to improve the competitiveness of HEIs, which, as the review showed, is part element of its preliminary analysis in the institutions themselves. According to the institutional model, strategic planning includes project management as a key element and the theoretical study confirms hypothesis H2 by integrating into the project a SWOT analysis with the specified components, which will ensure synchronization with the legal and regulatory acts of the RF and determine the state of HEIs in dynamics. By identifying institutional prerequisites using a combination of PESTEL and SWOT analyses supplemented by official data and dynamics, it is possible to develop a project initiative suitable for federal authorities and development institutions, revealing the development track of regional HEIs through the prism of chronologically presented information about their current level of development, taking into account the specificity of the region.

RESEARCH DESIGN

Based on the theories of the Nobel Prize winners – Paul Romer (endogenous growth theory) and Daron Acemoglu & James Robinson (new institutional economics), – it follows that inclusive institutions (public authorities, HEIs) determine economic growth. In the context of this article, the modern definition of the term "innovation" is used: this is a result of purposeful activity of scientific institutions and HEIs on diffusion, generation of codified (patents, publications) new knowledge, which are embodied in new products, processes and organizational decisions useful for the development of the region [Tsipouri et al., 2025]. This analysis does not focus on the coverage of education or the number of students, because in the theoretical section it was already discussed that the retrospective advantage of the RF in this area did not lead to expected results. The target value of patent is prioritized. However, it should be noted that the patent activity of the region is formed by the totality of all the natural and legal persons who submitted the respective applications.

The scientific work is carried out on the basis of regulations of the Federal Law no. 172-FZ, which establishes the legal basis of strategic documents[4] and regulates the relations[5] that arise between participants in strategic planning at the federal, regional and municipal levels in the process of targeting, forecasting, planning and programming socio-economic and scientific-technological development of the RF. In the context of the meta-analysis presented in [Sorokin, Yu, 2024, p. 142], competitiveness of HEIs is defined as a system with components and elements that ensure the innovative development of a higher education institution, taking into account the RF's guidelines for strategic planning as well as program and project management. The bias in favour of this analysis is due to the fact that state authority and public administration in the RF are exercised through regulation and rule-making, which can allow adapting new knowledge to possible practical application[6].

The empirical part is devoted to the analysis of investments and R&D activity in the RF as well as to HEIs' mechanisms for registering results of intellectual activity, since it is unlikely that significant results can be achieved without a substantial increase in spending on innovation. The column charts are used to assess changes in the funding of innovation and project activity in accordance with the S&T Development government program of the Nizhny Novgorod[7] and Novosibirsk[8] regions of the RF. These regions were selected on the following grounds:

1) implementation of the Federal Law no. 172-FZ should be a priority for the RF regions. According to this law, the Spatial Strategy and the S&T Strategy are federal strategic planning documents at the target level. Fur-

[1] On the Socio-Economic Development Strategy of the Khanty-Mansi Autonomous Okrug – Yugra until 2020 and for the period up to 2030. Department of Economic Development of the Khanty-Mansi Autonomous Okrug – Yugra. https://depeconom.admhmao.ru/deyatelnost/sotsialno-ekonomicheskoe-razvitie/strategiya-sotsialno-ekonomicheskogo-razvitiya-okruga/297873/strategiya-sotsialno-ekonomicheskogo-razvitiya-hanty-mansiyskogo-avtonomnogo-okruga-yugry-do2020-g. (in Russ.)

[2] Decree of the Government of the Russian Federation of May 26, 2021 no. 786 "On the management system of state programs of the Russian Federation" (as amended on August 2, 2025).

[3] Order by the Ministry of Science and Higher Education of the Russian Federation of February 1, 2024 no. 73 "On approval of expert evaluation of programs and projects for the development of universities". http://publication.pravo.gov.ru/document/0001202404020014?ysclid=mkpma7a45k777876431. (in Russ.)

[4] Federal Law of June 28, 2014 no. 172-FZ "On strategic planning in the Russian Federation", item 1, par. 3 (as amended on July 13, 2024).

[5] Ibid., Chapter 1, item 3.

[6] Federal Law of December 21, 2021 no. 414-FZ "On the general principles of organization of public authority in the constituent entities of the Russian Federation" (as amended on July 31, 2025).

[7] Resolution of the Government of the Nizhny Novgorod region of December 21, 2018 no. 889 "On the Strategy for Socio-Economic Development of the Nizhny Novgorod Region through 2035" (as amended on December 23, 2024). https://minec.nobl.ru/documents/active/72007/?ysclid=mfjrzikgww554502801. (in Russ.)

[8] Resolution of the Government of the Novosibirsk region of March 19, 2019 no. 105-r "On the Strategy for Socio-Economic Development of the Novosibirsk Region through 2030" (as amended on December 27, 2022). http://publication.pravo.gov.ru/document/5400201903210003?ysclid=mfje36r77g637235386. (in Russ.)

thermore, according to this law, all strategic planning documents at the goal-setting level, including regional and sectoral strategies, must be updated at least once every six years for a period of 12 years. Regional documents must be updated and synchronized with federal documents whenever the latter are updated. The regional strategies of socio-economic and scientific-technological development are the main mechanisms for stimulating the economy and R&D at the level of the region's goals and should follow the guidelines of the federal Spatial Strategy and S&T Strategy and comply with the law no. 172-FZ. The federal S&T Strategy entered into force in 2016 and was updated in 2021 and 2024. Until the Strategy's first update, only seven regions have adopted a territorial S&T Development Strategy. As seen from Appendix 1, there were only 16 regions that updated the Strategy for Socio-Economic Development in a timely manner and fixed separately the specialized S&T Development Strategy until 2025 at the level of rules and regulations of the RF;

2) subsequently, five best regions[1] were selected from these 16 regions in the institutional S&T Development Ranking of the Ministry of Education and Science, compiled in accordance with the Assignment of the President of the RF of December 24, 2021 no. Pr-290, par. 10v;

3) Moscow, Saint Petersburg, and Tatarstan are excluded from the list due to the existence of special economic zones and separate higher education funding, which several times exceeds the funding of the other regions. All the above-mentioned provisions will complement the analysis of formal institutions for strategic planning in higher education and enhance the explanatory power of the study to more effectively identify existing barriers.

PESTEL analysis will be carried out based on the institutional legal and regulatory environment, since the exercise of public authority and the functioning of the state occurs through regulatory framework [Furuncu, 2025; Niu, 2024; Peng, Yan, 2024]. This will help to define the contours of integration with state strategic planning initiatives, as well as identify the needs of the region and the RF, and prepare a basis for SWOT analysis. Analysis without the PESTEL specified elements is meaningless, because a mere listing of factors without considering the institutional environment will not increase the chances of the project being included in the national, federal projects and programs. At the second stage of the PESTEL analysis, the probability of change in factors (from 1 to 3) was assessed with the help vice-rectors using anonymous questionnaires, where "1" is the minimum probability, "2" is the average probability, and "3" is the maximum probability. Next, the arithmetic mean value weighted was calculated for them. The choice of respondents is determined by their official position, as well as the view of the HEI management on institutional factors.

The current work concentrates on fixation and systematization of analytical relationships, but not strict causal effects. That is why this pilot study does not look at the full innovation profile of the region or the set of effects from "Priority 2030", but identifies and maps key factors and barriers that challenge the competitiveness of regional HEIs in the upper echelons of the rankings of the RF entities. And the focus on management staff is dictated by the need to understand the logic and aspects important for decision-making, because they participate in HEI's strategizing, which depends on the interaction with government initiatives ("inside view"). Due to the processing conditions, as well as the complexity of the administrative resource, among HEIs in the two regions studied it was possible to obtain 477 anonymous surveys (digital questionnaire), and their general population was 82% of men aged between 40 and 50 years with scientific degree, who indicated an administrative and managerial position at HEI. Thus, the work, although limited, can lay the foundation of further studies using panel data and extended groups of respondents. There were questionnaires in which the position of vice-rector was indicated. A vice-rector with a degree is a strong resource subject and one of the main mechanisms for transformation at a HEI. However, taking into account the quasi-competitive model of higher education in the RF, the single authority of 89% HEIs, and the mechanism of the regulatory guillotine[2], the real impact on transformation within HEIs shifts from academic collegiality to administrative hierarchy and a HEI's heads of departments [Tyurina, 2023; Tomilin, 2024]. The vice-rector at a HEI is a bridge to regional authorities for strengthening R&D and strategic planning on the territory, and administrative staff is capable of influencing decisions made by vice-rectors [Peng, Yan, 2024; Wang, Yang, 2022]. This is relevant as, under a special assignment of the RF President[3] in 2022, the legislator emphasized HEIs as the driver of R&D in regions and granted them the right to provide unlimited financial support for higher education through grants, regional programs and projects[4].

At the final stage of the analysis, the importance of external environmental factors was calculated, which made it possible to assess the degree of influence of each

[1] On December 16, 2025, Valery Falkov presented a ranking in which the Novosibirsk region and Nizhny Novgorod region are among the top five regions. The Ministry of Science and Higher Education of the Russian Federation. https://minobrnauki.gov.ru/upload/2025/12/%D0%98%D1%82%D0%BE%D0%B3%D0%B8%20%D0%9D%D0%B0%D1%86%D1%80%D0%B5%D0%B9%D1%82%D0%B8%D0%BD%D0%B3%D0%B0%20%D0%B7%D0%B0%202024%20%D0%B3..pdf. (in Russ.)

[2] Federal Law of July 31, 2020 no. 247-FZ "On mandatory requirements in the Russian Federation" (as amended on February 28, 2025).

[3] The Russian President Vladimir Putin ordered "to expand the powers of regions in the field of higher education" following a joint meeting of the State Council Presidium and the Council for Science and Education. http://government.ru/news/42375/. (in Russ.)

[4] Decree of the Government of the Russian Federation of March 29, 2019 no. 377 "On scientific and technological development of the Russian Federation", Article 1750 (as amended on May 15, 2025).

on possible changes in the macro environment of regional HEIs. The result closer to "1" indicates a strong influence of a particular factor according to expert assessment. This calculation is performed using the following formula:

$$O_w = \frac{\sum_{i=1}^{n} E_e B_f}{\frac{n}{\sum B_f}}, \quad (1)$$

where O_w is weight-adjusted estimate; E_e is expert estimate; B_f is influence of the factor.

Due to the limited volume of the work, the factor assessment for innovation analysis is presented using the case of only one region (Novosibirsk) that has a certain advantage as an academic city since the times of the USSR. The analysis will focus on the performance indicators of regional HEIs using reports VPO-1 and VPO-2[1]. Indicative assessment of the material-technical condition of higher education and the indicators in institutional ranking systems relies on modern neoclassical theory of economic growth, which is based on the country's S&T development through increasing the competitiveness of HEIs and investments in the knowledge economy: human capital, education, and R&D [Verenikin, Verenikina, 2024; Lai et al., 2023; Lo, Liu, 2021; Proserpio et al., 2025]. The study measured the weights of each influencing factor by calculating the coefficient of variation expert assessments, which is computed as the ratio of the standard deviation of the assessments to their mean. To do this, experts were asked to rate the influence of each factor on a scale from 1 (minimal effect) to 10 (maximum effect). Based on the obtained estimates, the arithmetic mean and standard deviation were calculated for each factor, after which the coefficient of variation was determined as the ratio of the standard deviation to the mean, where a lower value of the coefficient indicates greater consistency of expert opinions and, accordingly, assigns a higher weight to the factor in the integral assessment. To determine the statistical and parametric significance, calculations were performed for a subset of factors using open-source software, the structured object-oriented programming language Python[2], supplemented with artificial intelligence components. The choice of Python is not due to the isolation of the calculation, but to the principles of calculations in a single scripting pipeline: using a Jupyter Notebook environment eliminates errors of manual data transfer between SAS's JMP, Replit and Pandas. In NumPy, for efficient computation of arrays of numbers there is a SciPy reconfiguration in order to build complex scientific algorithms, including weight and weighted evaluation. Thus, Python ultimately increases, not decreases, the reliability of results. The following statistical indicators were used to quantitatively assess the degree of agreement between expert opinions and subsequently calculate factor weights. The average factor score is calculated as the arithmetic mean of individual expert judgments using the formula:

$$X_i = \frac{1}{n}\sum_{i=1}^{n} X_{ij} \ (i = 1, 2, ..., n), \quad (2)$$

where X_j is the average score of factor j given by the experts; X_{ij} is the score value (for negative scores an absolute value was used for calculation). The dispersion of expert assessments relative to the average is determined by the standard deviation using the formula:

$$S_j = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n} (X_{ij} X_j)^2} \ (i = 1, 2, ..., n), \quad (3)$$

where S_j is the standard deviation of the expert estimates for factor j. The coefficient of variation was calculated as the ratio of the standard deviation to the mean to assess expert agreement using the formula:

$$C_j = \frac{S_j}{X_j} \ (i = 1, 2, ..., n), \quad (4)$$

where C_j is the coefficient of variation of the expert assessments for factor j.

