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Evaluation of the scientific results of youth laboratories: features of the methodological approach and potential for application in public administration

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Abstract. The study presents a methodological approach to assessing the results of research and development (R&D) of youth laboratories created within the framework of the "New Medicine" direction. The approach is based on the use of industry tools of technology readiness levels (TRL), which were finalized considering the purpose and objectives of the study. A distinctive feature of the approach is the ability to obtain not only integer but also fractional TRL values, which allows analyzing the dynamics of scientific and scientific-technical results by years of the budget cycle or the research planning cycle. The second feature of the approach is the assessment of the practical significance of the R&D result according to the criterion "Contribution. of the result to solving priority problems of medicine and health care". The methodology is implemented using the method of expert survey in the information environment. The requirements for the selection of experts, the features of the implementation of the questionnaire and the type of questions asked are characterized. All requirements are aimed at eliminating expert bias and other factors that can influence the choice of answer. The article presents the results of testing the methodology using the material of R&D of youth laboratories in the direction of "New Medicine", completed in 2023. The assessment of research results made it possible to form ratings based on the aggregation of assessments by laboratories and types of results. The theoretical and practical significance of the testing results is characterized. Conclusions are made on the practical applicability of the approach within a wider range of organizations not only in the field of medical sciences, but also in other industries. The methodological approach allows: 1) to assess the contribution of research results to solving the most acute and pressing problems of the industry or area of activity; 2) to assess the TRL of research results taking into account the industry-specific nature of research; 3) to form an assessment of research results taking into account their contribution to solving priority problems of the industry or area of activity and the achieved TRL; 4) to compile ratings of scientific and scientific-technical results, applying various approaches to their aggregation. An important consequence of applying the methodological approach is the emerging opportunity to analyze the dynamics of research results within the budget cycle or the research planning cycle and to monitor on this basis, as well as make the necessary management decisions. Ratings and analysis of the dynamics of research results can be used as an information basis when making decisions on the formation of a state assignment for the performance of scientific research or on its adjustment.

Keywords: innovation management, medical science, technology readiness levels, evaluation of research results, rating of research results

Contribution. All the authors participated in the development of the concept of this review, data collection, processing and analysis, drafted the manuscript, and formulated the conclusions.

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Оценка научных результатов молодежных лабораторий: особенности методического подхода и потенциал применения в государственном управлении

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Аннотация. Представлен методический подход к оценке результатов научно-исследовательских работ (НИР) молодежных лабораторий, созданных в рамках направления «Новая медицина». Подход основан на применении отраслевых инструментов уровней готовности технологий (УГТ), которые были доработаны с учетом цели и задач исследования. Отличительной особенностью подхода является возможность получения не только целых, но и дробных значений УГТ, что позволяет анализировать динамику научных и научно-технических результатов по годам бюджетного цикла или цикла планирования научного исследования. Второй особенностью подхода является оценка практической значимости результата НИР по критерию «Вклад результата в решение приоритетных проблем медицины и здравоохранения». Методика реализуется методом экспертного опроса в информационной среде. Охарактеризованы требования к отбору экспертов, особенности реализации анкетного опроса и тип задаваемых вопросов. Все требования направлены на исключение предвзятости эксперта и иных факторов, способных повлиять на выбор ответа. Представлены итоги апробации методики на материале НИР молодежных лабораторий по направлению «Новая медицина», выполненных в 2023 г. Оценка результатов НИР позволила сформировать рейтинги на основе агрегирования оценок по лабораториям и типам результата. Дана характеристика теоретической и практической значимости итогов апробации. Сделаны заключения о практической применимости подхода в рамках более широкого круга организаций не только в сфере медицинских наук, но и в других отраслях. Методический подход позволяет: 1) оценивать вклад результатов НИР в решение наиболее острых и актуальных проблем отрасли или сферы деятельности; 2) оценивать УГТ результатов НИР с учетом отраслевой специфики исследований; 3) формировать оценку результатов НИР с учетом их вклада в решение приоритетных проблем отрасли или сферы деятельности и достигнутого УГТ; 4) составлять рейтинги научных и научно-технических результатов, применяя разнообразные подходы к их агрегированию. Важным следствием применения методического подхода является открывающаяся возможность анализировать динамику результатов НИР в рамках бюджетного цикла или цикла планирования научного исследования и осуществлять на этой основе мониторинг, а также принимать необходимые управленческие решения. Рейтинги и анализ динамики результатов НИР могут быть использованы в качестве информационного обоснования при принятии решений о формировании государственного задания на выполнение научных исследований или о его корректировке.

Ключевые слова: управление инновациями, медицинские науки, уровень готовности технологии, оценка результатов НИР, рейтинг результатов НИР

Вклад авторов. Все авторы участвовали в разработке концепции исследования, сборе, обработке и анализе данных, написании текста рукописи, формулировке выводов.

Заявление о конфликте интересов. Авторы заявляют об отсутствии конфликта интересов.

