

# **Review of Spending, Competencies and Personnel in Research, Development and Innovation**

## **Final Report**

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The preparation of the Final Report was responsibility of the Value for Money Unit (UHP) of the Ministry of Finance of the Slovak Republic and the Research and Innovation Authority (VAIA) of the Government Office of the Slovak Republic. Under the leadership of Michal Habrman the Final Report was prepared by Miroslav Beblavý, Jaroslav Bukovina, Martina Erdélyiová Gancárová, Adam Gašparovič, Ľuba Habodászová, Barbora Halásová, Eva Husseinová, Roman Igaz, Patrik Turcsek and Filip Velký.

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Responsibility for errors or omissions lies with the authors.

## Executive Summary

**The present Review of spending, competencies and personnel in research, development and innovation (RDI) is an integral component of the policy management reform in RDI.** The spending review section examines the efficiency of public financing allocated to RDI. The Final State Budget Account for 2022 for Science and Technology reports funding in the amount of EUR 412 million from the state budget (including state budget (SB) co-financing for the European Structural and Investment Funds (ESIF)) and EUR 166 million from the ESIF. Additionally, a further EUR 40 million is identified and reviewed in the section on tax support of research and development (R&D). The section dedicated to competencies and personnel reviews the current distribution of competencies and explores options for potential reorganisation.

**The primary objective of the Review of spending, competencies and personnel in RDI (hereinafter “Review”) is to map existing expenditures and competencies.** The spending review section aims to identify current resources, pinpoint areas where increased investment is warranted, and to propose measures to improve efficiency. The recommendations in the Review do not require any additional funding beyond what has been already approved in the National Strategy for Research, Development and Innovation 2030<sup>1</sup> (hereinafter referred to as the “National Strategy”). Furthermore, the competencies and personnel review section aims not only to map out RDI management but also to suggest measures for streamlining the RDI support system. This includes establishing a framework for the Competences Consolidation Plan for the Ministries, agencies and institutions responsible for RDI policy-making and support.

**The key performance indicators of the RDI policy include private expenditure (i.e. investment) in R&D and Slovakia's position in the European Innovation Scoreboard (EIS).**<sup>2</sup> Slovakia ranks low among European countries in both indicators. Improvement in these indicators would lead to increased economic growth and a higher quality of life by means of enhanced total factor productivity, increased human capital, and the social benefits derived from innovations.

**Slovakia significantly lags behind in RDI investment. Long-term investment into R&D has been around 0.4% of GDP annually from the state budget, amounting to EUR 412 million in 2022.** Additional funding sources include the ESIF and the Recovery and Resilience Plan of the Slovak Republic (RRP). In comparison, the EU average stands at 0.8% of GDP. The Review recommends strengthening the government support to stimulate private spending, either through direct financial support or via tax incentives. The National Strategy envisions increasing the state budget allocation to 0.67% of GDP by 2030. The implementation of measures outlined in this Review can facilitate greater efficiency of these investments and contribute to achieving the ambitious goals set forth in the National Strategy.

**Institutional funding for public R&D entities amounts to approximately EUR 311 million.** In 2022, EUR 191 million was allocated to higher education institutions (HEIs), while the Slovak Academy of Sciences (SAS) received EUR 87 million (in 2021). Sectoral research institutes (SRIs) spent at least EUR 33.5 million on R&D in 2022. Both HEIs and the SAS exhibit a notable reliance on institutional funding provided by the state. Regarding institutional funding, it is recommended to introduce incentives for publishing research in reputable, high-quality journals (without suspicion of predatory behaviour) and to increase the weight of international grants and collaboration with

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<sup>1</sup>The National Strategy was approved by the government in [March 2023](#).

<sup>2</sup>The objectives of the RDI policy were defined in the National Strategy for Research, Development and Innovation 2030.

the private sector. For HEIs, there is also a recommendation to increase the proportion of funding allocated to research at the expense of other components. As for the SAS, this should include placing greater emphasis on performance-based funding, integrating public research institutions (PRIs) into larger entities, and improving communication about activities and results. For the SRIs, it is particularly recommended to introduce periodic assessments of their research through the Verification of Excellence in Research (VER).<sup>3</sup>

**In recent years, Slovakia's R&D project funding from the state budget has averaged approximately EUR 50 million per year.** The Slovak Research and Development Agency (SRDA), acting as a grant agency, distributes approximately EUR 40 million each year. Other domestic grant schemes have distributed between EUR 3 million and EUR 11 million annually from 2019 to 2021. Key recommendations for the SRDA include revising processes to prevent conflicts of interest of members of the Agency's Councils and removing rigid legal regulations governing the Agency's day-to-day operations.

**The annual project funding from the ESIF ranged between EUR 120 million and EUR 170 million from 2020 to 2022.** This funding was administered through the Research Agency (RA) of the Ministry of Education, Science, Research and Sports of the Slovak Republic (MESRS SR), the Ministry of Economy of the Slovak Republic (ME SR), and the Slovak Innovation and Energy Agency (SIEA). The support primarily targets the development of research and innovation capacities, cross-sectoral cooperation, participation in European programmes and the competitiveness of small and medium-sized enterprises (SMEs). It is recommended to focus mainly on *ex-post* evaluation of the impact, transferring of a portion of the funds to the Horizon Europe programme, and creating schemes funded from the state budget that are complementary to the ESIF for projects in the Bratislava Region.

**Venture capital<sup>4</sup>, within the framework of public policies, is a form of repayable financial instrument through which investors provide capital to companies exhibiting high growth potential in exchange for equity or option.** Thus far, Slovak Investment Holding (SIH) has allocated EUR 252.5 million for innovation support through financial instruments. Additional funds to bolster investments via SIH will be allocated in the future, mainly under the Programme Slovakia 2021-2027 and the RRP. International comparison shows Slovakia's low ranking in the volume of venture capital investment. Increasing public funding to pre-seed and seed phases through professional managers with proven track records, along with fostering the establishment and operation of high-quality incubators and accelerators across both public and private sectors, could contribute to a positive change.

**Research infrastructure is of fundamental importance to the attractiveness of the research and innovation environment.** Since 2007, thanks to the European funds, more than one billion has been invested in the building and development of research infrastructure in Slovakia. In particular, research centres, university science parks and centres of excellence were built. It is recommended

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<sup>3</sup> This concerns institutions conducting civilian research.

<sup>4</sup> Venture capital is a form of investment through which investors provide capital to companies with a high growth potential in exchange for equity or ownership shares. Investors take on higher risk compared to traditional investors/banks because many early-stage companies do not yet derive revenues or profits from their operations. Also, as a common feature, venture capital investing is accompanied by strategic advising, mentoring and providing industry expertise to help start-ups to succeed in their early years of existence.

to work mainly on financial sustainability for both existing and new research infrastructure, as outlined in the National Strategy, in addition to regular performance assessments.

**The super-deduction of R&D expenses serves as a reliable tool to support corporate investments in R&D, especially when compared to grant-based instruments, which often suffer from the unpredictable timing of calls for proposals and administrative complexity.** Currently, the RDI super-deduction leads to a loss of approximately EUR 40 million in state budget revenue. Expanding the range of deductible expenses to include services used in R&D and introducing the possibility of tax refunds could further enhance the potential of the R&D super-deduction to mobilize private investments in R&D support. This tax refund mechanism would improve access to support for young innovative firms, which often operate at a loss in their early years and rely on venture capital for survival. However, the design of other tax instruments does not address the needs of Slovakia's innovation ecosystem, including the need for increased financial support or risk mitigation in the initial stages of the innovation cycle.

**The funding of activities aimed at strengthening links to the international research environment amounts to over EUR 20 million per year, and this package is set to grow further.** There is room for improvement of the efficiency of funding through the selection of more suitable activities. For the financing of access to scientific databases (approx. EUR 7 million per year, a ESIF/SB funding mix), it is advisable to provide greater clarity on sources of financing and pricing, as well as the decision criteria regarding what should be financed from public funds. Connecting scientific and academic libraries will enhance the efficiency of the acquisition process and ensure the availability of comprehensive services to the research community in all regions. For greater success of the Horizon Programme, it is important to focus on connecting Slovak researchers with foreign partners. It is also necessary to bring more transparency to information about membership and participation possibilities for domestic researchers regarding international programmes other than the Horizon Programme, where clear information and performance indicators are absent despite almost EUR 13 million being spent on membership fees for 2021.

**Government support for the innovation ecosystem is primarily financed through the ESIF.** The majority of the funding, totalling over EUR 100 million for the previous programming period, is redistributed through national projects such as NITT SK II, NBC BA and Regions and ZIVSE NP. These projects focus on supporting the competitiveness of SMEs and raising general awareness of the need for innovation in society. Additionally, a portion of the activities targets support for young, highly innovative companies (start-ups). To enhance innovation performance, it is necessary to complement existing projects aimed at promoting competitiveness and innovation awareness with the intensive support in the form of professional services focused on the creation, development and scaling up of highly innovative companies. Examples may include non-financial services, such as incubation and acceleration, as well as readily available funding for testing innovative ideas at the initial stage.

**The goal of popularisation of science and technology is to present results of scientific exploration to the general public and enhance the attractiveness of scientific or technical careers for young people.** Science and technology popularisation activities financed from public funds are primarily organised by the subsidiary organization of the Ministry of Education - the Slovak Centre of Scientific and Technical Information (SCSTI), along with other actors, without strategic management. It is recommended to establish strategic management at the ministry level and diversify implementing entities to strengthen the regional outreach.

**RDI information systems, databases and websites are currently scattered, insufficiently interlinked, and offer limited opportunities for structured data export.** Apart from the SCSTI, total expenditure on IT is negligible. It is recommended to prioritise the building of a one-stop shop for grants and RDI information in a user-friendly way.

**There is a significant degree of institutional fragmentation of RDI policy-making,** resulting in duplicated and overlapping competencies. Examples include the coordination role between the MESRS SR and the Government Office of the Slovak Republic (GO SR), the collection of statistics by the MESRS SR and the Statistical Office of the Slovak Republic (SO SR), and duplication and overlap of competencies between different sections within Ministries. Competencies related to research infrastructures, particularly, seem to be inadequately covered. Delegation of policies to implementing organisations, such as open science, technology transfer, and science and technology popularization, is notably unsuitable. It is recommended to undertake a significant reorganisation of competencies, especially in the areas of policy-making and project funding. Additionally, certain activities, such as administrative eligibility checks, should be removed from the relevant legislation and the tasks of the MESRS SR.

**Project funding for RDI is currently administered by a multitude of actors,** including the Ministries of Education, Economy, Informatisation, Healthcare and Defence, and the GO SR. Furthermore, providers are dispersed across various sections within the Ministries. In addition to these sections, grants are also dispensed by specific agencies established for this purpose, such as the SRDA, Research Agency (RA), SAIA and SIEA. As part of the reorganisation, it is recommended to clearly segregate the administration of project funding from the Ministries, whose primary focus should be policy-making. Simultaneously, the number of funding agencies should be streamlined to two, each catering to a distinct type of priority recipient, namely research institutions and businesses.<sup>5</sup>

**The extensive financial control and auditing conducted in Slovakia significantly impacts RDI grants.** For RDI projects, reporting a large volume of small expenses is often necessary. RDI grant support relies on expert evaluation, which already selects the best projects and considers efficiency and purpose of expenditures. Therefore, it is recommended to amend the Act on financial control and audits to allow simplified cost reporting for all funding sources and auditing of only selected transactions based on risk analysis. It is also recommended to analyse options to simplify the public procurement of technologies used for research purposes, similar to a model employed in relation to other creative activities.

**The R&D ecosystem services in Slovakia are mainly administered by the SCSTI, with partial support from the SAIA.** Innovation ecosystem services are distributed among three agencies: the SIEA, SARIO and SBA.<sup>6</sup> As part of the consolidation of competencies, it is recommended to align with international best practices by consolidating support services for the innovation ecosystem.

**In addition to the higher education and business sectors, which hold dominant positions, approximately 5,000 employees in the government sector are involved in research.** Among these, around 2,000 individuals work at SRIs that have a variety of missions and functions, not solely

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<sup>5</sup>This requirement only applies to civilian research. Given the Ministry's specific task of state defence, the administration of RDI grants under the Ministry of Defence is subject to special arrangements.

<sup>6</sup> This mainly concerns services such as the operation of incubators and accelerators, support for start-ups, long-term individual consulting and networking of actors.

research-oriented ones. The incorporation of SRIs into the VER 2027 will enable the mapping of their R&D activities in terms of performance and impact.

**There are three potential scenarios for the reorganisation of RDI competencies.** They include (a) improvement of the existing model; (b) fundamental strengthening of coordination and political position without establishing a new Ministry; and (c) reorganisation of competencies across Ministries. The proposed reorganisation options are based on an evaluation of the current organisation and funding of the RDI ecosystem against best practice principles. The scenarios outline possibilities for an overall institutional and competence reform of the system to enhance and uphold those principles. The recommended scenario in this review advocates for redistributing competencies among Ministries so that a single entity can ensure the integrated development and implementation of relevant policies without the necessity for coordination among multiple actors. Such a reorganisation can be executed without imposing additional staffing or operational expenses.

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### **Box 0.1 Glossary of most common RDI terms**

#### **S&T**

Science and Technology

Based on the term “Science, Technology and Innovation (STI)”. This term is used in this Review in a broad sense covering the field of research, innovation, support and public policies with an emphasis on modern technology and its use. For example, the OECD regularly publishes the Science, Technology and Innovation Outlook<sup>7</sup>; UNESCO has a Science, Technology and Innovation website<sup>8</sup>.

#### **R&D**

Research & Development

This term is used in this Review in its usual sense, i.e. mainly as reference to research and development activities.

#### **RDI**

Research, Development and Innovation

This term is adopted from the National Strategy. This term is used in this Review in the context of public policies covering the whole cycle of activities from basic research to product and process innovation at the enterprise level.

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<sup>7</sup> OECD Science, Technology and Innovation [Outlook 2023](#).

<sup>8</sup> Science Technology and Innovation (STI) - [UNESCO](#).

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## Introduction

**The Review builds on the National Strategy and contributes to the attainment of its goals.** The lag in innovation and the quality of human capital are considered to be the main reasons for Slovakia being stuck in the “middle income trap”.<sup>9</sup> The National Strategy, along with other RRP reforms and investments, responded to the urgent need to address these challenges and initiate reforms. Based on expert mapping of the ecosystem and broad agreement among key actors, the National Strategy has identified three key areas for state interventions: (1) Provide higher funding for the reformed system; (2) Cultivate, attract and retain talent; and (3) Set up a framework for the national prioritisation of research and innovation investments. The Review<sup>10</sup> complements the National Strategy with an in-depth analysis of financial flows and their effectiveness. At the same time, it represents a starting point for streamlining and consolidating the fragmented RDI competencies.

**Any further increase in RDI funding must be accompanied by reforms.** According to the National Strategy, additional public funding can only be justified with the implementation of a comprehensive reform of the entire ecosystem and clarification of the state’s role within this system. Increasing RDI funding in the current setting would not necessarily result in the expected performance improvement, as measured, for example, by the EIS index, or lead to higher economic growth and quality of life. On the contrary: higher funding could perpetuate the existing status quo with its problems and continue to reinforce behaviours that do not align with societal goals. For a clearer formulation of measures aligned with the specific objectives of the National Strategy, it is therefore necessary to gain a deeper understanding of the motivations of RDI actors by thoroughly mapping funding and management arrangements.

**The primary objective of the Review is to map existing expenditures and competencies.** The spending review section aims to identify current resources, pinpoint areas where increased investment is warranted, and to propose measures to improve efficiency. The recommendations in the Review do not require any additional funding beyond what has been already approved in the National Strategy. Furthermore, the competencies and personnel review section aims not only to map out RDI management but also to suggest measures for streamlining the RDI support system. This includes establishing a framework for the Competences Consolidation Plan for the Ministries, agencies and institutions responsible for RDI policy-making and support.

**The spending review section examines the efficiency of RDI financing from public sources of funds.** The Final State Budget Account for Science and Technology (S&T) for 2022 reports funding in the amount of EUR 412 million from the SB (including co-financing) and EUR 166 million from the ESIF. Within this total amount, the Review primarily focuses on funds from the budget chapters of the MESRS SR, the SAS and the ME SR. Additionally, another EUR 40 million is identified and evaluated in the section dedicated to tax support of R&D.

**The section reviewing competencies and personnel analyses the current distribution of competencies and explores options for their reorganisation.** The mapping looks at all budget chapters and their subsidiary organisations involved in R&D expenditures, with focus on policy making, regulation, funding, financial control and audit, ecosystem services, and the actual implementation of R&D.

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<sup>9</sup> *Reformný kompas slovenskej ekonomiky* [Reform Compass of the Slovak Economy] (IFP, 2022).

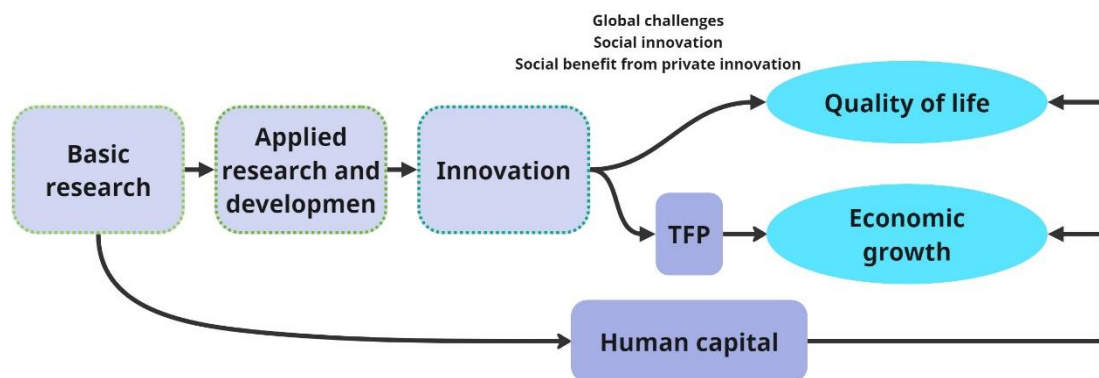
<sup>10</sup> This RDI Spending, Competencies and Personnel Review represents one of the 91 measures outlined in the National Strategy already approved by the Government. It was also outlined in the RRP as an integral part of Reform 1 under Component 9.

# 1. Performance

**The key performance indicators of the RDI policy include private expenditure (i.e. investment) in R&D and Slovakia's position in the European Innovation Scoreboard (EIS). Slovakia ranks low among European countries in both indicators. Improvement in these indicators would lead to increased economic growth and a higher quality of life by means of enhanced total factor productivity, increased human capital, and the social benefits derived from innovations.**

**The benefit of research is knowledge leading to innovation that increases long-term economic growth and improves quality of life.** The social importance and impact of research are integral to a complex system characterized by two main channels of intervention logic. Basic research serves as the foundation upon which applied research, development and innovation are built. However, for an innovative economy to be developed, it is not possible to use shortcuts and focus only on applied research and innovation based on other countries' basic research outcomes. Quality basic research not only enhances the knowledge base but also increases the quality of human capital. A critical mass of excellent researchers attracts business investments in R&D, attracts talented students and facilitates their skill development. Researchers, innovators, managers, professionals and various specialists then translate the knowledge into practical applications: they address global challenges, implement innovations, and enhance productivity in companies and public administration. Human capital plays a crucial role in this process. A higher quality of human capital characterized by a deep understanding of natural and social laws, ethical consequences of technological advancements and their environmental impacts, and social institutions, including a high degree of social trust, steers the direction of further progress.

**Figure 1.1 Intervention logic of the impact of R&D on economic growth and a quality of life**



Source: own by authors

**Due to the presence of market failures and positive externalities, RDI requires governmental support.** Investments in research activities differ from other types of private investments in that they are subject to various market failures, such as a high risk of unclear outcomes, unavailability of funding for high-risk projects, time lag between investment and results, and, in particular, a reduced ability to appropriate all benefits arising from research as the results are available to the whole society. These factors reduce the motivation of private sector actors to spend the necessary amount that is commensurate with social benefits. No less important is the significant externality of research, which may necessarily be carried out with the intention of commercial use or may be of a type that does not directly have commercial applications. For these reasons, governmental support for R&D is a crucial component of public policy.

### **Box 1.1 Impact of R&D on economic growth and quality of life**

**Economic growth is modelled by increasing the quantity of production factors, such as the labour force or physical capital, and increasing the efficiency of their utilization the quality of human capital and total factor productivity (TFP).** Empirical studies seeking to identify sources of TFP growth highlight the influence of institutions, including allocation efficiency (various regulations, quality of courts and public administration, overall regulatory framework - rules of the game, and social trust), as well as the availability of technologies stemming from research and innovation. However, the measurement of economic growth fails to capture all aspects relevant to quality of life and, accordingly, there is growing emphasis on measuring the impact of human activity and public policies on areas such as social and income equality, health, the environment, urban conditions, etc. (e.g. SDG - Agenda 2030). This implies that research affects quality of life not only through knowledge directly translated into higher economic growth, as measured by real GDP growth, but also through other channels.

**Private R&D expenditure and the European Innovation Scoreboard (EIS) composite indicator are considered to be key performance indicators for R&D policy.** While economic growth and quality of life are primary goals of RDI, however, as such they represent very general objectives. Moreover, the overall progress economic growth and quality of life is a result of interplay of a number of public policies. Indices measuring quality of life (e.g. Better Life Index), GDP growth or TFP growth are difficult to link to specific policy. In contrast, R&D investments allow us to measure the direct intervention logic between individual R&D support measures and TFP growth or economic growth.<sup>11</sup> An even more comprehensive picture is provided by the EIS composite index, which captures the efficiency of the entire ecosystem from several points of view.

**Private and total R&D expenditure in international comparison serve as the main indicators for monitoring performance of R&D.** Monitoring expenditure is a part of systematic monitoring of progress in research and innovation and is the main indicator for R&D in the Europe 2020 Strategy. Similarly, the OECD uses expenditure as the main indicator for S&T.<sup>12</sup> The monitoring of Goal 9 “Industry, innovation and infrastructure” of the Sustainable Development Goals (Agenda 2030) in the European context relies on four main indicators, one of which is expenditure<sup>13</sup>. An important factor contributing to the statistical quality of expenditure indicators and thus to their better utilization is the internationally recognised and uniform methodology based on the OECD Frascati Manual (see Box 1.2 below).

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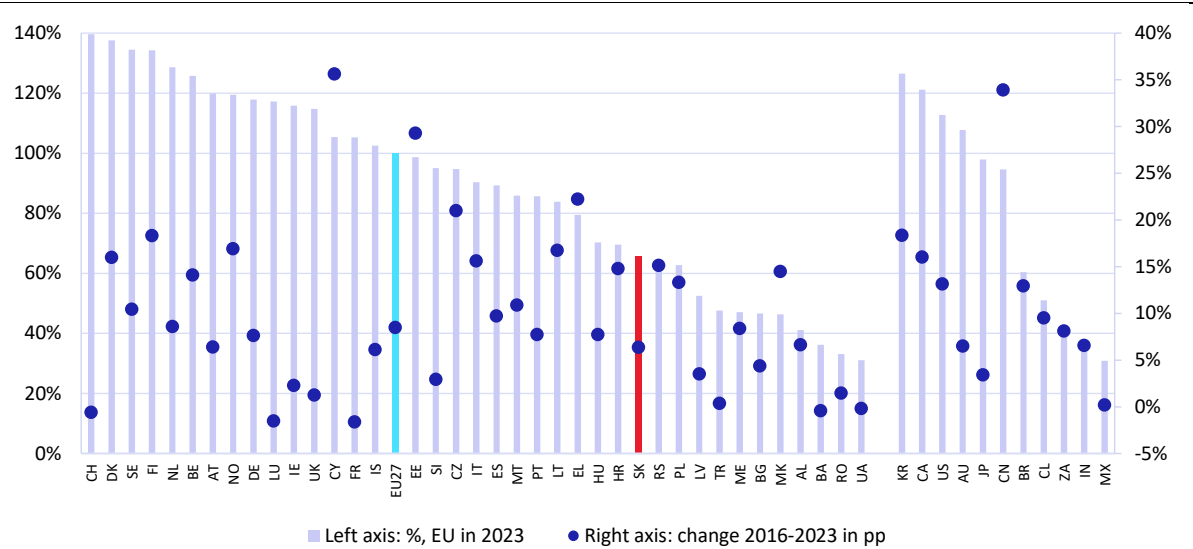
<sup>11</sup> Empirical models of economic growth (e.g. the OECD structural reform assessment framework) include private R&D expenditure. They also work with the assumption that government support stimulates private spending (Egert, Gal, 2016). In models that include both private and total expenditures, results indicate that the impact of total expenditure is driven by private expenditure (Egert, 2017).

<sup>12</sup> OECD Main Science and Technology Indicators.

<sup>13</sup> Monitoring report on progress towards the SDGs in an EU context – 2022 edition; or the Eurostat Indicator List. Other R&D indicators include the number of researchers, patents and the proportion of population with tertiary education.

**Using the European Innovation Scoreboard (EIS) as a composite indicator to comprehensively measure RDI performance is recommended.** Monitoring only R&D expenditure limits information for policy makers. As a solution, the Commission developed the EIS as a composite index containing both input and output indicators and it is also suitable for assessing effectiveness of public policies.<sup>14</sup> Among other things, it measures the impact on employment and sales in innovating companies and also monitors innovation expenditure beyond R&D expenditure. EIS monitors the ecosystems of European countries, but also other global innovation leaders.

**Graph 1.1 European Innovation Scoreboard<sup>15</sup>**



Source: EIS2023

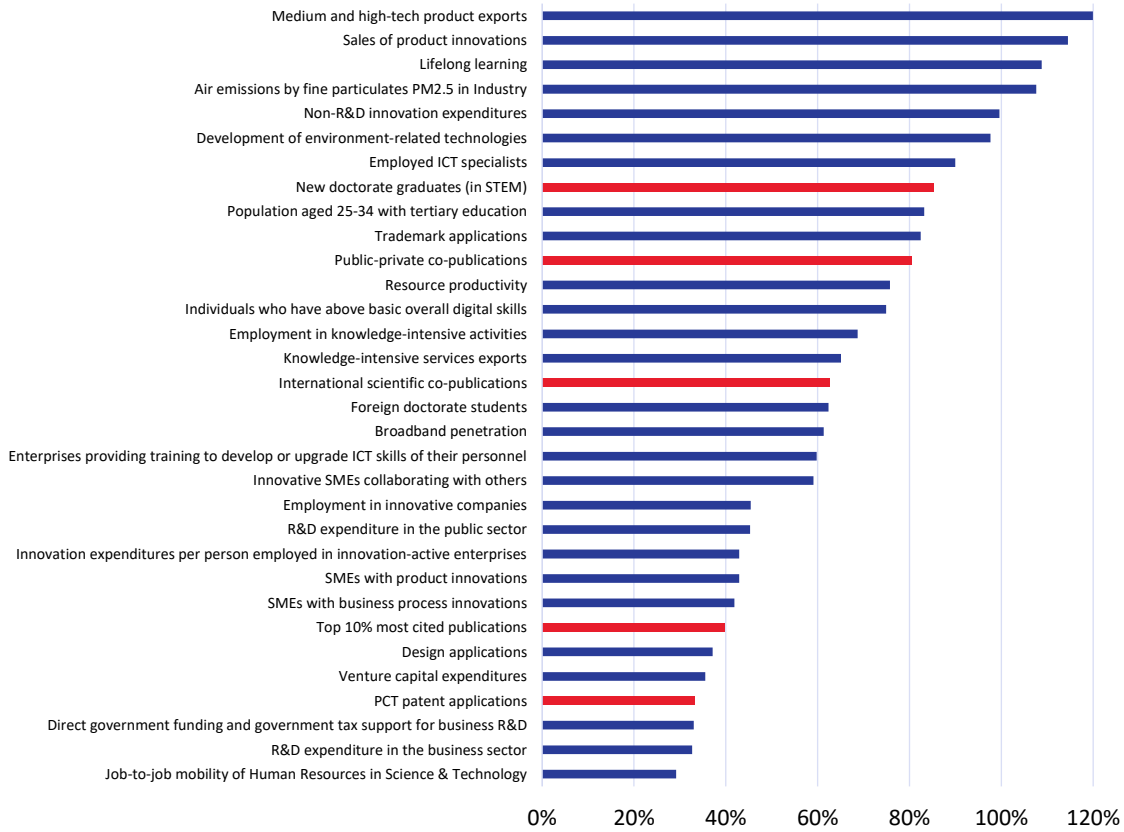
**Based on the EIS, Slovakia is considered an “emerging” innovator.** Slovakia is in a group of the lowest performing countries and the rate of improvement of the composite indicator is below the average rate of improvement for the EU 27 countries. This means that if the pace of improvement does not increase, Slovakia’s innovation performance gap will widen further. It is also the case that the EU as a whole is not a world leader and, according to a global EIS comparison, it is overtaken by South Korea, Canada, the USA and Australia, and from the non-EU 27 European countries by Switzerland, Norway, Great Britain and Iceland.