Since expert assessments of the factors demonstrated varying degrees of variability, a traditional method based on the coefficient of variation was used to calculate the weights. When the coefficient of variation for a given factor is large, this indicates that the experts have divergent views on the effect of that factor, and, therefore, less weight can be attributed to it. Conversely, for the factors with consistent expert estimates and a lower coefficient of variation, it indicates that the estimates for this factor are more objective and should be given greater weight. By normalizing the data, the weight of each factor W_j is calculated by formula:

$$W_j = \frac{\frac{1}{C_j}}{\sum_{i=1}^{n} \frac{1}{C_{ij}}} \ (i = 1, 2, ..., n). \quad (5)$$

According to the Resolution of the Government of the RF no. 1288 "On the organization of project activities in the Government of the Russian Federation"[3], the main objective of the factor assessment at the project initiation stage is to formulate and confirm the socio-economic problem of the system for which the project initiative idea is formalized within the established project documentation and included in the state and federal funding

[1] Forms no. VPO-1 and VPO-2. Information about the organization implementing educational activities in higher education programs – bachelor's degree programs, specialist degree programs, master's degree programs. https://minobrnauki.gov.ru/action/stat/highed/. (in Russ.).

[2] Python high level programming language. https://python.org.

[3] Resolution of the Government of the RF of October 31, 2018 no. 1288 "On the organization of project activities in the Government of the Russian Federation" (as amended on November 6, 2025). (in Russ.)

programs. At the end of the empirical section, the final results of the weighted expert assessments will be presented, the value of which was 0.2 (a number close to 1 is the most significant). The weight of each factor will be multiplied by its assessment, which may increase the explanatory power of the project and prepare a basis for approval negotiations with federal institutions.

RESEARCH RESULTS

Barriers to the program-targeted approach and innovation development in regional higher education. This study does not include a comprehensive analysis of the innovation profile of regions. Instead, it focuses on diversifying two large-scale research rankings: the national S&T Development Ranking[1] and the Scientific Ranking by National Research University HSE[2] (innovation policy, import and export of R&D products, the share of R&D in gross regional product, integration with firms, etc.). It is important to assess the institutional environment for HEIs and their contribution, excluding publications related to academic metrics whose use for R&D is complicated by the fact that corporate and public sectors do not use scientific databases of articles and are unfamiliar with high-rated scientific journals [Wang, 2021; Chong, Yuen, 2022; Zhao, He, 2024].

To improve the effectiveness of regional development projects involving HEIs, specific powers have been granted to regional government bodies[3]. This is because regional HEIs are becoming drivers of R&D, socio-economic and S&T development in the region[4]. To that end, the federal government program Scientific and Technological Development of the Russian Federation[5] (hereinafter called the S&T Development Program) ensures the implementation of public policy in the field of higher education and science and is the main tool for program-targeted management in this area. Since the launch of the S&T Development Program, according to the departmental classification structure presented in thirteen units of the federal budget of the RF Treasury, the share of unit "Higher education" (0700) and "Fundamental research" (0100) fell by an average of 2.4% annually, and in 2023 accounted for only 58.2% of total education expenditures[6]. In addition, 72.8% of the funds under these two headings comprise expenses on teacher's salaries, payment of HEIs utilities, and maintenance of facilities[7].

At the results of intellectual activity level, there are two institutional conflicts: 1) indicators[8] for teachers and researchers that contradict the secrecy of a patentable invention; 2) before obtaining any benefit, a HEI must pay royalties twice for the same intellectual property: the first time when it recognizes its secret organization, and the second time when it applies for a patent[9].

The strategic planning of the region is based on a comprehensive assessment of the state of innovation and technological potential indicators. Some of these indicators are shown in Figure. The starting point of the period is linked to the date of the introduction of the two rankings according to the Assignment of the President of the RF of December 24, 2021 no. Pr-290, par. 10v[10]. Following the President's directive, amendments to Article 8 of the Law on State Scientific-Technological Policy[11] were approved, allowing regions to finance HEIs. According to Figure, the Novosibirsk region increased funding by 59%, while the Nizhny Novgorod region reduced it almost threefold. During the period under review, the share of patents issued by two HEIs participating in "Priority 2030" in the Novosibirsk region (NSU and NSTU)[12] increased from 1.68 to 1.86, and two HEIs participating in "Priority 2030" in the Nizhny Novgorod region (Lobachevsky University and NNSTU n.a. R.E. Alekseev) – from 1.46 to 1.69 (national average – 1.24). However, the level of invention

[1] The national ranking of scientific and technological development of the constituent entities of the RF based on the results of 2021. https://minobrnauki.gov.ru/action/stat/rating/. (in Russ.).

[2] Abashkin V.L., Abdrakhmanova G.I., Artyomov S.V. et al. (2025). The Innovative Development Ranking of the Subjects of the Russian Federation. Issue 10 (ed. by L.M. Gokhberg). National Research University Higher School of Economics. https://issek.hse.ru/news/1068199937.html. (in Russ.)

[3] "To expand the powers of the regions in the sphere of higher education" was ordered by Russian President Vladimir Putin following a joint meeting of the Presidium of the State Council and the Council for Science and Education. The Government of the Russian Federation, 2022. http://government.ru/news/42375/. (in Russ.)

[4] Federal universities and research organizations will be able to receive financial support for development from the regions. https://minobrnauki.gov.ru/press-center/news/novosti-ministerstva/49931/. (in Russ.)

[5] Resolution of the Government of the Russian Federation of March 29, 2019 no. 377 "On approval of the state program of the Russian Federation Scientific and Technological Development of the Russian Federation" (as amended on February 15, 2025).

[6] Federal budget by sections and subsections of expenditure classification. Federal Treasury, 2023. http://datamarts.roskazna.ru/razdely/rashody/rashody-po-razdelam-podrazdelam/rashody-po-razdelam-i-podrazdelam/?paramPeriod=2022. (in Russ.)

[7] Order of the Ministry of Science and Higher Education of the Russian Federation of March 26, 2021 no. 209 "On approval of the General requirements for determining standard costs for the provision of state (municipal) services in the field of higher education" (as amended on March 13, 2024). http://publication.pravo.gov.ru/Document/View/0001202105280037?ysclid=mfoy4cqh7l397024484. (in Russ.)

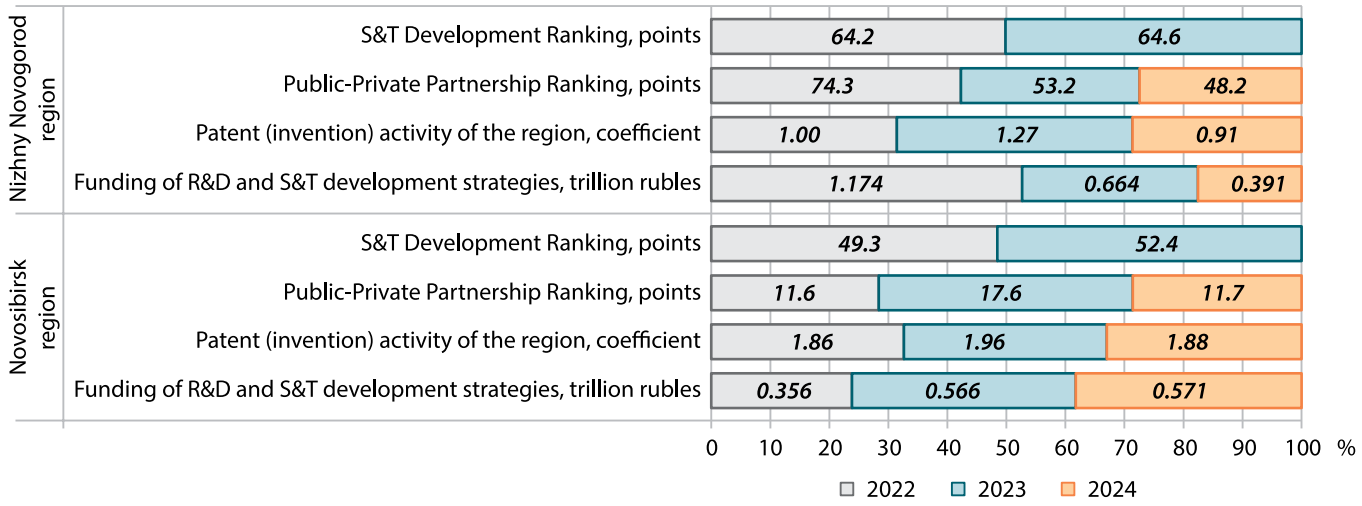
[8] Order of the Ministry of Science and Higher Education of the Russian Federation of November 1, 2021 no. 419-r "On approval of methods for calculating indicators of national, federal projects, programs" (as amended on August 14, 2023).

[9] Federal Law of November 28, 1994 no. 51-FZ "The Civil Code of the Russian Federation", Part 4, Chapter 3, item 4, par. 1370 (par. 1229) (as amended on July 23, 2025).

[10] V.V. Putin: We need to find such solutions that will enhance the prestige, academic status, and income of teachers and professors in the regions and ensure the quality of education and research at universities. Higher Education Today, no. 3, pp. 2–10. https://doi.org/10.25586/RNU.HET.20.03.P.02. (in Russ.)

[11] The website of the President of the Russian Federation. Documents section. http://www.kremlin.ru/acts/news/68214. (in Russ.)

[12] Information system for accredited persons by classification sections. The Federal Service for Intellectual Property of the Russian Federation, 2025. https://searchplatform.rospatent.gov.ru/. (in Russ.)



Dynamics of project and innovation development indicators in the Novosibirsk and Nizhny Novgorod regions in 2022–2024 years[1]

Динамика показателей проектного и инновационного развития в Новосибирской и Нижегородской областях в 2022–2024 гг.

activity in the Novosibirsk region increased by 1.3%, while in the Nizhny Novgorod region it decreased by 9%. The total number of patent applications in the former increased by 22% (971 units), and in the latter – 2 times (988 units)[2].

However, 73% patents granted in the Nizhny Novgorod region are trademarks, while in the Novosibirsk region this figure is only 22%. As for the share of technology imports under the results of intellectual activity, it rose 1.5 times in the former and 6 times in the latter. There is a contradictory dynamic associated with the formation of new and failure of current projects[3], usually related to underestimation of barriers, factor risks, interest closings[4], which may indicate the stage of adjustment of strategic planning processes in the subjects of the RF.