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Introduction

The creation of youth laboratories was conceived and is being implemented in order to increase the attractiveness of careers in science and higher education within the framework of the federal project "Development of human Capital in the interests of regions, industries and the research and development sector (Personnel)"[1] the national project "Science and Universities", and from 2025 — within the framework of the federal project "Universities for a generation of leaders" of the national project "Youth and Children". The principles of selection of applications for the establishment of youth laboratories and the requirements for the key results of their activities are determined by the Ministry of Science and Higher Education of the Russian Federation[2]. According to the plan of the head of the federal project, the results of the activities of youth laboratories should correspond to the priority areas of the Russian economy, be focused on the rapid transition of research results to the stage of practical application and include prototypes, prototypes of products with certain characteristics, materials with specified properties, etc. The conditions

[1] Passport of the federal project "Development of human capital in the interests of regions, industries and the research and development sector (Personnel)". *Minobrnauki.* URL: https://minobrnauki.gov.ru/about/deps/dsnpiopd/documents / (accessed: 17.05.2025). (In Russ.).

[2] Letter of the Ministry of Science and Higher Education of the Russian Federation dated June 3, 2022 # MN-15/1926-AM "On the creation of new laboratories as part of the result 'New laboratories have been created, including under the leadership of young promising researchers' of the national project "Science and Universities". *Garant.* URL: https://www.garant.ru/products/ipo/prime/doc/404851107/ (accessed: 18.05.2025). (In Russ.).

for financing scientific research of youth laboratories contain the requirement that the applicant organization meets the selection criteria, which, among other things, include achieving practically significant results. One of the basic requirements for the selection of organizations within which youth laboratories are created is the compliance of research projects with the priorities of the Strategy of Scientific and Technological Development, priority areas for the development of science, technology and technology, and the list of critical technologies defined by decrees of the President of the Russian Federation. Financial support is provided to organizations that meet the selection criteria developed by expert groups with the direct participation of industry representatives, as part of a government assignment to carry out research for a period of at least 3 years.

Evaluation of the results of scientific research and development funded from the federal budget according to the criteria of practical significance and relevance is one of the central issues of the state management system of scientific and technological development. One of the most important aspects of such an assessment is the characterization of the achieved technology readiness levels (TRL). The relevance of this approach to the state program "Scientific and Technological Development of the Russian Federation", which implements the federal projects "Personnel" and "Universities for the Generation of Leaders", is reflected in the instruction of the President of the Russian Federation following the joint meeting of the State Council and the Presidential Council on Science and Education, held on December 24 2021, to provide a mechanism for evaluating the effectiveness of scientific research and development conducted within the framework of the State Scientific and Technical University[3].

The general basis for the use of TRL in the assessment of scientific and scientific-technical results is defined by the regulatory documents of the Ministry of Science and Higher Education of the Russian Federation[4]. At the same time, the full implementation of the approach is hindered by the lack of TRL tools that reflect the specifics of scientific research and development, as well

[3] The list of instructions based on the results of the joint meeting of the State Council and the Council on Science and Education (approved by the President of the Russian Federation on February 10, 2022, # Pr-290, item 1a). *Garant*. URL: https://base.garant.ru/403514714/ (accessed: 07.05.2025). (In Russ.).

[4] Order No. 107 of the Ministry of Science and Higher Education of the Russian Federation dated February 6, 2023 "On Approval of the Procedure for Determining the Readiness Levels of Technologies being Developed or Developed, as well as Scientific and (or) Scientific and Technical Results Corresponding to Each Technology Readiness Level" (registered with the Ministry of Justice of Russia on April 5, 2023 # 72887). *Garant*. URL: https://www.garant.ru/products/ipo/prime/doc/406577269/ (accessed: 17.05.2025). (In Russ.); Order No. 108 of the Ministry of Science and Higher Education of the Russian Federation dated February 6, 2023 "On Approval of the Forms for Sending Information, Information and Documents Specified in Paragraph 3 of the Regulation on the Unified State Information System for Accounting for Research, Development and Technological Works for Civil Purposes, approved by Decree of the Government of the Russian Federation dated April 12, 2013. №327, requirements for filling out and sending the specified forms". *Garant*. URL: https://www.garant.ru/products/ipo/prime/doc/406618277/ (accessed:07.05.2025). (In Russ.).

as their products in various industries. The Ministry of Health of the Russian Federation has taken a definite step towards bridging the gap between regulatory requirements and available tools for evaluating scientific and scientific-technical results using TRL. At the initiative of the department, the segment "Research and Development in the interests of medicine and healthcare' of the unified state information system for accounting for research, development and technological work for civil purposes" (EGISU R&D) was developed, which reflects the principles of an industry-specific approach to evaluating the results of scientific research and development in medicine. The limitation of the approach implemented by the department is, in our opinion, the lack of the ability to track the dynamics of technological maturity of the results of a scientific project within the framework of a planning cycle covering, for example, 3 years, as in the case of scientific research (R&D) of youth laboratories. Within its framework, the evaluation of the TRL result throughout the entire period of the research of the youth laboratory, as well as any other scientific project, may retain the same value, which limits the possibilities of managing the effectiveness of research and development.

Guided by the expectations of achieving significant results of youth scientific laboratories and their orientation towards the early transition to the stage of practical application, FSBI Directorate of Scientific and Technical Programs developed and tested its own methodological approach to evaluating scientific results of youth laboratories. This approach was applied to evaluating the results of youth scientific laboratories created within the framework of the federal project "Personnel" in scientific organizations and universities, subordinated to the Ministry of Science and Higher Education of the Russian Federation in 2022 in the field of "New Medicine".

The aim of the research is to analyze the features and advantages of the developed methodological approach to evaluating the results of youth scientific laboratories, as well as to explore the potential for its use in managing the effectiveness of research and development funded from the federal budget.