<sup>14</sup> The EIS incorporates 32 indicators covering four main areas: framework conditions, investment, innovation activities and impacts (see Graph 1.2). In addition to the EIS, there is also a Global Innovation Index (GII) of the World Intellectual Property Organisation (WIPO) covering over 130 countries. Compared to the EIS, a relatively high number of indicators (32 versus 81) involve a degree of complexity that we do not consider necessary for continuous monitoring. For example, the GII incorporates indicators regarding the political and regulatory environment that do not change significantly over time and rather are more suited for comparisons of countries at one point of time. Since the National Strategy puts an emphasis on a significant improvement, we believe that the EIS is more relevant as it incorporates a narrower selection of indicators that are more sensitive to the implementation of R&D policy measures.

<sup>15</sup> The ranking for a given year is based on the ratio of a country’s score to the EU 27 average. For example, Slovakia’s score for 2023 is 65.6. This means that the innovation performance amounts to 65.6% of the weighted EU average for the given year. A comparison over time is made using the ratio of a country’s score in a given year to the score for the EU in the base period (8 years ago). Accordingly, the progress of a given country measured in 2023 is the increase measured in percentage points (pp) between two time points, both relative to the EU average in 2016.



**Graph 1.2 EIS by indicator in Slovakia; EU = 100%, 2023**



Source: EIS 2023

Note: \* The indicators in red have a high correlation with the overall EIS (value at least 0.85)

**According to the EIS, Slovakia most significantly lags in the government support for business R&D.** Research studies consistently confirm a positive impact of the state support on the level of R&D spending in the private sector<sup>16</sup>. The low support from public funds is probably also a factor behind the significant gap in the private R&D spending<sup>17</sup>. The expert debate is currently focused on examining optimal mix of state support through either direct financial support and/or various tax instruments.

**The quality of scientific publications and international scientific co-publication or private-public co-publications reflect the functioning of the entire ecosystem.** The share of domestic publications in the 10% of most cited publications worldwide is 40% of the EU 27 average. Top scientific publications largely reflect the presence of high-quality basic research, upon which applied research, development and innovation are built. Along with patent applications and doctoral graduates in STEM<sup>18</sup>, they are among indicators with the highest correlation with the EIS score, thus reflecting the overall functioning of the system.

**In line with the National Strategy, monitoring three key indicators, namely the EIS ranking, private R&D expenditure and total R&D expenditure, is recommended.** The National Strategy

<sup>16</sup> For a quick overview we recommend “An analysis of the efficiency of public spending and national policies in the area of R&D” by A. Conte, P. Schweizer, A. Dierx and F. Ilzkovitz (2009), prepared for the EC.

<sup>17</sup> The four sectors where R&D takes place are the government sector, HE sector, business sector and private non-profit sector. The EIS indicator takes into account only the business sector. The public sector includes the government sector and the HE sector.

<sup>18</sup> Science, Technology, Engineering and Mathematics.

has identified the most important areas requiring reform and has presented more than 90 measures to address them. Any further increase in public funding will be contingent upon the implementation of these measures. Thus, an increase in expenditure, as the key indicator, along with the EIS ranking, indirectly reflects progress in the implementation of proposed reforms. To assess the effectiveness of these measures, it is recommended to align the selection of key indicators with the National Strategy. Progress is also expected in individual indicators included in the calculation of the EIS score. The National Strategy sets 22 indicators to measure the progress, with 14 of them forming part of the EIS.<sup>19</sup>

**Table 1.1 RDI performance indicators**

|                                       |    | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Target 2030 |
|---------------------------------------|----|------|------|------|------|------|------|------|------|-------------|
| <b>European Innovation Scoreboard</b> | SK | 21   | 21   | 22   | 22   | 22   | 23   | 23   | 23   | 13          |
| <b>Private R&amp;D expenditure</b>    | SK | 0.40 | 0.48 | 0.45 | 0.45 | 0.49 | 0.52 | -    | -    | 1.2         |
| (% of GDP)                            | EU | 1.39 | 1.43 | 1.45 | 1.48 | 1.51 | 1.49 | -    | -    |             |
| <b>Total R&amp;D expenditure</b>      | SK | 0.79 | 0.88 | 0.84 | 0.82 | 0.90 | 0.93 | -    | -    | 2.0         |
| (% of GDP)                            | EU | 2.12 | 2.15 | 2.19 | 2.22 | 2.30 | 2.26 | -    | -    |             |

Source: EIS, Eurostat

### Box 1.2 R&D expenditure statistics

The main R&D indicator for international comparison is R&D expenditure, often referred to as R&D intensity. Eurostat collects data for the R&D expenditure indicator denoted GERD. Data are collected through a statistical survey of firms and institutions conducted by the SO SR using the VV 6-01 form. This survey covers all current and capital expenditures incurred by a reporting unit in a given year. Expenditures are further broken down by sector of performance, which includes the government sector, higher education sector, business sector and private non-profit sector. Additionally, data can be analysed by source of funds, which includes all performance sectors plus the foreign sector (i.e. funding from the ESIF, other multinational sources, or foreign private companies). This allows for comparison, such as comparing the level of direct financial support provided by the government to the private sector across different countries.

The questionnaire itself uses international R&D classification according to the Frascati Manual<sup>20</sup> (OECD). R&D activity must meet five basic criteria: it must involve an element of novelty, creativity, uncertainty, systematic approach, and be transferable and/or reproducible. The activities are subsequently divided into three main categories:<sup>21</sup>

**Basic research** is systematic work undertaken to increase the stock of knowledge about researched object and to gain a deeper understanding without any particular application or use in view;

**Applied research** is original investigation undertaken in order to acquire new knowledge, however, it is directed primarily towards a specific practical aim or objective;

<sup>19</sup>Annex 3 to the National Strategy for RDI.

<sup>20</sup>Frascati Manual 2015, Slovak version, 2002 .

<sup>21</sup>According to the SO SR's methodological guidance

**Experimental development** is systematic work drawing on knowledge gained from research which is directed towards producing new products materials, equipment, systems, methods or processes, including development of prototypes.

According to the SO SR's DataCube, there were 657 reporting units submitting the VV 6-01 form in 2021, of which 143 were independent R&D organisations and 514 non-independent R&D sites<sup>22</sup>. In addition, SO SR employs three other data collection forms. R&D data are also collected by the Ministry of Education using the Annual Report about R&D Potential (MESRS SR 1 – 01 Form) (see Chapter 5)<sup>23</sup>. Moreover, approximately half of the companies applying the R&D super-deduction are not included in the statistical data collection, suggesting insufficient updating of the list of reporting units<sup>24</sup>. This discrepancy is likely due to the difference between the availability of tax returns and the preparation of the list of reporting units for statistical surveying.<sup>25</sup>

In addition, an internationally used indicator, GBARD (Government Budget Allocations for R&D) is utilised.<sup>26</sup> This indicator is reported by the Ministry of Education and represents funds in the State Budget Final Account for the S&T area (SB expenditure plus ESIF co-financing). Government spending also includes systemic support, such as membership in international organisations. As a result, GBARD usually exceeds the government expenditure captured by GERD (government source of funding).

Considering the importance of measuring R&D expenditure as a key performance indicator of the National Strategy and the Review, it is appropriate to examine the data collection process itself. This includes evaluating both the data gathering at the level of statistical units (GERD) and the categorization of SB expenditure (GBARD). It is recommended to review the list of reporting units, assess the completeness and accuracy of the supplied data, and, particularly, ensure the comprehensibility and uniform interpretation of the R&D expenditure definition by reporting firms and institutions. Additionally, it is advisable to analyse a random sample of reporting units and verify the quality of reporting and. Where applicable, any problems encountered by reporting units when completing the reports should be identified.

Similarly, the process of categorizing expenditure in the State Budget Final Account as R&D is not subject to validation (nor are other expenditures in COFOG classification) and therefore, it is not possible to comment on its completeness and accuracy. For instance, according to the State Budget Final Account, the Water Research Institute (WRI) shows zero R&D expenditure, while other sources of information, such as contracts with the Ministry, suggest that it conducts research activities on a substantial scale. Similarly, according to budget data, university hospitals report minimal spending on research activities.

**Measure 1.1** Conduct a detailed analysis of statistical data collection related to R&D (GERD).

**Measure 1.2** Conduct a detailed analysis of the categorization of R&D expenditures in the Final State Budget Account (GBARD) and, based on the results, make appropriate adjustments to the reporting process.

**Measure 1.3** Extend the profit and loss statement forms for profit-seeking legal entities to include information on R&D costs.

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<sup>22</sup>R&D organisations and sites [vt2009rs].

<sup>23</sup> The obligation to report data to the SO SR is established by the Act No. 540/2001 on State Statistics, and the Decree No. 292/2020 specifies the individual reports. The Ministry of Education collects data on the basis of the Act No. 172/2005 on the Organisation of State Support for R&D and on amendments to the Act No. 575/2001 on the Organisation of Operation of the Government and on the Organisation of Central Government, as amended.

<sup>24</sup> See Chapter 3.6 Tax instruments.

<sup>25</sup> Based on feedback from the SO SR.

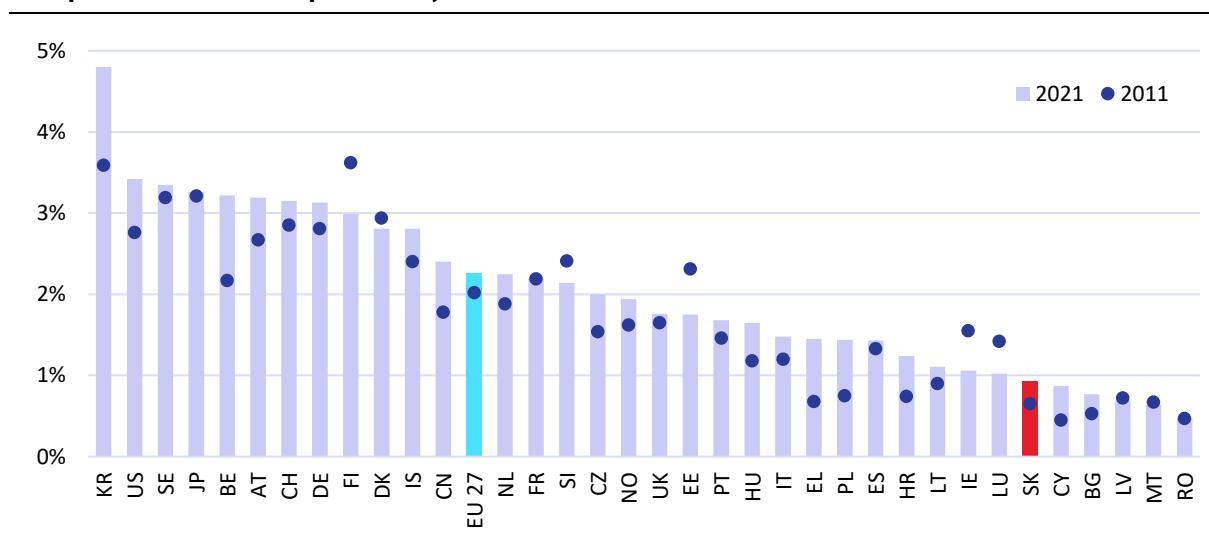
<sup>26</sup>Government Budget Allocations for R&D (GBARD).

## 2. Expenditure

**Slovakia significantly lags behind in RDI investment. Long-term investment into R&D has been around 0.4% of GDP annually from the state budget, amounting to EUR 412 million in 2022. Additional funding sources include the ESIF and the Recovery and Resilience Plan of the Slovak Republic (RRP). In comparison, the EU average stands at 0.8% of GDP. The Review recommends strengthening the government support to stimulate private spending, either through direct financial support or via tax incentives. The National Strategy envisions increasing the state budget allocation to 0.67% of GDP by 2030. The implementation of measures outlined in this Review can facilitate greater efficiency of these investments and contribute to achieving the ambitious goals set forth in the National Strategy.**

**Total R&D expenditure in Slovakia in the amount of 0.9% of GDP is significantly below the EU average.** In 2021, the R&D expenditure totalled EUR 918.4 million, representing 0.93% of GDP. This places Slovakia among the EU countries with the lowest R&D investment levels, as the EU 27 average is 2.3%. EU leaders, with the highest shares of R&D expenditure, are almost on par with the USA and Switzerland, which are world leaders with shares of 3.4% and 3.2%, respectively. However, the EU 27 average does not even reach the level of China’s investment. Since 2011, the share of the R&D spending in Slovakia has increased, but compared to countries with similarly low shares in 2011 (Greece, Croatia, and Poland), this growth has been slower. Since the adoption of the Lisbon Strategy in 2000, achieving a level of 3% of GDP<sup>27</sup>, with two thirds coming from private sources, has been considered the EU’s target.<sup>28</sup>

**Graph 2.1 Total R&D expenditure, % of GDP**



Source: Eurostat, [RD\_E\_GERDTOT]

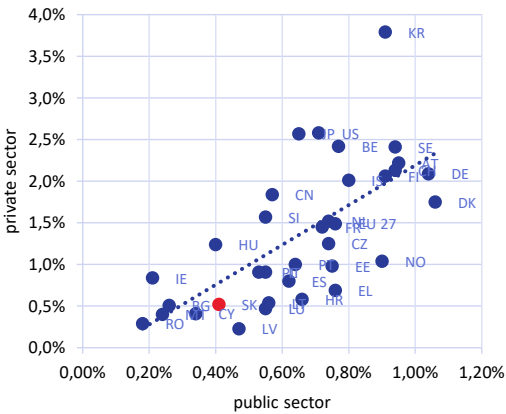
**The R&D expenditure (as a share of GDP) of Slovakia’s public sector has not grown, while the R&D spending in the private sector has doubled over the past decade.** Both indicators are a part

<sup>27</sup> Pact of Research and Innovation in Europe ( [European Commission](#) ), Council Recommendation ( [European Commission](#) ).

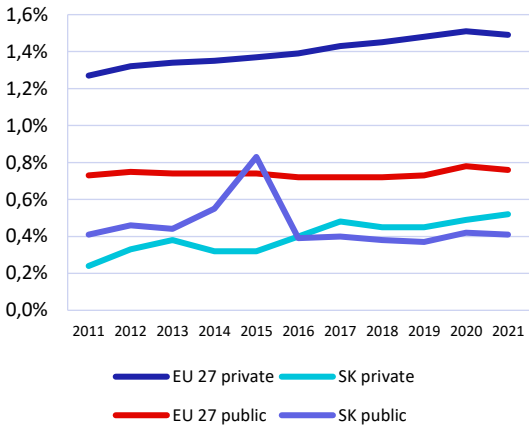
<sup>28</sup> It is recommended to follow a mix (as a “rule of thumb”): one third of public sources and two thirds of private sources. **Criticism** of this recommendation concerns (a) different policy combinations in different countries in terms of direct and indirect government support of the private sector; (b) global mobility of resources; (c) sectoral specialisation of economies; (d) distraction from the important cooperation between private and public sectors. Last but not least, the public spending on education, for example, also needs to be taken into account: while being a necessary prerequisite for R&D, it is not reported in statistics as government expenditure on R&D.

of the EIS<sup>29</sup>. There is a complementarity between the private sector and the public sector spending: higher R&D expenditure of the public sector is positively correlated with the private sector expenditure. In Slovakia, however, the public sector’s R&D expenditure as a share of GDP has been stagnating, with the exception of 2015 when allocations of EU funds remaining from the previous programming period were used. Private expenditure on R&D in Slovakia has more than doubled over the last decade from 0.24% of GDP to 0.52% of GDP.

**Graph 2.2 R&D expenditure in the public sector and the private sector, % of GDP, 2021**



**Graph 2.3 R&D expenditure in the public sector and the private sector, % of GDP**

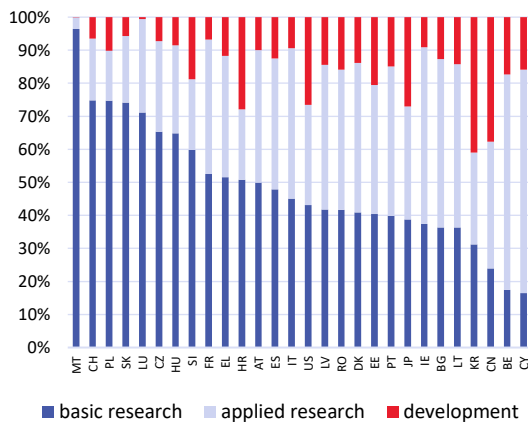


Source: Eurostat, [RD\_E\_GERDTOT]

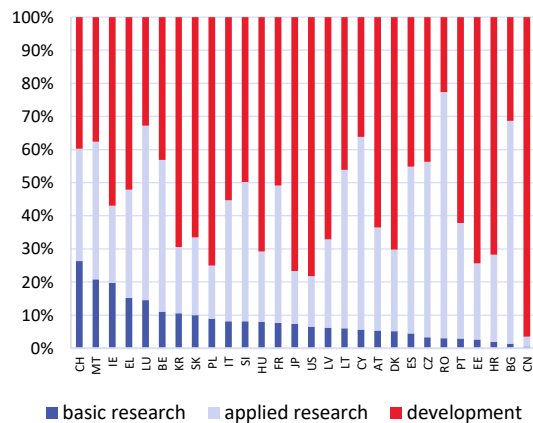
**The public sector expenditure on basic research relative to the other types of research is higher than the international average.** The international average share of expenditure on basic research in the public sector is approximately 50%. In Slovakia, it accounts for almost three quarters of all expenditure in the public sector (Graph 2.4). Although the public sector is better suited to carry out basic research due to lower pressure on commercial use, its excessive emphasis on basic research neglects the equally important role of transferring knowledge into practical use and the subsequent societal impact research results. It is necessary for the Slovak public sector to engage in applied research and development to a greater extent. However, this should not occur at the expense of basic research but through increased support of applied research in line with an increase in R&D funding. The mix of basic and applied research expenditure in the private sector in Slovakia is on par with international practice (Graph 2.5).

<sup>29</sup> R&D expenditure in the public sector as a percentage of GDP by sector of performance (GERDTOT) represents the government sector and HE sector expenditure. The second indicator of EIS is 2.2.1 R&D expenditure in the business sector as a percentage of GDP. The average share of spending in the private non-profit sector is very low – at the level of 0.01% of GDP in 2021. In 2020, for example, the USA (0.14%) and South Korea (0.09%), and from the European countries Cyprus (0.12%), had a high share. We omitted this sector in the analysis. The reason is not only a negligible relative volume of expenditure, but also missing data for many countries.

**Graph 2.4 Shares of different types of research in the public sector, 2020**



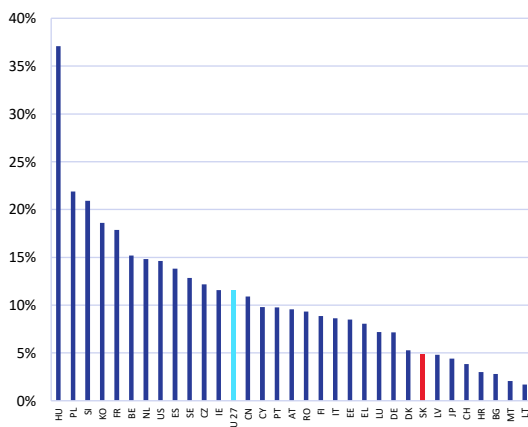
**Graph 2.5 Shares of different types of research in the private sector, 2020**



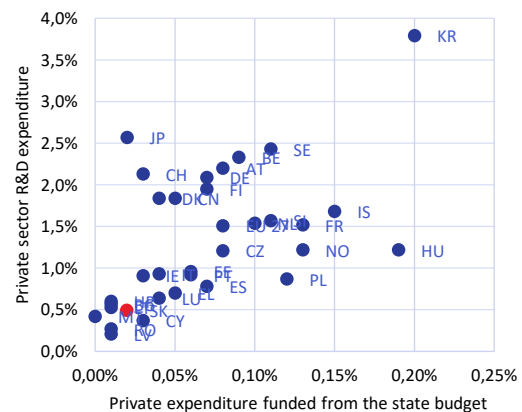
Source: Eurostat, [RD\_E\_GERDACT]

**The current low volume of R&D expenditure in the private sector is also related to low government support.** Direct government funding represents only 5% of private spending in Slovakia, while the EU average is almost 12%. Higher direct government support drives higher R&D expenditure in the private sector. Direct support, however, seems to be less significant in highly innovative countries. In other words, this direct government support is more important in countries whose institutional system is not yet fully functional. For example, Japan’s share of GDP spent on direct support for the private sector from the state budget is the same as that of Slovakia, but the share of Japan’s private sector R&D spending is five times higher. The different impact of direct state support for the private sector can also be attributed to differences in the levels of indirect support or systemic support.

**Graph 2.6 The share of private R&D expenditure financed from the state budget in %, 2020**



**Graph 2.7 Total R&D expenditure in the private sector and the share financed from the state budget, % of GDP, 2020**



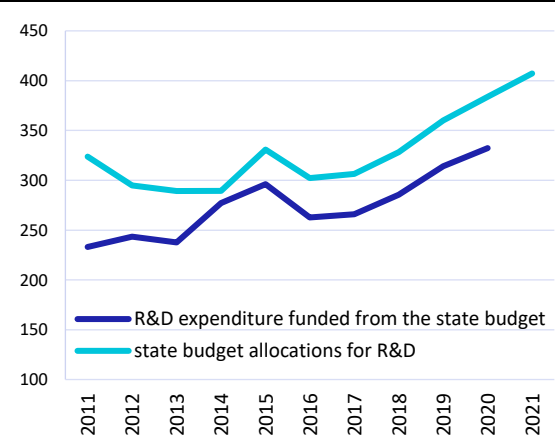
Source: Eurostat, [RD\_E\_GERDFUND]

**The government S&T expenditure also includes ecosystem support, but its share in the total government expenditure is decreasing.** Government budget allocations for R&D (GBARD)<sup>30</sup> represent the total government expenditure independent of the sector of performance. In contrast

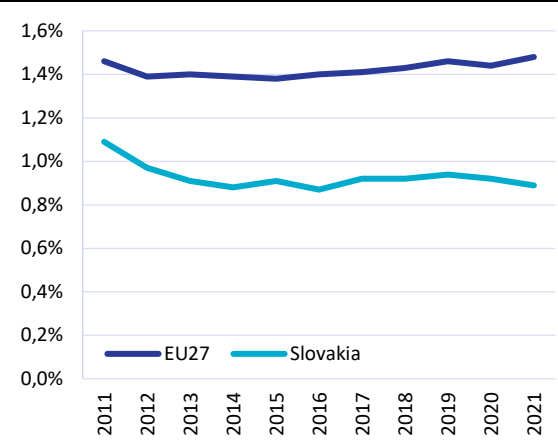
<sup>30</sup>Government Budget Allocations for Research and Development (GBARD).

to statistics mentioned above, which are derived from reports by entities conducting research, GBARD represent government spending. In principle, it is higher because of institutional support for R&D, such as membership in international organisations, funding of libraries and scientific databases, or other forms of institutional support for R&D activities. The difference amounted to additional EUR 52 million in 2020. As a share of total government expenditure, budget allocations for R&D have been slightly decreasing over time.

**Graph 2.8 R&D expenditure financed from the state budget and total expenditure including budget allocations, in EUR million**



**Graph 2.9 Budget allocations as a share of total public expenditure**

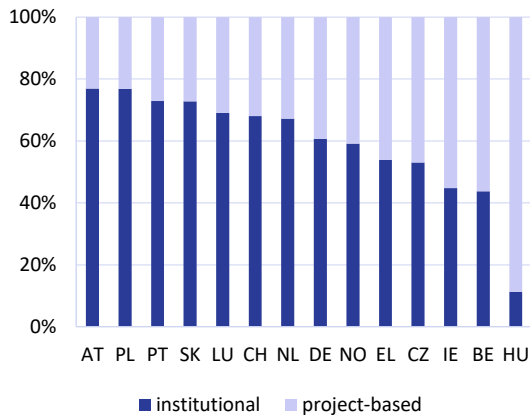


Source: Eurostat [RD\_E\_GERDFUND], [GBA\_NABSTE]

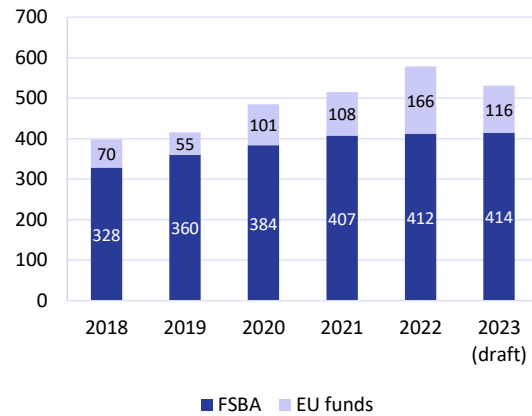
**Project funding serves as an incentive tool for the top researchers.** Budget allocations data allows to compare shares of institutional and project funding in an international context.<sup>31</sup> For countries with available data (the collection is not mandatory), institutional funding seems to account for almost two thirds of total funding on average. While institutional funding provides stability and predictability to research funding, it also necessitates supplementary incentive mechanisms and quality control measures. On the other hand, project funding introduces additional transaction costs due to administrative burdens and evaluations, but it also fosters motivation to deliver superior outcomes.

<sup>31</sup>In the context of the Review, we use terms “institutional funding” and “project funding” (also referred to as grant or competitive funding), acknowledging that institutional funding can also incorporate elements of competitive funding (such as the funding formula for public HEIs). Additionally, national projects financed from the ESIF are not necessarily competitive, i.e. do not fit into the typical category of project funding.

**Graph 2.10 Shares of institutional and project funding in budget allocations, 2021**



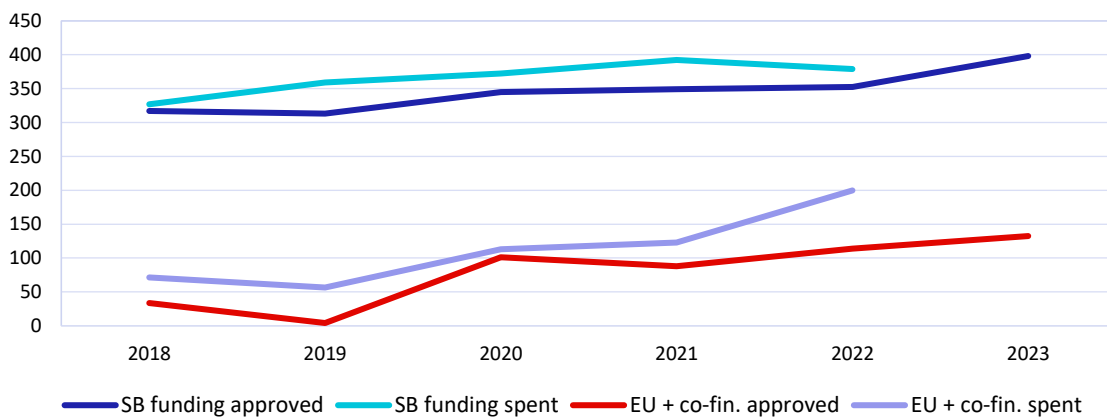
**Graph 2.11 Budget allocations for R&D and the EU funds (actual spending), EUR million**



Source: Eurostat [GBA\_FUNDMOD], BIS

**R&D is increasingly financed by the ESIF.** The budget allocation for R&D, as reported to Eurostat, includes both the funds specified in the State Budget Final Account and the state budget co-financing of the ESIF. In 2022, the total government budget allocations, including the ESIF, amounted to EUR 579.<sup>32</sup> However, actual expenditure slightly exceeded the budget allocations, highlighting the necessity for better planning and budgeting of activities.