In the S&T Development Ranking, the Nizhny Novgorod region moved from the 9th to the 6th position, while the Novosibirsk region remained in the 5th place. The failure of projects financed through public-private partnerships at the planning stages is due to violations of the methodological provisions of the Ministry of Economic Development, which was given some of the functions for adjusting strategic planning documents by the RF Government, including the factorial assessment of project requirements and their comparison with federal state programs through which they (the projects) are included in funding. Therefore, particular importance is attached to the Public-Private Partnership Ranking developed by the Ministry of Economic Development. In the national Public-Private Partnership Ranking[5], the former moved from the 10th to the 4th position, and the latter – from the 8th to the 32th. According to the ranking methodology, one of the evaluation parameters is the number rejected and failed projects due to poor assessment of factors and financial risks. In addition, the structure of government program funding indicators differs across the regions. In the Nizhny Novgorod region, there are "at least 10 monthly publications about the IT cluster in federal and regional media", and in the Novosibirsk region, there is "the number of awarded titles of Honored Scientist of the Region". The conducted dynamic analysis (see Figure) reveals different approaches to innovation development in the region and shows that the introduction of innovations is not a priority task, since the goal of the Nizhny Novgorod region is to create an image of the innovation centre, while the Novosibirsk region aims to stimulate leading researchers' scientific activities, rather than introduce innovations. Over the past eight years, federal spending on "Higher education" has almost doubled in absolute terms. However, relative to over-

[1] *Source*: the authors' compilation using data from the Federal Service for Intellectual Property (Rospatent) annual reports. https://rospatent.gov.ru/ru/about/reports. (in Russ.); Open Budget of the Novosibirsk region. https://openbudget.mfnso.ru/opendata/novosibirsk-fo-001-003. (in Russ.); The Investment Portal of the Nizhny Novgorod region. https://nn-invest.ru. (in Russ.); The national ranking of the constituent entities of the RF. https://minobrnauki.gov.ru/action/stat/rating/. (in Russ.); Budget execution report of the Novosibirsk oblast. https://nauka.nso.ru/page/1033. (in Russ.); Management decision support: Online service. https://openstat.rospatent.gov.ru:18443. (in Russ.); Ranking of regions by level of PPP development. https://www.economy.gov.ru/material/departments/d22/gosudarstvenno_chastnoe_partnerstvo/reyting_regionov_po_urovnyu_razvitiya_gchp/?ysclid=mfc8rdan3t745314553. (in Russ.); Investment in Russia. 2023. http://ssl.rosstat.gov.ru/storage/mediabank/Invest_2023.pdf. (in Russ.).

[2] Patent search. https://searchplatform.rospatent.gov.ru.

[3] Ranking of regions by public-private partnership development level. Ministry of Economic Development of the Russian Federation. https://www.economy.gov.ru/material/departments/d22/gosudarstvenno_chastnoe_partnerstvo/reyting_regionov_po_urovnyu_razvitiya_gchp/?ysclid=mdsasmmt0165301213. (in Russ.)

[4] Rosinfra – infrastructure project support platform. https://rosinfra.ru/project. (in Russ.)

[5] The ranking of regions by level of development of public-private partnerships. 2025. https://www.economy.gov.ru/material/departments/d22/gosudarstvenno_chastnoe_partnerstvo/reyting_regionov_po_urovnyu_razvitiya_gchp/?ysclid=mfc8rdan3t745314553. (in Russ.)

all education spending, the overall share of the "Higher education" budget classification has decreased annually. Since the launch of the federal S&T Development Program, which includes the national project "Science and HEIs", the share of project funding has decreased 1.5 times, reaching 10% in 2024. Formally, higher education spending increased by 16.4% in 2024, while spending on applied research decreased by 19%. The Novosibirsk and Nizhny Novgorod regions show strong competition. This is confirmed by the fact that over the past five years both regions have consistently ranked in the top six in the S&T Development Rankings and HSE rankings. The regions have accumulated valuable experience. It is noteworthy that the same HEIs (Novosibirsk's NSU and Nizhny Novgorod's Lobachevsky University) were involved in the completed "Project 5-100"[1] and the current program "Priority 2030", as well as Novosibirsk's NSTU and Nizhny Novgorod's NNSTU n.a. R.E. Alekseev are participants in the "Priority 2030"[2] which accumulate the core of applied science patents for the region. Due to the status of cities of federal significance and the presence of special economic zones with separate funding, spatial and regional differences create the effect of scientific enclaves in the first three regions leading in S&T development, and even with promising developments in the two regions under review, there is a lack of infrastructure for scaling up R&D. These processes are exacerbated by the ambiguous interpretation of patent law with respect to HEIs, as well as the mismatch between the objectives of regional government programs and measures for innovative development, which may point to some weaknesses in the configuration of institutional mechanisms and funding. Thus, in regional higher education, the importance of project management and public-private partnerships is increasing to initiate and promote local projects that will allow them to be included in the federal S&T Development Program, "Priority 2030", and federal projects "Campuses", "R&D", and "Development of human capital and research".

The study's data support hypothesis H1a. It was found that at the time of the study, only 11% of regional HEIs were participants in the "Priority 2030" program. However, participating HEIs (including four HEIs in the two regions studied) were the main drivers of patent activity in applied sciences. According to the theory of knowledge economics and endogenous growth, the competitiveness of HEIs as generators of innovation is a key factor in S&T development. Consequently, the low competitiveness of regional HEIs confirmed by their insignificant share of participants in "Priority 2030" is, among other things, the cause of destructive trends in S&T development. This is consistent with the theory of knowledge economics claiming that if knowledge is not reproduced and codified into patents, it will be quickly devalued [Zhang, Ji, 2021].

Hypothesis H1b is also confirmed, according to which the competitiveness of HEIs can decrease due to weak receptivity of the national economy to the development of their projects. Moreover, there are signs of immaturity of the system of registration of results of intellectual activity, as well as regional strategic planning systems, which was verified in this empirical block and Appendix 1. Hence, it is relevant for HEIs to attract resources themselves. Under such conditions, devising a method for evaluating the factors transparent to stakeholders at the stage of project initiation and planning can increase the chances of applications and projects being considered for inclusion in federal initiatives.

Applying the components of factor assessment of the program-targeted approach for strategizing higher education in the Novosibirsk region. As a result of the PESTEL analysis (Appendix 2), six large groups of factors influencing the development of the higher education system in the regions were formed, and the most important of them were identified from the perspective of HEI management.

The results help HEIs decode the legislator's strategic signals and develop more effective applications for programs, such as "Priority 2030", increasing the probability of success. This analysis is useful for HEI rectors, as it allows them to assess key institutional trends and observations that will not only help mitigate risks within the HEI, but also strengthen the connection with the state, which should be taken into account in the development of the HEI's project or strategy. The hypothesis H2 is partially confirmed, since the results of the evaluation indicated the possibility to revise the balance in favour of more accurate alignment with the state priorities, in case of a change in the approach to management in HEIs.

Appendix 3 presents a comprehensive analysis of strengths and weaknesses, opportunities and threats for higher education and innovation. Current regional and university strategies in the Nizhny Novgorod and Novosibirsk regions are not fully focused on the systematic implementation of the Spatial Strategy and S&T Strategy. This is due to the critical deterioration of the infrastructure of most HEIs, the conflict between the requirement to maintain the secrecy of patentable inventions until the application is filed and the performance indicators of research and teaching staff, as well as some indicators of regional S&T government programs focused primarily on reputational effects. Some key facts from the analysis: 1) the positive dynamics of the regions in the RIA rating, the state S&T Development Ranking and the HSE Ranking coincides with HEIs' performance in R&D and promotion to the first hundred of the Three University Missions Ranking, but only for those HEIs that participate in federal projects and programs; 2) at the time of the study, "Prior-

[1] The Accounts Chamber of the Russian Federation. Evaluation of the effectiveness of the University Project 5-100 (2021). https://ach.gov.ru/upload/iblock/ab8/ab8e9ce46a64ed39020ff200d407dde1.pdf. (in Russ.)

[2] The Strategic Academic Leadership Program of the Russian Federation "Priority 2030". https://priority2030.ru/participants/. (in Russ.)

ity 2030" included two HEIs from each of the two regions under review, which were simultaneously leaders among all the organizations (including corporate firms) in terms of R&D patents. Most other organizations in these regions focus on trademark registration. While other HEIs in the regions lack resources to participate in R&D registration, paragraphs 1 and 2 confirm the hypothesis H1a. In accordance with the methodological plan of the study, Table presents the most significant regressive trends in regional higher education.

We are not aiming for statistical generalization (from sample to population), which would be impossible without a representative sample of regions, but for analytical generalization. This is why the factor assessment is a methodological "bridge" between the requirements of laws and project management practice. The main regressive trends in regional higher education from Table are then ordered by the degree of weighted expert assessment:

1) the critical depreciation of the material and technical base of higher education is 78%, with a simultaneous basic need for 50 thousand places for student dormitories according to the RF`s national standards 58186-2018 "Services for population. Requirements to student accommodation services";

2) higher school in the Nizhny Novgorod and Novosibirsk regions was unable to convert a 33% inflow of migration into a tool for increasing its competitiveness and fell 1.5 times as far from the completed federal project "Export of Education" indicators and the "internationalization" indicator of the Ministry of Science and Higher Education;

3) at the same time, over the last nine years in the regions studied there was an average increase of 22% in the share of educational institutions oriented to secondary vocational education programs, a reduction of 2.4 times in the number of defended PhD dissertations, as well as a 29%increase in the number of teachers aged 60 years and above;

4) the average number of HEIs has decreased by 35% in the last nine years and most of them were not included in the Three University Missions Ranking;

5) the circumstance that complicates the development of the material and technical base of HEIs is the heterogeneity of strategic processes and the existing management model in HEIs, which does not provide for mandatory channels of interaction with regional authorities.

The identified regressive trends in higher education in the two regions leading in the S&T Ranking of the Ministry of Science and Education can not only reduce the quality of higher education, but also have a multiplier effect on innovation development, ranking positions, and investment attractiveness of the region, which confirms hypotheses H1a and H1c. Consider management solutions for such cases. When a regional HEI initiates a project to enhance its competitiveness by applying for a collective association within a regional project or participating in federal programs and projects, it is necessary to:

1) create a project office;

2) carry out PESTEL and dynamic analysis of barriers as well as SWOT analysis according to the regulatory framework of the RF program and project management, develop a tree of SMART goals and issues, and link them to federal / regional / industry strategic documents;

3) prepare a passport, a model project according to the RF Government Decree no. 1288, set SMART-tasks and link them with deadlines, executors, activities, indicators, results;

4) formulate an action plan for implementing the project, which contains a systematic list of activities linked to results / indicators, products, implementers, deadlines;

5) develop a system of indicators and evaluate its predictive and retrospective dynamics, assess risks and propose risk management measures, as well as a monitoring system.

Relevance demonstrated for decision-making procedures: the objective basis for a dialogue between university, regional authorities, and federal institutions; harmonization of interests on the basis of uniform formalized data and the methodology prescribed by the state "stencil" planning; increasing the explanatory force and validity of project applications, which is a critical factor for their inclusion in federal programs (e.g., under concession agreements or public contracts). Thus, the creation of own projects and applications for inclusion in federal initiatives

Threat and vulnerability assessment SWOT in regional higher education with weighting adjustments
Оценка угроз и уязвимостей (SWOT) регионального высшего образования с установкой весовых коэффициентов

Threats / vulnerability	Weight	Score	Weighted score
Reduction in the number of HEIs	0.1394	3.49	0.49
Lagging behind the federal project indicators of education export (internationalization)[1]	0.1592	3.76	0.60
Reorientation of HEIs to secondary vocational education programs (growth in college numbers by 22%)	0.1581	3.21	0.51
Critical deterioration of infrastructure over 80% (as well as emergency premises)	0.1669	3.94	0.66
Weak representation and project cooperation with the state for funding	0.1489	3.17	0.47

Note: Passport for the priority project "Development of the export potential of the Russian education system". http://static.government.ru/media/files/DkOXerfvAnLv0vFKJ59ZeqTC7ycla5HV.pdf. (in Russ.)

