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# Quality management of higher education within the framework of the socio-investment model of economic growth: State audit and financial control

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The article aims to study the contribution of quality management in higher education through state audit and financial control to the implementation of the socio-investment model of economic growth. The article is based on the scientific hypothesis that quality management in higher education should be based on university rankings. The article presents the authors' view on the interpretation of recent results in the research field of quality management in higher education and reveals the strengths and weaknesses of the hypothesis. Systematization and critical analysis of the indicators of quality and effectiveness in higher education based on the leading university rankings for 2022—the Ministry of Education and Science of the Russian Federation—are performed. The case study method is used for the case analysis of the management of quality and effectiveness on the example of the leading Russian university, which has been the leader of these rankings for many years: Lomonosov Moscow State University (MSU). The scientific novelty and originality of the article are associated with a systematic view of the quality and effectiveness of higher education, which was first formed by the authors through a combination and grouping of indicators from the leading university rankings for 2022. The theoretical significance of the authors' conclusions lies in the fact that the article clearly identifies a significant contribution of the quality control of education and the performance management of universities to the implementation of the socio-investment model of economic growth. The practical significance of the obtained results is that the scientific and methodological basis for monitoring and assessing quality and effectiveness in higher education based on the leading university ratings for 2022 makes it possible to improve the state audit and financial control of university activities in the implementation of the socio-investment model of economic growth.

## KEYWORDS

quality management, effectiveness, higher education, socio-investment model of economic growth, state audit, financial control, university rankings

## Introduction

Education and universities play a system-forming role in the socio-investment model of economic growth. The essence of this model is that the source of economic growth and development is social investments, that is, investments to develop and unlock human potential (Makhalina et al., 2020). The socio-investment model of economic growth is manifested in the following: the development of digital competencies among the population, the training of digital personnel for business, lifelong learning, targeted, and corporate (requested and paid by employers) training to improve the qualification level of employees of enterprises. All this is implemented based on universities (Henze et al., 2022; Liao et al., 2022).

Two conditions must be met for universities to successfully fulfill this role. The first condition is the high quality of the university's activities—both educational and scientific—as it determines the effectiveness of social investments (Depoo et al., 2022). The quality of educational services determines the growth of human potential achieved through training—the development of competencies and the improvement of the qualification level of human resources of economy and business (Popkova et al., 2021). The quality of scientific activity of universities determines internally-generated intangible assets—advanced technologies and university innovations that allow increasing productivity in knowledge-intensive and innovation-related workplaces (Brasher et al., 2022).

The second condition is the high performance of the university. The socio-investment model of economic growth is based on social investments, but not on non-commercial investments (Sibirskaya et al., 2019). In the conditions of a modern market economy, social investments have a pronounced commercial nature, and therefore the activities of universities are associated with the generation of public goods, not social ones. Services of higher education do not conform to the criteria of public goods: they are consumed collectively (non-exclusion criterion), the list of consumers-beneficiaries cannot be limited (criterion of non-competition in consumption), a good cannot be decomposed into separate units, and the fee collection for services is complicated (criterion of indivisibility).

However, the services of higher education that are provided by modern universities fully conform to all criteria of economic goods: they are exclusive (services are provided only to enrolled students), competitive in consumption (production capacities of universities are limited, and consumption of their higher education services by certain people reduces the possibilities for their consumption by other people), clearly divisible (could be divided into educational programs, separate disciplines, and detailed services) and envisage collection of fee for the services (from the state, students or employers). Effectiveness means commercial attractiveness, competitiveness, and payback of social investments in terms of their contribution to economic growth (Johnes et al., 2022).

These conditions are met through quality management in higher education, which includes not only corporate governance by the leadership (rector's office) and management bodies (deans of faculties, heads of departments, and laboratories) of the university but also state audit and financial control of university activities. It should be noted that state monitoring and regulation of universities' activities are specific in each country. Financial control over the activities of universities in Russia is understood as monitoring the effectiveness from the position of universities' revenues from the provision of paid services of higher education, budget financing/own revenues ratio, and revenues from the commercialization of university innovations.

In Russia, state audit is understood as quality control of higher education services that are provided by universities. In the course of quality control, attention is paid to the following indicators: level of knowledge (independent knowledge test with the help of state examinations), correspondence of educational programs to the federal state educational standards, the infrastructure of academic buildings and classrooms, level of qualification of universities' academic staff and teacher/student ratio.