**Graph 2.12 Approved government budget allocation for R&D and actual spending, EUR million**



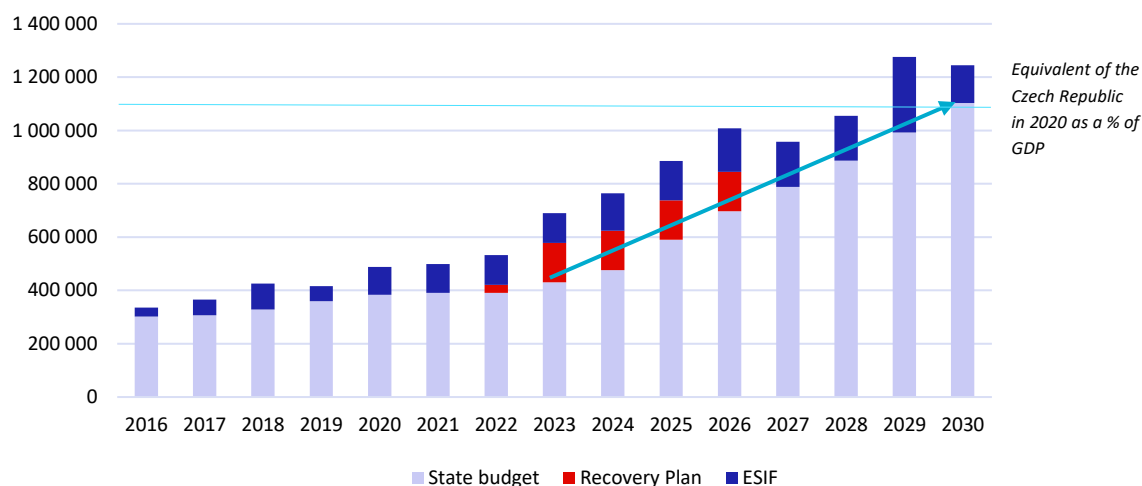
Source: BIS

**Public spending on R&D is expected to rise significantly in the coming years, primarily driven by the RRP initially, and sustained by the National Strategy,** which has secured financial backing. The National Strategy envisages aims to raise state budget allocations (GBARD) to 0.67% of GDP by 2030, up from the current 0.35% of GDP (as of 2022). Improved management of the ESIF is expected to contribute to higher ESIF funding. While the RDI budget allocations (in current prices) of the last programming period was comparable to the allocation under the Programme Slovakia 2021-2027, problems with utilization of the allocations led to some RDI-earmarked funds being reallocated to other economic objectives. Implementing Review measures offers the opportunity to enhance the efficiency of these increased investments.

**Graph 2.13 Planned growth of government budget allocations for R&D (GBARD), EUR thousand**

<sup>32</sup>State Budget Final Account, Table 13, Science and Technology





Source: Eurostat, Macroeconomic forecast of the Ministry of Finance of the Slovak Republic (September 2022), calculations of the Government Office of the Slovak Republic

**According to the State Budget Final Account, the chapter with the highest volume of government allocations for S&T is the MESRS SR**, including the SRDA, followed by the SAS and the ME SR<sup>33</sup>. Notably, the ME SR relies primarily on funding from the ESIF posing a significant risk to the long-term sustainability of its funding for S&T. The table below shows the actual spending in 2022 for programmes or subprograms categorized under S&T within the framework of programme budgeting, as reported in the Final State Budget Account<sup>34</sup>.

**The recording of R&D expenditures in the budgetary information system (BIS) requires a more consistent categorization.** The expenditures summarised in Table 2.1 do not always reflect the actual amount of R&D spending. For example, in the case of the Water Management Research Institute (WRI), whose research expenditure amounts to EUR 7.2 million (see Chapter 3.1.3), the COFOG classification of activities used for reporting R&D expenditures in the State Budget Final Account is insufficiently detailed. The research activities of the WRI are not classified as research, thus leading to an underestimation of the overall R&D expenditure.<sup>35</sup> Conversely, the Ministry of Agriculture and Rural Development (MARD SR) reports R&D expenditure for non-research activities.<sup>36</sup>

<sup>33</sup> Since these expenditures represent not only execution of R&D activities but also system support, it is more appropriate to denote them as S&T (Science and Technology) expenditures.

<sup>34</sup> The GBARD indicator is reported as per the Final State Budget Account classification (codes according to Table 14 in the Final State Budget Account).

<sup>35</sup> In the information system, the WRI's expenditures are classified as "environmental protection not elsewhere classified", which means that research has not been reported.

<sup>36</sup> Based on feedback from the Ministry's representatives during informal consultation. The actual R&D spending amounts to approx. EUR 7.3 million (funded from the SB).

**Table 2.1 The structure of government budget allocations according to the Final State Budget Account, 2022**

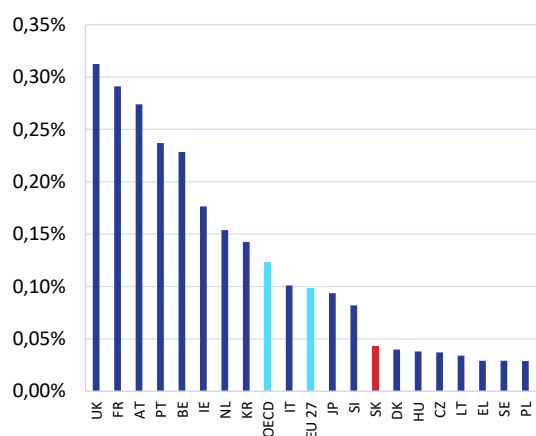
| 2022   | SB actual expenditure (GBARD) | ESIF actual expenditure | Total              |
|--|-------------------------------|-------------------------|--------------------|
| <b>MESRS SR</b>  | <b>280,709,647</b>            | <b>87,276,086</b>       | <b>367,985,733</b> |
| <i>06K11 SRDA</i>  | <i>37,978,577</i>             |                         |                    |
| <i>06K12 Coordination of cross-cutting activities of the state's science and technology policy</i> | <i>14,807,747</i>             |                         |                    |
| <i>07712 HEI science and technology</i>  | <i>189,527,452</i>            |                         |                    |
| <i>07813 Guidance and transformation of the regional school system</i>                             | <i>1,037,400</i>              |                         |                    |
| <i>0970A Contributions of the Slovak Republic to international organisations, MESRS SR</i>         | <i>13,773,921</i>             |                         |                    |
| <i>0EA01 Operational Programme Integrated Infrastructure</i>                                       | <i>23,568,887</i>             | <i>87,276,086</i>       | <i>110,844,973</i> |
| <i>0EK0F Information technology financed from the state budget</i>                                 | <i>15,663</i>                 |                         |                    |
| <b>SAS</b>   | <b>94,451,084</b>             | <b>8,594,099</b>        | <b>103,045,183</b> |
| <b>MARD SR</b>   | <b>16,773,326</b>             |                         | <b>16,773,326</b>  |
| <i>05T04 Official development assistance, MARD SR</i>  | <i>29,019</i>                 |                         |                    |
| <i>08V03 Research and expert assistance for sustainable forestry</i>                               | <i>2,020,660</i>              |                         |                    |
| <i>08W03 Knowledge base for ensuring food quality and safety</i>                                   | <i>229,344</i>                |                         |                    |
| <i>09003 Knowledge support for policy making</i>   | <i>12,121,443</i>             |                         |                    |
| <i>09105 Knowledge support for the competitiveness of agriculture</i>                              | <i>2,372,860</i>              |                         |                    |
| <b>MD SR</b>   | <b>11,853,189</b>             |                         | <b>11,853,189</b>  |
| <i>06E State defence support</i>   | <i>2,356,531</i>              |                         |                    |
| <i>095 Defence development</i>   | <i>2,053,456</i>              |                         |                    |
| <i>096 Defence</i>   | <i>7,443,202</i>              |                         |                    |
| <b>Slovak Office of Standards, Metrology and Testing</b>   | <b>2,444,030</b>              |                         | <b>2,444,030</b>   |
| <b>ME SR</b>   | <b>1,772,156</b>              | <b>68,625,095</b>       | <b>70,397,251</b>  |
| <i>07K Industry development and business support</i>   | <i>234,263</i>                |                         |                    |
| <i>0EA Operational Programme Integrated Infrastructure</i>   | <i>1,537,893</i>              | <i>68,625,095</i>       | <i>70,162,988</i>  |
| <b>SO SR</b>   | <b>737,984</b>                |                         | <b>737,984</b>     |
| <b>MC SR</b>   | <b>613,947</b>                |                         | <b>613,947</b>     |
| <b>MTC SR</b>  | <b>591,406</b>                |                         | <b>591,406</b>     |
| <b>MEnv SR</b>   | <b>545,000</b>                |                         | <b>545,000</b>     |
| <b>MLSAF SR</b>  | <b>560,997</b>                |                         | <b>560,997</b>     |
| <b>Geodesy, Cartography and Cadastre Authority of the Slovak Republic</b>                          | <b>433,495</b>                |                         | <b>433,495</b>     |
| <b>MIRDI SR</b>  | <b>340,776</b>                | <b>1,275,512</b>        | <b>1,616,288</b>   |
| <b>MH SR</b>   | <b>328,633</b>                |                         | <b>328,633</b>     |
| <b>MFEA SR</b>   | <b>134,305</b>                |                         | <b>134,305</b>     |
| <b>ASMR SR</b>   | <b>105,775</b>                | <b>463,826</b>          | <b>569,601</b>     |
| <b>Total</b>   | <b>412,395,751</b>            | <b>166,234,618</b>      | <b>578,630,368</b> |

Source: BIS

## R&D tax support

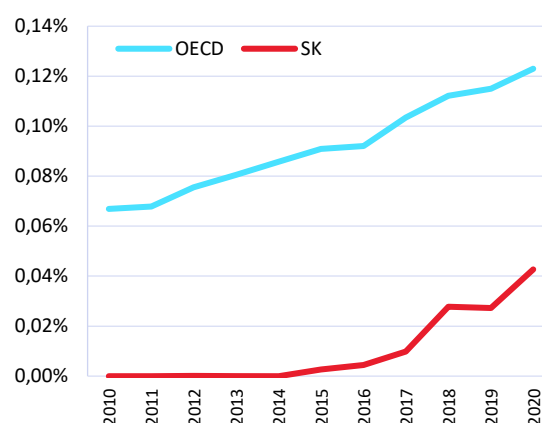
**Indirect forms of support are becoming increasingly appealing.** Tax credits, as a form of indirect R&D support, offer the advantage of not requiring costly administrative verifications of support recipients by fund providers. On the other hand, this approach may not be practical for innovative start-ups, which often operate at a loss for several years, unless the country has a refund system in place for loss-making companies within its tax support framework. An optimal set-up of indirect support schemes includes reducing the risk of substitution of government support for private expenditure that would have occurred anyway. In Slovakia, the volume of tax support is significantly below the averages of both European and OECD countries. Nevertheless, Slovakia is following the increasing international trend of providing business R&D tax support.

**Graph 2.14 Tax support for R&D, % of GDP, 2020**



OECD

**Graph 2.15 Tax support for R&D, % of GDP**



Source: OECD

## Expenditure on innovation and public procurement of innovations

**A wide range of innovations and ambiguous interpretation of the concept of innovation by firms cause difficulties in the mapping of expenditure on innovation activities.** Eurostat publishes results of the Community Innovation Survey (CIS) conducted among firms. The results from 2020 indicate that the share of business expenditure on non-R&D innovation activities amounts to 0.8% of businesses' turnover (the non-weighted EU average was 0.7%).<sup>37</sup>

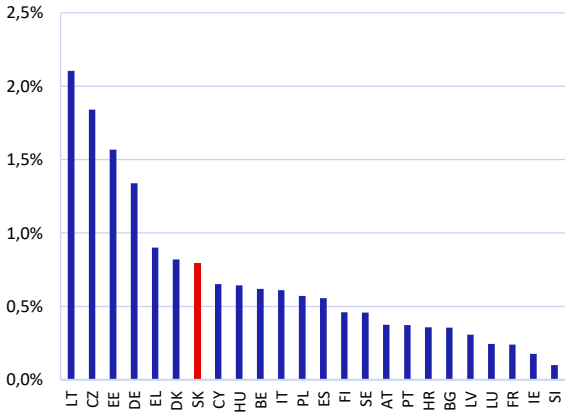
**The state can play a significantly role in supporting innovation activities through its purchasing power.** Public procurement (PP) of innovations serves as a crucial tool for state support of innovations. By acting as an "early adopter", the state's purchasing power can substantially stimulate the early-stage development and successful commercialisation of innovation through PP. In Slovakia, the share of PP dedicated to innovations is estimated to be approximately 3.6% of the total volume of PP, while the EU27 average stands at 9.3%. It is recommended that 20% of the total volume of PP be focused on innovation, including 3% for R&D procurement and 17% for innovation procurement.<sup>38</sup> Due to these considerations, the PP of innovations has been incorporated into the New European Innovation Agenda.<sup>39</sup>

<sup>37</sup> Eurostat [INN\_CIS12\_EXP].

<sup>38</sup> Benchmarking of innovation procurement investments and policy frameworks across Europe (European Commission).

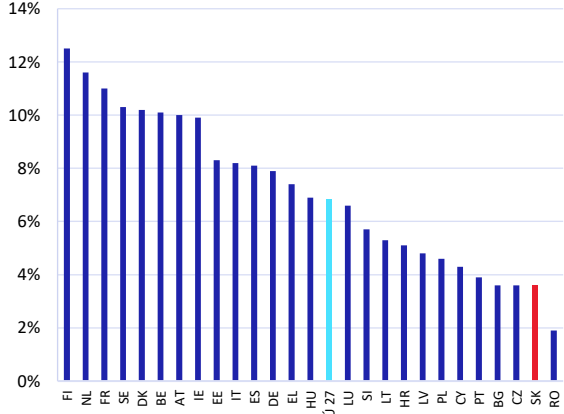
<sup>39</sup> A New European Innovation Agenda (European Commission).

**Graph 2.16 Innovation expenditure as a percentage of total turnover, 2020**



Source: CIS

**Graph 2.17 Proportion of PP of innovation in the total volume of PP, 2016**



Source: Eurostat

## 3. Financing

### 3.1. Institutional funding

*Institutional funding for public R&D entities amounts to approximately EUR 311 million. In 2022, EUR 191 million was allocated to higher education institutions (HEIs), while the Slovak Academy of Sciences (SAS) received EUR 87 million (in 2021). Sectoral research institutes (SRIs) spent at least EUR 33.5 million on R&D in 2022. Both HEIs and the SAS exhibit a notable reliance on institutional funding provided by the state. Regarding institutional funding, it is recommended to introduce incentives for publishing research in reputable, high-quality journals (without suspicion of predatory behaviour) and to increase the weight of international grants and collaboration with the private sector. For HEIs, there is also a recommendation to increase the proportion of funding allocated to research at the expense of other components. As for the SAS, this should include placing greater emphasis on performance-based funding, integrating public research institutions (PRIs) into larger entities, and improving communication about activities and results. For the SRIs, it is particularly recommended to introduce periodic assessments of their research through the Verification of Excellence in Research (VER).<sup>40</sup>*

Institutional funding plays an important role in financing R&D endeavours. It provides stability to institutions, enabling them to focus on R&D, which often involves risk and delayed results. However, institutional funding comes with the requirement to monitor the performance of these institutions to ensure the quality of research in the absence of competitive element of funding, such as in grant schemes.

#### 3.1.1. Higher education institutions

**In recent years, institutional R&D support for HEIs through block subsidies has reached approximately EUR 190 million.** Additionally, funding earmarked for teaching amounts to approximately EUR 360 million (in 2022). These funds are not designated for a specific purpose, allowing HEIs to utilize them freely. HEIs can allocate these funds towards various expenditures, including salaries for both research and non-research personnel, procurement of goods and services, as well as covering operational costs of the university itself, in any proportions they deem necessary.

**Slovakia's tertiary education system operates with below-average expenditure and produces below-average results.** While internationally comparable indicators of tertiary education quality, such as PISA testing, are limited, available indicators paint an unflattering picture of Slovak HEIs performance.<sup>41</sup> Ranking of Slovak universities in the three most recognized quality rankings<sup>42</sup> indicate a lag behind not only European universities, but also universities in the V3 countries. The average ranking of the best Slovak university has declined to 834th place, while the average of the V3 countries is approximately 430th place. These rankings largely reflect research quality, which is easier to compare internationally than education quality. On the other hand, the employment rate

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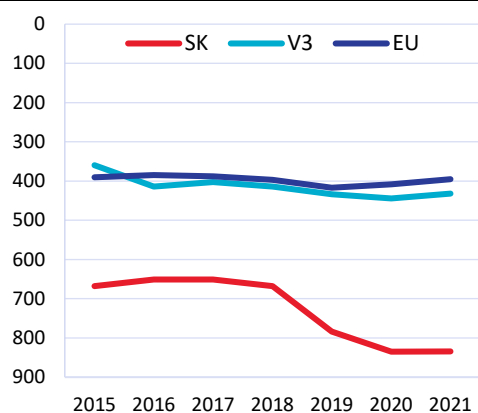
<sup>40</sup> This concerns institutions conducting civilian research.

<sup>41</sup> For example, the PIAAC adult skills testing results date back to 2012, providing only limited insight into the influence of tertiary education on adults' skills.

<sup>42</sup> ARWU, Times higher education, QS rankings.

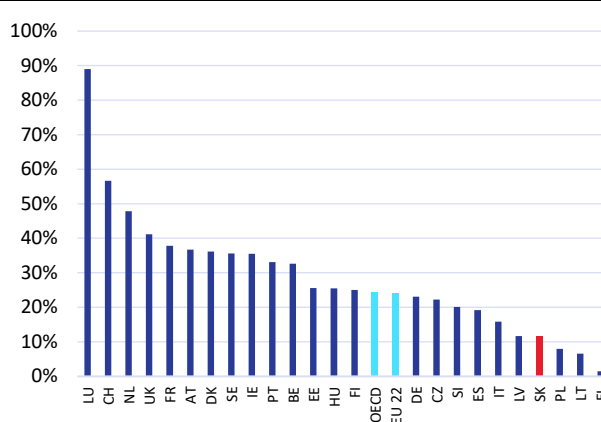
of university graduates is slightly above the EU average, and their unemployment rate is among the lowest in the EU.<sup>43</sup>

**Graph 3.1 Average placement of the best university in three quality rankings**



Source: MFSR

**Graph 3.2 Proportion of foreign/international doctoral students (2020)**



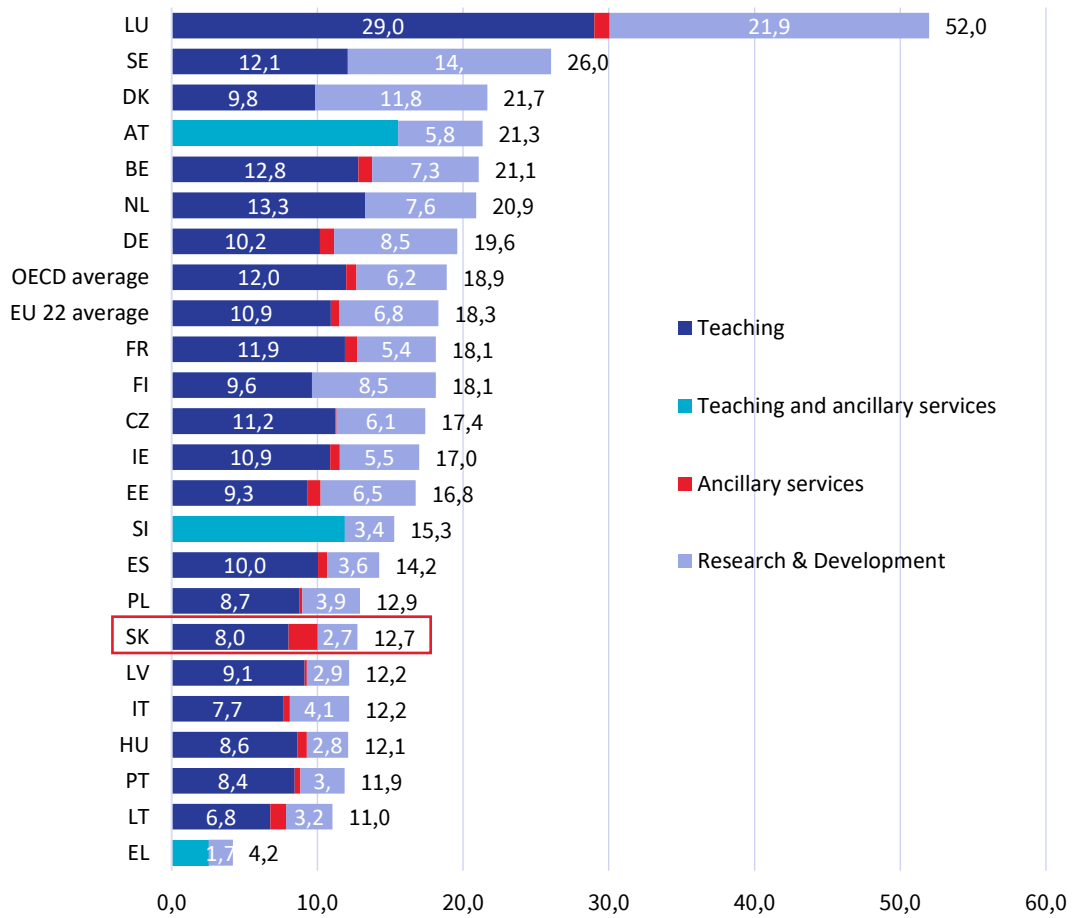
Source: OECD Education at a Glance 2022

**The quality of research, as well as the attractiveness of the system, are also reflected in the proportion of foreign doctoral students enrolled at universities.** In this regard, Slovakia's proportion of 11.6% is less than half of the EU countries' average, while the Czech Republic falls just below the average. The EU average exceeds 25%. These figures suggest that Slovak HEIs, as well as the country as a whole, may struggle to provide an adequately attractive environment and streamlined processes to attract students to doctoral study programmes.

**While spending on HEIs in Slovakia is low in international comparisons, it is comparable to Hungary and Poland when adjusted for purchasing power parity per student.** However, a significant portion of Slovakia's total spending is allocated to ancillary services rather than directly towards teaching or research – a practice not common in other countries, where such expenses are not funded through HEIs and are not considered as part of higher education expenditure. Education expenditure per student ranks as the fourth lowest among EU countries, while research expenditure is the second lowest after Greece. Notably, Slovakia spends the highest portion of expenditure per student among all countries on ancillary services, such as accommodation and meals.

<sup>43</sup> In 2022, the employment rate for graduates in Slovakia stood at 86.9%, while the EU 27 average was 86%. Similarly, the unemployment rate in Slovakia for the same period was 2.4%, compared to the EU average of 3.8%. These figures are significantly impacted by the prevailing conditions in the labour market.

**Graph 3.3 Total annual expenditure per full-time student (PPP, USD thousand, 2019)**

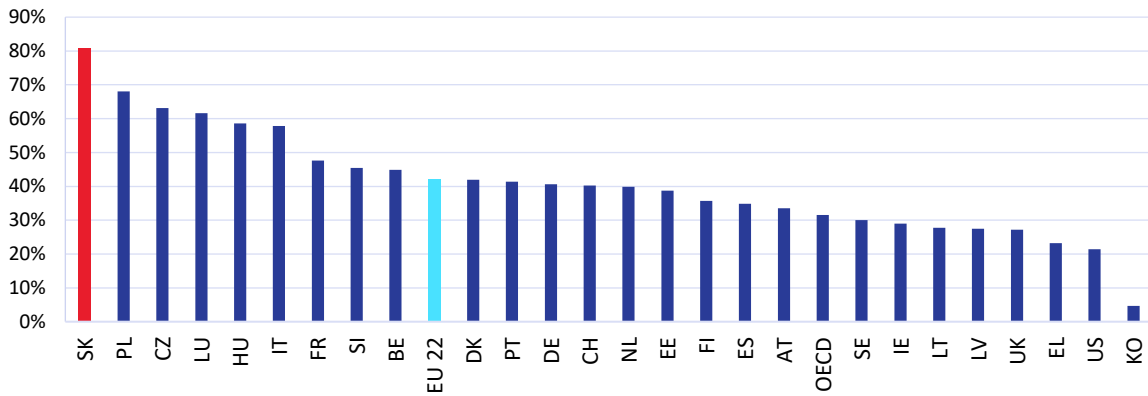


Source: OECD Education at a Glance 2022

**The total expenditure on tertiary education in Slovakia is elevated by the high proportion of master's level graduates.** This translates into higher costs for completing an individual's education. In Slovakia, the proportion of master's degree holder among university degree holders in the population aged 25-34 is the highest among OECD countries; it stands at 81%, while the EU-22 average is 42%. In light of this, the Education Spending Review<sup>44</sup> has recommended that the MESRS SR to take measures to increase the proportion of students who complete their studies at the bachelor level.

<sup>44</sup> Education Spending Review (MESRS SR, 2017).

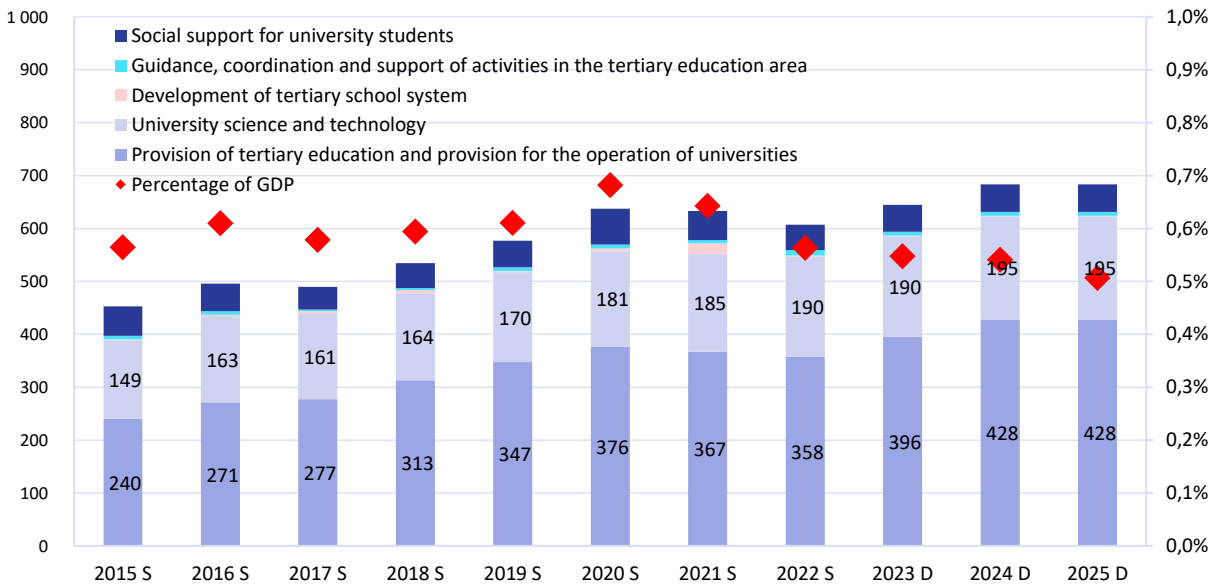
**Graph 3.4 Proportion of population aged 25-34 with master’s degree out of population with tertiary education, except doctoral, 2021**



Source: OECD Education at a Glance 2022

**State budget expenditure on the “Tertiary education and science, social support for HEIs students” programme had been increasing until 2020**, and then decreased slightly as a result of saving measures under the Spending Review of Public Wage Bill<sup>45</sup>. Despite a slight increase projected for the period between 2023 and 2025, the predicted expenditure share of GDP is expected to fall to 0.5%, marking a significant decrease compared to the years 2015-2017 and falling well below the EU average of 0.8% of GDP and the V3 average 1,0% of GDP.<sup>46</sup> At the same time, while overall expenditure on higher education is growing, expenditure on research at HEIs increases only marginally. This funding model is thus in contrast with the ongoing effort to shift focus from increasing student numbers to enhancing the quality of education and research.