Source: compiled by the authors based on research materials.

with concession agreements, in which at the initial stages a clear design of the demonstrated factor assessment is important considering the institutional methodology of the program-targeted approach, are one of the few ways to attract funding for infrastructure renewal and R&D in regional higher education.

DISCUSSION

In the study, HEIs are considered as a social economic object, which consists of components (elements) and the system of relationships with the internal and external environment, a combined purpose, and a HEI development project. In the Russian tradition, management is considered an "economic mechanism", part of the Nomenclature of Scientific Specialties (Specialty Code no. 5.2.6 "Management"), but this study is based on an international model[1] (distributed in the PRC and Western countries), in which management is an independent instrumental discipline, studying the theory of functioning of organizations, managerial decisions, and closely related to sociology. Therefore, despite the methods used, the complete elimination of endogeneity, the presence of unaccounted factors cannot be excluded (this is a frequent phenomenon in social sciences). Rather than exploring broad representation for casual effects in this paper, theoretical thinking focuses on the analytical mapping of factors, as well as on identification and systematization of the formal requirements for the procedure of initiation and planning of projects in the higher education system, for managerial decision-making. The results obtained provide an analytical framework, identifying key problem nodes and forming a conceptual basis for future comparative studies using extended control groups of regions and panel data. The proposed methodological improvements to the factor assessment were applied in a theoretical regional project of improving the competitiveness of HEIs, which received a positive review from the Ministry of Economic Development of the RF. In addition, the results of the study are consistent with selected dynamic statistics, surveys and trends.

Having agreed with Sergey Glazyev and Vladimir Kvint that strategies should form the future shape of the planned object, and, therefore, it is necessary to apply strategic analysis inherent in the state approach. This is because for the first time from the position of the institutional approach the theoretical study of legal and regulatory acts of the Russian Federation and their comprehension allowed substantiating a modern framework for improving the operational effectiveness of factor assessment for strategizing processes in higher education through SWOT and PESTEL analysis, based on the Federal Law no. 172-FZ strategic planning methodology. The practical study made it possible to demonstrate the application of theoretically justified components of the program-target approach, in accordance with the Federal Law no. 172-FZ, federal government decree no. 1288, on the basis of which a socio-economic evaluation of the RF subject was performed. The material, technical and resource base of higher education does not fully ensure the implementation of the region's S&T development. This supported hypothesis H1a, since the results of the factor assessment demonstrating the decrease in the competitiveness of higher education to some extent lead to a reduction in the innovation potential of the region and a containment of technological development of the RF. Byvshev and Pisarev [2024] compare regional governance institutions and the regulatory framework for regional science and technology policy to identify macro-level challenges in innovation development and strategic planning. The unsystematic nature and high degree of differentiation in regional R&D governance they identified create an environment of strategic uncertainty for HEIs, necessitating the use of factor assessment to adapt HEIs to the conditions of a specific region. The analysis of barriers in their article can be expanded by SWOT and PESTEL, by focusing on regional aspects of development of higher education, R&D, and financing. Wang and Yang [2022] argue that when assessing capital in higher education, it is better not to use SWOT and PESTEL analysis because of the subjectivity of conclusions. However, the carried-out factor assessment can provide the expert group of the regional project office and the interested parties of the HEIs with official dynamic data that may be consistent with the interests of the state and initiated by a project to enhance the competitiveness of HEIs in the region within the framework of a concession agreement.

This is consistent with the methodology of strategic planning and allows identifying higher education imbalances and constraints in the context of existing threats to the strategic development of the region's innovation system, considering its potential and opportunities. This confirms hypothesis H2 due to the decomposition method of the Federal Law no. 172-FZ and other legal regulation of the RF, as well as practical demonstration of the developed methodological provisions of factor assessment, although they are rather intermediate results, provide the scientific basis for the recognition of demonstrated SWOT and PESTEL analysis as a necessary element program-targeted approach used at the stage of initiation and planning in projects and applications for federal initiatives to enhance the competitiveness of regional higher education in the RF. A number of authors, such as Proserpio et al. [2025] and Furuncu [2025], recommend increasing the objectivity of SWOT analysis by using the five-force model of Porter, but the analysis has been reinforced by mathematical calculations and statistics in dynamics. However, when determining the purpose of the study, it is necessary to take into account the institutional state approach to management based on legal regulations of the RF. The study thus confirmed

[1] The International Standard Classification of Education. UNESCO, 2024. https://www.uis.unesco.org/en/methods-and-tools/isced.

the usefulness of data processing in the context of providing dynamic statistics, the results of which will be shared with experts. Despite the criticism of former Minister of Finance and Accounts Chamber Chairman Aleksei Kudrin about the program-targeted approach to allocation of funds and its exclusive use as a means to distribute public spending, the author's study does not contradict this. This is because, even from this point of view, HEIs and regional authorities, through their own regional projects and applications, have the possibility to participate in additional federal funding.

Out of 1,247, only 303 (24.3%) HEIs submitted applications to participate in the "Priority 2030", and 143 (11,5%) HEIs became participants in 2025, including 19 out of 21 participants in "Project 5-100". However, only a third of the universities successfully passed the selection process, and since the program's launch, the annual growth in the number of applications has not exceeded 2%. It can be concluded that the earlier a HEI begins applying program-project management tools, the higher its competitiveness, patent activity and financial stability, regardless of the monetary policy.

CONCLUSION

The study forms an interdisciplinary bridge between institutional theory, strategic management and public sector economics, offering a new perspective on the interaction of organizations with public finance systems. The results of the study showed that program-project management is integrated into strategic planning processes, including SWOT and PESTEL analysis as its components to solve socio-economic problems of industries and regions in the RF, and allows the decomposition of problems into individual projects, ensuring the alignment of horizontal and vertical interests between science, higher education, industry and the state, as well as guaranteeing the sustainability of project financing. Thus, the scientific novelty consists in the synthesis and theoretical comprehension of existing normative acts and studies that allow interpreting as a phenomenon of "integration" (embeddedness) of program-targeted approaches as a management tool in the domestic system of strategic planning. In addition, the originality of the work lies in comparing the results of the analysis of two general strategic planning documents at the level of regions with the assessment of the state of R&D components and the conditions of operation of HEIs. This comparison identified signs of formal discrepancy between the measures to stimulate science and innovation in the region and S&T Strategy`s guidelines. The innovation activities of HEIs are complicated due to material base, technical limitations and institutional distortions, which are classified according to the degree of weighted expert assessment. This was confirmed by the classification of barriers to integration of HEIs in strategic planning from the position of resource and institutional constraints.

The proposed methodological improvements to the configuration of the factor assessment of projects and strategies for increasing the competitiveness of HEIs at the initiation and planning stages have allowed increasing the operational efficiency of such an assessment, make it clear for approval in federal institutions, and describe its context in the institutional template and the Federal Law no. 172-FZ "On strategic planning", which represents a scientific novelty. These science-based provisions to improve the assessment of conditions led to an empirical verification of declarative theoretical factors supported by dynamic statistical data in the form of a ranking of statistically significant changes in expert assessments. This made it possible to simultaneously identify the most significant factors and vulnerabilities of regional higher education and reflect its current state for subsequent and more accurate identification of problems, managerial decision-making, setting goals and indicators for projects and strategies to enhance the competitiveness of regional HEIs.

The prepared plan of recommendations, consisting of five key steps necessary for initiating own projects to enhance the competitiveness of regional HEIs and participation in existing federal initiatives, can be the basis for strategizing at HEIs that is focused on attracting federal and concession resources. As part of the institutional approach, applying the decomposition method in content analysis of legal and regulatory acts of the RF allowed one to outline the framework, systematize formal requirements, and contextualize (link) essential operational characteristics for the combination of dynamic SWOT analysis and PESTEL with institutional project management methodology.

The theoretical significance lies in broadening the application of the program-target approach components at the initiation and planning stages, as well as management strategies for higher education systems and innovation in the region. Factor assessment, both dynamic and statistical, is substantiated and integrated into the methodology of strategic planning, which can serve as a basis for developing systems to monitor and evaluate the performance of HEIs. This, in turn, will help HEI management to communicate their strategies, development projects and proposals more clearly to stakeholders, increasing the likelihood of their approval by federal government agencies for modernizing HEI infrastructure and attracting new students. The practical value of the study lies in the potential to use its results and findings by HEIs and regional authorities as components for design-oriented technologies in strategic planning of regional higher education and innovation systems in the entities of the RF. ■

Authors' contribution. The scientific contribution of the author from China (PRC) to the article was 15% and consists mainly of Chinese sources and excerpts, as well as final check of calculations. The Russian author's contribution to the study is 85% of the research, as well as 100% of the scientific novelty and original content (scientific innovations, scientific results).

Appendix 1 – Regional strategic planning documents[1]
Приложение 1 – Региональные документы стратегического планирования

RF regions	Regional Strategy for Socio-Economic Development		Regional S&T Development Program (entry into force)
	Approved	Updated	
Republic of Adygea	2018	In development 2025	Absent
Republic of Bashkortostan	2018	17.05.2023	2024
Republic of Buryatia	2019	05.07.2025	2024
Altai Republic	2018	06.09.2021	Absent
Republic of Dagestan	2018	12.12.2022	2019
Republic of Ingushetia	2016	15.02.2023	In development 2025
Kabardino-Balkarian Republic	2021	27.03.2023	2023
Republic of Kalmykia	2019	30.12.2023	Absent
Karachay-Cherkess Republic	2014	02.10.2023	Absent
Republic of Karelia	2018	14.07.2025	In development 2025
Komi Republic	2019	07.02.2024	–
Republic of Mari El	2018	24.07.2024	In development 2025
Republic of Mordovia	2017	Absent	2023
Republic of Sakha (Yakutia)	2018	18.06.2020	2022
Republic of North Ossetia-Alania	2019	11.11.2021	Absent
Republic of Tatarstan	2015	17.06.2019	2022
Republic of Tuva	2018	17.01.2023	2022
Udmurt Republic	2018	–	2015
Republic of Khakassia	2020	11.11.2025	2025
Chechen Republic	2021	01.08.2025	In development 2024
Republic of Chuvashia	2020	Absent	Absent
Altai krai	2021	The update is not yet due	In development 2025
Kamchatka krai	2023	16.10.2025	In development 2025
Krasnodar krai	2018	28.07.2025	Absent
Krasnoyarsk krai	2018	Absent	Absent
Perm krai	2024	The update is not yet due	2024
Primorsky krai	2018	21.07.2025	2024
Stavropol krai	2019	Absent	Absent
Khabarovsk krai	2018	In development 2025	2024
Amur region	2023	The update is not yet due	2025
Arkhangelsk region	2017	In development 2025	2025
Astrakhan region	2023	The update is not yet due	Absent
Belgorod region	2023	17.03.2025	2023
Bryansk region	2019	08.07.2024	2018
Vladimir region	2018	06.12.2024	Absent
Volgograd region	2021	13.10.2023	In development 2025
Vologda region	2016	26.12.2024	Absent
Voronezh region	2018	23.12.2019	2024
Ivanovo region	2021	09.09.2024	In development 2025
Irkutsk region	2022	07.11.2024	2025
Kaliningrad region	2012	09.04.2025	Absent
Kaluga region	2022	The update is not yet due	In development 2025
Kemerovo region	2018	04.10.2024	In development 2025
Kirov region	2024	The update is not yet due	2025