Materials and methods

When developing the methodology, we were guided by the understanding of the term "scientific results" and their typification for medical sciences proposed by the Ministry of Health of the Russian Federation and embodied in the industry segment "Research and Development in the interests of medicine and healthcare". As a result, 13 types of scientific and scientific-technical results were identified, which can result in scientific research in the field of medical sciences, grouped into four clusters (types) — a medicinal product, a medical device, clinical recommendations, and others. Clustering of results is important because for each type of result, tools have been developed for determining TRL based on the specifics of research and development in the relevant segment of medical sciences.

The assessment of each individual research result depends on two factors — the contribution of the result to solving priority problems of medicine and healthcare and the level of technology availability. The effect of the first factor is determined by the number of priority problems, the solution of which is directly influenced by the result, and the score of this influence in the range of integers from 1 to 10.

Experts in the field of medicine, healthcare, medical and biological sciences, selected according to the following criteria, were involved in the assessment:

1) academic degree: Doctor of Medical/Biological Sciences or Candidate of Medical/Biological Sciences;

2) having work experience and/or research activities in the field of medicine and healthcare;

3) availability of publications in the field of medicine, healthcare, medical and biological sciences;

4) lack of affiliation with organizations whose materials are submitted for expert evaluation, or any other conflict of interest with collectives whose materials are submitted for expert evaluation.

The work of the experts consists in answering the questions of the questionnaire posted in the information environment. Lists and answers have been prepared for the implementation of each stage of the evaluation procedure. At some stages of the procedure, the algorithm allows the expert to make multiple choices, and at others — one. Most of the questions are of the closed type.

Having decided on the type to which the research result belongs, the expert proceeds to select the priority problem of medicine and healthcare, the solution of which is influenced by this result. The problem is selected from a ready-made list developed by specialists of the Ministry of Health of the Russian Federation. The expert's work in the segment of the chosen problem ends with a point assessment of the contribution of the result to solving this problem. The expert is asked to choose a single answer option, which is then converted into a numerical estimate using a software tool. The difference between what is presented to the expert in the questionnaire and the result of applying the algorithm is shown in Table

After completing the assessment of the contribution, the expert can return to the list of problems and follow the steps described above for all the problems to which, in his opinion, the result of the research contributes. Thus, the sum of points is formed, assigned to the contribution of the research result to solving priority problems of medicine and healthcare. Next, this value must be adjusted by multiplying by a coefficient, the value of which is directly dependent on the TRL. For TRL0, the correction factor is zero.

The value of the TRL of the research result is determined by the expert by choosing the answers to the questionnaire questions. To determine the TRL result of research, we have developed our own methodological approach based on the analysis of scientific publications, considering methodological recommendations for adapting the TRL approach to the specifics of industries, as well as studying the regulatory requirements governing the transitions of innovative medical development by stages of readiness.

Answer options for the expert and numerical scores assigned to the results of the youth laboratory research

Answer options found by the expert (clinical effect)	Response alternatives for the selected clinical effect	Numerical assessment invisible to the expert (the contribution of the result to solving a priority problem in medicine and health care, points)
Reduction in mortality	There is a possibility of serial production in Russia	10
	There is no possibility of serial production in Russia	9
Reducing disability in minors (preventing disability, achieving a deferment in the onset of disability, removing disability)	There is a possibility of serial production in Russia	8
	There is no possibility of serial production in Russia	7
Reducing disability in adulthood (preventing disability, achieving a deferment in the onset of disability, transition to a less severe disability group, removing disability)	There is a possibility of serial production in Russia	6
	There is no possibility of serial production in Russia	5
Reducing temporary loss of working capacity (more than 14 days)	There is a possibility of serial production in Russia	4
	There is no possibility of serial production in Russia	3
Reducing temporary loss of working capacity (up to 14 days)	There is a possibility of serial production in Russia	2
	There is no possibility of serial production in Russia	1
Improving the quality of life associated with health	There is a possibility of serial production in Russia	2
	There is no possibility of serial production in Russia	1

Source: developed by E.V. Maslennikova, S.E. Soldatova, A.A. Dvoinikov independently based on the conducted research.

A lot of materials have been accumulated on the development of the TRL approach and the directions of its use in the innovation sector [1–6], on information tools that facilitate the application of TRL in practice [7; 8], on the extension of TRL to related areas of results assessment [9; 10]. There are publications that highlight the industry-specific features of the use of TRL [11], including in medicine [12; 13]. Industry experts have proposed a meaningful interpretation of the use of TRL in relation to the selected categories of results — to medical technologies [12] and to medicines [13].

The significant role in the development of the methodological approach presented in this article play the recommendations of the European Association of Scientific Research and Technological Organizations played[5] and the U.S. Department of Health and Human Services[6] on the use of the TRL approach in industries, as well as regulatory documents adopted at the level of the Council of the Eurasian Economic Commission, the Russian Federation and the Ministry of Health of the Russian Federation[7].

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[5] The TRL Scale as a Research & Innovation Policy Tool: EARTO Recommendations. *EARTO*. Brussels: European Association of Research and Technology Organisations; 2014. URL: https://www.earto.eu/wp-content/uploads/The_TRL_Scale_as_a_R_I_Policy_Tool_-_EARTO_Recommendations_-_Final.pdf (accessed: 17.05.2025).