**Graph 3.5 State budget allocations on the “Tertiary education and science, and social support for HEIs students” programme, EUR million**



Note: S=Actual spending D=Draft budget

Source: BIS

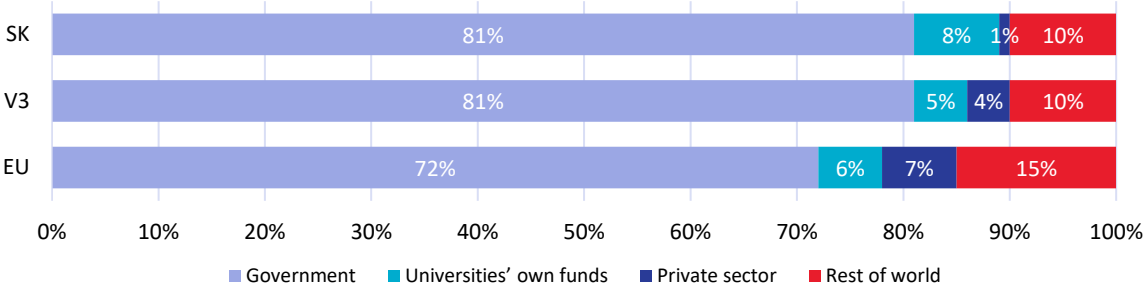
<sup>45</sup> The Spending Review of the Public Wage Bill noted that the number of students per teacher was too low compared to the Czech Republic or other EU and OECD countries. In 2020, the Government decided to reduce the block subsidy for public HEIs in attempt to motivate a reduction in the numbers of both university teachers and non-teaching staff.

<sup>46</sup> Eurostat – General government expenditure by function (COFOG).



**University research suffers from insufficient funding even more than teaching. In contrast to other countries, Slovak HEIs are unable to obtain sufficient funding from sources other than state budget.** While in other EU countries state budget contributions make up about 72% of the expenditure on university research, in Slovakia it is 81%. Slovakia is particularly lagging behind in raising funds from the private sector, which amount to only 1%, while the EU average is 7% and the V3 is 4%. This situation applies to international funding as well (10% vs. 15%). At the same time, the total spending of Slovak HEIs on research is very low compared to other countries, so a comparison of GDP percentages is even more unfavourable. While an average university in the EU has 0.09% share of GDP available from private or foreign sources, in Slovakia it is only 0.02%.

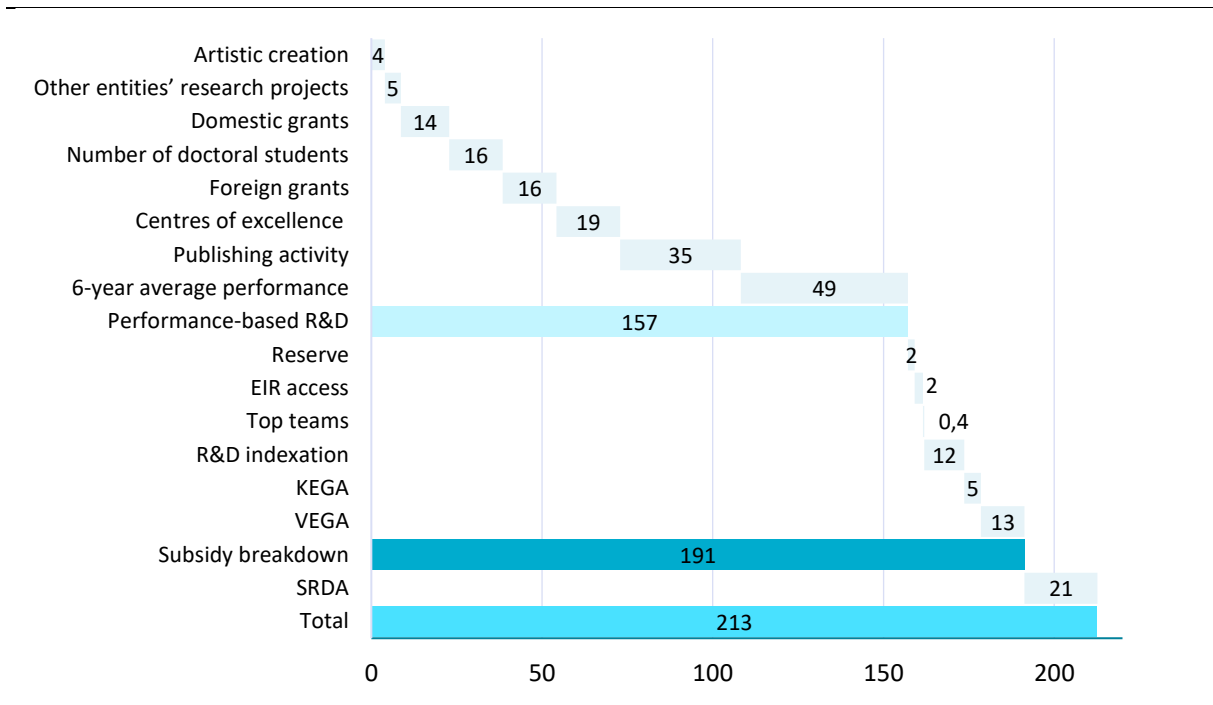
**Graph 3.6 Sources of R&D funding in higher education (GERD, 2020)**



Source: Eurostat, [RD\_E\_GERDFUND]

**Out of the R&D allocation for HEIs in the amount EUR 191 million, EUR 157 million is distributed based on performance.** The rest is allocated to VEGA and KEGA grant programmes, indexation of research staff salaries, access to electronic information resources (EIR), support for top research teams and also as a reserve. In the past, the performance-based allocation of funds largely relied on accreditation results, but in the transition period, this component is being replaced by each HEI's average performance over the last six years. The performance rating reflects the HEI's publishing activity, the presence of centres of excellence, success in obtaining foreign and domestic grants, or the number of doctoral students who have passed the doctoral examination.

**Graph 3.7 Funding of research at HEIs (budget plan 2023, for SRDA actual expenditure in 2022), EUR million**



Source: MESRSSR, MFSR

**The success of HEIs in obtaining domestic or foreign grants is one of the criteria for the allocation of funding for research, development and arts.** The simplicity of the formula in block subsidy<sup>47</sup> means, in practice, that the state matches the grant financing received. A HEI that received a foreign grant in 2016 obtains funding twice: in 2018 and again in 2019. However, due to the changing total volume of grants, such HEI received up to 102% of the grant amount in 2018, but only 82% in 2019.

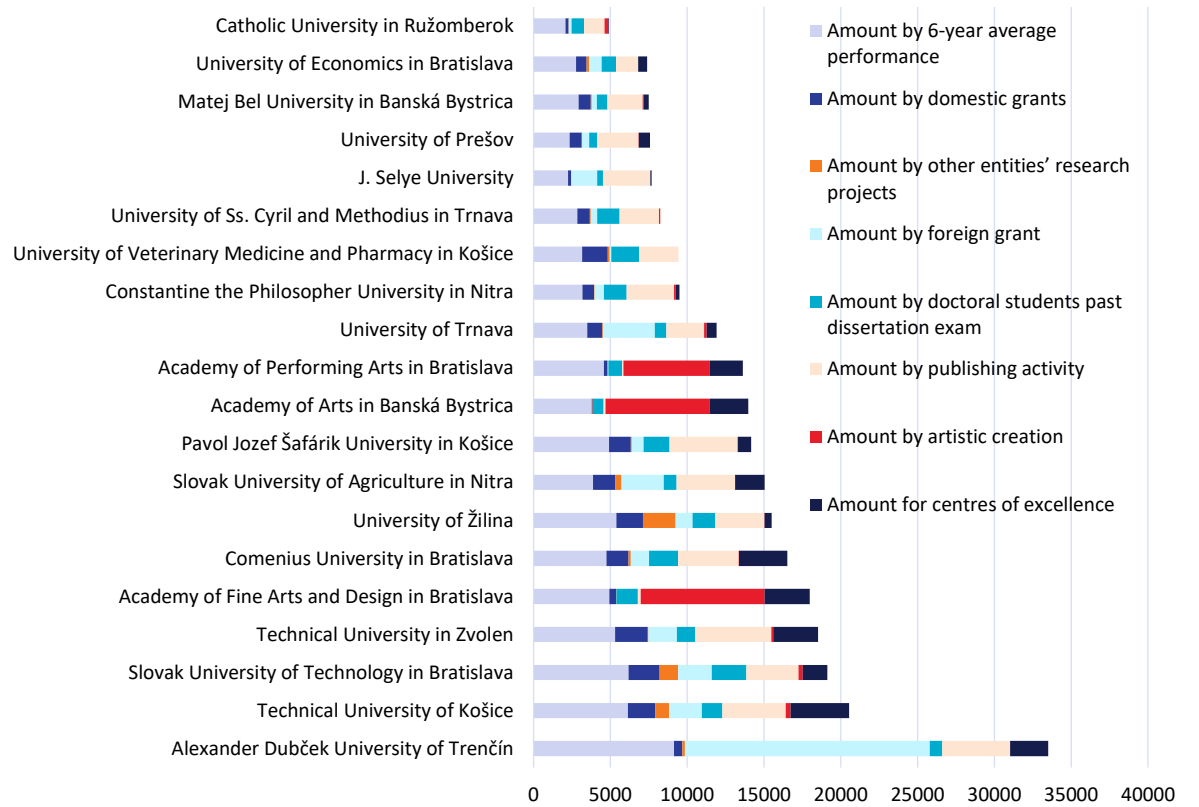
**Matching grants represents a suitable method of supporting researchers in HEIs.** Often, a grant may not fully cover all project expenses incurred by a research team. Moreover, the success in securing grants serves as a valuable indicator of research quality. Given that grant proposals undergo rigorous evaluation assessing the potential quality of research, successful grant acquisition justifies additional support for the research or research team. The matching of funding from external sources is also an important factor for fostering applied research and facilitating cooperation with the business sector. This is of particular relevance in light of statistics indicating that only 1% of HEIs' research funding comes from private partners.

Ensuring predictability in grant matching is essential, and one way to achieve this is by establishing a fixed percentage by which the state matches grants. Additionally, it is recommended to refrain from duplication of matching grants (see the RRP call for proposal launched in June)<sup>48</sup>. Furthermore, for to ensure funding stability, consideration should be given to reducing the intensity of matching for exceptionally high one-off grants.

<sup>47</sup> The methodology and results are available on [the website of the Ministry of Education, Culture, Sports and Science of the Slovak Republic](#).

<sup>48</sup> The Matching Grants call for proposals ([VAIA](#)).

**Graph 3.8 Performance-based block subsidy per teacher or researcher (public HEIs, 2023)**



Source: MESRSSR

**Scientific publications have the greatest influence on the institutional research funding.**

Directly, publications impact 25% of institutional funding, and a partial impact through the performance criterion of centres of excellence. Indirectly, their impact extends through indicators such as the average performance over six years (or VER results starting from 2024, and comprehensive accreditation results until 2022), as well as through the funding of education via the research activity intensity coefficient.

**There is a significant increase in publications in scientific journals suspected of predatory behaviour.**

Since its emergence, driven by the expansion of open access publications, the problem of predatory publishing has moved from the fringes to the centre of scientific debates. Researchers address this issue not only in numerous discussions targeted at the academic community and wider audiences but also directly in their scientific publications. Several experts, as well as research institutions and organisations, including some in Slovakia, warn against publishing in such journals.<sup>49</sup>

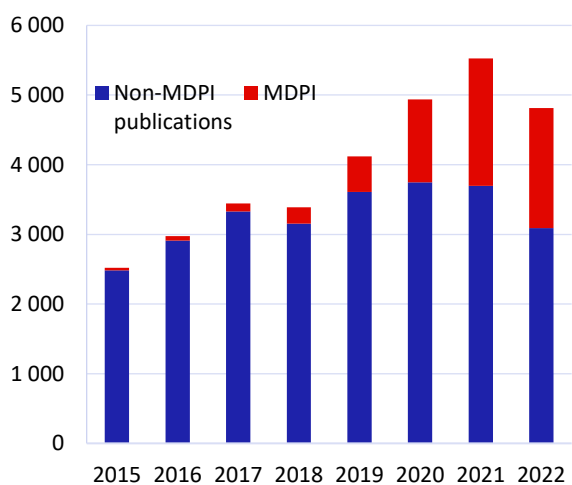
<sup>49</sup> The University of Economics recommends avoiding publication with MDPI publishing house and refuses to reimburse its employees for the article processing charge (APC). Likewise, the Scientific Council of the Academy of Sciences in the Czech Republic advises against publishing through MDPI. In Slovakia, [Slovak Economic Association](#) recommends avoiding publishing through MDPI; the Faculty of Economics at EUBA declines reimbursement for APC related to MDPI publishing.

### Box 3.1 Predatory publishing

Predatory publishing does not denote a homogeneous set of practices. However, there is a consensus among the scientific community on the definition of predatory publishers (or journals) as media that grossly violate publication and research ethics. Despite the difficulty in clearly identifying their characteristic features, they mostly involve the absence of peer-review processes (or limited to only a formal declaration), providing false information about one's credibility and the services provided, using aggressive methods in approaching researchers, unreasonably short publishing periods, imitating names of recognised periodicals and, above all, the obvious abuse of the author-pays model in open-access publishing.<sup>50</sup> The name itself was coined in 2008 by American librarian Jeffrey Beall (University of Colorado), who compiled a list of “deceitful and fraudulent” publishers, which served as a reference until its withdrawal in 2017 due to public pressure and legal disputes.<sup>51</sup>

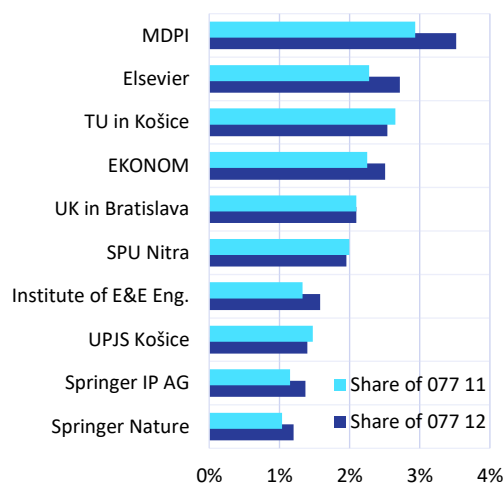
**The number of scientific publications in Slovakia is growing mainly due to publications in journals affiliated with MDPI, a Chinese publishing house widely suspected of engaging in predatory practices in academic circles.** However, definitely identifying MDPI as a predatory publisher is difficult. While journals under MDPI’s umbrella often exhibit lax peer-review standards, they nevertheless also publish quality publications. Proving unethical practices becomes very difficult under such circumstances. When excluding MDPI publications, the growth of Slovak open-access publications has been stagnating.

**Graph 3.9 Number of Slovak open-access publications indexed in Web of Science Core Collection**



Source: Web of Science (Clarivate)

**Graph 3.10 Publishing houses where Slovak researchers publish most often - publications relevant to the financing of HEIs<sup>52</sup>, 2022**



Source: Budget of universities' subsidies, own calculations

**In other countries, addressing the issue of predatory publications often involves maintaining whitelists or using better bibliometric indicators.** For instance, Nordic countries like Norway, Denmark, and Finland utilise a so-called Nordic List.<sup>53</sup> However, it largely overlaps with the Web of Science database. The Czech Republic employs the Article Influence Score (AIS) indicator instead of

<sup>50</sup>Predatory Journals in Scientific Publishing ([Predatory Reports](#)).

<sup>51</sup> Beall, Jeffrey (2017), “What I learned from predatory publishers”, *Biochemia Medica*, 27 (2): 273–279.

<sup>52</sup> This concerns the portion of the subsidy earmarked for university staff wages, salaries and social security insurance contributions within the sub-programme 077 11 (Provision of tertiary education and support for HEI operations), which is allocated according to publishing performance. Similarly, sub-programme 077 12 (HEI science and technology) also represents only a fraction of the block subsidy allocated based on publications performance.

<sup>53</sup> Kanalregisteret.

the Impact factor for funding allocations.<sup>54</sup> One advantage of AIS is its longer horizon for journal evaluation and its consideration of the quality of journals from which citations originate. This problem is gradually gaining attention from indexing services. As of February 2023, Clarivate has de-indexed more than fifty journals within their Web of Science platform and continues to reassess others.<sup>55</sup>

**Measure 3.1** Increase the proportion of research, development and arts funding in the MESRS SR's institutional block subsidy for public HEIs.

**Measure 3.2** Redesign the institutional block subsidy structure to mitigate the impact of publishing in predatory journals.

**Measure 3.3** Redesign the institutional block subsidy structure to support HEIs in their efforts to secure external resources, particularly from the private sector and from abroad.

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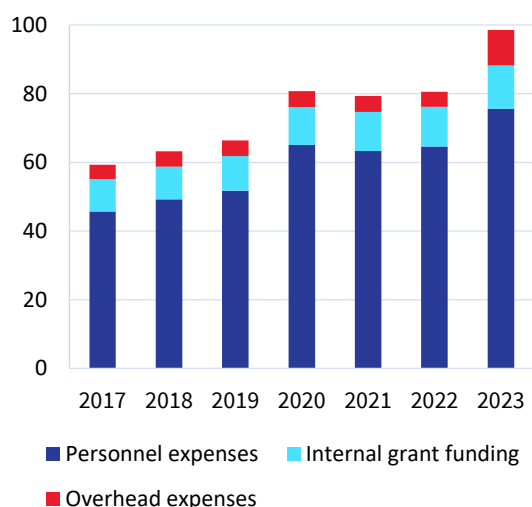
<sup>54</sup> Methodology 17+, Module 2.

<sup>55</sup> Supporting integrity of the scholarly record: Our commitment to curation and selectivity in the WoS ([Clarivate, 2023](#)).

### 3.1.2. Slovak Academy of Sciences

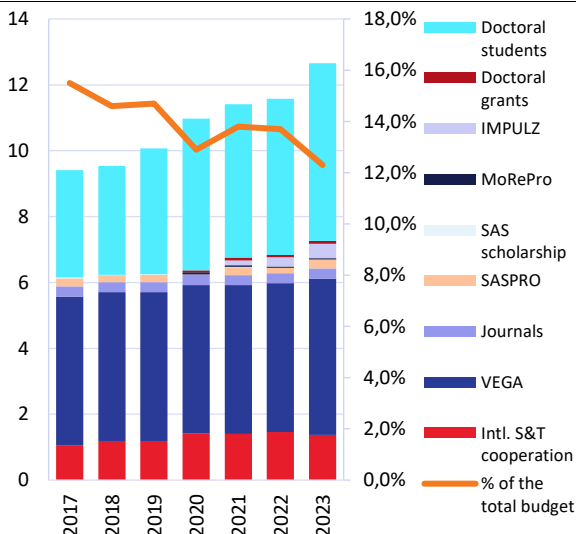
**The institutional funding of the Slovak Academy of Sciences (SAS) from public funds in 2021 reached EUR 89 million.** The total budget, including other sources of funding, reached EUR 111 million.<sup>56</sup> Major components in the SAS's budget in 2023 included personnel expenses (EUR 63.2 million), internal grant funding (EUR 11.4 million) and overhead expenses totalling EUR 4.6 million. A significant increase in overhead expenses is expected in 2023 due to rising energy prices.<sup>57</sup> Only a relatively small portion of institutional funding for research institutes (PRIs) depends on research performance. Excluding internal grant funding, only 16% of funding is performance-based, with the remainder distributed according to the number of employees.

**Graph 3.11 Main components of the SAS budget, total for 2017-2023, in EUR million**



Data source: Presidium of the SAS, own calculations

**Graph 3.12 Breakdown of SAS internal competitive funding by source, in EUR million**



Data source: Presidium of the SAS, own calculations

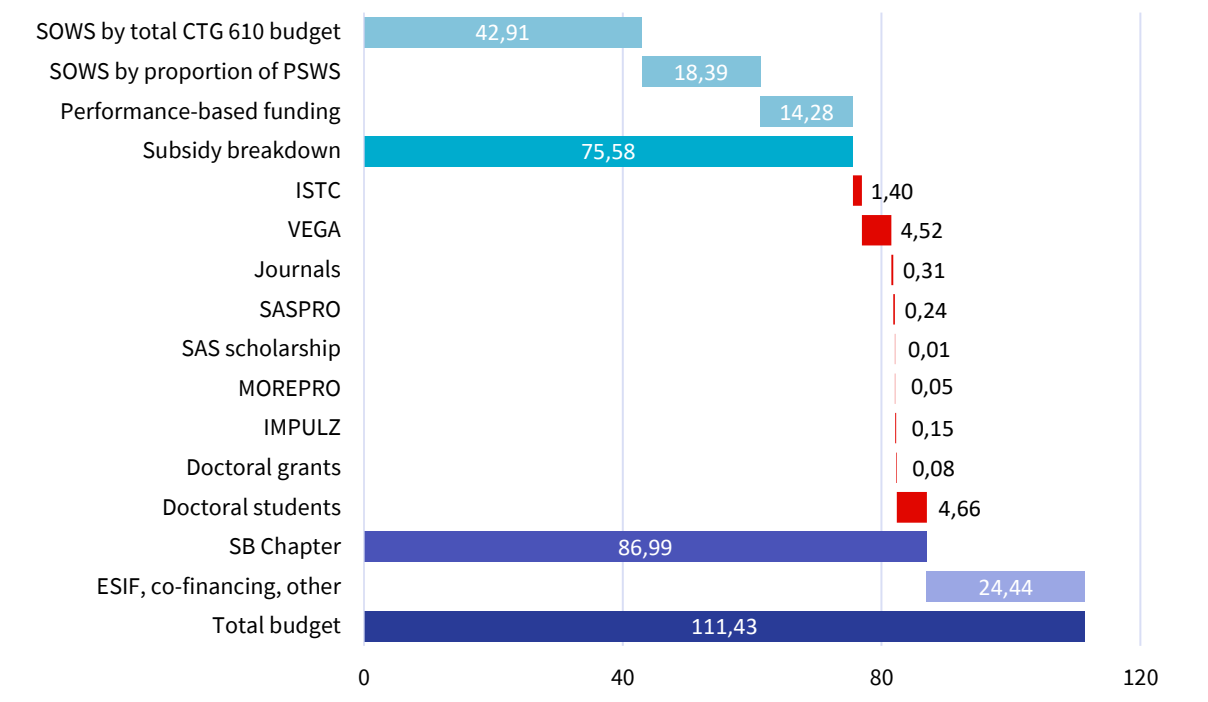
**The proportion of internal competitive funding to the total budget has been slightly decreasing since 2017.** In recent years, the primary portion of internal competitive funding has been comprised of VEGA projects and support for doctoral students. In 2021, a total of 632 VEGA projects were approved, receiving an allocation of EUR 4.5 million. While the number of doctoral students has seen a slight increase in recent years, it has remained relatively stable. In 2021, EUR 4.66 million was allocated from the budget for support 509 doctoral students. Another significant component of funding was directed towards international scientific and technical cooperation (ISTC), which amounted to EUR 1.4 million in 2021. Additionally, the SAS allocated over EUR 1 million for talent attraction initiatives in 2021, with more than EUR 436 thousand dedicated to SASPRO, IMPULZ, MOREPRO grants, while the rest was allocated to salaries.<sup>58</sup>

<sup>56</sup>Annual Report of SAS 2021, MIS.

<sup>57</sup>SAS budget breakdown, Presidium of the SAS.

<sup>58</sup> Data from the Presidium of the SAS.

**Graph 3.13 Summary of the funding of the SAS for 2021, EUR million<sup>59</sup>**



Source: Presidium of the SAS, MFSR, own calculations

**The scientific outcomes of the SAS are better those of the average HEI.** Only 7 PRIs fell below the average of HEIs in a particular scientific discipline according to the periodic VER assessment. However, neither case was the result notably inferior. This outcome is unsurprising, given that the SAS functions as a research organisation, with its researchers not bearing direct teaching responsibilities. Nonetheless, they actively contribute to the scientific education of doctoral students.

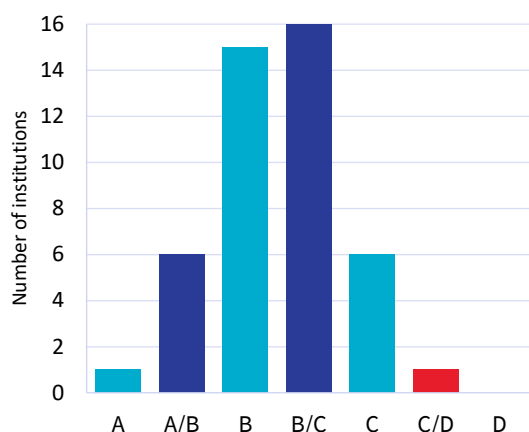
**In the SAS's regular self-assessments conducted for the years 2016-2021, the majority of PRIs were assessed at levels B and B/C.** The evaluation encompassed three main areas: scientific quality and productivity, social, cultural or economic impact, and strategy and development potential. Each PRI received an overall rating on a scale ranging from A to D based on these criteria. The Institute of Polymers was the only one to receive the highest rating of A, while its research excellence is at the international elite level within the European context. Conversely, the Institute of Oriental Studies received the lowest rating (C/D). While a portion of its research demonstrates solid foundations and contributes to the advancement of knowledge in the scientific field at the European level, a significant portion exhibits scientific or technical deficiencies.<sup>60</sup> The overall and partial results highlight areas where individual PRIs need improvement. As observed in previous assessments conducted for 2011-2015 period, the Presidium of the SAS should implement steps based on the recommendations provided by the International Assessment Panel to enhance the quality and performance of PRIs.<sup>61</sup>

<sup>59</sup>SOWS – wages and salaries of scientific organisations; PSWS – public sector wages and salaries

<sup>60</sup> Regular Assessment of the Research Institutes of the Slovak Academy of Sciences 2016-2021, a material presented by the Presidium of the SAS.

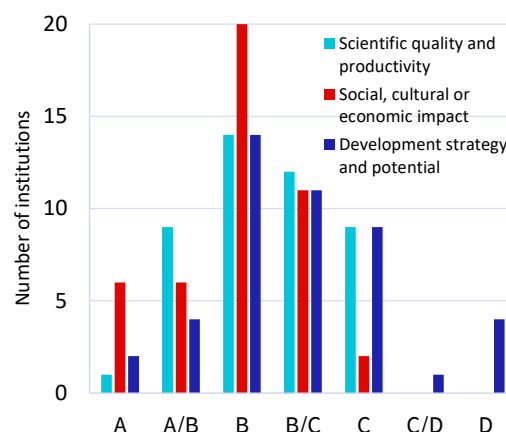
<sup>61</sup> Recommendations of the International Advisory Board for the Presidium of the SAS (SAS, 2021).