Appendix 1 (continued)
Окончание приложения 1

RF regions	Regional Strategy for Socio-Economic Development		Regional S&T Development Program (entry into force)
	Approved	Updated	
Kostroma region	2017	12.07.2021	In development 2025
Kurgan region	2022	26.06.2025	Absent
Kursk region	2020	07.02.2025	2022
Leningrad region	2016	23.07.2025	In development 2025
Lipetsk region	2022	The update is not yet due	Absent
Magadan region	2020	07.11.2025	Absent
Moscow region	2018	16.02.2022	2016
Murmansk region	2013	06.06.2024	2020
Nizhny Novgorod region	2018	23.12.2024	2020 (6 update)
Novgorod region	2019	07.07.2025	2023
Novosibirsk region	2019	27.12.2022	2019 (27 update)
Omsk region	2022	15.05.2025	2024
Orenburg region	2010	18.07.2023	2025
Oryol region	2018	31.20.2025	In development 2025
Penza region	2019	18.12.2024	2024
Pskov region	2021	29.05.2023	2020
Rostov region	2018	23.12.2025	2025
Ryazan region	2018	30.05.2023	In development 2025
Samara region	2017	28.06.2022	In development 2024
Saratov region	2016	14.11.2025	Absent
Sakhalin region	2019	26.08.2025	2022
Sverdlovsk region	2015	23.12.2024	2024
Smolensk region	2018	28.03.2023	Absent
Tambov region	2018	Absent	2023
Tver region	2013	Absent	Absent
Tomsk region	2015	01.07.2021	2019 (19 update)
Tula region	2018	Absent	2020
Tyumen region	2020	27.03.2024	In development 2025
Ulyanovsk region	2015	17.12.2025	2019 (18 update)
Chelyabinsk region	2019	08.04.2024	2020
Transbaikal Territory	2023	The update is not yet due	2025
Yaroslavl region	2014	01.07.2025	2024
Moscow federal town	2024	The update is not yet due	In development2025
St. Petersburg federal town	2018	10.12.2025	In development 2024
Sevastopol federal town	2017	Absent	2024
Jewish Autonomous region	2018	11.06.2025	Absent
Nenets Autonomous Okrug	2019	Absent	Absent
Khanty-Mansi Autonomous Okrug	2013	08.09.2022	2022
Chukotka Autonomous Okrug	2014	Absent	Absent
Yamalo-Nenets Autonomous Okrug	2021	The update is not yet due	2021
Republic of Crimea	2015	05.09.2022	2025
Zaporizhzhia region	2023	The update is not yet due	In development 2025
Donetsk People's Republic	2024	The update is not yet due	2025
Luhansk People's Republic	2024	The update is not yet due	Absent
Kherson region	2025	The update is not yet due	Absent

Note: [1] At the level of target group – the Regional Socio-Economic Development Strategy, and at the programming level – the Program for S&T Development of the region.

Source: compiled by the authors based on Consortium Codex. The Electronic Open Fund of Legal and Regulatory Acts of the Russian Federation. https://docs.cntd.ru/. (in Russ.); the Official Internet Portal of Legal Information. www.pravo.gov.ru. (in Russ.)

Appendix 2 – PESTEL matrix of the institutional regulatory environment for regional higher education
Приложение 2 – PESTEL-анализ институциональной нормативно-правовой среды для регионального высшего образования

Description of the factors	Influence of the factor	Average evaluation	Weighted score
Political factors (P)			
Volatility of sanctions: average annual GDP losses up to 7%, brain drain[1], technological lag, blocking of international scientific connections and loss of educational efficiency[2]	3	1.3	0.22
Political decision to increase the number of foreign students according to the federal project "Export of Education", which requires Russian HEIs to provide student accommodation[3]	2	2.6	0.26
Economic factors (E)			
Forecast of federal funding for the sector[4]	2	1.3	0.18
Transformation of the labour market taking into account the economic needs and strategies of the S&T Development of the region, as well as the S&T Strategy[5]	1	2.3	0.29
Social factors (S)			
Change of values in Russian society[6]	1	1.3	0.07
Dynamics of the number of students receiving higher education[7]	3	2.6	0.34
Technological factors (T)			
Changes in the legal framework for intellectual property[8]	1	1.6	0.12
Development of cooperation between science, government and innovation enterprises, the national project "Science and Universities"[9]	3	1.3	0.22
Environmental factors (E)			
ISO 14001-2016[10] Consumer Protection Agency sent to the Novosibirsk region's HEIs warnings about fire-fighting violations, environmental violations and malfunction of catering department[11]	1	1.1	0.048
ISO 14001-2016: Consumer Protection Agency sent to the Nizhny Novgorod region's HEIs warnings about preventing the spread of infections, environmental violations and malfunction of catering department[12]	1	1.2	0.049
Legal factors (L)			
Framework for the development of sectoral strategic planning documents in the field of scientific and technological development, S&T Strategy of the RF[13]	3	1.3	0.22
HEIs perceive biosafety as a formality for medical or chemical faculties (not considering the logistical components: the spread of infections in ventilation and sanitary facilities, the fragmentation of regulations of sanitary-epidemiological rules and norms, risk of biological threats in the infrastructure of canteens)[14], while the consequences are not only reputational, but also may lead to criminal liability under Article 236	2	1.7	0.23

Source: compiled by the authors based on research materials.

[1] World Economic Outlook, Chapter 3. The Macroeconomic Effects of Global Supply Chain Reconfiguration. International Monetary Fund. 2023. https://www.imf.org/en/Publications/WEO/Issues/2023/04/11/world-economic-outlook-april-2023.

[2] Global Competitiveness Report GCI WEF. World Economic Forum, 2023. https://www.weforum.org/publications/global-risks-report-2025/digest/.

[3] Passport of the priority project "Development of the export potential of the Russian education system": approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and Priority Projects, Protocol of May 30, 2017 no. 6.

[4] Federal Law of November 27, 2023 no. 540-FZ "On the federal budget for 2024 and the planning period of 2025 and 2026".

[5] The Employment Center of the city of Novosibirsk, 2024. http://www.gczn.nsk.su/market/professii-vostrebovannye/. (in Russ.)

[6] Decree of the President of the Russian Federation of November 9, 2022 no. 809 "On approval of the fundamentals of state policy for the preservation and strengthening of traditional Russian spiritual and moral values".

[7] Bondarenko N.V., Varlamova T.A., Gokhberg L.M. et al. (2025). Education indicators: Statistical collection. Moscow: HSE University. https://issek.hse.ru/mirror/pubs/share/102357680.pdf. (in Russ.)

[8] Federal Law of December 22, 2020 no. 456-FZ "On amendments to parts two and four of the Civil Code of the Russian Federation and recognition of legislative acts (individual provisions of legislative acts) of the Russian Federation as Invalid".

[9] Passport of the national project "Science and Universities", approved by the Presidium of the Council under the President of the RF for Strategic Development, Protocol of 24 December, 2018 no. 16.

[10] Warning from Rospotrebnadzor on preventing the spread of infections in universities. The Ministry of Science and Higher Education, 2024. https://minobrnauki.gov.ru/press-center/news/novosti-ministerstva/67954/. (in Russ.)

[11] National report "On the state of sanitary and epidemiological well-being of the population in the Novosibirsk region in 2023". http://54.rospotrebnadzor.ru/sites/default/files/gosudarstvennyy_doklad_o_seb_v_novosibirskoy_oblasti_za_2023_god.pdf?ysclid=mkgv42gq3j481496862. (in Russ.)

[12] National report "On the state of sanitary and epidemiological well-being of the population in the Nizhny Novgorod region in 2023". https://52.rospotrebnadzor.ru/sites/default/files/52_gosdoklad_2023_n.o._.pdf?ysclid=mkgv9zj3yf909380202. (in Russ.)

[13] Decree of the President of the Russian Federation of February 28, 2024 no. 145 "On the Strategy for Scientific and Technological Development of the Russian Federation".

[14] Federal Law of December 30, 2020 no 492-FZ "On biological safety in the Russian Federation" (as amended on July 23, 2025).

Appendix 3 – SWOT analysis of the state of higher education in the Novosibirsk and Nizhny Novgorod regions
Приложение 3 – SWOT-анализ состояния высшего образования в Новосибирской и Нижегородской областях

Strengths (S)	Opportunities (O)
1. Presence in the Novosibirsk and Nizhny Novgorod regions four types of university: national research, federal, supporting, academy[1]. 2. Fourth place of the Nizhny Novgorod region and fifth place of the Novosibirsk region in the Innovation Development Ranking of the Higher School of Economics, due to double promotion of regions for 8 years[2]. 3. Positive dynamics of the regions in the state evaluation of S&T development, characterized by promotion of the Nizhny Novgorod region by five points and the Novosibirsk region by one point over 5 years[3]. 4. Six-year positive growth dynamics in the practical implementation of the network partnership model in the field of health and academic science, confirmed by the creation of 3 joint scientific centres and 116 departments in the Novosibirsk region[4], as well as two joint scientific centres and 98 departments in the Nizhny Novgorod region[5]. 5. The participation of NSU (the Novosibirsk region) and Lobachevsky University (the Nizhny Novgorod Region) in "Project 5-100"[6] has enriched project management practices in higher education in these regions. At the time of analysis, two HEIs from the Novosibirsk region (NSU, NSTU) and two HEIs from the Nizhny Novgorod region (Lobachevsky University, NNSTU n.a. R.E. Alekseev) are participating in "Priority 2030", whose experience can be replicated within regions[7]. 6. Double strengthening of the competitiveness of higher education and R&D in the two regions over the past 9 years, as confirmed by the professional innovation assessment of the Centre for Macroeconomic Studies RIA-Analytics (weight of the expert market in RF = 50%): growth of the Novosibirsk region from 28th to 14th place and growth of the Nizhny Novgorod region from 14th to 6th place[8]. 7. The existence of a high-quality institutional regulatory framework and innovation policy: in terms of quality of innovation policy and overall ranking of innovative development, the Novosibirsk region is ranked 3rd, while the Nizhny Novgorod region is ranked 6th[9]	1. Potential of human capital for inclusion in the educational process of HEIs in the Novosibirsk and Nizhny Novgorod regions. Over the past 9 years, the population growth rate of the former, where 24 HEIs are located, has increased from 58% to 79.8%, and of the latter – from 32% to 49%[10]. 2. Average annual GDP growth over 8 years amounted to 2%, which is 0.269 per person employed in the Novosibirsk region's high-tech industries[11]; average annual GDP growth over 8 years amounted to 1,7%, which is 0.199 per person employed in the Nizhny Novgorod region's high-tech industries[12]. 3. The Novosibirsk region ranks 5th among the subjects of the RF (increase by 16% over 8 years) in the share of employees in the science and education sector, as well as the Nizhny Novgorod region ranks 7th (increase by 14% over 8 years)[13]. 4. For 5 years, there has been stable cross-industry specialization of vacancies in the Novosibirsk region[14] and the Nizhny Novgorod region[15] with simultaneously low unemployment rate, which stimulated the inflow of diversity of professions and the need for highly qualified personnel. 5. Bringing the share of teachers under 39 years in the two regions up to 30% in relation to the total teaching staff of the HEI, according to the President's order, which is also one of the requirements for HEIs to participate in a special grant of 1 billion ruble per year[16]. 6. The use of own successful management practices of the NSU in the Novosibirsk region[17] and Lobachevsky University in the Nizhny Novgorod region[18], which allowed entering the list of 400 best HEIs of the planet for the first time in 10 years, according to international rankings of the Three University Missions. These factors will contribute to the promotion in the new federal project "Technologies" (sub-program "Commercialization of scientific research") starting in 2026
Weaknesses (W)	**Threats (T)**
1. HEIs management in the context of higher education transformation according to the Presidential decree 343[19]. 2. According to the Chairman of the Council of Rectors of the Novosibirsk region, the need for dormitories is more than 25 thousand places[20]. Verification has been assigned on the fact of collective appeals to Ekaterina Mizulina that about 18% of first-year students did not have enough accommodation in the campuses of HEIs of the Nizhny Novgorod region[21]. 3. In the period of 2016–2024, the number of students in higher education programs in the Novosibirsk region has decreased by 11% (the indicator was 98.6 thousand students), and in the Nizhny Novgorod region – by 5.4% (the indicator was 91.2 thousand students)[22]. 4. Since 2017, NSU and Lobachevsky University have been among the top 10 HEIs in the Three University Missions ranking, and over the past five years, NNSTU n.a. R.E. Alekseev and NSTU have entered the top 100 HEIs[23]. 5. In the last 9 years, the number of teachers over 60 years increased by 29% (4,880) in the Novosibirsk region, and by 37% (6,875) in the Nizhny Novgorod region[24]. 6. Low distribution of graduate programs in R&D with a modest material and technical infrastructure. Despite a 12% growth in the number of graduate students, in the last 8 years the amount of defended dissertations (in %) in the Novosibirsk region fell 2.4 times and in the Nizhny Novgorod region 2.9 times[25]. 7. Over the past 10 years, there has been a reduction in the number of HEIs and their logistical base by 38%, including branches in the Novosibirsk region (currently 22 HEIs) and in the Nizhny Novgorod region – by 25% (currently 30 HEIs)[26]. 8. In 2024, the number of foreign students (4,700) in the Novosibirsk region was below the 2016 level and 1.9 times behind the indicator of the federal project "Export of Education"[27] that stipulates doubling the internationalization of the regional higher education system in 8 years. in the Nizhny Novgorod region – 1.5 times behind with 5,200 students	1. Stagnation of innovation processes in the Novosibirsk region is evidenced by a decline from 7th to 5th place, then lost its position and a drop to 6th place over the past eight years. Over the same period, the Nizhny Novgorod region rose in the rankings from 5th to 3rd place, then dropped to 4th place[28]. 2. By 2032, enterprises' need for higher-skilled personnel is expected to increase by 24% in the Novosibirsk region[29] and by 29% in the Nizhny Novgorod region[30]. 3. Worsening effects of demographic failure: in the Novosibirsk region, the number of children born (26.75 thousand) in 2024 is 5.5% less than a year before and 23.8% less than 8 years ago; in the Nizhny Novgorod region, the number of children born was 18,46 thousand, which is 4% less than a year before and 17.5% less than 8 years ago[31]. 4. For 8 years, there has been a positive growth in the number of students studying on secondary professional programs in educational institutions opening licenses with federal state standards codes, with 9% of the total number of students in the Novosibirsk region and 6% of students in the Nizhny Novgorod region, which drives a swing in these regions' higher education system[32]. 5. In 2024, the higher school infrastructure in the Novosibirsk region included 69 dispersed buildings, 87% of which were commissioned between 1961 and 1980. The total area of dormitories was 220.5 thousand square meters, while the area of 171.4 thousand square meters required major repairs (a 31% increase over 8 years), and another 6.9 thousand square meters were in a critical condition. The total area of HEIs in the Nizhny Novgorod region is 389 thousand square meters, of which 78% require major repairs[33]. 7. Since 2022, the ratio of issued university patents rose from 1.68 to 1.86 in the Novosibirsk region and from 1.46 to 1.69 and in the Nizhny Novgorod region (national average was 1.24)[34], but over 5 years in these regions the leaders have tripled the number of patents on trademarks rather than useful scientific models