[6] Technology Readiness Assessment Guide: Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects. GAO-20-48G. *U.S. Government Accountability Office.* Reissued with revisions on February 11, 2020. Washington, DC: U.S. GAO; 2020. URL: https://www.gao.gov/products/gao-20-48g (accessed: 17.05.2025).

[7] Decision of the Council of the Eurasian Economic Commission of November 3, 2016 No. 78 (as amended on October 20, 2023) "On the Rules for Registration and Examination of medicines for medical use" and other decisions of the EAEU. *Consultant Plus*. URL: https://www.consultant.ru/document/cons_ doc_LAW_207379/ (accessed: 17.05.2025) (In Russ.); Federal Law No. 61-FZ of April 12, 2010 (as amended on October 19, 2023) "On the Circulation of Medicines". *Consultant Plus*. URL: (accessed: 17.05.2025) (In Russ.); Decree of the Government of the Russian Federation No. 552 of April 1, 2022 (as amended on December 29, 2022) "On Approval of the Specifics of treatment, including the Specifics of State Registration, of medical devices in case of their defect or the risk of defect due to the introduction of Restrictive economic measures against the Russian Federation". *Garant.* URL: https://www.consultant.ru/document/cons_doc_LAW_140066/ (accessed: 17.05.2025) (In Russ.); Order of the Ministry of Health of the Russian Federation No. 103n dated February 28, 2019 "On Approval of the procedure and deadlines for the development of clinical recommendations, their revision, the Standard Form of clinical recommendations and the requirements for their structure, composition and scientific validity, information included in clinical recommendations". *Garant*. URL: https://www.garant.ru / products/ipo/prime/doc/72140714/ (accessed: 17.05.2025) (In Russ.); Order No. 104n of the Ministry of Health of the Russian Federation dated February 28, 2019 "On Approval of the Procedure and Deadlines for Approval and Approval of Clinical recommendations, criteria for making a decision by the Scientific and Practical Council on approval, rejection or referral for revision of clinical recommendations or a decision on their revision". *Garant*. URL: https://www.garant.ru/products/ipo/prime/doc/72599420/ (accessed: 17.05.2025) (In Russ.); Decree of the Government of the Russian Federation No. 1416 dated December 27, 2012 "On Approval of the Rules for State Registration of Medical Devices". *Consultant Plus*. URL: https://www.consultant.ru/document/cons_doc_LAW_140066 / (accessed: 17.05.2025) (In Russ.).

To form tools that make it possible to assess the dynamics of TRL research results within the planning cycle, it is necessary to assume that TRL indicators can take not only integer, but also fractional values. To this end, a list of tasks to be solved was assigned to each TRL for each type of result (drug, medical device, clinical recommendations, etc.). A certain TRL is achieved if all the tasks of the previous levels and all the tasks of this level are solved. The actual TRL of the research result is calculated depending on the number of successfully completed tasks from among those subject to mandatory solution according to the formula

$$L_l = L_{l-1} + q_l, \quad (1)$$

where L_{l-1} is the achieved value of the TRL (the level for which all tasks, including those of all previous stages, have been solved); L_l is the current value of the TRL; q_l is the proportion of solved tasks from among those subject to mandatory solution at the lth level, determined by formula.

$$q_l = \frac{F_l}{V_l}, \quad (2)$$

where F_l is the number of solved tasks at the l-level; V_l is the total number of tasks that must be solved at the l-level.

The reference measure of the achieved TRL is the list of documentary evidence of the research result. A list of documentary evidence of solving tasks within the framework of its achievement is assigned to each TRL for each type of result. When evaluating the TRL of the research result, we are guided by the principle: a certain TRL is achieved only if there is documentary evidence corresponding to the tasks solved at this level.

If, for example, according to the results of the assessment of the solution of tasks, the TRL indicator of the research result turned out to be equal to 1.30, but the contractor did not provide any documentary evidence corresponding to the second TRL (TRL 2), then the TRL is assumed to be equal to 1, provided that there is documentary evidence corresponding to the first TRL. If, according to the results of the assessment of the solution of the tasks, the TRL indicator of the research result turned out to be equal to 4.20, but the documentary confirmation corresponds to the second TRL (TRL 2), then the TRL is assumed to be equal to 2. If, according to the results of the assessment of the solution of the tasks, the UGT indicator of the research result turned out to be equal to 2.40 and there is documentary evidence corresponding to the third TRL (TRL 3), then the TRL is assumed to be equal to 2.40. If, according to the results of the assessment of the solution of the tasks, the TRL indicator is equal to 0.35, but the solution of the tasks is not documented, the TRL is assumed to be equal to 0, and this leads to a zero assessment of the research result due to the application of a correction factor equal to zero.

The assessment of the tasks performed and the assessment of the availability of documentary evidence is carried out by experts independently, which eliminates bias and the possibility of "adjusting" the TRL to the desired values.

Our approach was developed based on the assumption that several results can be obtained within the framework of a single research project. The expert should perform the actions described above for all the research results that were achieved during its implementation by the youth laboratory. A schematic description of the entire assessment process is shown in Fig. 1.