**Graph 3.14 Overall ratings of the SAS PRIs for 2016 -2021<sup>62</sup>**



Source: Regular Assessment of the Research Institutes of the SAS 2016-2021, own calculations

**Graph 3.15 Partial ratings of the SAS PRIs for 2016 - 2021**



Source: Regular Assessment of the Research Institutes of the SAS 2016-2021, own calculations

**In absolute terms, the budget of the SAS is significantly lower compared to that of the Academy of Sciences of the Czech Republic (AS CR), however, when considering the budget per employee and focusing solely on the SB funding, the picture changes.**<sup>63</sup> In 2021, the AS CR operated with a total budget exceeding EUR 623 million<sup>64</sup>, of which approximately EUR 223 million were funds from the SB chapter. The average number of FTE employees of the AS CR and the SAS in 2021 were 10,037 (of which 5,167 were financed from the budget chapter)<sup>65</sup> and 3,030, respectively.<sup>66</sup> Nominally, the AS CR thus receives a higher amount per employee from the budget chapter than the SAS. However, this comparison is not entirely fair due to the differences in the institutions' funding mechanism, namely the overall higher volume of grant financing in the Czech Republic compared to Slovakia. In 2021, almost EUR 183 million of the AS CR's budget came from subsidies from other budget chapters<sup>67</sup> and EUR 217 million were own funds, which represents almost half of the total budget of the AS CR.<sup>68</sup>

<sup>62</sup> None of the Institutes had an overall rating of D.

<sup>63</sup> This includes all categories of employees.

<sup>64</sup> NBS conversion rate as of 31/12/2021, EUR 1 = CZK 24,858.

<sup>65</sup> [Annual Report on the Activities of the AS CZ for 2021.](#)

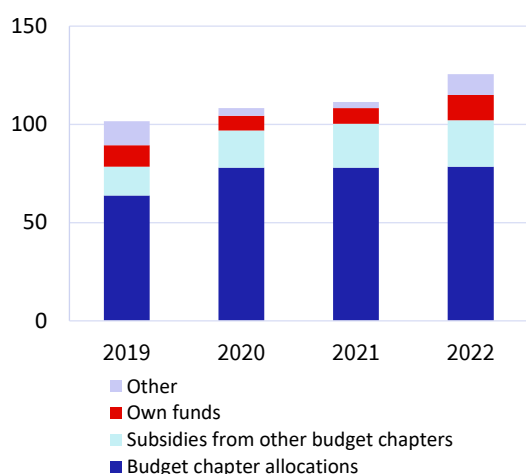
<sup>66</sup> [Annual Report of SAS 2021.](#)

<sup>67</sup> Grants from the Grant Agency of the Czech Republic, TA CR projects and projects of other Ministries, including Operational Programmes.

<sup>68</sup> [Annual Report on the Activities of the AS CZ for 2021.](#)

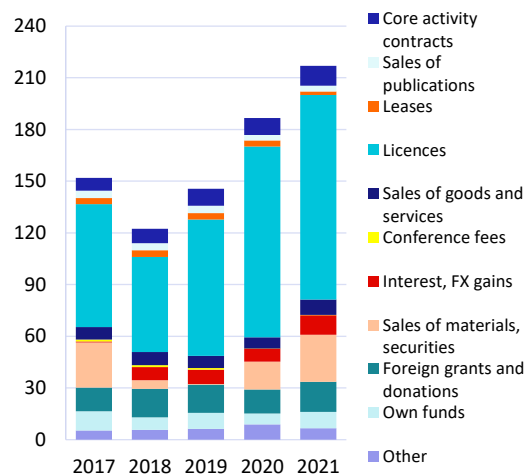


**Graph 3.16 The SAS's sources of funding, EUR million<sup>69</sup>**



Source: Annual Reports of the SAS's organisations, MF SR, own calculations

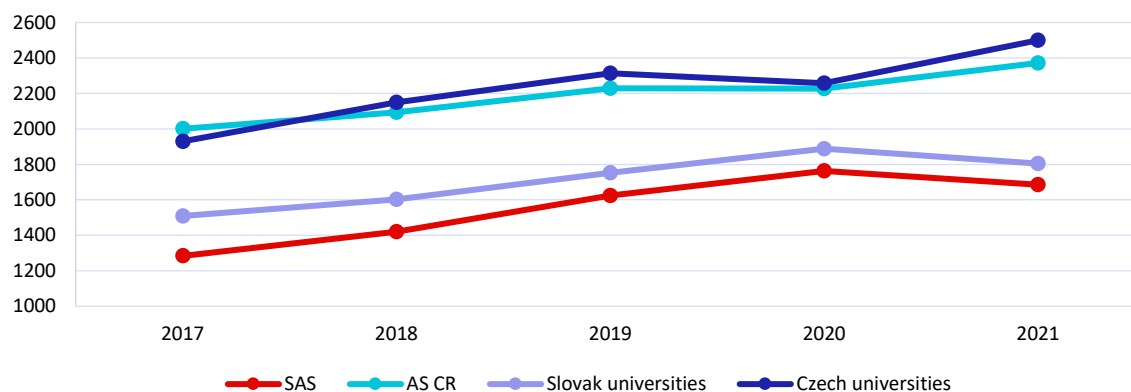
**Graph 3.17 Own funds of the AS CR, EUR million**



Source: Annual Reports of the AS CR, own calculations

**The salaries of researchers at the SAS are not competitive compared to those at the AS CR.** The average salary of a SAS researcher was EUR 1,686 in 2021<sup>70</sup>, whereas the average salary of a researcher at the AS CR was EUR 2,372<sup>71</sup>, representing an almost 40% difference.<sup>72</sup> Similarly, the average salary of a researcher at a Slovak HEIs in 2021 was EUR 1,805<sup>73</sup>, while the average salary of a researcher at a Czech HEI was EUR 2,499<sup>74</sup>. Furthermore, there exists significant variation in earnings distribution across PRIs of the SAS.

**Graph 3.18 Average salary of a researcher in EUR**



Source: Annual Reports of the SAS, the AS CR, Slovak public HEIs, Czech public HEIs; own calculations

<sup>69</sup>The collected data are not 100% accurate, as there were ambiguities in the funding data reported in some Annual Reports.

<sup>70</sup> An average salary of researchers (DrSc, PhD, CSc.) of the budgetary and contributory organisations of the SAS altogether (Source 111 SB and other sources in aggregate), data from the Presidium of the SAS: EUR 1,686.

<sup>71</sup> Annual Reports of the AS CR; NBS conversion rate as of 12/31/2021, EUR 1 = CZK 24.858.

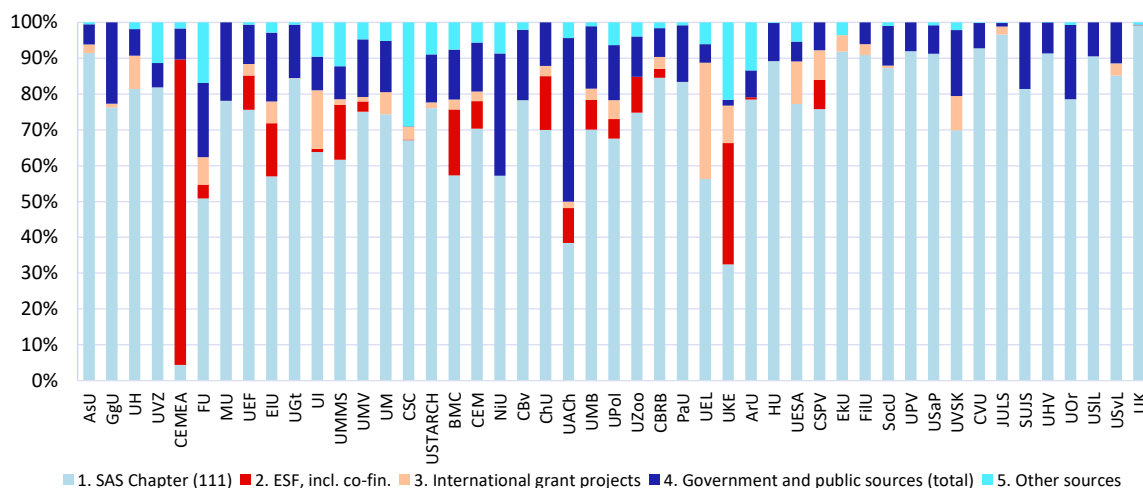
<sup>72</sup> This is not an entirely correct comparison since the SAS has currently a higher expert structure, making the situation even more unfavourable in reality.

<sup>73</sup> Annual Reports of twenty public HEIs in the Slovak Republic; the calculation includes weighted average salary of a professor, associate professor, assistant professor, assistant and researcher.

<sup>74</sup> Annual Reports of the 26 public HEIs in the Czech Republic; the calculation includes weighted average salary of a professor, associate professor, assistant professor, assistant, RDI pedagogical employee and researcher. NBS conversion rate as of 31/12/2021, EUR 1 = CZK 24.858; as of 31/12/2020, EUR 1 = CZK 26.242; as of 31/12/2019, EUR 1 = CZK 25.408; as of 31/12/2018, EUR 1 = CZK 25.724; as of 31/12/2020, EUR 1 = CZK 25.535.

**The sources of funding of the individual PRIs of the SAS and their departments vary.** The primary proportion of funds for nearly all PRIs comes from allocations from the from the SB chapter for the SAS. The ESIF and grants were predominantly utilised by the PRIs in natural and chemical sciences, notably the Biomedical Research Centre, the Institute of Landscape Ecology and the Institute of Forest Ecology. The Centre for Advanced Materials Applications (CEMEA) has a specific position. Initially established as a project, it was financed almost exclusively from the ESIF until 30 June 2023.<sup>75</sup> The Science Section II had the most domestic projects,<sup>76</sup> which is one of the reasons for the highest amount of funds received by this Section.

**Graph 3.19 Shares of the SAS PRIs funding sources, 2022**



Source: Annual Reports of the SAS PRIs, own calculations

\* Abbreviations of names of the SAS organizations are original, their English equivalents are provided in the abbreviation section at the end of the document

**In 2021, the PRIs of the SAS generated revenue from business and expert activities amounting to EUR 3 million, increasing to EUR 7 million in the following year.** Some of them collaborated with firms significantly less or not at all, particularly those in social and cultural sciences. It is recommended to increase the proportion of revenue from the main economic activity, especially from contractual research, to 5% of the volume of institutional funding, matching the proportion achieved by the AS CR under core activity contracts, i.e. net of licenses and leases. The transformation of the SAS's institutes from budgetary and contributory organisations to PRIs presents new possibilities<sup>77</sup>, including multi-source funding, full rights to intellectual property, full asset disposal rights, establishment of joint legal entities, enhanced flexibility in collaboration with the private sector and HEIs<sup>78</sup> and transparent management rules akin to those of HEIs.<sup>79</sup>

<sup>75</sup> Central Register of Contracts (CRC) – Partnership Agreement .

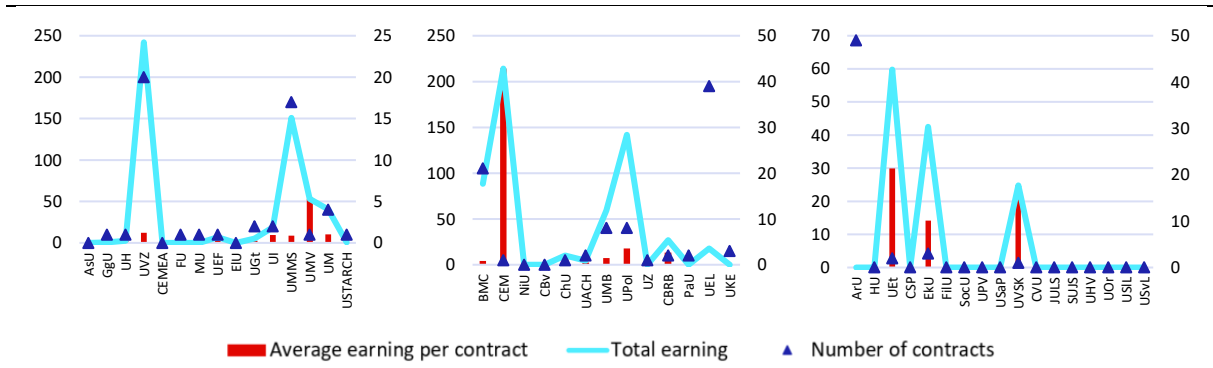
<sup>76</sup> Domestic projects include: 1. VEGA projects; 2. SRDA projects; 3. ESIF/SF OP projects; 4. SASPRO, MoRePro, IMPULZ projects; 5. other projects (EEA FM, scientific and technical projects, projects procured by the Ministries, etc.).

<sup>77</sup> Act No 133/2002 on the SAS.

<sup>78</sup> The transformation of the SAS will bring transparent management rules as well as a stronger position in the European research environment (SAS, 2021).

<sup>79</sup> Prečo transformácia organizácií the SAS na verejné výskumné inštitúcie a prečo práve teraz [Why the transformation of SAS organisations into public research institutions and why now] (SAS, 2020).

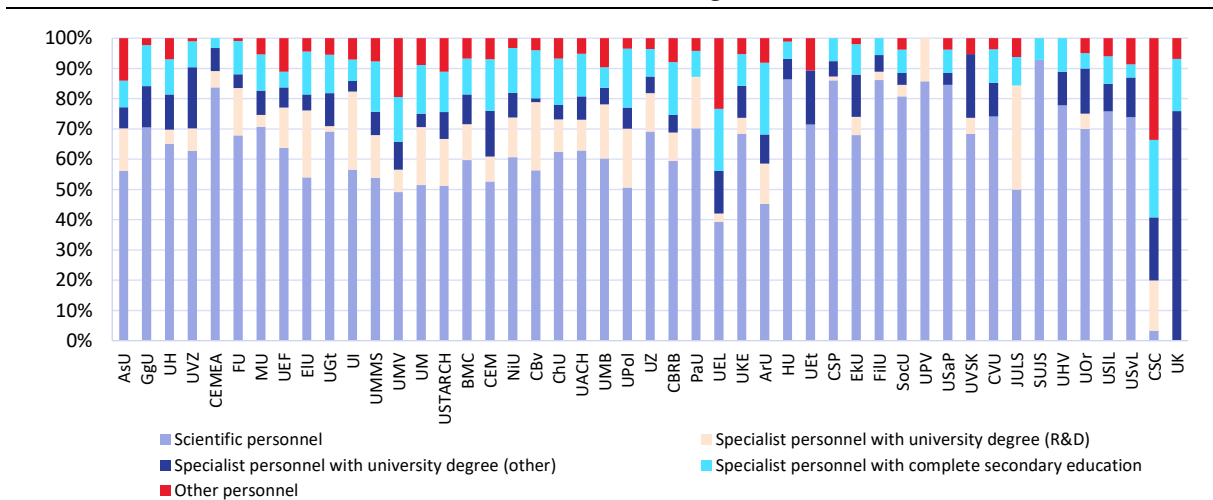
**Graph 3.20 Contractual research, including foreign contracts of the Science Sections I to III of the SAS for 2022, EUR thousand<sup>80</sup> (left axis) and number of contracts (right axis)**



Source: Annual Reports of the SAS PRIs in 2022, own calculations

**The research personnel comprises the largest proportion of employees of the SAS PRIs.** At the end of 2022, there were a total of 2,546 researchers out of a total headcount of 3,489. The Institute of Forest Ecology is the only one with a share of R&D employees less than 50%, attributed to a significant portion of personnel involved in managing of the *Mlyňany* SAS Arboretum, which collects, records, and presents a gene pool of domestic and world’s wood species.<sup>81</sup> By comparison, researchers in the AS CR accounted for less than 42% (4,178), other tertiary educated employees of research units accounted for 20% (2,011), and a substantial proportion of 12% (1,220) consisted of technical and administrative personnel.<sup>82</sup>

**Graph 3.21 Proportions of the SAS PRIs’ employees by category in 2022<sup>83</sup>**



Source: Annual Reports of the SAS PRIs, own calculations

**A big challenge for the SAS’s management is the extreme fragmentation, especially in the Science Section III** where up to 12 PRIs have fewer than 30 employees, including 6 PRIs having 16 or even fewer employees. These figures are comparable to those of a university department or a research group. Moreover, these institutes often work in the same scientific field. To address this

<sup>80</sup> The Institute of Archaeology is the only one to not state the financial benefit of the individual contracts for the organisation.

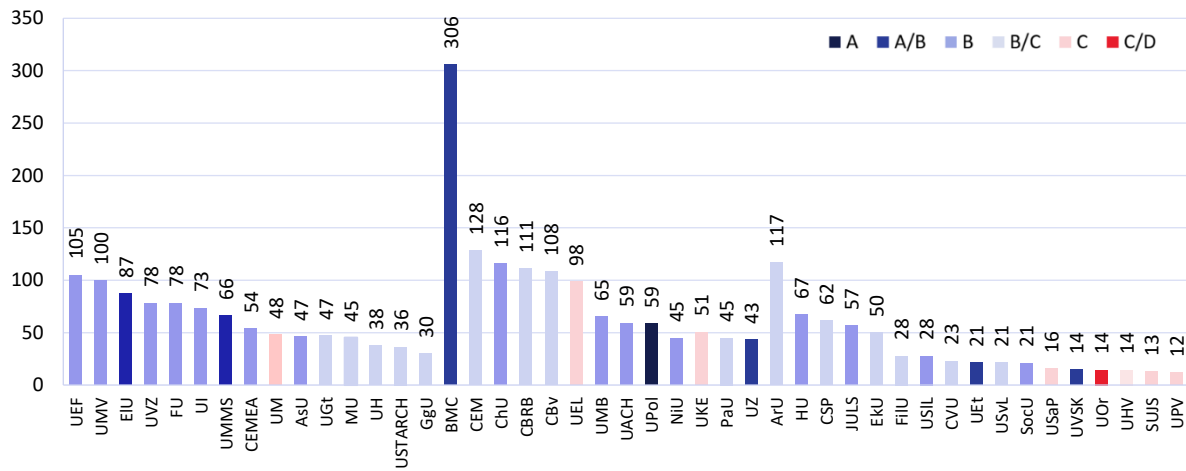
<sup>81</sup> Presidium of the SAS – Founding Document.

<sup>82</sup> Annual Report on the activities of the AS CZ for 2021. Eight categories of employees in total.

<sup>83</sup> Including core employees with employment contracts as of 31 December 2022 (employees with employment contract including maternity leave, work abroad, public office holders, members of the Presidium of the SAS).

issue, it is recommended that individual institutes be integrated into larger entities with at least 30 employees, as is the case with the Sections I and II.

**Graph 3.22 Annual average number of FTE employees by Science Section in 2022 and overall rating of the PRIs<sup>84</sup>**



Source: Annual Reports of the SAS's PRIs; Regular Assessment of the Research Institutes of the SAS 2016-2021; own calculations

**The increase in RDI funding for the SAS must be accompanied by an enhancement in the quality of research.** As outlined in the Action Plan of the National Strategy, any increase in funding is contingent upon modifications in funding allocations. This includes raising the proportion of performance-based funding (currently at 16%) to at least the level of research funding at HEIs, introducing performance agreements, and taking into account institutional assessment through internal accreditation and VER.<sup>85</sup> Given the significant fragmentation of the PRIs, it is advisable to include the integration of institutes into larger units as part of performance agreements.

**According to the results of the institutional assessment of the SAS, the most problematic aspect is the strategy and development potential of the individual PRIs.** Additional resources for institutional funding of the SAS, as foreseen in the National Strategy, should also be directed to strategic priorities identified in the International Panel Report resulting from the assessment of the SAS PRIs or set by the Presidium of the SAS.

**Measure 3.4** Revise the SAS's Annual Reports to include all sources of revenue and expenses, and employment figures for both the Office of the SAS and all SAS organisations, including their organisational units.

**Measure 3.5** Integrate PRIs into larger entities under performance agreements.

**Measure 3.6** Increase the weight of performance-based funding, performance agreements and internal competitive funding to at least 50% of the institutional funding of PRIs from the state budget chapter of the SAS.

<sup>84</sup> Regular Assessment of the Research Institutes of the SAS 2016-2021, a material provided by the Presidium of the SAS.

<sup>85</sup> Action Plan of the National Strategy for Research, Development and Innovation 2030 (VAIA).

### 3.1.3. Sectoral research institutes

#### Some ministries establish sectoral research institutes (SRIs) to fulfil certain research tasks.

Their annual budgets (averaging for 2020-2022) exceed EUR 125 million, with about EUR 78 million from the state budget and approximately EUR 20 million from own funds and EU funds, including co-financing. Out of this, at least EUR 33 million is allocated to research. Additionally, the SRIs employ about 2,300 people, with at least 750 engaged in R&D. For comparison, the SAS has a budget of about EUR 85 million and approximately 3,000 employees. Therefore, SRIs are a significant component of the research ecosystem, highlighting the importance of efficiently utilizing allocated funds, with clearly defined and results of specified quality. It is noteworthy that for some SRIs, only half of their revenues comes from the founder's subsidy, with the remainder sourced from grants and commercial activity (for example, the National Agricultural and Food Centre<sup>86</sup>).

**Table 3.1 Expenditure (in EUR thousand) and employment of sectoral research institutes (2022)**

|  | Expenditures       |                  |          | Employment |               |             |
|--|--------------------|------------------|----------|------------|---------------|-------------|
|  | Total expenditures | R&D expenditures | Of that: | Total      | RDI personnel | Researchers |
| National Agricultural and Food Centre                      | 42,434.3*          |                  | 6,832.3  | 381        | 379.9         | 200.9       |
| National Forestry Centre                                   | 19,385.1           |                  | 515      | 227        | 80.4          | 52.4        |
| State Veterinary and Food Institute in <i>Dolný Kubín</i>  | 9,568.5            |                  |          | 247        |               |             |
| State Geological Institute of <i>Dionýz Štúr</i>           | 9,093.1            |                  |          | 214        |               |             |
| Water Research Institute                                   | 7,189.7            | 7,189.7          | 3,706.1  | 183        | 187.0         | 155.0       |
| Slovak Hydro-meteorological Institute                      | 25,017.7           |                  |          | 449.9      | 58            |             |
| Research Institute of Child Psychology and Pathopsychology | 8,358.9            | 1,005.8          | 1,005.8  | 175        | 60.0          | 60.0        |
| Military Technical and Testing Institute <i>Záhorie</i>    | 5,140.1            |                  |          | 136        |               |             |
| Nation's Memory Institute                                  | 2,676.7            | 217.6            | 217.6    | 92         | 10.0          | 10.0        |
| Institute of Military History                              | 4,999.6            | 4,995.5          | 4,995.5  | 74         | 32.0          | 26.8        |
| Slovak Institute of Metrology                              | 3,744.8            |                  |          | 76         |               |             |
| Labour and Family Research Institute                       | 3,341.0            |                  |          | 38         |               |             |
| Theatre Institute  | 1,430.5            | 127.8            | 127.8    | 41         | 5.0           | 5.0         |
| Geodesy and Cartography Research Institute in Bratislava   | 881.6              |                  |          | 20         |               |             |
| Slovak Historical Institute in Rome                        | 118.5              | 118.5            | 118.5    | 3          | 3.0           | 1.0         |

Source: BIS

Note: Total expenditure and employment data come from BIS, other data from the organisations concerned, if disclosed.

\*Of which, EUR 24 million were grants to other entities, not operating expenses

**According to the VV 6-01 form, these organisations employ over 750 people in R&D.** In some cases, this constitutes the entire personnel, while in others, it represents only a fraction of the total staff. Similarly, R&D expenditures vary among organizations, for many, it forms only a fraction of their total spending, while others are exclusively dedicated to R&D.

**The SRIs were a subject of a compliance and financial audit of central government bodies in 2000<sup>87</sup>, which recommended retaining only some of them.** The audit identified significant risks

<sup>86</sup> Annual Report 2022 (NAFC).

<sup>87</sup> Compliance audit of the activities and financing of central government bodies and organisations within their jurisdiction (INEKO 2008).

associated with the direct management of these institutions by the Ministries. These risks included departmentalism, inefficient resource allocation, a preference for historical and administrative incremental approaches over open competition, low transparency of conducted activities and funding, insufficient link between research and its practical applications, and duplication and fragmentation. Many research activities performed by the SRIs are currently conducted or could potentially be undertaken by HEIs and the PRIs of the SAS.

**According to the audit, it is important to preserve institutions that conduct applied research whose results are directly utilised by central government bodies or other public institutions in their decision-making processes.** This includes the creation of databases, expertise, and analyses needed by public institutions. However, the audit recommended that institutions conducting basic and applied research or consultancy services should be transformed into units within HEIs, research institutes of the SAS, a non-profit organisations, or a private entities.

**The available data indicate a high degree of variability in the research output of the SRIs, even when considering the number of researchers.** Research output, such as the number of published scientific articles, is not centralized in one source. Major bibliometric databases, such as Web of Science (WoS), are commonly used, but social sciences and humanities are not sufficiently represented in WoS<sup>88</sup>. Additionally, not all publishers are covered in scientific databases. On the other hand, Central Register of Publication Activity (CRPA) does not comprehensively include all Slovak publications, since the obligation to register them in CRPA does not apply to SRIs<sup>89</sup>. Nevertheless, despite the wide range of tasks specified in contracts with the Ministries, SRIs are still expected to publicly disclose the results of their research activities.

**Table 3.2 Sectoral research institutes' outputs according to CRPA (total for the years 2018-2022)**

|  | Number of researchers | WoS Core Collection | Outputs according to CRPA |                   |       |
|--|-----------------------|---------------------|---------------------------|-------------------|-------|
|  |                       | Registered outputs  | Articles                  | Books, monographs | Other |
| National Agricultural and Food Centre                      | 201                   | 253                 | 144                       | 4                 | 123   |
| National Forestry Centre                                   | 52                    | 133                 | 34                        | 3                 | 71    |
| State Veterinary and Food Institute in <i>Dolný Kubín</i>  |                       |                     |                           |                   |       |
| State Geological Institute of <i>Dionýz Štúr</i>           |                       | 53                  | 34                        | 2                 | 157   |
| Water Research Institute                                   | 155                   | 41                  | 26                        | 2                 | 40    |
| Slovak Hydro-meteorological Institute                      |                       | 78                  |                           |                   |       |
| Research Institute of Child Psychology and Pathopsychology | 60                    | 1                   | 41                        |                   | 34    |
| Military Technical and Testing Institute <i>Záhorie</i>    |                       |                     |                           |                   |       |
| Nation's Memory Institute                                  | 10                    | 1                   | 23                        | 4                 | 24    |
| Institute of Military History                              | 27                    | 1                   | 19                        |                   | 32    |
| Slovak Institute of Metrology                              |                       | 36                  |                           |                   |       |
| Labour and Family Research Institute                       |                       | 3                   |                           | 1                 | 8     |
| Theatre Institute  | 5                     |                     | 79                        | 7                 | 181   |
| Geodesy and Cartography Research Institute in Bratislava   |                       |                     |                           |                   |       |
| Slovak Historical Institute in Rome                        | 1                     |                     |                           |                   | 8     |

Source: CRPA, WoS Core Collection

<sup>88</sup>The Scopus database was not available at the time the Review was prepared.

<sup>89</sup> Article 26c of the [Act No. 172/2005](#)

**The SRIs should undergo the same VER assessment as universities or the SAS PRIs.**<sup>90</sup> In the next VER assessment in 2027, the socio-economic impact and research environment should be included as categories in which SRIs can excel, given their orientation toward applied research and direct social impact.

**Measure 3.7** Include sectoral research institutes in the VER 2027 assessment.

### 3.1.4. Applied research institutes

**Applied research institutes are absent in Slovakia at present.** Although several organisations engage in the application of results in practice, they still show a low level of knowledge transfer. Models of state non-profit companies focusing on developing excellence in applied research and linking it to business and commercialising its results can be found abroad.<sup>91</sup> The main benefit of these institutions is their ability to connect socially beneficial research and innovation and manage their subsequent application in practice. The difference compared to standard research institutions is the emphasis on commercially usable applied research, and thus a higher relevance of research activity for the economy and the society, as well as the capacity to generate own resources either through contractual research, intellectual property licensing, or technological spin-offs and consulting services.