Source: compiled by the authors based on research materials, official sources, and statistics.

[1] Register of University Licenses of the Russian Federation. Federal Service for Supervision in Education and Science of the Russian Federation, 2025. https://obrnadzor.gov.ru/gosudarstvennye-uslugi-i-funkczii/gosudarstvennye-uslugi/liczenzirovanie-obrazovatelnoj-deyatelnosti/svodnyj-reestr-liczenzij/. (in Russ.)

[2] Abashkin V.L., Abdrakhmanova G.I., Artyomov S.V. et al. (2024). The Innovative Development Ranking of the Subjects of the Russian Federation. Issue 9 (ed. by L.M. Gokhberg, E.S. Kutsenko). National Research University Higher School of Economics. (in Russ.)

[3] The national ranking of the constituent entities of the RF based on the results of 2021. https://minobrnauki.gov.ru/action/stat/rating/. (in Russ.)

[4] Novosibirsk region 2025: Statistical yearbook. https://54.rosstat.gov.ru/search?q=%D0%B5%D0%B6%D0%B5%D0%B3%D0%BE%D0%B4%D0%BD%D0%B8%D0%BA. (in Russ.)

[5] Nizhny Novgorod region 2025: Statistical yearbook. https://52.rosstat.gov.ru/search?q=%D0%B5%D0%B6%D0%B5%D0%B3%D0%BE%D0%B4%D0%BD%D0%B8%D0%BA. (in Russ.)

[6] The Accounts Chamber of the Russian Federation. Evaluation of the effectiveness of the University Project 5-100 (2021). https://ach.gov.ru/upload/iblock/ab8/ab8e9ce46a64ed39020ff200d407dde1.pdf. (in Russ.)

[7] Ranking of HEIs participating in the state program "Priority 2030". Strategic Academic Leadership Program of the Russian Federation "Priority 2030". 2025. https://priority2030.ru/upload/medialibrary/867/ur-3qifd7mhtoss2pp9w35ivkr6nubft3/Prioritet_itogi_2026_.pdf. (in Russ.)

[8] Evaluation of innovations and education systems. Final Ranking of the RF regions – 2025. https://riarating.ru/infografika/20251222/630290560.html. (in Russ.)

[9] Abashkin V.L., Abdrakhmanova G.I., Artyomov S.V. et al. (2025). The Innovative Development Ranking of the Subjects of the Russian Federation. Issue 10 (ed. by L.M. Gokhberg). National Research University Higher School of Economics. https://issek.hse.ru/news/1068199937.html. (in Russ.)

[10] Education and Demography. Federal State Statistics Service of the RF (Rosstat). 2025. https://rosstat.gov.ru/compendium/document/13282. (in Russ.); Varlamova T.A., Gokhberg L.M., Ozerova O.K., Portnyagina O.N., Shkaleva E.V., Shugal N.B. (2023). Education in numbers: A brief statistical digest. Moscow: HSE Publ.

[11] Gross regional product. Territorial body of the Federal State Statistics Service for the Novosibirsk region 2024. https://54.rosstat.gov.ru/folder/140578. (in Russ.)

[12] Gross regional product. Territorial body of the Federal State Statistics Service for the Nizhny Novgorod region 2024. https://52.rosstat.gov.ru/folder/138111. (in Russ.).

[13] Abashkin V.L., Gokhberg L.M., Eferin Ya.Yu. et al. (2022). Atlas of economic specialization of regions of Russia (ed. by L.M. Gokhberg, E.S. Kutsenko). Moscow: HSE Publ.

[14] Monitoring in-demand vacancies and unemployment. The Employment Centre of the city of Novosibirsk. 2024. https://czn.nso.ru/page/218. (in Russ.)

[15] Monitoring in-demand vacancies and unemployment. Department of Labour and Employment of the Nizhny Novgorod Region. https://trud.nobl.ru/activity/60064/. (in Russ.)

[16] Assignment of the President of the RF V. Putin Pr-589, 1.d-2 of March 20, 2020, following the meeting of the Presidium of the State Council and the Council for Science and Education. http://www.kremlin.ru/acts/assignments/orders/63083?ysclid=mnwo1zfr2p748106521. (in Russ.); List of instructions following the joint expanded meeting of the Presidium of the State Council and the Council on Science and Education (approved by the President of the RF on March 28, 2020 no. Pr-589). (in Russ.)

[17] Performance indicators of an organization subject to self-assessment. Novosibirsk State University, 2024. https://www.nsu.ru/n/sveden/document/. (in Russ.)

[18] Performance indicators of an organization subject to self-assessment. Lobachevsky University, 2024. http://www.unn.ru/sveden/document.php. (in Russ.)

[19] Decree of the President of the Russian Federation of May 12, 2024 no. 343 "On certain issues in improving the higher education system".

[20] Public educational portal. All news of the Novosibirsk region. https://vn.ru/news-priezzhie-studenty-vytesnyayut-novosibirtsev-iz-vuzov-goroda/https://vn.ru/news-priezzhie-studenty-vytesnyayut-novosibirtsev-iz-vuzov-goroda/. (in Russ.)

[21] Office of the Prosecutor General of the Russian Federation for the Volga Federal District, 2024. https://epp.genproc.gov.ru/ru/proc_pvfo/mass-media/news/news-regional/?item=54518427&ysclid=mkf4lx7ffc420772854. (in Russ.)

[22] Report for 2024 VPO-2. Ministry of Science and Higher Education of the Russian Federation. https://minobrnauki.gov.ru/action/stat/highed/. (in Russ.)

[23] The Three University Missions Ranking. 2024. https://mosiur.org/. (in Russ.)

[24] Demographic Yearbook of Russia, 2024. Rosstat. https://www.rosstat.gov.ru/folder/210/document/12994. (in Russ.); Report: Science, Innovation, Technology, Personnel. 2024. Rosstat.https://rosstat.gov.ru/statistics/science. (in Russ.)

[25] Report: Science, Innovation, Technology, Personnel. 2024. Rosstat. https://rosstat.gov.ru/statistics/science. (in Russ.); Indicators of Highly Qualified Personnel Training. 2024. Rosstat. https://rosstat.gov.ru/statistics/education. (in Russ.)

[26] Report for 2024 VPO-2. The Ministry of Science and Higher Education of the Russian Federation. https://minobrnauki.gov.ru/action/stat/highed/. (in Russ.)

[27] Ibid.

[28] Abashkin V.L., Abdrakhmanova G.I., Artyomov S.V. et al. (2025). The Innovative Development Ranking of the Subjects of the Russian Federation. Issue 9 (ed. by L.M. Gokhberg, E.S. Kutsenko). National Research University Higher School of Economics. https://www.hse.ru/primarydata/rir. (in Russ.)

[29] Resolution of the Government of the Novosibirsk Region of July 13, 2021 no. 271-p "On the creation of a state information system of the Novosibirsk Region".

[30] Resolution of the Government of the Nizhny Novgorod Region of December 21, 2018 no. 889 "On approval of the Strategy for the Socio-Economic Development of the Nizhny Novgorod region until 2035" (as amended on December 23, 2024).

[31] Population. Russian Statistical Yearbook, 2024. Rosstat. https://rosstat.gov.ru/storage/mediabank/Ejegodnik_2024.htm. (in Russ.)

[32] Register of University Licenses, 2024. The Federal Service for Supervision in Education and Science of the Russian Federation. https://obrnadzor.gov.ru/gosudarstvennye-uslugi-i-funkczii/gosudarstvennye-uslugi/liczenzirovanie-obrazovatelnoj-deyatelnosti/svodnyj-reestr-liczenzij/. (in Russ.)

[33] Report VPO-1 and VPO-2. The Ministry of Science and Higher Education of the Russian Federation. https://minobrnauki.gov.ru/. (in Russ.)

[34] Information system of accredited persons by classification sections. Federal Service for Intellectual Property of the Russian Federation, 2025. https://searchplatform.rospatent.gov.ru. (in Russ.)

References

Aganbegyan A.G. (2024). Foreign experience in strategizing accelerated socio-economic development and options for its application in Russia. *Strategirovanie: teoriya i praktika / Strategizing: Theory and Practice*, vol. 4, no. 1 (11), pp. 1–26. https://doi.org/10.21603/2782-2435-2024-4-1-1-26. (in Russ.)

Balatsky E.V., Ekimova N.A. (2021). Public administration tools: Forecasting vs designing. *Upravlenets / The Manager*, vol. 12, no. 1, pp. 18–31. https://doi.org/10.29141/2218-5003-2021-12-1-2. (in Russ.)

Baranov A.O., Slepenkova Iu.M., Tagaeva T.O. (2020). Improvement of statistics on the reproduction of human capital. *Problemy prognozirovaniya / Problems of Forecasting*, no. 1 (178), pp. 22–31. (in Russ.)