The issues of monitoring and managing the quality and effectiveness of universities have been studied in sufficient detail and covered in the existing literature by Efimova et al. (2021) and Zheng et al. (2021). Nevertheless, there remains uncertainty as to what contribution monitoring and management make to the implementation of the socio-investment model of economic growth, this is a gap in the literature. The article aims to fill the identified gap in the literature and examine the contribution of quality management in higher education through state audit and financial control to the implementation of the socio-investment model of economic growth.

## Literature review

The article is based on the scientific provisions of the concept of university management. When selecting literature sources for inclusion in the literature review, preference was given, first, to the most cited and, therefore, most significant publications on the topic of the paper, to ensure the reliability of the theoretical framework; second, to the latest literature sources on the topic of the paper, to take into account the current state of affairs in the subject sphere of the research.

In their works Contreras and Lozano (2022), Okure (2022), Shi et al. (2022), and Thai and Noguchi (2021) note the significant contribution of management and control to improving the quality and effectiveness of universities. The theoretical substantiation of the standards of quality and management in higher education is based on the provisions of the competence-based approach to personnel training (Noaman et al., 2017; Alzafari and Ursin, 2019). Educational standards allow guaranteeing the required integration and close connection between the labor market and the higher education services market (Gerasimova et al., 2019; Dallashah and Zubeidat, 2022). This is an advantage of educational

standards compared to the absolute power of universities, since its absence of control may lead to the critical reduction of the quality of higher education services and the gap between them and the realities of the labor market (Bazarsky et al., 2022).

The advantage of the educational standards compared to a high level of control over the activities of universities and norming of personnel training and the limited character of government control (Mujallid, 2021). Due to this, educational standards ensure the proper quality of higher education services and, at the same time, preserve a high level of freedom and independence of universities in the aspect of management and organization of the educational process (Brøgger, 2019). This facilitates the development of the diversity of the directions of training and educational programs and supports “healthy” competition between universities (Morley and Aynsley, 2007).

In their works, Galleli et al. (2022), Kaidesoja (2022) and Wut et al. (2022) note the completeness, objectivity, and diversity of university rankings, which are evolving under the influence of the development of national systems and global trends in higher education; in recent years, international university rankings have been supplemented by indicators of gender neutrality of universities [or example, the indicator “female/male ratio,” taken into account by Times Higher Education (THE), 2022] and indicators regarding the achievement of the Sustainable Development Goals (for example, “SDG rating,” taken into account by QS, 2022a).

Also, new dynamically developing and progressive universities are annually incorporated into the international university rankings. For example, Times Higher Education (THE) (2022), in addition to the main (general) international university rankings, also includes “Emerging Economies University Rankings 2022” and “Young University Rankings 2022.” The reviewed literature allows us to determine the amount of elaboration associated with the subject of this study as high.

Socio-investment model of economic growth is a modern model that is based on the principles of sustainable development (Wang, 2022) and supports the top-priority implementation of the following Sustainable Development Goals: SDG 1 (fight against poverty through the creation of jobs), SDG 4 (quality education and affordable higher education; Jabeen and Khan, 2022), SDG 5 (gender-neutral jobs), (Ogujiuba and Mngometulu, 2022), SDG 8 (decent work, corporate social responsibility, high-performance jobs that ensure human potential development, green jobs that support economic growth; Huidobro et al., 2022).

The essence of the described model and its main specific feature consist, on the hand, in the reliance on highly qualified and creative human resources with the acceleration of economic growth rate and the humanistic treatment of economic growth, which is to serve the interests of society and each individual (Bajraktari et al., 2022; Usman, 2022). Nevertheless, there remains uncertainty about the contribution of quality control and management of universities to the implementation of the socio-investment model of economic growth.

This raises a research question (RQ): How should monitoring, state audit, and financial control of university activities be carried out to manage the quality and effectiveness of higher education within the framework of the socio-investment model of economic growth? As an answer to this question, authors such as Bellantuono et al. (2022), Catalán and Santelices (2022), and Naven and Whalen (2022) reproduce the widespread hypothesis that monitoring, state audit, and financial control in higher education allow conducting university ratings.

To test this hypothesis and strengthen its scientific justification, this article examines the modern Russian experience of quality and performance management in higher education. In Russia, the core of the socio-investment model of economic growth is the education of students at state universities on a budgetary basis. This makes Russia a particularly suitable subject for the research in this article since public investment is known to be associated with the highest risks to quality and effectiveness.