**Examples of best practice include the Finnish company VTT Finland, under the Ministry of Economic Affairs and Employment, and the German company Fraunhofer.** The primary sources of funding for these companies are their direct and indirect revenues from the commercialisation of their research, either through the sale of licences and patents, or through creation of spin-off companies. However, they are partially financed from public funds. VTT Finland employs 2,213 people and operates with annual turnover of EUR 261 million. Fraunhofer is an umbrella entity for 76 research institutes and teams, employing over 30,000 people and operating with a budget of EUR 2.9 billion, of which EUR 2.5 billion comes from contractual research. Institutions of this type offer great potential for strengthening research, and for technology transfer in particular.

**Measure 3.8** Design and pilot a concept for an applied research institute in Slovakia in a selected area.

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<sup>90</sup> The above concerns only the SRIs conducting civilian research.

<sup>91</sup> Examples of applied research institutes - [EARTO](#).

### 3.2. Project funding from the state budget

*In recent years, Slovakia's R&D project funding from the state budget has averaged approximately EUR 50 million per year. The Slovak Research and Development Agency (SRDA), acting as a grant agency, distributes approximately EUR 40 million each year. Other domestic grant schemes have distributed between EUR 3 million and EUR 11 million annually from 2019 to 2021. Key recommendations for the SRDA include revising processes to prevent conflicts of interest of members of the Agency's Councils and removing rigid legal regulations governing the Agency's day-to-day operations.*

RDI project funding works effectively in symbiosis with institutional funding, offering several undeniable benefits: (1) it enables support for the best projects and ideas; (2) it facilitates the allocation of resources according to policy priorities, whether thematic or horizontal; and (3) it complements institutional funding, thereby reducing dependency on a single funding source for research institutions.

| <b>Table 3.3 Project RDI funding</b>  |  | <b>2019</b>  | <b>2020</b>  | <b>2021</b>  |
|---------------------------------------|--|--------------|--------------|--------------|
| SRDA                                  |  | 39.3         | 39.5         | 39.1         |
| Of which:                             | SRDA General Call for Proposals              | 38.2         | 35.1         | 33.8         |
|                                       | PP-COVID 2020                                |              | 3.6          | 4.6          |
|                                       | Bilateral calls for proposals                | 0.8          | 0.7          | 0.5          |
|                                       | Other calls for proposals                    | 0.3          | 0.1          | 0.3          |
| R&D incentives for businesses         |  | 10.6         | 3.6          | 2.8          |
| Other R&D subsidies from the MESRS SR |  |              |              |              |
| State defence R&D                     |  | 0.0          | 0.0          | 0.9          |
| R&D financed from the ESIF            |  | 54.0         | 98.8         | 88.0         |
| Grant funding of innovations          |  | 40.2         | 20.8         | 16.4         |
| Of which                              | Innovation vouchers                          |              |              | 6.1*         |
|                                       | ESIF grant support for SME's competitiveness | 40.2         | 20.8         | 10.3         |
| <b>TOTAL</b>                          |  | <b>143.9</b> | <b>162.7</b> | <b>147.2</b> |
| Institutional competitive funding     |  | 20.1         | 21.1         | 22.1         |
| Of which:                             | VEGA – MESRS SR                              | 11.8         | 12.3         | 12.8         |
|                                       | VEGA - SAS                                   | 4.5          | 4.5          | 4.5          |
|                                       | KEGA   | 3.9          | 4.4          | 4.9          |

\* Part disbursed in 2021, the rest in 2022 and 2023

Source: MESRS SR, ME SR, SRDA, SIEA, VFM Unit

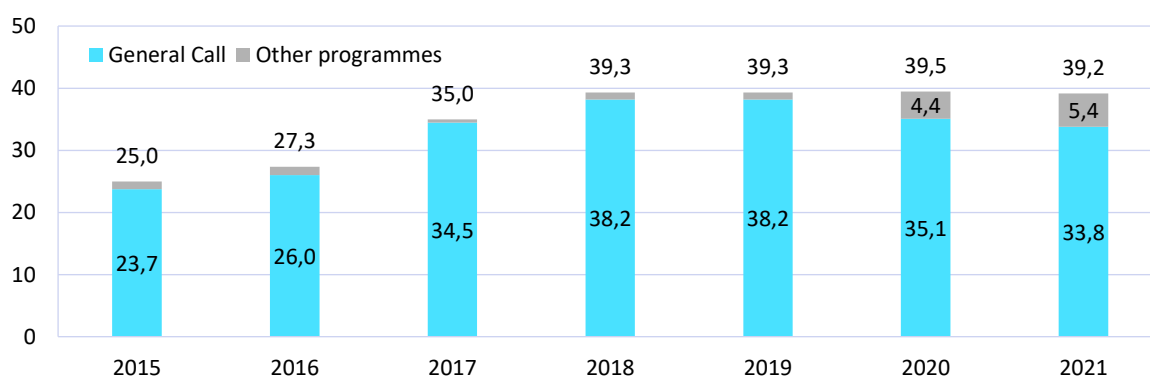


### 3.2.1. Slovak Research and Development Agency

The main R&D grant agency funded from the state budget is the **Slovak Research and Development Agency (SRDA)**. The main mission of the SRDA is to support top basic and applied R&D across all fields of science and technology, including interdisciplinary and multidisciplinary research. The largest call for proposals provided by the SRDA is the so-called General call, which does not have a specific focus. Smaller calls for proposals support initiatives such as bilateral cooperation with various EU and non-EU countries, projects related to the COVID 19 pandemic, and other activities.

**The total budget of the SRDA amounts to 41 million, with EUR 39 million allocated as transfers to recipients.** By comparison, the SRDA's Czech counterpart, the Grant Agency of the Czech Republic (GACR), had a budget of EUR 177 million in 2021, over four times the budget of the SRDA. The budget of the Slovenian Research Agency is even higher, reaching EUR 225 million, although one third of this represents institutional funding. However, these foreign agencies handle a broader spectrum of projects, including mobilities, programmes for young scientists, and infrastructure funding. Of the SRDA's budget, EUR 1.5 million (i.e. 3.7% of the whole budget) is allocated to operating cost, while an additional EUR 0.4 million (1% of the budget) is used for project evaluations. The SRDA has 33 FTE employees. In comparison, GACR's operating costs represent 2.7% of its budget. However, as there are inevitable operating costs irrespective of organization size, a direct comparison is not feasible. Measures to reduce the SRDA's operating cost could include higher project support rates and legislation enabling simplified cost reporting. For illustration, for GACR, annual expenses per ongoing project are EUR 90 thousand; for the SRDA, it is a half of that, even though the administrative burden per project may be the same, and up to 19 employees of the SRDA deal with control, see Chapter 5.

**Graph 3.23 SRDA support by call for proposals/programme, EUR million**



Source: SRDA

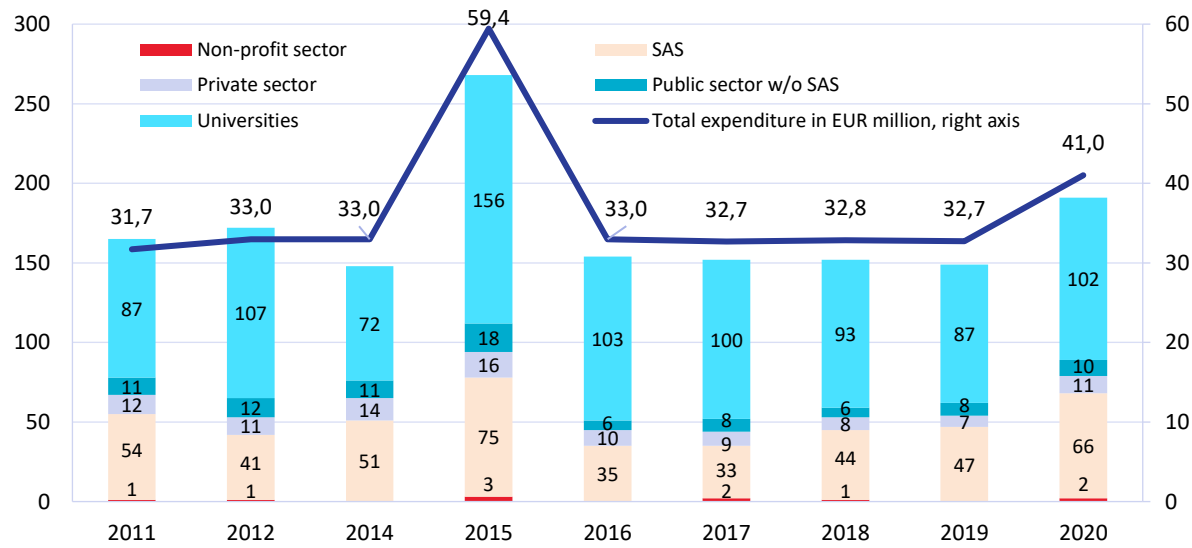
**The SRDA's General Call for Proposals serves as the primary project funding scheme in Slovakia, aiming to support top basic and applied R&D across all fields of science and technology.** It caters to entrepreneurs, firms, and institutions without sector affiliation restrictions. Unlike specific subject-oriented R&D projects, the General Call for Proposals allows applicants to determine the focus, objectives, and content of their projects. Its goal is to enhance the quality of Slovakia's research and development potential, thereby increasing the success rate of Slovak entities in international research cooperation. The competitive nature of project selection encourages applicants to submit the most relevant and original proposals, thereby elevating the overall quality of R&D endeavours. With an average success rate of 30%, only projects with the highest ratings secure funding through this scheme.

**The SRDA monitors the social and economic impact of successful projects.** Applicants must inform the Agency about the benefits of achieved results within three years of project completion. The SRDA tracks various metrics including publications and citations, patents and inventions, applied results, outputs for education and science popularisation, as well as the added value of R&D projects. While data on project outcomes are published on the SRDA’s website in a simplified form, detailed information is not provided. Additionally, exporting data on successful projects is not user-friendly.

**In 2019-2021, the annual average volume of total project funding was EUR 35.7 million.** On average, 94% of financing budget went to the public sector, particularly the SAS and public HEIs, with relatively low support for private sector projects. The Agency monitors the quality of projects throughout its duration. Although the maximum length of project funding is 48 months, the Agency typically provides funding for one budget year at a time. Multi-year projects undergo annual evaluations, and if deficiencies are identified, the SRDA has the authority to stop project funding. For non-business entities, the Agency can fund up to 100% of eligible costs, while for business entities, the level of support may be lower in compliance with the state aid regulations.

**The General Call for Proposals is highly competitive: in 2020, approximately one third of submitted applications were successful.** During that year, a total of 622 applications, requesting a sum of EUR 143 million, were submitted. Following quality assessment by assessors, approximately one third of the projects were successful, resulting in 191 projects receiving funding totalling EUR 41 million. Similar proportions of successful applications were observed in 2018 and 2019. The quality of submitted projects is assessed by the SRDA Council based on expert evaluations, considering five criteria: relevance and scientific rigor, originality, project structure, qualifications of the principal investigator, and qualifications of the research team.

**Graph 3.24 Expenditure and numbers of successful General Call projects by sector, EUR million**



\* The Call was suspended in 2013

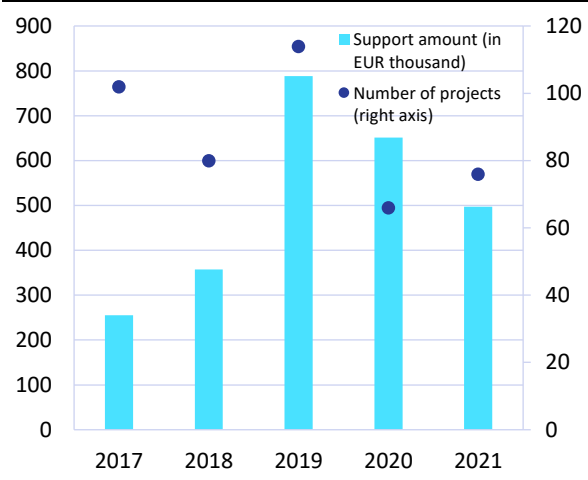
Source: SRDA

**In addition to the General call for proposals, the SRDA also supports R&D through other programmes.** Among these, the largest one in recent years was the PP-COVID 2020 programme, which received more than EUR 8 million in funding for the years 2020 and 2021). This initiative aimed to support projects directly related to the Covid-19 pandemic. Specifically, the call for proposals aimed to support R&D focused on pharmaceuticals (including vaccines) and treatments, pharmaceutical ingredients and raw materials, medical devices, and hospital and medical

equipment. Additionally, it supported data collection and processing, and measures aimed at strengthening the readiness of the Slovak Republic's public health system and its emergency response capabilities to biological threats, with a particular focus on epidemiological procedures and the monitoring of infectious diseases.

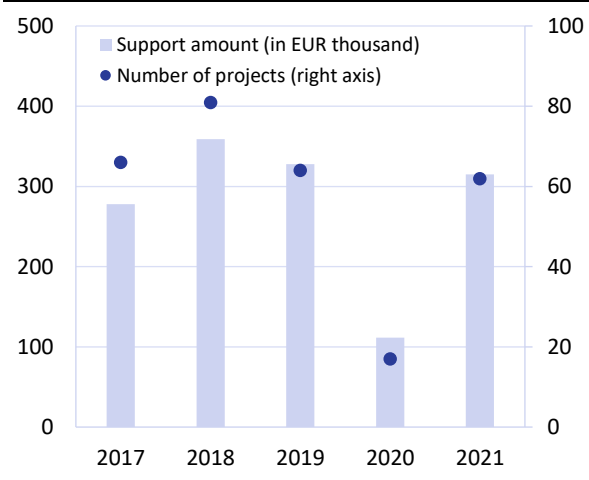
**The objective of bilateral cooperation projects, with an allocation of EUR 0.5-0.8 million per year, is to foster new or enhance existing research and technical collaboration between Slovakia and foreign partners.** These projects support the preparation of joint international initiatives, publications and other outputs, as well as active participation in conferences, organisation of joint scientific events, or sharing of laboratory equipment and technology. However, the number of projects supported through this programme has recently experienced a decline due to various factors, including the COVID-19 pandemic.

**Graph 3.25 The SRDA’s bilateral calls for proposals**



Source: The SRDA’s Annual Reports

**Graph 3.26 Support through smaller SRDA calls for proposals**



Source: The SRDA’s Annual Reports

**A small portion of the budget (up to EUR 0.5 million per year) was allocated to financing other projects.** Under the DO7RP programme, the Agency co-financed projects supported by the European Commission, with an average of EUR 50,000 per year from 2019 to 2021. The H-EUROPE call for proposals aims to encourage the involvement of Slovak R&D institutions in the European Union's research and innovation programme Horizon Europe for the years 2021 to 2027, with approximately EUR 205 thousand allocated in 2021. The Danube Strategy programme supports collaborative R&D projects between the countries of the Danube region and France, with an allocation of approximately EUR 77,000 per year from 2020 to 2021. Bilateral programmes and those supporting the participation of Slovak organizations in international consortia of Horizon Europe projects have significant potential, and it is advisable to subject them to analytical review to assess the extent to which the ongoing schemes are successful in achieving their objectives.

**A major challenge for the SRDA primarily involves expanding the portfolio of grant schemes, following the example of other EU countries.** This is closely linked to the need for an increased budget for both new and existing calls for proposals. The SRDA's General Call has remained nearly unchanged for more than a decade, without even adjusting for inflation. Other calls and support schemes have negligible impact on the Slovak research environment.

**In order to increase the credibility of the SRDA and its funding calls, it is necessary to revise internal processes to systematically prevent conflicts of interest.** The current practice, where

Agency Councils determine the final ranking of applications, should be replaced by engaging foreign expert panels for larger projects, as stipulated by the latest amendment to the Act No. 172/2005 and the rules of the Binding Methodology. The current practice in that a Council member is abstaining from physically attending the assessment of projects due to direct conflict of interest, such as institutional affiliation, is insufficient as it fails to address indirect conflicts of interests, such as potentially more strict assessment of their competition. To bolster transparency, independence, and expertise within the Agency's management, it would be beneficial to introduce external validation of selecting members of the SRDA Presidium. This could be achieved by, for instance, employing an international panel of experts rather than direct nomination by the Minister of Education, or implementing a public selection process for the Director of the SRDA including a public hearings for candidates, and consequently increasing executive responsibilities and commensurate remuneration for SRDA management members, reflecting their significant responsibility for the use of public resources, and potentially further increase in compensation.<sup>92</sup>

**The third significant change that the Agency must undergo is removal of several rigidities within the legislation governing the SRDA**, namely the Act No. 172/2005 and Act No. 357/2015 on financial control and audits and Act No. 523/2004 on the budgetary rules of public administration. In the case of Act No. 172/2005, this concerns, for example, the Agency's Councils, detailed requirements for the formal content of applications, eligible cost, and the formal process of funding successful applications. Without such legislative changes, it is impossible to implement processes that align with the Agency's needs. Regarding Act No. 357/2015, this concerns, for example, the option of utilising simplified cost reporting.

**Measure 3.9** Increase the maximum funding support per project in the SRDA's General Call.

**Measure 3.10** Revise the SRDA's operating processes to systematically mitigate potential conflicts of interest among its Councils' members, primarily through the introduction of evaluations by international expert panels.

**Measure 3.11** Remove the rigid provisions on the operation of the SRDA from the Act No 172/2005.

### 3.2.2. VEGA and KEGA grant schemes

**The Scientific Grant Agency (VEGA) operates an internal grant scheme of the MESRS SR and the SAS. In 2022, it allocated EUR 12.8 million to HEIs and EUR 4.7 million to the SAS PRIs through project funding.** VEGA oversees the coordination of the selection and evaluation process for basic research projects conducted by both HEIs and SAS PRIs. It suggests the amount of project funding for selected new and ongoing research projects from institutional funds. Annually, approximately 1,000 projects seek support from VEGA.

**Projects undergo evaluation by VEGA's committees in two rounds, with an initial rejection rate of approximately 15% during the first round.** The first round entails assessing whether a project falls under basic research, verifying the principal investigator's qualification based on their publication record, and evaluating the adequacy and suitability of financial requirements. Projects meeting these criteria proceed to the second selection round. During the second round involves, committee members conduct anonymous evaluations of projects, assigning scores ranging from 0

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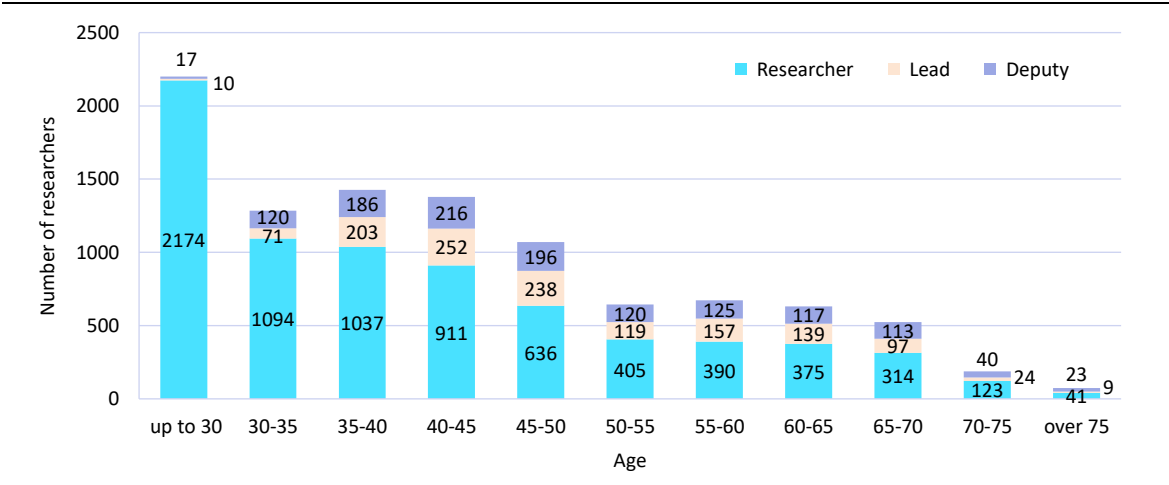
<sup>92</sup> While Article 14(4) of Act No. 172/2005 includes public hearings of candidates, the implementation of these hearings into the decision of the Minister of Education remains unclear.

to 100 points to each. Projects failing to achieve satisfactory score are rejected in this round. Consequently, VEGA eliminates approximately 15% of projects in the first round and provides funding to approximately half of the remaining projects in the second round.

**More than two thirds of researchers at HEIs and the SAS are involved in at least one VEGA project.**<sup>93</sup> The average grant size for HEIs and for the SAS is approximately EUR 10,000 and a little over EUR 7,000, respectively, per year. For researchers, this funding serves as a form of “pocket money” to support their research. In addition, out of the total number of publications in WoS, 39% were funded by VEGA. However, this number may suggest a distorted picture since due to insufficient institutional funding for research, VEGA often becomes the sole option for scientists to finance minor expenses such as business travel, publication costs, computers and other operational expenses. This is not the intended aim of project funding, and as a result, it leads to significant allocation inefficiency. The energy expended in preparing, evaluating, and administering grants detracts from researchers’ time that could otherwise be dedicated to productive research. While the absence of control mechanism specified in Act No 357/2015 alleviates this burden to some extent, a random audit by the Supreme Audit Office (SAO) revealed a 13% sample error rate<sup>94</sup>. However, these errors primarily pertained to minor accounting discrepancies without impacting the projects’ objectives or completion. A potential solution for VEGA and other project funding mechanisms lies in implementing simplified cost reporting (in the Act No 357/2015). This adjustment would enable the agency to focus on monitoring the attainment of project objectives and KPIs, rather than engaging in time-consuming and inefficient control of payment receipts. For more details see Chapter 3.1.

**The VEGA agency is falling short in achieving one of its objectives, namely the support of young scientists.** Although researchers under the age of 35 account for up to 34.5% of all researchers, only 6% are among principal investigators.<sup>95</sup>

**Graph 3.27 Numbers of researches in VEGA projects by age**



Source: VEGA

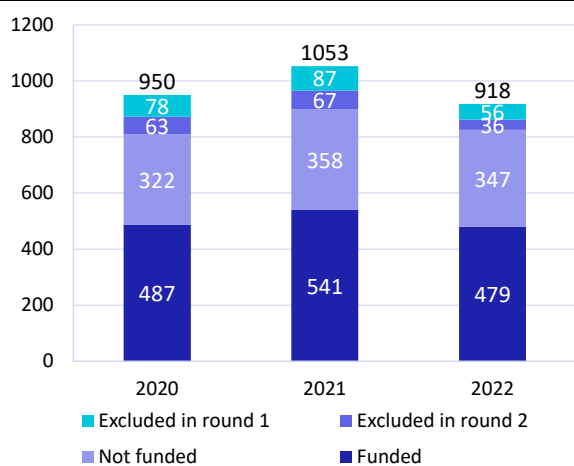
<sup>93</sup> Annual Report of the Scientific grant Agency of the MESRS SR and the SAS (VEGA) for 2021.

<sup>94</sup>The most frequent deficiencies were concerned with non-compliance with the Act on travel reimbursements, errors in the final report, use of funds earmarked for current expenditure for capital expenditure instead, etc. <sup>94</sup>The most frequent deficiencies were related to non-compliance with the Act on travel reimbursements, errors in the final report, and misuse of funds earmarked for current expenditure for capital expenditure instead, etc. (SAO SR).

<sup>95</sup> Annual Report of the Scientific Grant Agency of the MESRS SR and the SAS (VEGA) for 2021.

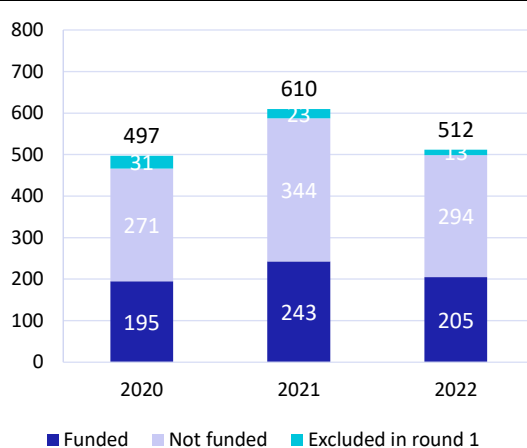
**A comparable project funding scheme does not exist in other countries<sup>96</sup>.** Typically, grant agencies initiate grant calls that are open to all applicants. A separate grant call reserved only for HEIs and the Academy of Sciences is an exception among the examined countries.

**Graph 3.28 Number of VEGA projects**



Source: MESRS SR

**Graph 3.29 Number of KEGA projects**



Source: MESRS SR

**The Cultural and Educational Grant Agency (KEGA) is an internal grant scheme of the MESRS SR aimed at providing financial support for R&D projects in the fields of education and creative arts.** Grants are exclusively available to employees of public HEIs. Less than half of the submitted proposals receive support, with an average grant amount of approximately EUR 7,400 per year.

**It is recommended to replace the VEGA and KEGA schemes with direct institutional funding or grant schemes for young scientists.** Compared to SRDA grants, the success rate of new proposals seems to be higher (37% for KEGA and 44% for VEGA in case of HEIs). They mainly serve to finance operating cost of research sites and, given a relatively high success rate of proposals, competitive funding with all the related administration costs does not need to be used. In contrast, there is a shortage of schemes for young scientists in comparison with other countries. Part of VEGA and KEGA funds could be reallocated for such support.

### 3.2.3. Research and development incentives for business

**The purpose<sup>97</sup> of the incentives scheme is to support R&D in the private sector.** Support is provided for both basic and applied research, experimental development, preparation of project feasibility studies, industrial property protection, and temporary assignment of highly qualified personnel. The interconnectedness and interdependence between public and private R&D spending shows that an increase in public R&D spending often drives an increase in private spending (Falk, 2006<sup>98</sup>).

<sup>96</sup> In countries examined in Chapter 5.

<sup>97</sup> Incentives are governed by the Act No. 185/2009 on incentives for R&D and on amendments to the Act No. 595/2003 on income tax, as amended; this is not an established regular scheme but a subsidy.

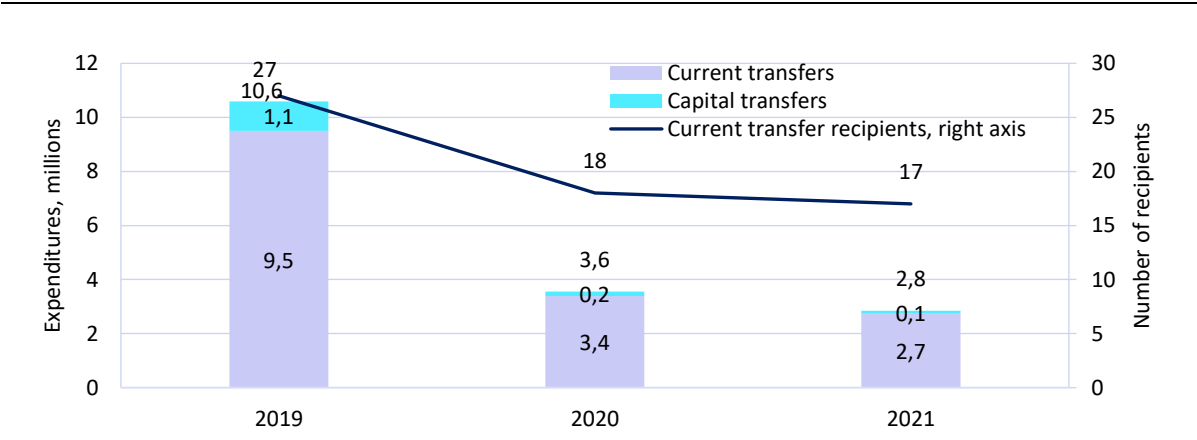
<sup>98</sup> FALK, M., 2006. What drives business Research and Development (R&D) intensity across Organisation for Economic Co-operation and Development (OECD) countries? *Applied Economics*, vol. 38, Issue 5, pp. 533-547.