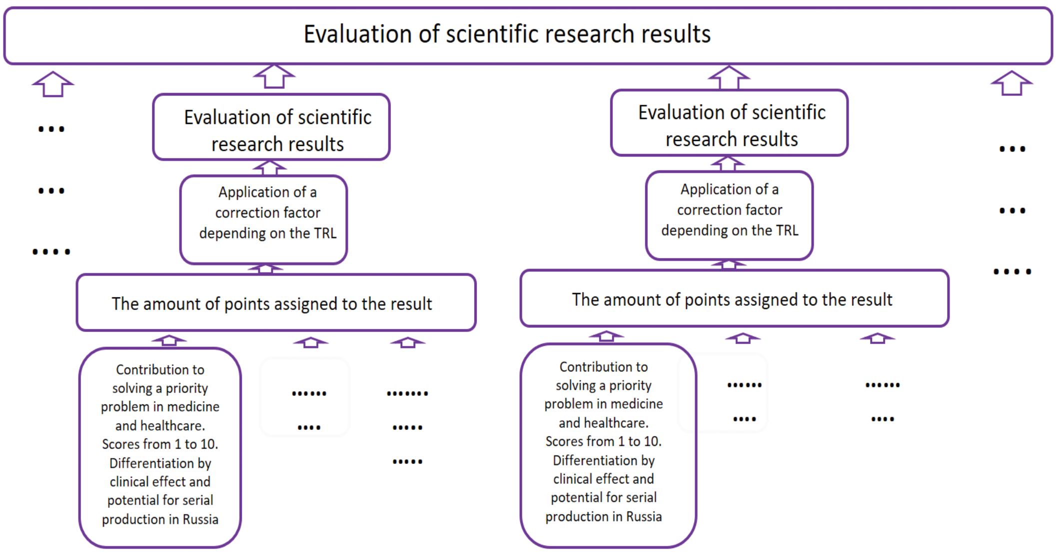

Fig. 1. Scheme for assessing the results of the research

Source: developed by E.V. Maslennikova, S.E. Soldatova, A.A. Dvoinikov independently based on the conducted research with the use of MS Word.

Applying the described methodological approach, it is possible to obtain significantly more differentiated TRL indicators by years of research and, accordingly, final assessments of scientific and scientific-technical results within the framework of a three-year cycle of planning a scientific topic on which the youth laboratory is working.

Results

The need to create special tools to support young people in science is the subject of an interested discussion in the literature. The interest is due to both the peculiarities of the legal status of young researchers [14] and the specifics of cognitive and social functions performed by scientific youth [15].

The role of youth laboratories as a significant tool for integrating novice researchers into the scientific environment of a university or scientific organization is becoming generally recognized [16–18]. According to a survey conducted by the National Research University Higher School of Economics among managers and staff of youth laboratories, most of the members of youth research teams (89.6% of the respondents) noted that they were satisfied with their work in the laboratory. The most satisfying thing is the work schedule, relationships with colleagues, the content of the work and interesting tasks. The surveyed managers (93.4%) and laboratory staff (78.8%) expressed their intention to continue working in the laboratory in the near future (78,8%)[8].

In 2024, as part of a series of strategic sessions "Youth Laboratories: Uniting to solve the challenges of the region and the country", the Directorate of Scientific and Technical Programs initiated a sociological survey of 604 heads of youth laboratories established in the period 2019–2024, including 102 heads of laboratories related to the priority area "Transition to personalized, predictive and preventive medicine, high-tech healthcare and health-saving technologies"[9]. This includes the rational use of medicines (primarily antibacterial ones) and the use of genetic data and technologies. One of the survey sections included open-ended questions about the most common problems of youth laboratories. The range of the problems identified by the heads of laboratories specializing in medicine did not significantly differ from the opinions of respondents from other sciences. Aggregation of the survey results makes it possible to form a list of the most frequently identified problems based on the results of a survey of youth laboratory managers:

Financial support:

- Difficulties in ensuring a salary level of 200% of the regional average within the framework of the received funding; lack of annual indexation of the subsidy amount.
- The financial support of the laboratory is not enough for a staff of 10 researchers.
- Inability to use financing for certain items of expenditure, for example, the purchase of reagents, routine repairs and maintenance of equipment (including expensive ones), purchase of consumables for appliances, chemical utensils, etc.).

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[8] Is it good to work in a youth laboratory? *Institute of Statistical Research and Economics of Knowledge of the National Research University Higher School of Economics*. 26.11.2024. URL: https://issek.hse.ru/news/991045628.html (accessed: 17.05.2025) (In Russ.).

[9] Decree of the President of the Russian Federation dated February 28, 2024 No. 145 "On the Strategy of Scientific and Technological Development of the Russian Federation". *Consultant*. URL: https://www.consultant.ru/document/cons_doc_LAW_447894/ (accessed: 17.05.2025) (In Russ.).

Infrastructure provision:

- Obsolete equipment due to insufficient financing for the purchase of new equipment (funds allocated for infrastructure account for approximately 15% of the total budget).
- Complex and lengthy procurement process.
- Lack of targeted financing for the repair of premises allocated by the basic organization to expand the range and scale of applied work.

Human resources:

- Difficulties in attracting young and talented personnel: uncompetitive wages; uncertainty of social guarantees for young professionals.
- The lack of clearly defined prospects for further financing and the existence of youth laboratories.
- A long-time interval for young specialists to acquire the competencies and skills necessary to perform specific tasks.

Most respondents did not encounter any problems in the field of interaction with the basic organization. The only problems noted are related to difficulties in financial planning, large volume and, often, spontaneity of reporting.

Availability of information on opportunities for cooperation and exchange of experience, laboratory equipment:

- Lack of systematic information about opportunities for cooperation and exchange of experience, laboratory equipment.
- Difficulties with documentation of purchases and drafting agreements on scientific cooperation with organizations.