Thus, in countries where private social investments in the form of paid educational services in higher education provided by private universities prevail, quality and effectiveness, due to high flexibility and adaptability, are assessed with the help of internal monitoring, control, and audit of private universities, with dual systems of control and audit (internal and external; Kızılay and Ödemiş, 2021). In contrast, state universities, which rely on funding from the state budget, also rely primarily on external monitoring and control—university ratings (Akah et al., 2022; Negash et al., 2022).

## Materials and methods

### Theoretical and methodological base of the research

The article is based on a systematic approach and presents the authors’ view on the interpretation of recent results in the research field of quality management in higher education. The article is based on a widespread and well-developed scientific hypothesis that quality management in higher education should be based on university ratings. The article rethinks this hypothesis from the standpoint of stakeholder theory and forms a systematic view of monitoring and management of the quality and effectiveness of universities. Using the method of cause and effect analysis, the article in-depth studies and reveals the contribution of university ratings to the implementation of the socio-investment model of economic growth.

### Order and methodology of hypothesis testing

To demonstrate the strengths and weaknesses of the formulated hypothesis, this article uses content analysis and generalization methods to systematize and critically analyze

quality and effectiveness indicators in higher education based on the leading university rankings for 2022: Times Higher Education [Times Higher Education (THE), 2022] and QS (2022a) “World University Rankings 2022,” “Graduate Employability Rankings” from QS (2022b), “University rankings on the demand for graduates in the labor market” from RAEX (2022), as well as information and analytical materials on the results of monitoring the effectiveness of educational institutions of higher education in 2022 from the Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022).

As an approbation, an analysis of quality and performance management was carried out using the example of Lomonosov Moscow State University (MSU), which is a leading Russian university, as well as a long-term leader of all the above rankings, using the case study method and the obtained system of indicators. The results of the university rankings for 2022 make it possible to assess the quality and effectiveness of the management of the selected university, as well as to analyze its contribution to the implementation of the socio-investment model of economic growth in Russia.

To ensure the objectivity of the research and the high precision, completeness, and correctness of its results, this paper, first, combines the quantitative and qualitative research methods. Quantitative methods are used to collect, overview and analyze the most actual and relevant statistics. Qualitative methods are used to rethink the statistics and provide qualitative scientific treatment.

Second, this paper is based on the generally recognized and reliable sources of statistical information and takes into account a whole range of these sources (but is not limited by one of them). These sources are the information and analytical materials of the Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022), which reflect the main indicators of the Russian universities’ activities, and the international university rankings Times Higher Education (THE) (2022) and QS (2022a).

## Results

### The system of quality and effectiveness indicators in higher education based on the leading university rankings for 2022

To form a holistic view of quality and effectiveness indicators in higher education, a systematization and critical analysis of the leading university rankings for 2022 was carried out using content analysis and generalization methods (Table 1).

As shown in Table 1, each component of the management of quality and effectiveness in higher education is presented in the considered university rankings, but only by separate indicators. The quality of higher education services, provided by a university, is characterized by the indicators “teaching” [Times Higher

Education (THE), 2022], “faculty/student ratio,” “employer reputation” (QS, 2022a), as well as “educational activities,” “salary of the teaching staff” and “teachers’ qualification level” [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022].

Productivity and quality of the scientific activities are characterized by the indicators “research,” “citations” [Times Higher Education (THE), 2022], “citations per faculty,” “academic reputation” (QS, 2022a), as well as “research activities” [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022]. Financial effectiveness is characterized by the indicators “industry income” [Times Higher Education (THE), 2022] and “financial and economic activity” [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022]. Internationality of a university is characterized by the indicators “international outlook” [Times Higher Education (THE), 2022], “international students ratio,” “international faculty ratio” (QS, 2022a), and “international activities” [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022].

The results from Table 1 revealed the weaknesses of the formulated hypothesis, which are the discrepancy and fragmentary nature of university rankings. None of the rankings provides a complete picture of the quality and effectiveness of universities. Indicators from different rankings are often in conflict with one another. So, for example, the indicator “faculty/student ratio” from the QS ranking (2022a) shows the number of academics per student, according to this indicator, the more teachers there are for each student, the higher the quality of higher education services provided by the university.