**In 2018, 27 enterprises were supported and they also received funding in the following years, while the average support was EUR 214,000 per entity per year. In 2019 - 2021, volume of incentives on average EUR 5.7 million per year were provided.** The scheme is competitive, successful projects are selected based on expert evaluations by Slovak or foreign experts that are subsequently assessed by a committee established by the MESRS SR, evaluations analysing projects from a financial point of view, and in terms of the project contribution to a given scientific field. The assessment process is fully handled by the Ministry. Despite relatively generous funding per project (up to EUR 1.3 million), the success rate was relatively high (27 out of 46 projects were successful). Since 2022, no support through incentives scheme has been provided, as the projects from the last call announced in 2018 have been completed.

**The scheme lacks disclosure and monitoring of key indicators allowing evaluation of its effectiveness.** Several scheme objectives are quantifiable, which allows for their monitoring and subsequent evaluation. One example is increasing R&D personnel or increasing R&D expenditure in the business sector. It is important to ensure a high-quality assessment of outcomes in order to ensure targeting specific areas of R&D, as well as transparency and information for taxpayers about efficiency of the use of public resources.

**It is recommended to eliminate the current scheme and instead introduce a different type of grant program for businesses.** This could be structured as thematic calls, based on smart specialization domains and missions, or modelled after examples of best international practices, such as the EIC within Horizon Europe or programs of the Israel Innovation Authority.

**Graph 3.30 Expenditure on R&D incentives, EUR million**



Source: MESRS SR

**Measure 3.12** Remove the instrument of R&D incentives from legislation and introduce support for business based on the Horizon Europe, or another type of a functional model from abroad.

**3.2.4. Research and development to support the state’s defence**

**In 2021, the Ministry of Defence of the Slovak Republic (MD SR) supported defence R&D with a subsidy in the amount of EUR 0.9 million.** The primary objective of the scheme was to enhance the technological know-how of research entities and promote the adoption of green defence principles. The scheme operates on a competitive bases, with subsidy applications assessed by a committee according to predetermined criteria. It is open to both the private and public sectors. Eight proposals received funding. The rate of project co-financing under the scheme varies based on the type of

research and the size of the enterprise, with higher support allocated to small enterprises and basic research. The MD SR is specific in that its expenditure for the support of state defence and associated R&D are funded exclusively from the state budget<sup>99</sup>.

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<sup>99</sup> The support for R&D in the state defence is based on Article 26(1) and (4) of the Act No. 319/2002 on the defence of the Slovak Republic, as amended by the Act No. 330/2003.



### 3.3. Project funding from the European Structural and Investment Funds

*The annual project funding from the ESIF ranged between EUR 120 million and EUR 170 million from 2020 to 2022. This funding was administered through the Research Agency (RA) of the Ministry of Education, Science, Research and Sports of the Slovak Republic (MESRS SR), the Ministry of Economy of the Slovak Republic (ME SR), and the Slovak Innovation and Energy Agency (SIEA). The support primarily targets the development of research and innovation capacities, cross-sectoral cooperation, participation in European programmes and the competitiveness of small and medium-sized enterprises (SMEs). It is recommended to focus mainly on ex-post evaluation of the impact, transferring of a portion of the funds to the Horizon Europe programme, and creating schemes funded from the state budget that are complementary to the ESIF for projects in the Bratislava Region.*

#### 3.3.1. Support for participation in the Horizon Programme and international cooperation projects

**Activities were aimed at supporting the participation of Slovak entities in ERA projects and initiatives, such as Horizon 2020 or other European activities.**<sup>100</sup> The primary objectives included increasing the number of project proposals involving Slovak entities submitted for Horizon 2020 calls, enhancing the success rate of project participations, and fostering greater involvement in international activities, particularly within international and European programmes. Increased participation in international programmes and partnerships serves not only an additional funding source for domestic research but also facilitates spill-over effects from partners and, importantly, reflects the quality of Slovak institutions.

**Public funds in the amount of EUR 9.5 million were invested from the ESIF 2014-2020 in participation in the Horizon Programme and international cooperation.** Of this amount, EUR 8.5 million originated from the EU, while the remaining EUR 1 million was co-financed by the Slovak Government. Despite the contracted support amounting to EUR 42.5 million, the absorption of the entire contracted sum has been delayed due to the postponed announcement of major calls in 2020 and 2021. Apart of the COVID call, only a minimal amount of funding was allocated for specific Objective "1.1.2 Increase the participation of the Slovak Republic in international cooperation projects" (Objective (9.2 in OP II). Funding provided under priority axes 3 and 4 (11 and 12 in OP II) targeted "Seal of Excellence" projects and support for the involvement of enterprises in the "SME Instrument", which is also in line with the policy. In addition to demand-oriented projects, participation in international cooperation is also supported through the SK4ERA National Project managed by the SCSTI (for more details see Chapter 4 on ecosystem support), but also through the National Project called Support for SME Internationalisation managed by the SBA.

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<sup>100</sup>European Technology Platforms/Joint Technology Initiatives, Eureka, COST, tars2, Eranet, EU Strategy for the Danube Region etc.

**Table 3.4 ESIF calls for proposals for support of international cooperation in R&D (in EUR million)**

| Call                      | Description   | Contracted  |             |            |             | Absorption  |            |            |            |
|---------------------------|---|-------------|-------------|------------|-------------|-------------|------------|------------|------------|
|                           |   | Total       | EU          | SB         | OF          | Total       | EU         | SB         | OF         |
| OPVal-VA/DP/2018/1.1.2-01 | Support for international research projects approved in the H2020 programme   | 1.4         | 1.2         | 0.2        | 0.1         | 1.0         | 0.9        | 0.1        | 0.0        |
| OPII-VA/DP/2020/9.2-01    | Support for the participation of Slovak research institutions in international research projects aimed at combating the COVID-19 pandemic | 17.7        | 14.8        | 1.4        | 1.5         | 5.2         | 4.3        | 0.4        | 0.5        |
| OPVal-MH/DP/2018/3.2.1-18 | Support for the participation of SMEs in the SME Instrument (feasibility study)   | 1.4         | 1.0         | 0.0        | 0.4         | 1.4         | 1.0        | 0.0        | 0.4        |
| OPVal-MH/DP/2018/4.1.1-19 | Support for the participation of SMEs in the SME Instrument (feasibility study), BSGR   | 1.3         | 0.6         | 0.3        | 0.4         | 1.3         | 0.6        | 0.3        | 0.4        |
| OPII-MH/DP/2021/11.3-32   | Support of SoE projects   | 17.6        | 12.3        | 0.0        | 5.3         | 1.7         | 1.2        | 0.0        | 0.5        |
| OPII-MH/DP/2021/12.1-33   | Support for SoE projects - BSGR   | 15.6        | 7.8         | 2.9        | 4.8         | 1.0         | 0.5        | 0.2        | 0.3        |
| <b>TOTAL</b>              |   | <b>55.0</b> | <b>37.7</b> | <b>4.8</b> | <b>12.5</b> | <b>11.6</b> | <b>8.5</b> | <b>1.0</b> | <b>2.1</b> |

Data as of 01/01/2023, Source: MESR and MESRSR

**For the aim in the new programming period to enhance the participation of Slovak entities in European research and innovation programmes EUR 122 million are allocated.** This represents a substantial increase compared to the previous period, especially when combined with resources allocated under Investment 1 of the RRP. This initiative aligns with the objectives of the National Strategy, which focuses on strengthening the involvement of Slovak entities in European programmes. Facilitating the use of allocated funds could involve transferring a portion of these funds to the Horizon Europe program, as proposed in measure No 1.3.6.6 of the Action Plan of the National Strategy. Similar steps have already been taken by EU Member States Lithuania (EUR 18.5 million) and Malta (EUR 5 million).<sup>101</sup> The rationale behind this proposal is that project administration under Horizon Europe is considerably simpler compared to that under the ESIF. For instance, domestic experience indicates that recipients of ESIF support with the Seal of Excellence (SoE) face higher administrative burdens at the national level and limited time flexibility, unlike recipients of SoE support under the Horizon Europe program.

**A persistent problem in the new programming period 2021-2027 is the insufficient allocation for the Bratislava Region.** This problem extends beyond the objective of supporting participation in the Horizon Programme and other international cooperation programmes, encompassing all specific objectives and measures of the “Science, research and innovation” priority. The allocation for the Bratislava Region is less than 10% of the available funds, reflecting the cohesion policy’s focus on regional development. However, a significant portion of R&D capacity is concentrated in Bratislava, accounting for 47% of total expenditure and 47% of R&D employees).<sup>102</sup> Therefore, it is recommended to utilize additional resources associated with the National Strategy for complementary financing to the ESIF, in addition to funding other activities. This would significantly enhance the development of the research and innovation ecosystem in Bratislava. Such support would generate positive spill-over effects on the Slovakia-wide ecosystem.

**Measure 3.13** Reallocate funds from the Programme Slovakia 2021-2027 to the Horizon Europe programme.

<sup>101</sup> Information from the RIMA meeting of 07 June 2023.

<sup>102</sup> Eurostat, [RD\_E\_GERDREG] and [RD\_P\_PERSREG], 2020

**Measure 3.14** Create schemes funded from the state budget that are complementary to the ESIF for the Bratislava Region’s projects.

### 3.3.2. Support of research and development projects managed by the Research Agency

**A large part of investments from the ESIF was allocated to R&D projects aimed at smart specialisation and cross-sectoral cooperation domains.** These funds were intended to support excellent research, enhance research activities, and foster R&D collaboration and partnerships between the business sector and research. However, an issue with these investments has been recurring cancellations, postponement, or complete discontinuation of calls aimed at collaboration between academia and firms. Calls to support strategic industrial R&D centres were completely cancelled across all domains<sup>103</sup>, as were calls for long-term strategic research support in two domains. Additionally, calls for the “Industry for the 21st century” and “Digital Slovakia and creative industry” domains were also cancelled.

**The public funding of R&D projects provided by the Research Agency from the ESIF amounts to EUR 149 million,** with EUR 134 million originating from the ESIF and the remainder being co-financed from the state budget. Although the contracted support amount is nearly double at EUR 290 million, delayed evaluation of proposals has resulted in delayed absorption of the entire contracted volume, posing a potential risk. For the new programming period, it is recommended that a significant portion of calls be launched in 2024-2025 to align with the calls under the RRP (announced in 2023) and, at the same time, enough time is left for the implementation of successful projects.

| Call                      | Description  | Contracted |      |     |     | Absorption |      |     |     |
|---------------------------|--|------------|------|-----|-----|------------|------|-----|-----|
|                           |  | Total      | EU   | SB  | OF  | Total      | EU   | SB  | OF  |
| OPVal-VA/DP/2018/1.1.3-10 | Support for R&D capacities in the “Public health and medical technology” area  | 24.1       | 20.5 | 2.6 | 1.0 | 24.1       | 20.5 | 2.6 | 1.0 |
| OPVal-VA/DP/2018/1.1.3-09 | Support for R&D capacities in the “Digital Slovakia and creative industry” area  | 11.1       | 9.4  | 1.1 | 0.5 | 11.1       | 9.4  | 1.1 | 0.5 |
| OPVal-VA/DP/2018/1.1.3-08 | Support for R&D capacities in the “Healthy food and environment” area  | 9.0        | 7.7  | 1.1 | 0.3 | 9.0        | 7.7  | 1.1 | 0.3 |
| OPVal-VA/DP/2018/1.1.3-07 | Support for R&D capacities in the “Industry for the 21st century” area   | 25.8       | 21.9 | 2.6 | 1.3 | 25.8       | 21.9 | 2.6 | 1.3 |
| OPVal-VA/DP/2018/1.1.3-06 | Support for R&D capacities in the “Transportation for the 21st century” area   | 9.0        | 7.6  | 0.9 | 0.4 | 9.0        | 7.6  | 0.9 | 0.4 |
| OPVal-VA/DP/2018/1.1.3-05 | Support for the mobilisation of excellent research teams in the RIS3 SK specialisation areas outside Bratislava Region | 31.0       | 26.0 | 3.2 | 1.7 | 15.6       | 13.0 | 1.6 | 1.0 |

<sup>103</sup> The domains represent areas of specialisation of Slovak research and innovation as defined in the “ Strategy of Research and Innovation for Smart Specialisation of the Slovak Republic” adopted in 2013 as *ex ante* condition for the Multiannual Financial Framework 2014-2020. The above-mentioned domains were “Transportation for the 21st century”, “Industry for the 21st century”, “Digital Slovakia and creative industry”, “Public health and health technology” and “Healthy food and environment”. In 2021, the updated “ Strategy of Research and Innovation for Smart Specialisation of the Slovak Republic 2021-2027” was adopted with updated domains “Innovative industry for the 21st century”, “Mobility for the 21st century”, “Digital transformation of Slovakia”, “Healthy society” and “Healthy food and environment”.

| Call                      | Description  | Contracted   |              |             |             | Absorption   |              |             |             |
|---------------------------|--|--------------|--------------|-------------|-------------|--------------|--------------|-------------|-------------|
|                           |  | Total        | EU           | SB          | OF          | Total        | EU           | SB          | OF          |
| OPVal-VA/DP/2018/2.1.1-05 | Support for the mobilisation of excellent research teams in the RIS3 SK specialisation areas within Bratislava Region  | 2.0          | 1.0          | 0.8         | 0.2         | 1.1          | 0.5          | 0.5         | 0.1         |
| OPII-VA/DP/2020/9.4-01    | Support for the mobilisation and use of the research institutions' potential in combating the COVID-19 pandemic and reducing the negative consequences of the pandemic | 91.4         | 76.3         | 6.7         | 8.3         | 25.2         | 20.9         | 1.5         | 2.9         |
| OPVal-VA/DP/2018/1.2.1-08 | Support for the long-term strategic research in the "Public health and medical technology" area  | 49.4         | 40.5         | 4.0         | 4.8         | 16.2         | 13.2         | 1.2         | 1.8         |
| OPVal-VA/DP/2018/1.2.1-06 | Support for the long-term strategic research in the "Healthy food and environment" area  | 40.9         | 33.9         | 4.1         | 2.8         | 12.5         | 10.3         | 1.1         | 1.1         |
| OPVal-VA/DP/2018/1.2.1-04 | Support for the long-term research and development projects in the "Transportation for the 21st century" area  | 25.1         | 19.6         | 1.5         | 4.1         | 12.4         | 9.8          | 0.8         | 1.9         |
| <b>TOTAL</b>              |  | <b>318.8</b> | <b>264.4</b> | <b>28.6</b> | <b>25.4</b> | <b>162.0</b> | <b>134.8</b> | <b>15.0</b> | <b>12.3</b> |

*Data as of 01/01/2023, Source: MESRS SR*

### 3.3.3. Support for research, development and innovation projects managed by the Ministry of Economy of the Slovak Republic

**Calls for proposals focus on supporting business RDI with the goal of increasing their competitiveness on an international scale.** Financed activities concentrate on building and developing research and innovation capacities within firms, as well as on projects with innovative potential. Priority was given to supporting small and medium-sized enterprises (SMEs), although large firms could also be supported. The objective is to increase the share of firms conducting RDI, enhance competitiveness, reduce the regional unemployment rate, and increase the utilisation of intellectual property right protection by firms.

**So far, EUR 260 million has been utilised to support RDI projects within the jurisdiction of the ME SR,** with a contracted volume reaching EUR 480 million). Given the substantial volume of contracted public funds, it is necessary to analyse the impact of this support on the expansion of R&D capacities.<sup>104</sup> The majority of investments were allocated to projects at higher Technology Readiness Levels (TRL). The design of the calls resulted in financing projects focused on the acquisition of ready-to-use technologies. For example, in the two largest calls "Support for smart innovation (Industry 4.0)" and "Support for innovation and technology transfer", there was a relatively high level of support intensity (up to 55% for small enterprises and up to 35% for large enterprises). The analysis should not only assess the impact on the individual competitiveness of companies but also on the contribution to sustainable growth of RDI capacity.

**In the new programming period, innovation support will primarily be implemented through financial instruments.** The rationale behind public support for RDI in the private sector lies in the

<sup>104</sup> Only a limited number of analyses were conducted in the past, see [OPII Evaluation](#).

presence of positive externalities and high risk, especially relevant to lower TRLs. While enhancing individual competitiveness of firms is a legitimate objective of public policies (the proportion of enterprises implementing product or process innovation is included in the indicators of the EIS), the intensity of state support should be adjusted accordingly. For instance, this adjustment can be achieved by utilising financial instruments, as envisaged in the Programme Slovakia.

**Taking into consideration the specifics of the functioning of so-called distributed teams would help simplify RDI project management, especially within firms.** Experience from implementation, such as Seal of Excellence projects, shows that innovative solutions today are no longer solely developed by in-house employees but also by suppliers acting as contractors. The Labour Inspectorate’s guidelines for this area would significantly contribute to the attractiveness of research and innovation projects, including Seal of Excellence projects. Treating expenses for contractors (suppliers of innovative solutions or their components) not as service expenses, as is currently done, but as part of personnel expenses, would be desirable.

| <b>Table 3.6 Calls for proposals targeting Objectives 1.1.2 and 2.2.2.</b> |  |                |              |            |              |              |              |            |              |
|--|--|----------------|--------------|------------|--------------|--------------|--------------|------------|--------------|
| Call   | Description  | Contracted     |              |            |              | Absorption   |              |            |              |
|  |  | Total          | EU           | SB         | OF           | Total        | EU           | SB         | OF           |
| OPII-MH/DP/2022/9.5-35   | Support for innovation and technology transfer   | 0.0            | 0.0          | 0.0        | 0.0          | 0.0          | 0.0          | 0.0        | 0.0          |
| OPII-MH/DP/2021/9.5-34   | Support for IPCEI EuBatIn (Phase 1)  | 78.3           | 57.8         | 0.0        | 20.5         | 0.6          | 0.4          | 0.0        | 0.2          |
| OPII-MH/DP/2021/9.5-31   | Synergistic support for projects that received regional investment aid                   | 62.0           | 16.8         | 0.0        | 45.3         | 33.6         | 9.1          | 0.0        | 24.5         |
| OPII-MH/DP/2020/9.5-28   | Support for clusters   | 2.6            | 2.2          | 0.0        | 0.4          | 0.5          | 0.4          | 0.0        | 0.1          |
| OPVal-MH/DP/2018/1.2.2-21  | Support for smart innovation (Industry 4.0)  | 368.9          | 151.2        | 0.0        | 217.7        | 131.0        | 55.9         | 0.0        | 75.1         |
| OPVal-MH/DP/2018/1.2.2-17  | Support for innovation through R&D activities - “Digital Slovakia and creative industry” | 17.1           | 12.5         | 0.1        | 4.5          | 12.2         | 8.9          | 0.1        | 3.2          |
| OPVal-MH/DP/2018/1.2.2-16  | Support for innovation through R&D activities - “Public health”                          | 4.4            | 3.4          | 0.0        | 1.0          | 0.4          | 0.3          | 0.0        | 0.1          |
| OPVal-MH/DP/2018/1.2.2-15  | Support for smart innovation (Industry 4.0)  | 51.4           | 21.5         | 0.0        | 29.9         | 44.3         | 18.3         | 0.0        | 26.0         |
| OPVal-MH/DP/2017/1.2.2-13  | Innovation support through R&D activities - “Healthy food and environment”               | 4.2            | 3.0          | 0.0        | 1.2          | 1.4          | 0.9          | 0.0        | 0.5          |
| OPVal-MH/DP/2017/1.2.2-12  | Support for innovation through R&D activities - “Industry”                               | 56.1           | 33.7         | 0.3        | 22.1         | 25.5         | 16.4         | 0.2        | 8.9          |
| OPVal-MH/DP/2017/1.2.2-11  | Support for innovation through R&D activities - “Transportation”                         | 15.2           | 10.3         | 0.1        | 4.9          | 9.1          | 6.2          | 0.1        | 2.8          |
| OPVal-MH/DP/2016/1.2.2-02  | Support for innovation and technology transfer   | 340.8          | 153.1        | 0.0        | 187.8        | 302.0        | 135.6        | 0.0        | 166.4        |
| OPII-MH/DP/2020/10.3-29  | Support for clusters, BSGR   | 1.5            | 0.7          | 0.5        | 0.2          | 0.6          | 0.3          | 0.2        | 0.1          |
| OPVal-MH/DP/2018/2.2.2-20  | Support for innovation through R&D activities - “All RIS3 domains, BSGR”                 | 18.0           | 9.0          | 4.0        | 5.1          | 9.4          | 4.7          | 2.2        | 2.5          |
| <b>TOTAL</b>   |  | <b>1,020.7</b> | <b>475.1</b> | <b>5.1</b> | <b>540.5</b> | <b>570.8</b> | <b>257.6</b> | <b>2.9</b> | <b>310.3</b> |

Data as of 01/01/2023, Source: ME SR

**Measure 3.15** Conduct *ex-post* evaluation of projects from calls for proposals for RDI funding from the ESIF.

### 3.3.4. Innovation vouchers

**One of the grant schemes is innovation voucher scheme for enterprises. The Slovak Innovation and Energy Agency (SIEA) allocated an average of approximately EUR 2 million per year** (over EUR 6 million in total) for such schemes through the National Project to Increase the Innovation Performance of the Slovak Economy (ZIVSE NP) and the National Project to Support the Development of Slovakia’s Creative Industry (Creative Industry NP). The SIEA provides companies with both direct financial support through innovation vouchers and indirect support through online advising. The volume of support ranges from EUR 2,000 to EUR 50,000 and is intended to facilitate access to professional services or knowledge that can assist recipients in developing service or product, whether for the domestic or a foreign market. Support may not exceed 85% of the total eligible expenses. Vouchers are also financed under the RRP, with an allocation of approximately EUR 20 million,<sup>105</sup> and under the new Programme Slovakia through the continuation of the ZIVSE NP (over EUR 11 million). In the past, voucher support was provided through the ME SR with an annual budget of around EUR 300,000.

**Mapping of international practice<sup>106</sup> shows that voucher support is highly prevalent; the average support is up to EUR 20 thousand**, and the intensity of support commonly reaches 100% or 80%. Only about a quarter of schemes utilise a support intensity of up to 50%. The most common types are innovative and digital vouchers. *Ex-post* evaluation of results and impact of innovation vouchers is to be conducted under Measure No 1.3.5.4 of the Action Plan of the National Strategy: Mapping and evaluation of support provided to SMEs for non-technological innovation.

| Table 3.7 Innovation voucher schemes and scheme expenditure |              |                   |             |
|---|--------------|-------------------|-------------|
|   | Number       | Amount            | Notice date |
| Innovation vouchers BBSGR                                   | 61           | 843,830           | 22/06/2021  |
| Innovation vouchers IPCEI                                   | 11           | 498,715           | 24/06/2021  |
| Innovation vouchers Slovakia                                | 144          | 1,357,349         | 06/10/2021  |
| Innovation vouchers Healthy Society                         | 26           | 1,200,755         | 02/05/2022  |
| Innovation vouchers Slovakia 2.0                            | 107          | 987,998           | 04/07/2022  |
| Innovation vouchers Slovakia 3.0*                           | 97           | 1,420,000         | 28/11/2022  |
| Innovation vouchers Healthy Society 2.0*                    | 27           | 1,250,000         | 01/02/2023  |
| Creative vouchers   | 1,500        | 6,250,000         | 09/09/2022  |
| <b>TOTAL</b>  | <b>1,973</b> | <b>13,808,647</b> | <b>-</b>    |

\* Expected numbers and amounts since the schemes are not yet closed

Source: SIEA

### 3.3.5. Support for the competitiveness of SMEs

**As part of the support for the competitiveness of SMEs from ESIF funds, support for innovations in enterprises and support for technological and non-technological companies are intertwined.** Grants were provided under the Priority Axes 3 and 4 of the OP R&I (and Priority Axes 11 and 12 of the OP II, respectively). These grants aim to support entrepreneurship and facilitate the creation and growth of competitive SMEs. The support was primarily focused on introducing a new

<sup>105</sup> Patent activities will also be financed through innovation vouchers.

<sup>106</sup> Voucher Schemes in Member States ([European Commission](#)).

or innovated product to the market by the applicant, or innovating the production process, as well as support within the “Catching-up Regions (CuRi)” and for the creative industry.

**Grants from the ESIF of almost EUR 142 million were contracted to support competitiveness and growth of SMEs, of which nearly EUR 95 million had been utilised by the beginning of 2023.**

The aim is to provide systematic support at the inception of business, create conducive conditions for increasing competitiveness of SMEs, and reduce the rate of their closure. The survival rate of SMEs in the market was already higher in 2019 (62%) than the target set for 2023 (52%).<sup>107</sup> Activities were also directed towards supporting growth and innovation in well-established SMEs in a development phase to increase added value and productivity within the value chain and foster clustering and cooperation between SMEs and large companies. However, the proportion of SMEs in generating added value in the private sector, which was expected to increase to 59% by 2023 through these grants, remains below 55% even in 2021,<sup>108</sup> suggesting that the target may not be achieved. Future public spending in this area should prioritise increasing the proportion of enterprises engaged in product or process innovations (EIS indicator), rather than focusing solely on business survival rates.

**Table 3.8 Calls targeting Objective 3.3.1 (in EUR million)**

| Call                      | Description  | Contracted   |              |            |             | Absorption   |             |            |             |
|---------------------------|--|--------------|--------------|------------|-------------|--------------|-------------|------------|-------------|
|                           |  | Total        | EU           | SB         | OF          | Total        | EU          | SB         | OF          |
| OPII-MH/DP/2020/11.3-30   | CuRi support for connecting SMEs and secondary vocational schools, BBSGR                       | 3.5          | 3.0          | 0.2        | 0.3         | 0.1          | 0.1         | 0.0        | 0.0         |
| OPII-MH/DP/2020/11.3-27   | CuRi support for tourism, BBSGR  | 7.4          | 6.3          | 0.0        | 1.2         | 0.2          | 0.2         | 0.0        | 0.0         |
| OPII-MH/DP/2020/11.3-26   | CuRi support for tourism, POSRG  | 5.8          | 4.9          | 0.0        | 0.9         | 0.6          | 0.5         | 0.0        | 0.1         |
| OPII-MH/DP/2020/11.3-25   | CuRi support for connecting SMEs and secondary vocational schools, POSRG                       | 10.0         | 8.5          | 0.5        | 1.0         | 2.5          | 2.2         | 0.1        | 0.3         |
| OPII-MH/DP/2020/11.3-23   | Support for SMEs in <i>Horná Nitra</i> region (EC initiative - transformation of coal regions) | 18.9         | 15.6         | 0.0        | 3.3         | 4.1          | 3.3         | 0.0        | 0.8         |
| OPVal-MH/DP/2017/3.3.1-14 | Support for SMEs' innovation in services - least developed districts                           | 4.3          | 2.7          | 0.0        | 1.5         | 1.6          | 1.0         | 0.0        | 0.6         |
| OPVal-MH/DP/2017/3.3.1-10 | Support for raising SMEs' standards through REACH  | 0.4          | 0.2          | 0.0        | 0.1         | 0.4          | 0.2         | 0.0        | 0.1         |
| OPVal-MH/DP/2017/3.3.1-09 | Support for raising SMEs' performance and functionality standards                              | 0.6          | 0.5          | 0.0        | 0.1         | 0.5          | 0.3         | 0.0        | 0.1         |
| OPVal-MH/DP/2017/3.3.1-08 | Support for SMEs' innovation in manufacturing - least developed districts                      | 62.5         | 32.1         | 0.0        | 30.4        | 47.8         | 24.6        | 0.0        | 23.2        |
| OPVal-MH/DP/2017/4.1.1-07 | Support of creative industry, SMEs in BSGR   | 4.0          | 2.0          | 0.0        | 2.0         | 3.4          | 1.7         | 0.0        | 1.7         |
| OPVal-MH/DP/2016/3.1.1-03 | Support for SMEs' innovation, start-ups  | 41.6         | 25.9         | 0.0        | 15.8        | 36.9         | 22.9        | 0.0        | 14.0        |
| OPVal-MH/DP/2016/3.3.1-04 | Support for SMEs' innovation, well-established businesses                                      | 77.9         | 39.7         | 0.0        | 38.2        | 73.7         | 37.5        | 0.0        | 36.3        |
| <b>TOTAL</b>              |  | <b>236.9</b> | <b>141.4</b> | <b>0.7</b> | <b>94.8</b> | <b>171.8</b> | <b>94.5</b> | <b>0.1</b> | <b>77.2</b> |

Data as of 01/01/2023, Source: ME SR

<sup>107</sup> Similarly, for SMEs in the BSGR, the share of profitable enterprises (62%) was above the target set for 2023 (57%), even though it has been decreasing from the maximum of 67% since 2017.