When interacting with an industrial partner:

- Difficulties in finding an industrial partner; with building a collaboration with an industrial partner.
- The legal/contractual mechanism of relations with the industrial partner has not been worked out.
- Fundamental science is poorly demanded by industrial partners.

The survey results allow us to state that the scientific effectiveness of youth laboratories largely depends on the conditions in which laboratories were created and operate, on the clarity of the prospects for the development and support (organizational, infrastructural, financial) of scientific research.

In 2022, 55 laboratories were opened in 30 scientific and educational institutions in the field of “New Medicine”, for the development of which in 2023–2024. The Russian Ministry of Education and Science has allocated 1.9 billion rubles. 17.3 million rubles were allocated annually to each laboratory as part of the state assignment for conducting scientific research on an approved topic.

The methodology was tested on the materials of research carried out by youth laboratories in 2023. During the expert assessment, 70 scientific results obtained during 55 research projects were recorded. Seven research projects resulted in two results and four research projects resulted in three results. The results relate to the types of "Medicinal product", "Medical device" and "Other". The differentiation in the evaluation of the research results of youth laboratories turned out to be very significant (Fig. 2).

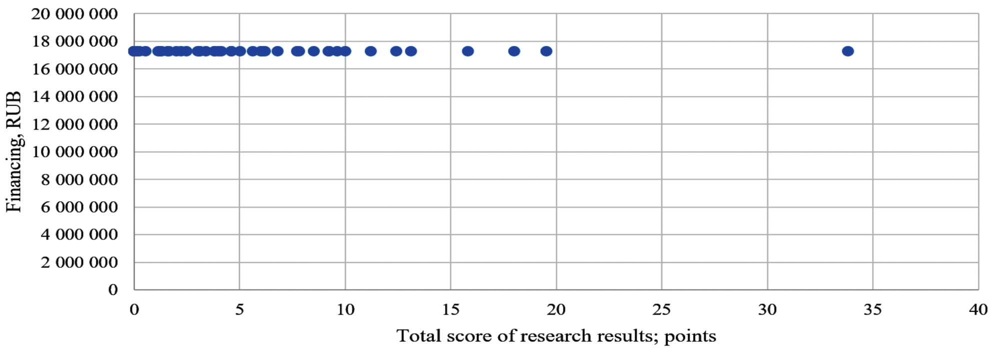

Fig. 2. Distribution of the total assessments of research results of youth laboratories
Source: developed by E.V. Maslennikova, S.E. Soldatova, A.A. Dvoinikov independently based on the conducted research with the use of MS Word.

Based on the estimates obtained, a rating of the research results of youth laboratories was formed. The first position was taken by the research results obtained by one of the youth laboratories established on the basis of the Tomsk National Research Medical Center of the Russian Academy of Sciences. The assessment of the Directorate of Scientific and Technical Programs correlates with the RAS expert opinion on this research. It is noted that the scientific results presented in the report on the work are of high importance and are at a global level. In the top ten of the rating were the research results of two more laboratories created on the basis of this institution, which took the third and sixth positions. Among the leaders were the results of the youth laboratories of the Northeastern Federal University named after M.K. Ammosov (2nd place), the Moscow Institute of Physics and Technology (4th place), Peter the Great St. Petersburg Polytechnic University (5th place), the Medical and Genetic Research Center named after Academician N.P. Bochkov (7th place), Federal Research Center of Virology and Microbiology (8th place), N.S. Enikolopov Institute of Synthetic Polymer Materials of the Russian Academy of Sciences (9th place), N.I. Vavilov Institute of General Genetics of the Russian Academy of Sciences (10th place).

Along with the leaders, there were also laggards. Some research projects in youth laboratories received a zero assessment of the results due to the fact that the technological readiness of these results turned out to be zero, both due to the fact that the tasks corresponding to TRL1 were not solved, and due to the fact that not a single documentary confirmation of the solution of the tasks of the first level was provided. It should also be noted that three research projects of youth laboratories received negative conclusions from the Russian Academy of Sciences, which noted that the results are not significant and do not have serious prospects for development.

The evaluations of the research results were also ranked. 24 laboratories participated in the rating in the "Medicinal product" category. The winner, as well as in the overall ranking, was one of the youth laboratories established on the basis of the Tomsk National Research Medical Center of the Russian Academy of Sciences. The second place was taken by the youth laboratory of the N.I. Institute of General Genetics. The Vavilov Institute of the Russian Academy of Sciences, and the third is the youth research team of the G.F. Gauze Scientific Research Institute for the Exploration of New Antibiotics. The results of 21 youth laboratories took part in the formation of the rating for the "Medical device" category. The first and third positions in this ranking are occupied by the results of youth laboratories established on the basis of the Tomsk National Research Medical Center of the Russian Academy of Sciences. The second position belongs to the results of the youth laboratory of the Northeastern Federal University named after M.K. Ammosov. 16 laboratories participated in the rating of "Other" results. The first place was shared by the laboratory of Peter the Great St. Petersburg Polytechnic University and one of the laboratories of Kazan Federal University, the second position was taken by the laboratory of the ITMO National Research University, and the third position was taken by the team of the Far Eastern Federal University. The total number of participants in the rating by type of result exceeds the total number of laboratories because individual laboratories have received more than one result, and therefore they can participate in several ratings.