At the same time, the indicator “financial and economic activity” from the materials of the Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022) has a better value, the fewer teachers work at the university. In addition, in Russia, state universities have strict norms and standards that minimize the number of teachers per student, designed to maximize the financial and economic effectiveness of universities. The revealed contradiction between quality and effectiveness dictates the need for simultaneous consideration of all these indicators for a reliable comprehensive assessment.

The strength of the hypothesis under consideration is that systematic monitoring of the leading university rankings for 2022 makes it possible to assess the quality and effectiveness in higher education with high accuracy and reliability. For this purpose, the authors recommend grouping indicators with the following generalized components of university management: (1) the quality of higher education services provided by the university; (2) productivity and quality of scientific activity; (3) financial efficiency; (4) internationality of the university; and (5) employment of graduates. When monitoring the quality and



TABLE 1 The system of quality and effectiveness indicators in higher education based on the leading university rankings for 2022.

Components of management	Statistical indicators	The essence of the indicator	Source of official statistics
Quality of higher education services provided by the University	Teaching	The learning environment	Times Higher Education (THE) (2022)
	Faculty/student ratio	Number of academics per student	QS (2022a)
	Employer reputation	The ability to attract and retain the best teaching staff	QS (2022a)
	Educational activities	The passing score for enrolling in a bachelor' or specialist degree program in an intramural form of education at the expense of budgetary funds	Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022)
	Salary of the teaching staff	The ratio of the salary of the teaching staff to the average salary in the economy of the region	Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022)
Productivity and quality of scientific activity	Teachers' qualification level	Number of teachers with academic degrees per 100 students	Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022)
	Research	Volume, income, and reputation	Times Higher Education (THE) (2022)
	Citations	Research influence	Times Higher Education (THE) (2022)
	Citations per faculty	Total number of academic citations in papers	QS (2022a)
	Academic reputation	Teaching and research quality	QS (2022a)
Financial effectiveness	Research activities	Cost of R&D per teacher (commercialization of university innovations)	Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022)
	Industry income	Knowledge transfer	Times Higher Education (THE) (2022)
Internationality of the University	Financial and economic activity	Income from all sources per teacher	Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022)
	International outlook	Staff, students, and research	Times Higher Education (THE) (2022)
	International students ratio	The ability to attract quality students and staff from across the world	QS (2022a)
	International faculty ratio		QS (2022a)
Employment of graduates	International activities	Share of international students	Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022)
		Share of foreign teachers	
	The demand for graduates by employers		RAEX (2022)
	Graduate Employability		QS (2022b)

Compiled by the authors.

effectiveness, state audit, and financial control of higher education, it is recommended to take into account the selected components of university management in an integrated manner.

## Case study of quality and performance management of higher education in Russia

As a result of studying the case experience of implementing the socio-investment model of economic growth in Russia, a

significant feature has been identified. This feature consists in the fact that when making decisions on state orders related to the allocation of budget places to universities, state regulatory bodies of higher education seek to fill in the gaps in the labor market. Because of this, the most promising areas of placement of social investments remain uncovered by budget places.

As a rule, budget places are not allocated for those educational programs that are in the highest demand among applicants (allowing getting the most prestigious job, guaranteeing the best employment conditions: comfort and remuneration, career building) and which are very popular as paid educational services.

Instead, the state allocates the main budget places for those educational programs that are not popular. This makes it possible to increase their attractiveness and overcome the shortage of personnel in the labor market.

The described feature has a contradictory interpretation in the existing literature, where the authors note the increased risks of imbalance associated with it, the increasing disparity of the higher education services market from the labor market (Crowley-Vigneau et al., 2022; Taranov and Ugnich, 2022; Timofeyev and Dremova, 2022). This could potentially limit the contribution of social investment to economic growth. To determine what the real implications for economic growth are provided by social investments in the Russian model, a case analysis of quality and performance management was conducted on the example of a leading Russian university, which is a long-term historical leader of all the above rankings: Lomonosov Moscow State University (MSU).

In all the rankings under consideration, MSU occupies the best or leading position among Russian universities. Thus, according to the Times Higher Education rankings [Times Higher Education (THE), 2022], MSU is in 158th place (56.8 points), in the ranking of universities by QS (2022a), in 78th place (65.6 points). Monitoring by the Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation) (2022) does not result in a rating, but reflects the ratio of indicators for the university to the average indicators in Russia—MSU is significantly ahead of the average Russian level of quality and effectiveness in all indicators.