Byvshev V.I., Pisarev I.V. (2024). Regional scientific, technological and innovation policy: Strategic planning and regulatory-legal support. *Journal of Institutional Studies*, vol. 16, no. 2, pp. 73–85. https://doi.org/10.17835/2076-6297.2024.16.2.073-085. (in Russ.)

Verenikin A.O., Verenikina A.Y. (2024). Potential of digital transformation: Russian regions ranking. *Ekonomika regiona / Economy of Regions*, vol. 20, no. 4, pp. 1008–1025. https://doi.org/10.17059/ekon.reg.2024-4-3. (in Russ.)

Volchik V.V., Maslyukova E.V., Barunova A.A., Demakhina O.V. (2025). Differentiation of Russia's regions in the process of reindustrialization. *Ekonomika regiona / Economy of Regions*, vol. 21, no. 1, pp. 1–16. https://doi.org/10.17059/ekon.reg.2025-1-1. (in Russ.)

Volchik V.V., Tsygankov S.S., Maskaev A.I. (2024). New public management as an extension of neoliberal ideology. *Upravlenets / The Manager*, vol. 15, no. 6, pp. 2–16. https://doi.org/10.29141/2218-5003-2024-15-6-1. (in Russ.)

Gatiyatov A.R., Safiullin M.R., Gataullina A.A. (2025). Scientometric analysis as a tool for identifying scientific trends in the region. *Vysshee obrazovanie v Rossii / Higher Education in Russia*, vol. 34, no. 4, pp. 48–79. https://doi.org/10.31992/0869-3617-2025-34-4-48-79. (in Russ.)

Glazyev S.Yu. (2022). Global transformations from the perspective of technological and economic world order change. *AlterEconomics*, vol. 19, no. 1, pp. 93–115. https://doi.org/10.31063/AlterEconomics/2022.19-1.6. (in Russ.)

Glazyev S.Yu., Sukharev O.S. (2024). Economic growth of Russia and structural modernization: Project approach. *Rossiyskiy ekonomicheskiy zhurnal / Russian Economic Journal*, no. 2, pp. 4–30. https://doi.org/10.52210/0130-9757_2024_2_4. (in Russ.)

Golubeva A.S., Kanunnikova K.I., Volkov A.R. (2024). Scientific and educational clusters in regional innovative and investment capacity. *AlterEconomics*, vol. 21, no. 4, pp. 748–776. https://doi.org/10.31063/AlterEconomics/2024.21-4.6. (in Russ.)

Dvoryadkina E.B., Kuklinova P.S. (2024). Strategic priorities of regional economic development in the context of regulating non-monetary factors of inflation. *Upravlenets / The Manager*, vol. 15, no. 4, pp. 27–40. https://doi.org/10.29141/2218-5003-2024-15-4-3. (in Russ.)

Kvint V.L., Seredyuk I.V. (2025). Strategic assessment of the compliance of open diffuse agglomerations with global, national and regional trends (Kemerovo region – Kuzbass agglomerations case study). *Ekonomika promyshlennosti / Russian Journal of Industrial Economics*, vol. 18, no. 1, pp. 7–23. https://doi.org/10.17073/2072-1633-2025-1-1435. (in Russ.)

Kleiner G.B. (2024). Multipolar management of organization. *Rossiyskiy zhurnal menedzhmenta / Russian Management Journal*, vol. 22, no. 2, pp. 163–178. https://doi.org/10.21638/spbu18.2024.201. (in Russ.)

Kryukov V.A., Kolomak E.A. (2025). Strategy of Russia's spatial development in a turbulent world: Goals, priorities, key approaches. *Vestnik Rossiyskoy akademii nauk / Herald of the Russian Academy of Sciences*, no. 2, pp. 22–32. https://doi.org/10.7868/S3034520025020032. (in Russ.)

Kryukov V.A., Kolomak E.A., Suslov N.I., Kostin A.V. (2023). Asian Russia: From problems to growth. *Nauchnye trudy Volnogo ekonomicheskogo obshchestva Rossii / Scientific Works of the Free Economic Society of Russia*, vol. 241, no. 3, pp. 110–128. https://doi.org/10.38197/2072-2060-2023-241-3-110-128. (in Russ.)

Kudrin A.L. (2018). *Theoretical and methodological approaches to the implementation of a balanced and effective fiscal policy. Dr. econ. sci. diss*. Moscow. (in Russ.)

Kuzyk M.G., Simachev Yu.V. (2025). Features of countries' response to large-scale sanctions: Are there lessons to be learned? *Voprosy ekonomiki / Issues of Economics*, no. 10, pp. 5–27. https://doi.org/10.32609/0042-8736-2025-10-5-27. (in Russ.)

Melnikov V.V. (2021). *Strategic planning for the socio-economic development of a macro-region based on the balanced scorecard (using the North Caucasian Federal District as an example). Cand. econ. sci. diss*. Saint Petersburg. (in Russ.)

Sukharev O.S. (2024). Technological substitution: The key control modes. *Upravlenets / The Manager*, vol. 15, no. 2, pp. 66–78. https://doi.org/10.29141/2218-5003-2024-15-2-5. (in Russ.)

Tomilin O.B. (2024). Stalemates of university managerialism: Conceptual analysis. *Universitetskoe upravlenie: praktika i analiz / University Management: Practice and Analysis*, vol. 28, no. 1, pp. 125–143. https://doi.org/10.15826/umpa.2024.01.009. (in Russ.)

Tyurina Yu.A. (2023). Status and role positions of the vice-rector as a subject of changes in the youth policy and educational activities of the university. *Vlast i upravlenie na Vostoke Rossii / Power and Administration in the East of Russia*, no. 2 (103), pp. 51–65. https://doi.org/10.22394/1818-4049-2023-103-2-51-65. (in Russ.)

Acemoglu D., Robinson J. (2022). Non-modernization: Power–culture trajectories and the dynamics of political institutions. *Annual Review of Political Science*, vol. 25, pp. 323–339. https://doi.org/10.1146/annurev-polisci-051120-103913

Bloom N., Romer P., Terry S., Van Reenen J. (2013). A trapped-factors model of innovation. *American Economic Review,* vol. 103, issue 3, pp. 208–213. https://doi.org/10.1257/aer.103.3.208

Chong C.W., Yuen Y.Y. (2022). The impacts of KM-centred strategies and practices on innovation: A survey study of R&D firms in Malaysia. *Interdisciplinary Journal of Information, Knowledge, and Management*, vol. 17, pp. 67–86. https://doi.org/10.28945/4892

Edler J., Blind K., Kroll H., Schubert T. (2023). Technology sovereignty as an emerging frame for innovation policy. Defining rationales, ends and means. *Research Policy*, vol. 52, issue 6, 104765. https://doi.org/10.1016/j.respol.2023.104765

Feng A.-Q. (2022). Exploring the path of deepening China's energy cooperation with Russia in the new context. *Jīng jì zòng héng / Economic Review Journal*, no. 6, pp. 79–84. http://dianda.cqvip.com/Qikan/Article/Detail?id=7107703015. (in Chinese)

Fujita M., Krugman P. (2004). The new economic geography: Past, present and the future. *Papers in Regional Science*, vol. 83, no. 1, pp. 139–164. https://doi.org/10.1007/s10110-003-0180-0

Furuncu Y. (2025). PESTEL and SWOT analysis of hydrogen economy in Turkey. *International Journal of Hydrogen Energy*, vol. 113, pp. 161–169. https://doi.org/10.1016/j.ijhydene.2025.02.408

Lai F., Xiong D., Zhu S., Li Y., Tan Y. (2023). Will geopolitical risks only inhibit corporate investment? Evidence from China. *Pacific-Basin Finance Journal*, vol. 82, 102134. https://doi.org/10.1016/j.pacfin.2023.102134

Liu X., White S. (2001). Comparing innovation systems: A framework and application to China's transitional context. *Research Policy*, vol. 30, issue 7, pp. 1091–1114. https://doi.org/10.1016/S0048-7333(00)00132-3

Lo W.Y.W., Liu S. (2021). Are university rankings still important? Perspectives from Greater China (pp. 278–293). In: E. Hazelkorn, G. Mihut. (Eds.). *Research handbook on university rankings: Theory, methodology, influence and impact*. Cheltenham: Edward Elgar Publishing. https://doi.org/10.4337/9781788974981.00030

March C., Schieferdecker I. (2023). Technological sovereignty as ability, not autarky. *International Studies Review*, vol. 25, issue 2. https://doi.org/10.1093/isr/viad012

Mariotti S. (2025). "Open strategic autonomy" as an industrial policy compass for the EU competitiveness and growth: The good, the bad, or the ugly? *Journal of Industrial and Business Economics*, vol. 52, pp. 1–26. https://doi.org/10.1007/s40812-024-00327-y

Niu Z. (2024). Risk and opportunity of Diageo: PESTEL and SWOT analysis. *Finance & Economics*, vol. 2, no. 9, pp. 1–12. https://doi.org/10.61173/wdw94h39

Peng L., Yan Y. (2024). Analysis on the path of integration of industry and education of vocational education to help the construction of the Chengdu-Chongqing economic circle – Based on SWOT analysis. *Zhí yè jì shù / Vocational Technology*, vol. 23, no. 11, pp. 1–10. https://doi.org/10.19552/j.cnki.issn1672-0601.2024.11.001. (in Chinese)

Proserpio L., Kandiko Howson C., Lall M. (2025). The university ranking game in East Asia: The sensemaking of academic leaders between pressures and fatigue. *Asia Pacific Education Review*, vol. 26, pp. 159–171. https://doi.org/10.1007/s12564-024-10012-3

Sorokin M.Yu., Yu L. (2024). The role of program and project management in increasing the competitiveness of Russian universities: A comparative analysis including China and India. *Ekonomicheskaya politika / Economic Policy*, vol. 19, no. 5, pp. 114–149. https://doi.org/10.18288/1994-5124-2024-5-114-149

Tsipouri L., Liarti S., Vignetti S., Martins Grapengiesser I. (2025). The economic impact of open science: A scoping review. *Royal Society Open Science*, vol. 12, issue 9, 250754. https://doi.org/10.1098/rsos.250754

Wang S.-Y., Yang Q.-J. (2022). Research on the impact of higher education scale on economic growth from the perspective of international science and technology cooperation. *Jiào yù jīng jì píng lùn / China Economics of Education Review*, vol. 7, no. 1, pp. 23–39. https://doi.org/10.19512/j.cnki.issn2096-2088.2022.01.002. (in Chinese)

Wang W. (2021). *SWOT analysis of Hunchun's marine economic development*. Master's thesis, Yanbian University. Chinese National Knowledge Infrastructure. https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202201&filename=1021115684.nh. (in Chinese)

Wu J.C., Xie Y. (2025). Unconventional monetary and fiscal policy. *Review of Economic Dynamics*, vol. 56, 101259. https://doi.org/10.1016/j.red.2024.101259

Zhang J. (2022). Data analysis of fiscal expenditure and GDP based on financial budget performance evaluation indicators. *Discrete Dynamics in Nature and Society*, vol. 2022, issue 1, 1141618. https://doi.org/10.1155/2022/1141618

Zhang K., Zhang X., Xiong L., Rao B. (2024). The stabilizing effect of government guarantees in real economy investment: Evidence from China. *International Review of Economics & Finance*, vol. 91, pp. 219–240. https://doi.org/10.1016/j.iref.2024.01.025

Zhang P., Ji Z.-H. (2021). Study on spatial differences and driving mechanism of educational human capital in China. *Jiào yù jīng jì píng lùn / China Economics of Education Review*, vol. 6, no. 2, pp. 3–23. https://doi.org/10.19512/j.cnki.issn2096-2088.2021.02.001. (in Chinese)

Zhao R., He P. (2024). Government spending efficiency, fiscal decentralization and regional innovation capability: Evidence from China. *Economic Analysis and Policy*, vol. 84, pp. 693–706. https://doi.org/10.1016/j.eap.2024.08.033

Источники

Аганбегян А.Г. (2024). Опыт зарубежных стран по ускоренному социально- экономическому росту и его возможное использование для России // Стратегирование: теория и практика. Т. 4, № 1 (11). С. 1–26. https://doi.org/10.21603/2782-2435-2024-4-1-1-26

Балацкий Е.В., Екимова Н.А. (2021). Инструменты государственного управления: прогнозирование vs проектирование // Управленец. Т. 12, № 1. С. 18–31. https://doi.org/10.29141/2218-5003-2021-12-1-2

Баранов А.О., Слепенкова Ю.М., Тагаева Т.О. (2020). Совершенствование статистики воспроизводства человеческого капитала // Проблемы прогнозирования. № 1 (178). С. 22–31.