It is possible to recommend the application of the presented approach to the evaluation of research results with its extension to a wider range of organizations in the field of medical sciences. There are also no fundamental obstacles to the use of his scheme and basic principles in other branches of science. The only limitation may be the current lack of industry-specific HRT tools, which is a significant disadvantage in evaluating scientific and scientific-technical research in certain scientific areas with pronounced specificity.

The presented methodological approach makes it possible to evaluate the results of research according to the criterion of practical relevance and applicability both at mature and at the initial stages of the movement of innovative development from idea to practical implementation. The importance of end-to-end application of this criterion, starting with fundamental and exploratory research, has been highlighted by many authors [19–21], including those specializing in medicine [22; 23] and pharmacy [24; 25].

The evaluations of scientific and scientific-technical results allow us to form ratings on various grounds and extract information from them that is important for decision-making in the field of public administration of scientific research and development.

The issue of forming a state task for research and development in response to the technological requests of qualified customers, including representatives of the industrial sector, is on the agenda. In this regard, the evaluation of scientific and (or) scientific and technical results based on the proposed methodological approach seems to be significant and in demand, since the methodology includes the separation of results according to the technological criterion and the consideration of TRL. Research and development ratings, based on the types of results, are a convenient tool aimed at coordinating the interests of representatives of science and the manufacturing sector of the economy. These ratings can reflect the capabilities, strengths, and competencies of youth laboratories, as well as any organizations engaged in research and development in certain technological fields. This should increase the focus and efficiency of qualified customers' search for partners to solve practical problems among scientists and developers. On the other hand, representatives of the scientific sector gain a clearer understanding of their strengths and advantages in certain technological fields, so they will be able to form more informed and adequate responses in response to industry requests.

The evaluation of scientific and (or) scientific and technical results can be used both in the process of forming a state assignment for conducting R&D for the next planned period, and during monitoring the implementation of the state assignment, including to track the dynamics of the achieved research results by the years of the planned period. Based on the results of monitoring carried out using estimates of research results, it is possible to make corrective decisions on the composition of the work assigned to the contractor, as well as on the amount of funding for the state task.

Conclusions

The presented methodological approach seems to be consistent in theoretical and practical terms. Its theoretical significance lies in the fact that it justifies the possibility of evaluating research results in the field of fundamental, exploratory and applied research not only indirectly, considering only documentary evidence of the results obtained — publications, patents, but also directly, analyzing the results themselves based on the criterion of their practical relevance and applicability. The methodology offers specific tools for using this criterion. The practical significance of the presented methodological approach is determined by the fact that it allows:

- to evaluate the contribution of research results to solving the most acute and urgent problems of an industry or field of activity;
- to evaluate the UGT of research results, taking into account the industry specifics of research;

• to form an assessment of the results of research and development, taking into account their contribution to solving priority problems of the industry or field of activity and the achieved TRL;

• to compile ratings of scientific and scientific-technical results, applying various approaches to their aggregation;

• to analyze the dynamics of research results within the framework of the budget cycle or the research planning cycle and monitor on this basis, as well as make the necessary management decisions.

During the testing, the consistency and validity of the developed methodological approach to evaluating scientific and scientific-technical research results according to criteria of practical significance and relevance was proved, which creates prerequisites for its further application in the field of medical sciences and the dissemination of its basic principles to other scientific fields.

REFERENCES

1. Héder M. From NASA to EU: the evolution of the TRL scale in public sector innovation. *The Innovation Journal: The Public Sector Innovation Journal.* 2017;22(2). URL: https://innovation.cc/document/2017-22-2-3-from-nasa-to-eu-the-evolution-of-the-trl-scale-in-public-sector-innovation/ (accessed: 02.06.2025).
2. Drogovoz PA, Pushkareva PP. Features of use of a method of assessment of level of readiness of technologies in the knowledge-intensive industries: foreign and domestic experience. *Ekonomika i predprinimatel'stvo.* 2019;(5):1066–1070. (In Russ.). EDN: DYDGMM
3. Komarov AV, Pikhtar AN, Grinevsky IV, Komarov KA, Golitsyn LV. A conceptual model for assessing the technological readiness of a R&D project and its potential at the early stages of development. *Economics of Science.* 2021;7(2):111–134. (In Russ.). https://doi.org/10.22394/2410-132X-2021-7-2-111-134 EDN: KFBSAK
4. Badanov AYu, Ryzvanov RA. Adapting best-practice approaches to evaluating technology, integration, and system readiness levels. *Aktual'nye problemy gumanitarnykh i estestvennykh nauk.* 2017;4(1):71–82. (In Russ.). EDN: YGRPCF
5. Sartori AV. Improving research performance through planning by readiness levels in lean R&D. *Economics of Science.* 2022;8(1):4–21. (In Russ.). https://doi.org/10.22394/2410-132X-2022-8-1-4-21 EDN: PRCTCD
6. Heslop L.A, McGregor E, Griffith M. Development of a technology readiness assessment measure: the cloverleaf model of technology transfer. *The Journal of Technology Transfer.* 2001;26(4): 369–384. https://doi.org/10.1023/A:1011139021356 EDN: ARRRFX
7. Granich VYu, Dutov AV, Miroshkin VL, Sypalo KI. About The technology readiness level and the application of the TRL calculator for their assessment. *Economics of Science.* 2020;6(1–2):6–10. (In Russ.). https://doi.org/10.22394/2410-132X-2020-6-1-2-6-10 EDN: IDJEKP
8. Bakke K, Haskins C. Use of TRL in the systems engineering toolbox. *INCOSE International Symposium.* 2018;28(1):587–601. https://doi.org/10.1002/j.2334-5837.2018.00502.x
9. Webster A, Gardner J. Aligning technology and institutional readiness: The adoption of innovation. *Technology Analysis & Strategic Management*. 2019;31(10):1229–1241. https://doi.org/10.1080/09537325.2019.1601694
10. Zemlickiene V, Bubliene R, Jakubavičius A. A model for assessing the commercial potential of high technologies. *Oeconomia Copernicana.* 2018;9(1):29–54. https://doi.org/10.24136/oc.2018.002 EDN: RZALGS