As a result of detailed analysis in the context of the selected indicators, it was revealed that according to the “teaching” indicator, MSU in 2022 demonstrated a very high result [80.3 points out of 100 possible; Times Higher Education (THE), 2022]. The value of the indicator “employer reputation” is high [76.5 points], and the indicator “faculty/student ratio” is very high: 99.8 points (QS, 2022a). MSU also demonstrated very high values of the indicators “educational activity” (84.28 points), “teachers’ salaries” (205.77), and “teachers’ qualification level” (10.76; Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022). According to the totality of the considered indicators, it is possible to characterize the quality of higher education services provided by MSU as high.

According to the “research” indicator, MSU in 2022 showed a high result (69.9 points)—the highest indicator among Russian universities presented in the rating. But according to the “citations” indicator, the result was low [12.8 points; Times Higher Education (THE), 2022]. By comparison, the value of this indicator in another Russian university—Don State University—is 96.9 points in 2022. The value of the indicator “academic reputation” is high: 79.5 points (the highest among Russian universities). But the value of the indicator “citations per faculty” is low: 5.9 points (QS, 2022a). By comparison, the value of this indicator in Novosibirsk State University is 19.5 points in 2022.

At the same time, MSU also demonstrated a very high value of the indicator “research activity”: 726.42 million rubles [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022]. According to the totality of the considered indicators, the productivity and quality of MSU scientific activity can be characterized as high.

According to the “industry income” indicator, MSU in 2022 demonstrated a very high result: 99.3 points [Times Higher Education (THE), 2022]. MSU also demonstrated a very high value of the indicator “financial and economic activity”: 4,015.53 million rubles [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022].

According to the indicator “international outlook” MSU in 2022 demonstrated a high result: 72.5 points [Times Higher Education (THE), 2022], with just Tomsk State University (among Russian universities in 2022) ahead (73.6 points). The value of the indicator “international students ratio” is very high (87.8 points), 5th position in Russia, with Tomsk State University (93.8 points) being the leader. But the value of the indicator “international faculty ratio” is low (7.3 points; QS, 2022a). By comparison, the Russian leader in 2022—National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)—has this indicator at the level of 37.2 points.

MSU also demonstrated a very high value of the indicator “international activity”: 12.25% [Ministry of Science and Higher Education of the Russian Federation (Ministry of Education and Science of the Russian Federation), 2022]. According to the totality of the considered indicators, the internationality of MSU can be characterized as high.

In 2022, MSU also became the best university in terms of the level of demand for graduates by employers, taking first place in the all-Russian rating of RAEX (2022) and in the QS rating (2022b), taking 121th–130th place in the world in terms of “graduate employability.” According to the totality of the considered indicators, it is possible to characterize the level of employment opportunities for MSU graduates as high.

## Discussion

The article develops the scientific provisions of the university management concept. Unlike Galleli et al. (2022), Kaidesoja (2022), and Wut et al. (2022), the article proves that university rankings, despite their diversity, are not universal. They allow for international comparisons, determining the global competitiveness of universities. Nevertheless, university rankings, when used in isolation, are unsuitable for corporate and state management of universities and for the purposes of making decisions about the provision of state-funded places to universities. To overcome this limitation, it is advisable to take into account the results of several university rankings.

Unlike Crowley-Vigneau et al. (2022), Taranov and Ugnich (2022) and Timofeyev and Dremova (2022), the article proves that the peculiarity of the socio-investment model of economic growth in Russia does not hinder, but supports its implementation. The impact of the labor market on the market of higher education services is not unilateral (direct), but it also has the opposite effect – these markets are systemically interdependent and influence each other. The allocation of budget places to universities for the least popular educational programs allows not only to overcome the shortage of personnel in the labor market but also stimulates the demand of employers for professions supported by the state. Thanks to this feature, the integration of the labor market and the market of higher education services is achieved in Russia.

The contribution of the article to the literature consists in the systematization of quality and effectiveness indicators in higher education based on the leading university rankings for 2022. Thanks to this, the article has formed a scientific and methodological basis for a multi-criteria assessment of the activities of universities, which allows determining the quality and effectiveness of universities with the highest accuracy, completeness, and reliability.

The paper's originality consists in its proposing a new approach to the implementation of state audit and financial control over the activities of universities. The key conclusion of the research is as follows: no university rating can be exhaustive, all of them have natural limits. Based on this conclusion, to raise the effectiveness of quality management in higher education, we should not limit ourselves to the improvement of a single university rating. For example, such a rating in Russia is the materials of the [Ministry of Science and Higher Education of the Russian Federation \(Ministry of Education and Science of the Russian Federation\) \(2022\)](#).