Бывшев В.И., Писарев И.В. (2024). Региональная научно-технологическая и инновационная политика: стратегическое планирование и нормативно-правовое обеспечение // Journal of Institutional Studies. Т. 16, № 2. С. 73–85. https://doi.org/10.17835/2076-6297.2024.16.2.073-085

Вереникин А.О., Вереникина А.Ю. (2024). Потенциал цифровой трансформации: рейтинг регионов РФ // Экономика региона. Т. 20, № 4. С. 1008–1025. https://doi.org/10.17059/ekon.reg.2024-4-3

Вольчик В.В., Маслюкова Е.В., Барунова А.А., Демахина О.В. (2025). Дифференциация регионов России в процессе реиндустриализации // Экономика региона. Т. 21, № 1. С. 1–16. https://doi.org/10.17059/ekon.reg.2025-1-1

Вольчик В.В., Цыганков С.С., Маскаев А.И. (2024). Политика нового менеджмента в государственном секторе как продолжение идеологии неолиберализма // Управленец. Т. 15, № 6. С. 2–16. https://doi.org/10.29141/2218-5003-2024-15-6-1

Гатиятов А.Р., Сафиуллин М.Р., Гатауллина А.А. (2025). Наукометрический анализ как инструмент выявления тенденций развития научных направлений региона // Высшее образование в России. Т. 34, № 4. С. 48–79. https://doi.org/10.31992/0869-3617-2025-34-4-48-79

Глазьев С.Ю. (2022). Глобальная трансформация через призму смены технологических и мирохозяйственных укладов // AlterEconomics. Т. 19, № 1. С. 93–115. https://doi.org/10.31063/AlterEconomics/2022.19-1.6

Глазьев С.Ю., Сухарев О.С. (2024). Экономический рост России и структурная модернизация: проектный подход // Российский экономический журнал. № 2. С. 4–30. https://doi.org/10.52210/0130-9757_2024_2_4

Голубева А.С., Канунникова К.И., Волков А.Р. (2024). Научно-образовательные кластеры в инновационно-инвестиционном потенциале региона // AlterEconomics. Т. 21, № 4. С. 748–776. https://doi.org/10.31063/AlterEconomics/2024.21-4.6

Дворядкина Е.Б., Куклинова П.С. (2024). Стратегические приоритеты развития региональной экономики в контексте регулирования немонетарных факторов инфляции // Управленец. Т. 15, № 4. С. 27–40. https://doi.org/10.29141/2218-5003-2024-15-4-3

Квинт В.Л., Середюк И.В. (2025). Стратегическая оценка соответствия открытых диффузных агломераций глобальным, национальным и региональным трендам (на примере агломераций Кемеровской области – Кузбасса) // Экономика промышленности. Т. 18, № 1. С. 7–23. https://doi.org/10.17073/2072-1633-2025-1-1435

Клейнер Г.Б. (2024). Многополярное управление организацией // Российский журнал менеджмента. Т. 22, № 2. С. 163–178. https://doi.org/10.21638/spbu18.2024.201

Крюков В.А., Коломак Е.А. (2025). Стратегия пространственного развития России в турбулентном мире: цели, приоритеты, основные подходы // Вестник Российской академии наук. № 2. С. 22–32. https://doi.org/10.7868/S3034520025020032

Крюков В.А., Коломак Е.А., Суслов Н.И., Костин А.В. (2023). Азиатская Россия: от проблем к росту // Научные труды Вольного экономического общества России. Т. 241, № 3. С. 110–128. https://doi.org/10.38197/2072-2060-2023-241-3-110-128

Кудрин А.Л. (2018). Теоретические и методологические подходы к реализации сбалансированной и эффективной бюджетной политики: дис. … д-ра экон. наук. Москва.

Кузык М.Г., Симачев Ю.В. (2025). Особенности реагирования зарубежных стран на масштабные санкции: есть ли уроки для изучения? // Вопросы экономики. № 10. С. 5–27. https://doi.org/10.32609/0042-8736-2025-10-5-27

Мельников В.В. (2021). Стратегическое планирование социально-экономического развития макрорегиона на основе системы сбалансированных показателей (на примере Северо-Кавказского федерального округа): дис. … канд. экон. наук. Санкт-Петербург.

Сухарев О.С. (2024). Управление технологическим замещением: основные режимы // Управленец. Т. 15, № 2. С. 66–78. https://doi.org/10.29141/2218-5003-2024-15-2-5

Томилин О.Б. (2024). Тупики университетского менеджериализма: концептуальный анализ // Университетское управление: практика и анализ. Т. 28, № 1. С. 125–143. https://doi.org/10.15826/umpa.2024.01.009

Тюрина Ю.А. (2023). Статусно-ролевые позиции проректора как субъекта изменений в молодежной политике и воспитательной деятельности вуза // Власть и управление на Востоке России. № 2 (103). С. 51–65. https://doi.org/10.22394/1818-4049-2023-103-2-51-65

Acemoglu D., Robinson J. (2022). Non-modernization: Power–culture trajectories and the dynamics of political institutions. *Annual Review of Political Science*, vol. 25, pp. 323–339. https://doi.org/10.1146/annurev-polisci-051120-103913

Bloom N., Romer P., Terry S., Van Reenen J. (2013). A trapped-factors model of innovation. *American Economic Review,* vol. 103, issue 3, pp. 208–213. https://doi.org/10.1257/aer.103.3.208

Chong C.W., Yuen Y.Y. (2022). The impacts of KM-centred strategies and practices on innovation: A survey study of R&D firms in Malaysia. *Interdisciplinary Journal of Information, Knowledge, and Management*, vol. 17, pp. 67–86. https://doi.org/10.28945/4892

Edler J., Blind K., Kroll H., Schubert T. (2023). Technology sovereignty as an emerging frame for innovation policy. Defining rationales, ends and means. *Research Policy*, vol. 52, issue 6, 104765. https://doi.org/10.1016/j.respol.2023.104765

Feng A.-Q. (2022). Exploring the path of deepening China's energy cooperation with Russia in the new context. *Jīng jì zòng héng / Economic Review Journal*, no. 6, pp. 79–84. http://dianda.cqvip.com/Qikan/Article/Detail?id=7107703015. (in Chinese)

Fujita M., Krugman P. (2004). The new economic geography: Past, present and the future. *Papers in Regional Science*, vol. 83, no. 1, pp. 139–164. https://doi.org/10.1007/s10110-003-0180-0

Furuncu Y. (2025). PESTEL and SWOT analysis of hydrogen economy in Turkey. *International Journal of Hydrogen Energy*, vol. 113, pp. 161–169. https://doi.org/10.1016/j.ijhydene.2025.02.408

Lai F., Xiong D., Zhu S., Li Y., Tan Y. (2023). Will geopolitical risks only inhibit corporate investment? Evidence from China. *Pacific-Basin Finance Journal*, vol. 82, 102134. https://doi.org/10.1016/j.pacfin.2023.102134

Liu X., White S. (2001). Comparing innovation systems: A framework and application to China's transitional context. *Research Policy*, vol. 30, issue 7, pp. 1091–1114. https://doi.org/10.1016/S0048-7333(00)00132-3

Lo W.Y.W., Liu S. (2021). Are university rankings still important? Perspectives from Greater China (pp. 278–293). In: E. Hazelkorn, G. Mihut. (Eds.). *Research handbook on university rankings: Theory, methodology, influence and impact*. Cheltenham: Edward Elgar Publishing. https://doi.org/10.4337/9781788974981.00030

March C., Schieferdecker I. (2023). Technological sovereignty as ability, not autarky. *International Studies Review*, vol. 25, issue 2. https://doi.org/10.1093/isr/viad012

Mariotti S. (2025). "Open strategic autonomy" as an industrial policy compass for the EU competitiveness and growth: The good, the bad, or the ugly? *Journal of Industrial and Business Economics*, vol. 52, pp. 1–26. https://doi.org/10.1007/s40812-024-00327-y

Niu Z. (2024). Risk and opportunity of Diageo: PESTEL and SWOT analysis. *Finance & Economics*, vol. 2, no. 9, pp. 1–12. https://doi.org/10.61173/wdw94h39

Peng L., Yan Y. (2024). Analysis on the path of integration of industry and education of vocational education to help the construction of the Chengdu-Chongqing economic circle – Based on SWOT analysis. *Zhí yè jì shù / Vocational Technology*, vol. 23, no. 11, pp. 1–10. https://doi.org/10.19552/j.cnki.issn1672-0601.2024.11.001. (in Chinese)

Proserpio L., Kandiko Howson C., Lall M. (2025). The university ranking game in East Asia: The sensemaking of academic leaders between pressures and fatigue. *Asia Pacific Education Review*, vol. 26, pp. 159–171. https://doi.org/10.1007/s12564-024-10012-3

Sorokin M.Yu., Yu L. (2024). The role of program and project management in increasing the competitiveness of Russian universities: A comparative analysis including China and India. *Ekonomicheskaya politika / Economic Policy*, vol. 19, no. 5, pp. 114–149. https://doi.org/10.18288/1994-5124-2024-5-114-149

Tsipouri L., Liarti S., Vignetti S., Martins Grapengiesser I. (2025). The economic impact of open science: A scoping review. *Royal Society Open Science*, vol. 12, issue 9, 250754. https://doi.org/10.1098/rsos.250754

Wang S.-Y., Yang Q.-J. (2022). Research on the impact of higher education scale on economic growth from the perspective of international science and technology cooperation. *Jiào yù jīng jì píng lùn / China Economics of Education Review*, vol. 7, no. 1, pp. 23–39. https://doi.org/10.19512/j.cnki.issn2096-2088.2022.01.002. (in Chinese)

Wang W. (2021). *SWOT analysis of Hunchun's marine economic development*. Master's thesis, Yanbian University. Chinese National Knowledge Infrastructure. https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202201&filename=1021115684.nh. (in Chinese)

Wu J.C., Xie Y. (2025). Unconventional monetary and fiscal policy. *Review of Economic Dynamics*, vol. 56, 101259. https://doi.org/10.1016/j.red.2024.101259

Zhang J. (2022). Data analysis of fiscal expenditure and GDP based on financial budget performance evaluation indicators. *Discrete Dynamics in Nature and Society*, vol. 2022, issue 1, 1141618. https://doi.org/10.1155/2022/1141618

Zhang K., Zhang X., Xiong L., Rao B. (2024). The stabilizing effect of government guarantees in real economy investment: Evidence from China. *International Review of Economics & Finance*, vol. 91, pp. 219–240. https://doi.org/10.1016/j.iref.2024.01.025

Zhang P., Ji Z.-H. (2021). Study on spatial differences and driving mechanism of educational human capital in China. *Jiào yù jīng jì píng lùn / China Economics of Education Review*, vol. 6, no. 2, pp. 3–23. https://doi.org/10.19512/j.cnki.issn2096-2088.2021.02.001. (in Chinese)

Zhao R., He P. (2024). Government spending efficiency, fiscal decentralization and regional innovation capability: Evidence from China. *Economic Analysis and Policy*, vol. 84, pp. 693–706. https://doi.org/10.1016/j.eap.2024.08.033

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