11. Zatsarinny AA, Ionenkov YuS. Some methodological issues of assessing the level of technological readiness of information systems projects. *Systems and Means of Informatics*. 2022;32(3):4–14. (In Russ.). https://doi.org/10.14357/08696527220301 EDN: MEFTQV
12. Aksenova EI., Gorbatov SYu, Pivovarova OA. Determining the level of technological readiness of developments in medicine based on the TRL methodology. *Problems of Social Hygiene, Public Health and History of Medicine*. 2021;29(S2):1395–1399. (In Russ.). https://doi.org/10.3 2687/0869-866X-2021-29-s2-1395-1399 EDN: NMEWSM
13. Pyatigorsky AM, Brkich GE, Beregovykh VV, Pyatigorskaya NV. Comprehensive assessment of technological readiness of an innovative project during the development of a pharmaceutical product. *Annals of The Russian Academy of Medical Sciences*. 2023;78(3):234–241. (In Russ.). https://doi.org/10.15690/vramn8349 EDN: EZNFUO
14. Asadov AG. Features of the legal status of the young scientist in the Russian Federation. *Works on Intellectual Property*. 2024;49(2):47–61. (In Russ.). https://doi.org/10.17323/tis.2024.21712. EDN SKFXVO
15. Pirozhkova SV. Early career researcher: from managerial construct to socio-epistemic reality. *Epistemology & Philosophy of Science*. 2022;59(3):149–165. (In Russ.). https://doi.org/10.5840/eps202259347 EDN TOCBYR
16. Gil'mundinov VM, Pankova YuV. Implementation of performance-based employment contracts and youth policy in research institutes: the experience of the institute of economics and industrial engineering, Siberian Branch of the Russian Academy of Sciences (IEIE SB RAS). *Nauka: vo vremeni i prostranstve: v 2-kh tomakh* [Science: in time and space: in 2 vols]. Novosibirsk: Institut ekonomiki i organizatsii promyshlennogo proizvodstva SO RAN publ.;2022;52(12):155–169. (In Russ.). https://doi.org/10.30680/ECO0131-7652-2022-12-90-105 EDN RMGPKY
17. Zulkarnai IU. About the mission of the "youth laboratories" created within the framework of the national project "Science and universities". *Economics and Management: Scientific and Practical Journal*. 2024;(6):29–35. (In Russ.). https://doi.org/10.34773/EU.2024.6.5 EDN TMXMYD
18. Ivanova MI., Klepinin AV, Saratova IS. The national system for the development of human resources in the scientific field: Problems and solutions. *Ekonomika i upravlenie: problemy, resheniya*. 2024;6(2):26–36. (In Russ.). https://doi.org/10.36871/ek.up.p.r.2024.02.06.004 EDN CGHVOU
19. Dezhina IG, Ponomarev AK. From science to technologies: New trends of government regulations. *Innovations*. 2020;(10):30–40. (In Russ.). https://doi.org/10.26310/2071-3010.2020.264.10.004 EDN: VVAFFE
20. Karasev OI, Smirnov RG, Beloshitskii AV. Facilitating the transition of basic research to the applied stage in the Russian Federation. *Obshchestvennye finansy*. 2020;(39):25–45. (In Russ.). EDN: XDSWXJ
21. Voronov YuP. New approaches to evaluating the effectiveness of fundamental research. *EKO*. 2009;(6):64–82. (In Russ.). EDN: KDSUXZ
22. Lebedev GS, Krylov OB, Lelyakov AI, Mironov YuG, Tkachenko VV. Efficiency integral assessment of research works in research institutions of the Ministry of public health of Russia. *Modern high technologies*. 2019;(1):69–75. (In Russ.). https://doi.org/10.17513/snt.37381 EDN: YWYUMX
23. Korobko IV. Comprehensive measures to enhance the efficiency and effectiveness of applied research for medicine and healthcare. *Meditsina molodaya: sbornik tezisov II Mezhdistsiplinarnogo foruma* [Young Medicine: Collection of abstracts of the 2nd Interdisciplinary Forum]. Moscow; 2023:22–25. (In Russ.). EDN: QURCOI
24. Aladysheva ZhI, Belyaev VV, Beregovykh VV. *Promyshlennaya farmatsiya. Put' sozdaniya produkta* [Industrial pharmacy: the product development path]. Moscow: Izd-vo Rossiiskaya akademiya nauk publ.; 2019. (In Russ.). EDN: KWJJUK
25. Gusev AB, Yurevich MA. The sovereignty of Russia in the area of pharmaceuticals: Challenges and opportunities. *Terra Economicus*. 2023;21(3):17–31. (In Russ.). https://doi.org/10.18522/2073-6606-2023-21-3-17-31 EDN: SSZDBG

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