Instead of this, a new approach to quality management in higher education in the socio-investment model of economic growth offers to consider—in a comprehensive manner—the materials of several ratings—internal and external—international, among which an important place belongs to [Times Higher Education \(THE\) \(2022\)](#) and [QS \(2022a\)](#). The proposed new approach will allow increasing the precision, completeness, objectivity, and reliability of state audit and financial control over the activities of universities.

## Conclusion

Based on the results of the study, it can be concluded that the article answered the posed RQ and strengthened the evidence base of the hypothesis that monitoring, state audit, and financial control in higher education allow for university ratings. It is demonstrated that the weak side of this hypothesis is the inconsistency and fragmentation of university rankings.

The strength of the hypothesis under consideration is that systematic monitoring of the leading university rankings for 2022 makes it possible to assess the quality and effectiveness

of higher education with high accuracy and reliability. For this purpose, the authors recommend grouping indicators with the following generalized components of university management: (1) the quality of higher education services provided by the university; (2) productivity and quality of scientific activity; (3) financial efficiency; (4) internationality of the university; and (5) employment of graduates. The authors' recommendations were tested using a case study of quality control and management and the efficiency of higher education in Russia.

The scientific novelty and originality of the article are associated with a systematic view of the quality and effectiveness of higher education, which was first formed by the authors through a combination and grouping of indicators from the leading university rankings for 2022. The theoretical significance of the authors' conclusions lies in the fact that the article clearly identifies a significant contribution of the quality control of education and the performance management of universities to the implementation of the socio-investment model of economic growth.

Rethinking the existing hypothesis from the standpoint of stakeholder theory proved that only when the results of university rankings are systematically taken into account, they satisfy the interests of all stakeholders—university administration and management, state regulators of higher education, students, teachers and employers—and ensure the contribution of university rankings to the implementation of the socio-investment model of economic growth.

The practical significance of the obtained results is that the scientific and methodological basis for monitoring and assessing quality and effectiveness in higher education based on the leading university ratings for 2022 makes it possible to improve the state audit and financial control of university activities in the implementation of the socio-investment model of economic growth. The scientific and methodological basis formed in the article for monitoring and evaluating the quality and effectiveness of higher education is based on the leading university rankings for 2022. It makes it possible to improve the internal corporate governance (leadership by the rector's office and management bodies by the deans of faculties and heads of departments and laboratories) of the university, as well as external (by the state) management of the quality and effectiveness of universities in support of the implementation of the socio-investment model of economic growth.

In conclusion, it is worth noting that such socio-investment models of economic growth, involving a significant number of budget places at universities, are characteristic of many countries around the world. Among them are Germany, France, Italy, Greece, the Czech Republic, Slovakia, Finland, Norway, Iceland, Argentina, China, and India, as well as other countries in which there are many state universities. This makes the experience of Russia useful for many other countries to which the conclusions of this study can be extended and for which the results and recommendations of this article will be useful.

However, the focus on Russia's experience is a limitation of this research. Experience of other countries, where there are many state universities, needs further study. Given the popularity of country models of higher education, it is expedient to study this experience separately for each country.

Though the general conclusion of this research—that it is necessary to take into account the materials of a set of university rankings for the most reliable state audit and financial control of the activities of universities—could be extended to other countries, the list of specific rankings and indicators will vary. The samples of prospective university rankings and their indicators for the monitoring and management of quality in higher education in the socio-investment model of economic growth in various countries of the world should be determined and substantiated in further studies.

## Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: 1. [Ministry of Science and Higher Education of the Russian Federation \(Ministry of Education and Science of the Russian Federation\) \(2022\)](#). Information and analytical materials on the results of monitoring the effectiveness of the activities of educational institutions of higher education in 2022. URL: [https://monitoring.miccedu.ru/iam/2022/\\_vpo/inst.php?id=1725](https://monitoring.miccedu.ru/iam/2022/_vpo/inst.php?id=1725) (data accessed: 03.09.2022). 2. [QS \(2022a\)](#). World University Rankings 2022. URL: <https://www.topuniversities.com/university-rankings/world-university-rankings/2022> (data accessed: 03.09.2022). 3. [QS \(2022b\)](#). Graduate Employability Rankings. URL: <https://www.unipage.net/ru/2273> (data accessed: 03.09.2022). 4. [RAEX](#)

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## Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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