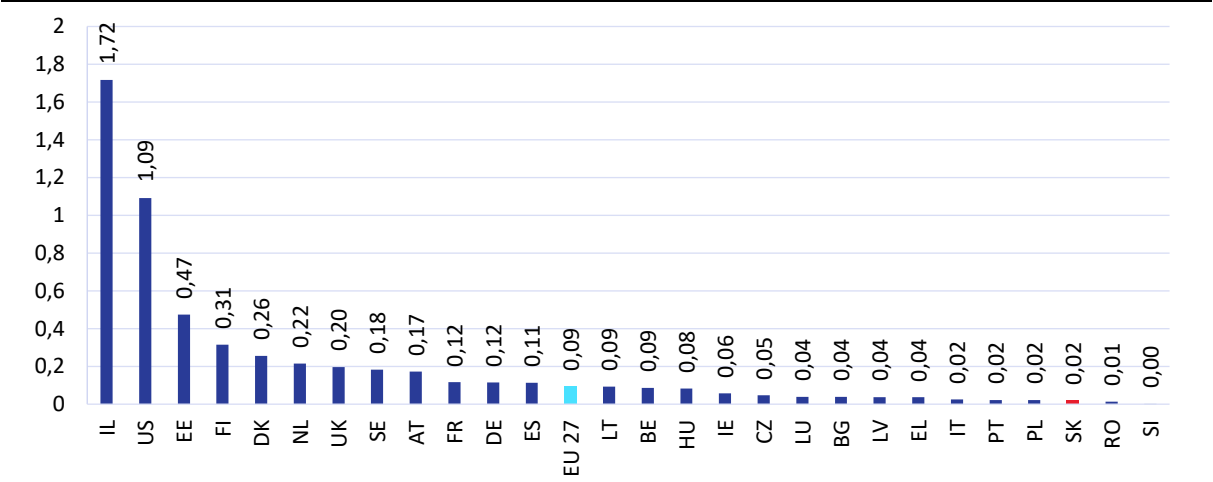
<sup>108</sup> OP II Annual Report for 2021.

### 3.4. Financial instruments to support innovation

*Venture capital<sup>109</sup>, within the framework of public policies, is a form of repayable financial instrument through which investors provide capital to companies exhibiting high growth potential in exchange for equity or option. Thus far, Slovak Investment Holding (SIH) has allocated EUR 252.5 million for innovation support through financial instruments. Additional funds to bolster investments via SIH will be allocated in the future, mainly under the Programme Slovakia 2021-2027 and the RRP. International comparison shows Slovakia's low ranking in the volume of venture capital investment. Increasing public funding to pre-seed and seed phases through professional managers with proven track records, along with fostering the establishment and operation of high-quality incubators and accelerators across both public and private sectors, could contribute to a positive change.*

**International comparison shows Slovakia ranking low in the volume of venture capital investment** (Graph 3.1). This is attributed to both the low volume of invested capital and the business environment lacking intensive support for innovative ideas. While the SIH and the Austrian AWS have similar volumes of available capital, AWS has allocated up to 85% of its budget to innovative ideas and businesses.<sup>110</sup> In the last programming period, the SIH invested only 7.5% of its available funds in innovative companies, primarily due to set priorities in operational programmes with funding limits for supporting innovative businesses. These limits are low in international comparison, and it is recommended to seek sources of funding to increase the volume of venture capital for innovative companies. Further discussion on the development of innovative ideas and recommendations to enhance their chances of success are addressed in Chapter 4.2.2.

**Graph 3.31 Venture capital investments in selected OECD countries for 2022 (% of GDP)**



Source: OECD, own calculations

**The use of public funds to establish a functional venture capital market is a common practice abroad.** Expert literature considers leveraging private capital with public funds as the most effective way to support the development of a functioning market. Public capital serves to address market

<sup>109</sup> Venture capital is a form of investment through which investors provide capital to companies with a high growth potential in exchange for equity or ownership shares. Investors take on higher risk compared to traditional investors/banks because many early-stage companies do not yet derive revenues or profits from their operations. Also, as a common feature, venture capital investing is accompanied by strategic advising, mentoring and providing industry expertise to help start-ups to succeed in their early years of existence.

<sup>110</sup> Austrian promotional bank: Boosting innovation & growth (AWS).



failures stemming from a lack of savings and risk aversion. Utilising public capital as so-called patient capital is also appropriate for investments in technologically demanding sectors, which have significant positive externalities but yield returns only in the long run and have a high failure rate.<sup>111</sup> However, when it comes to state interventions, it is crucial to establish a system that mobilises private capital rather than displacing it.<sup>112</sup>

**In Slovakia, the provider of public capital is the Slovak Investment Holding (SIH), which has EUR 252.5 million at its disposal to support innovation and venture capital.**<sup>113</sup> During the programming period 2014-2020, the SIH was responsible for almost all ESIF financial instruments, amounting to EUR 1.025 billion.<sup>114</sup> The main task of the SIH is to invest resources in repayable instruments in line with the objectives specified in respective ESIF operational programmes. Currently, most resources are allocated to support for the competitiveness of SMEs and to provide bank guarantees.<sup>115</sup> The EUR 252.5 million allocated to support for innovation and venture capital consists of EUR 23 million from the National Development Fund I, EUR 189.1 million from the National Development Fund II, and EUR 40.4 million from the Venture to Future Fund. Additional funds to support investments through SIH will be allocated in the next period, mainly under the Programme Slovakia 2021-2027 and the Recovery and Resilience Plan. The NDF II allocation in a form of equity/quasi-equity instruments in the amount of EUR 189.1 million consists of four financial instruments. The highest allocations are earmarked for supporting the seed/start-up phases through investment funds (EUR 68.08 million), investment in waste management projects and renewable energy sources (EUR 67.84 million), direct investment by NDF II (EUR 32.3 million), and investment in social enterprises through investment funds (EUR 20.9 million). According to the last update, the National Development Fund II has invested EUR 147.7 million. An additional option for funding Slovak innovative companies is through the Venture to Future Fund (VFF), established in 2020. The VFF invests alongside private investors. Currently, direct investments are provided only from the VFF fund.

Structure of VFF funds:

- EUR 25 million from the Ministry of Finance of the Slovak Republic
- EUR 5 million from NDF I from recycled funds
- EUR 10 million from the European Investment Bank
- EUR 0.4 million from Slovak Asset Management<sup>116</sup>

**The role of SIH equity and quasi-equity financing is to bridge the venture capital gap in the Slovak market.** This support is primarily focused on initial capital for micro and small businesses (Vision Ventures, CB Investment Management, Zero Gravity Capital), capital to support social enterprises (CB ESPRI, Social Innovators), capital for waste management and renewable energy

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<sup>111</sup> [Mazzucato Mariana and Semieniuk Gregor. \(2017\). Public financing of innovation: from market fixing to mission oriented market shaping.](#)

<sup>112</sup> [Jáki Erika and Molnár Endre Miháli. \(2021\). Venture capital and government involvement from a qualitative systematic literature review perspective.](#)

<sup>113</sup> Including COFOG funding and excluding NDF I funding. All figures in this paragraph are current as of September 2023 based on direct communication with SIH during the consultation process for this Review.

<sup>114</sup> Slovak Investment Holding: Multi-sector financial instruments in Slovakia ([EIB, 2023](#)).

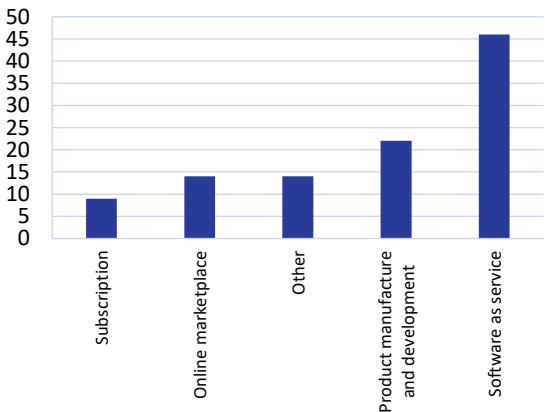
<sup>115</sup> Annual Report 2021 ([SIH, 2022](#)).

<sup>116</sup> Annual report 2021 ([SIH, 2022](#)), Venture to Future Fund ([VFF, 2023](#)).

sources (Wasteland, CEE, IPM), and the growth phase (especially Series A, B, VFF).<sup>117</sup> The investment period of the Venture to Future Fund ends in 2024, and more than EUR 22.5 million have been utilised of the EUR 40.4 million VFF allocation.

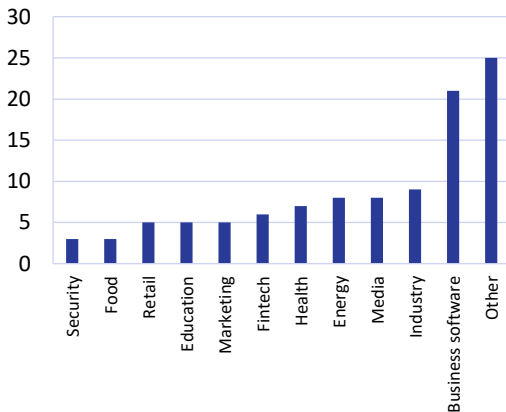
**Since 2015, SIH has invested, directly or through financial intermediaries,<sup>118</sup> in more than 100 innovative companies.<sup>119</sup>** These include companies whose business model primarily revolves around providing digital services such as software solutions or on-line marketplaces (Graph 3.32) across various industries or areas<sup>120</sup> (Graph 3.33). Highly innovative companies focused on product development and production are represented to a lesser extent. All investments have targeted companies in the seed stage or early growth (series A) stage (Box 3.5). Typically, investments in such companies have been made in exchange for an ownership share ranging from 10% to 30%. In mature markets, the median value of ownership shares stands at around 20% for both seed and series A<sup>121</sup> stages, indicating potentially lower availability of venture capital and limited competition in the domestic market. However, from a company’s standpoint, relinquishing a higher share in the initial stages of the life cycle could pose a challenge in securing capital in subsequent investment rounds.

**Graph 3.32 Structure of firms by business model**



Source: SIH, financial intermediaries, Dealroom

**Graph 3.33 Structure of firms by area/sector**



Source: SIH, financial intermediaries, Dealroom

**The return on investment in specific companies can only be partially assessed.** Approximately 50% of the investments were made in 2020 or later, which is a very short time frame for evaluating return on investment. For NDF II, around EUR 25 million was invested in companies between 2015 and 2017, with an average investment amount of approximately EUR 440 thousand. Based on the current valuation, the nominal value of this “portfolio” amounts to EUR 50 million<sup>122</sup>. The return on investment, expressed as the internal rate of return (IRR), reaches almost 10% per year. Of these investments, 60% are incurring losses, while the majority of profitable investments exceed a return of 10% (Graph 3.34). The rate of return is significantly influenced by the time horizon over which

<sup>117</sup> Venture to Future Fund (VFF, 2023); Direct investment (SIH); Vision Ventures. Portfolio companies; Crowdberry - Our portfolio; Zero Gravity Capital.

<sup>118</sup> Neulogy Venture, Limerock, Vision Ventures, CB Investment Management, Zero Gravity Capital.

<sup>119</sup> From the NDF I, NDF II and VFF funds: these are only investments involving an exchange for an ownership share. These statistics do not include convertible loans.

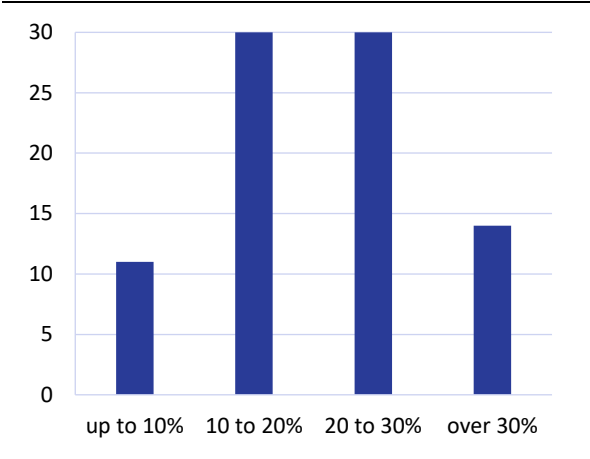
<sup>120</sup> It is difficult to “categorise” innovative companies into the traditional industries according to NACE because their business is often at the border of several economic activities.

<sup>121</sup> <https://medium.com/pace-ventures/how-much-dilution-should-founders-factor-in-for-financing-rounds-3f817d1ebfe7> Pace Ventures (2022).

<sup>122</sup> This figure also includes investments past the so-called exit. The nominal value includes the profit/loss on the given investment.

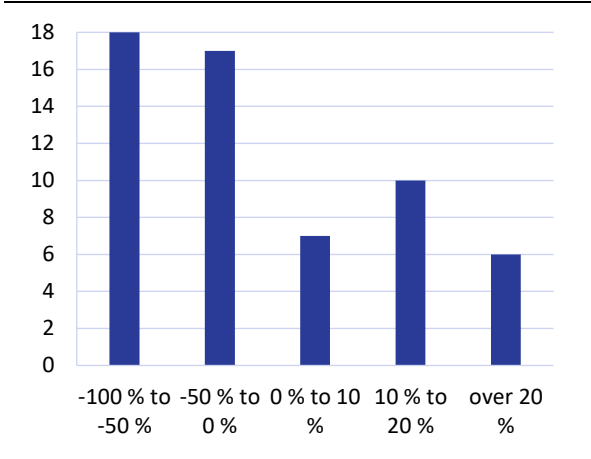
investments are evaluated. Venture capital funds in mature markets typically achieve returns of around 15% per year over a 5-year horizon for funds investing in both early-stage and late-stage companies. However, over a 30-year horizon, early-stage investments yielded a return of 25%, whereas investments in later-stage companies yielded 12% per year<sup>123</sup>.

**Graph 3.34 Structure of firms by investment ownership percentage**



Source: SIH, financial intermediaries

**Graph 3.35 Structure of firms by achieved return**



Source: SIH, financial intermediaries

<sup>123</sup> Cambridge associates (<https://hbr.org/1998/11/how-venture-capital-works>).

### **Box 3.2 Venture capital funding stages**

#### **Pre-seed**

Pre-seed funding marks the initial stage of financing for a startup, typically occurring during the ideation or concept phase, before the development of a minimum viable product or any revenue generated (TRL 3-4). Usually, pre-seed funding comes from friends and family, angel investors, or incubators/accelerators. The National Strategy plans to provide pre-seed capital ranging from EUR 100 to EUR 500 thousand per project, with a total allocation of EUR 10-20 million. The rationale for state involvement as an “investor” in the riskiest phase of a business is the acute shortage of venture capital and the insufficient number of incubators or angel investors willing to invest.

#### **Seed**

Seed funding typically occurs after the company has developed a minimum viable product, received initial feedback from customers, and has a clear plan for business development (TRL 5-6). This funding round is generally utilised for initial product development, assembling a founding team, and conducting market research. The National Strategy aims to align investment incentives with private venture capital and support projects with an allocation of EUR 80-160 million.

#### **Series A**

With Series A funding, investors anticipate that the company has a market-validated product and requires financing for growth. This funding round is often directed towards scaling up a business, developing new products or services, and expanding into new markets. The National Strategy seeks to attract foreign venture funds to co-invest in mature innovative companies, with the envisioned support amounting to EUR 2-8 million per project and a total allocation of EUR 120-240 million (TRL 7-8).

#### **Series B, C, D**

Series B, C, D funding aims at a functioning business model expanding into new geographic markets, introducing new products or investing in RDI. At this stage, the company is approaching profitability. For this phase, the National Strategy primarily focuses on measures to encourage private capital entry through the involvement of pension funds or banks.

**Using public funds to establish a functional venture capital market is a common practice abroad.** Expert literature evaluates leveraging private capital with public funds as the most effective means of supporting the development of a functional market. Public capital fills in for market failures stemming from insufficient savings, risk aversion, and inadequate support for riskier sectors. However, for state interventions, it is essential to establish a system that does not crowd out private capital.<sup>124</sup> Utilising public capital as so-called patient capital is also suitable for investments in highly technological sectors, which generate significant positive externalities, but yield returns only in a long term.<sup>125</sup>

**Measure 3.16** Develop a map of the (non)financial needs of innovative companies to facilitate the coordination and design of (non)financial instruments from the SIH and the agencies of the ME SR and the MESRS SR.3

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<sup>124</sup> Jáki Erika and Molnár Endre Miháli. (2021). Venture capital and government involvement. (from a qualitative systematic literature review perspective.

<sup>125</sup> Mazzucato Mariana and Semieniuk Gregor. (2017). Public financing of innovation: from market fixing to mission oriented market shaping.

### 3.5. Research infrastructure funding

*Research infrastructure is of fundamental importance to the attractiveness of the research and innovation environment. Since 2007, thanks to the European funds, more than one billion has been invested in the building and development of research infrastructure in Slovakia. In particular, research centres, university science parks and centres of excellence were built. It is recommended to work mainly on financial sustainability for both existing and new research infrastructure, as outlined in the National Strategy, in addition to regular performance assessments.*

**A significant weakness in supporting the research and innovation is the lack of adequate support for research infrastructure,<sup>126</sup> and an even bigger problem is the absence of a sustainability plan as exemplified by neighbouring countries like the Czech Republic.<sup>127</sup>** The measures outlined in the Action Plan of the National Strategy<sup>128</sup> aimed at research infrastructure are already addressing sustainability concerns in line with initiatives in the Strategy for Smart Specialisation<sup>129</sup>. Until 2007, Slovakia had lacked a systematic support for research infrastructure that met international standards. The situation improved with investment from ESIF<sup>130</sup> which facilitated construction of a significant portion of research infrastructure. However, this method of financing is inefficient, due to the absence of strategic planning, sustainability mechanism, and also actual competition, as the majority of projects were successful.

**In the programming period 2007-2013, more than EUR 225 million was invested in networks of excellent R&D sites under the Operational Programme Science and Research<sup>131</sup> with a total of 102 projects contracted.** Among universities, the Slovak University of Technology (STU) and the Pavol Jozef Šafárik University (UPJS) in Košice saw the establishment of the highest number of centres of excellence. Additionally, numerous centres of excellence were established at the Slovak Academy of Sciences, as well as within the National Forestry Centre, the International Laser Centre, the National Agricultural and Food Centre, and in private companies. However, there has been no *ex-post* evaluation of the scheme and its impact on Slovak R&D outcomes.

**The funds allocated for building seven university science parks and seven research centres during the same programming period amounted to nearly double: EUR 446 million.** These constitute the so-called strategic infrastructure of national importance with some of them extending implementation into the next programming period.

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<sup>126</sup> The term "research infrastructure" can encompass various forms, such as centre of excellence, research and development centre, competence centre, infrastructure for applied research and technology transfer, research centre, university science park, general research infrastructure, public central research infrastructure, educational infrastructure of universities, and more. (MESRS SR).

<sup>127</sup> Analysis of the state of research, development and innovation in the Czech Republic and comparison with other countries in 2020 (Office of the Government of the Czech Republic).

<sup>128</sup> Annex 1: National Strategy Action Plan (VAIA).

<sup>129</sup> Draft Research and Innovation Strategy for Smart Specialisation of the Slovak Republic 2021-2027 (MIRDI SR).

<sup>130</sup> National Plan for Research Infrastructure Use and Development - SK Roadmap 2016 (MESRS SR).

<sup>131</sup> Measure 2.1 Support for networks of excellent R&D centres as pillars of the region's development and support for cross-regional cooperation and Measure 4.1 Support for networks of excellent R&D as pillars of the region's development and support for cross-regional cooperation in the Bratislava Region (SORDA).

**Table 3.9 Strategic research infrastructure: University Science Parks (USPs) and Research Centres (RCs)**

| Project title   | Recipient                                       | Grant amount (in EUR) <sup>132</sup> |
|---|---|--------------------------------------|
| STU BA Science City USP (Phase I)   | Slovak University of Technology in Bratislava   | 39,918,730.48                        |
| “STU MTF CAMPUS” - CAMBO USP  | STU Faculty of Materials Science and Technology | 39,993,517.64                        |
| USP of Comenius University in Bratislava (Phase I)  | Comenius University in Bratislava               | 39,811,056.92                        |
| BIOMED USP for biomedicine in Bratislava  | Slovak Academy of Sciences                      | 39,539,681.70                        |
| TECHNICOM USP for innovation applications supported by knowledge technology (Phase I)                   | Technical University of Košice                  | 39,648,903.64                        |
| USP of the University of Žilina (Phase I)   | University of Žilina                            | 38,882,192.69                        |
| MediPark Medical USP in Košice (Phase I)  | Pavol Jozef Šafárik University in Košice        | 31,136,177.45                        |
| AgroBioTech RC  | Slovak University of Agriculture in Nitra       | 24,993,512.29                        |
| RC of the University of Žilina (Phase I)  | University of Žilina                            | 24,340,233.91                        |
| PROMATECH Research Centre of progressive materials and technologies for current and future applications | Slovak Academy of Sciences                      | 22,192,045.00                        |
| Centre for applied research of new materials and technology transfer                                    | Slovak Academy of Sciences                      | 39,539,682.00                        |
| BioMed Martin, biomedicine centre in Martin   | Jessenius ´ Faculty of Medicine, CU             | 24,999,468.00                        |
| CVVIAL, Centre for Research and Development of Immunologically Active Substances                        | Slovak Academy of Sciences                      | 24,995,713.48                        |
| ALLEGRO Research Centre   | Slovak Academy of Sciences                      | 16,214,712.00                        |

Source: Central Register of Contracts, Central Register of Projects

**An additional EUR 79 million was invested in the renovation and construction of the RDI technical infrastructure through national projects**, specifically for the Slovak Centre of Scientific and Technical Information (SCSTI) and the SAS Computing Centre. However, for the SCSTI, it is not actually research infrastructure but supportive activities. For the SAS, it constitutes genuine research infrastructure (Aurel supercomputer). Currently, the Devana supercomputer (EUR 3.2 million), which replaced the former Aurel supercomputer, serves as significant infrastructure of European relevance. Slovak infrastructure for high-performance computing is currently located in the cities of Bratislava, Žilina, Banská Bystrica and Košice.<sup>133</sup>

**Table 3.10 National projects of the 2007-2013 programming period**

| Project title   | Recipient            | Approved grant amount (in EUR) |
|---|----------------------|--------------------------------|
| OPVaV-2008/K/RKZ/NP/2008-2 Research and development infrastructure - Research and development data centre               | SCSTI                | 33,133,963.58                  |
| OPVaV/K/RKZ/NP/2009-1 Slovak infrastructure for high-performance computing  | SAS Computing Centre | 25,965,000.00                  |
| OPVaV/K/RKZ/NP/2015-3 National telepresentation infrastructure to support research, development and technology transfer | SCSTI                | 19,943,206.00                  |

Source: MESRS SR

<sup>132</sup> It includes a non-refundable financial contribution from the EU and the state budget.

<sup>133</sup> National Supercomputing Centre (NSCC).

**In the concluding programming period 2014-2020, over EUR 250 million was allocated for research infrastructure projects.** The largest project, ACCORD (EUR 105 million) conducted in cooperation between STU BA and CU BA, aims to enhance RDI capacities and competencies at HEIs. Another notable investment is a biobank (comprising two interconnected projects), totalling almost EUR 30 million. Additionally, the SAS CEMEA teaming centre project (EUR 30 million) obtained the H2020 Seal of Excellence. An additional EUR 30 million was invested in other teaming centres. Contracts totalling EUR 33 million were signed for the development and sustainability of university science parks and research centres. Smaller funding was also allocated to three projects involving non-public companies.

**Table 3.11 Research infrastructure projects of the 2014- 2020 programming period**

|  | Recipient  |      |      |     | Approved grant amount (in EUR) |      |     |     |
|--|--|------|------|-----|--------------------------------|------|-----|-----|
|  | Contracted   |      |      |     | Absorption                     |      |     |     |
| <b>OPII-VA/DP/2021/10.1-01 - Support for research and development capacities of University Science Parks and Research Centres in the Bratislava Region</b> | Total  | EU   | SB   | OF  | Total                          | EU   | SB  | OF  |
|  | 13.5   | 6.8  | 6.1  | 0.7 | 2.1                            | 1.1  | 1.0 | 0.1 |
| Increasing the Comenius University's research, development and innovation capacities and competencies  | Comenius University in Bratislava                      |      |      |     | 5,438,240.46                   |      |     |     |
| Support for research activities of the excellent laboratories of the Slovak University of Technology in Bratislava   | Slovak University of Technology in Bratislava          |      |      |     | 5,973,226.31                   |      |     |     |
| Strengthening of research, development and innovation capacities for translational biomedical research of human diseases                                   | SAS Biomedical Research Centre                         |      |      |     | 1,416,237.20                   |      |     |     |
| <b>OPII-2020/7/55-NP - National project: National Competence Centre for High Performance Computing</b>   | Contracted   |      |      |     | Absorption                     |      |     |     |
|  | -  |      |      |     | -                              |      |     |     |
|  | Centre of Operations of the Slovak Academy of Sciences |      |      |     | 3,199,191.67                   |      |     |     |
| <b>OPVal-VA/DP/2019/1.1.3-11 - Support for systemic public research infrastructure in the public health and health technology domain</b>                   | Contracted   |      |      |     | Absorption                     |      |     |     |
|  | Total  | EU   | SB   | OF  | Total                          | EU   | SB  | OF  |
|  | 30.9   | 26.3 | 3.2  | 1.5 | 4.1                            | 3.5  | 0.4 | 0.2 |
| Systemic public research infrastructure – biobank for cancer and rare diseases   | Comenius University in Bratislava                      |      |      |     | 17,894,129.32                  |      |     |     |
| Creation of a digital biobank to support systemic public research infrastructure   | University of Žilina                                   |      |      |     | 11,590,338.03                  |      |     |     |
| <b>OPVal-VA/DP/2018/1.1.3-04 - Support for teaming research centres outside the BSGR</b>   | Contracted   |      |      |     | Absorption                     |      |     |     |
|  | Total  | EU   | SB   | OF  | Total                          | EU   | SB  | OF  |
|  | 31.4   | 26.5 | 3.2  | 1.6 | 13.6                           | 11.5 | 1.3 | 0.8 |
| Centre for Functional and Surface-functionalised Glasses   | Alexander Dubček University of Trenčín in Trenčín      |      |      |     | 9,999,561.08                   |      |     |     |
| SlovakION Scientific Research Centre of Excellence for Material Science and Interdisciplinary Research   | Slovak University of Technology in Bratislava          |      |      |     | 9,920,068.90                   |      |     |     |
| LignoSilva Centre of Excellence of Forest-based Industry   | National Forestry Centre                               |      |      |     | 9,882,527.47                   |      |     |     |
| <b>OPVal- VA/ DP/2018/1.1.1-04- Support for teaming centres</b>  | Contracted   |      |      |     | Absorption                     |      |     |     |
|  | Total  | EU   | SB   | OF  | Total                          | EU   | SB  | OF  |
|  | 29.4   | 14.7 | 14.5 | 0.2 | 9.3                            | 4.6  | 4.6 | 0.0 |
| SAS Centre for Advanced Materials Application (CEMEA)  | Slovak Academy of Sciences                             |      |      |     | 29,941,629.34                  |      |     |     |

| OPVal-RO/VP/2018/2.1.1-06 - Advancing university capacity and competence in research, development and innovation                      | Recipient   |      |      |     | Approved grant amount (in EUR) |      |      |     |
|---|---|------|------|-----|--------------------------------|------|------|-----|
|   | Contracted  |      |      |     | Absorption                     |      |      |     |
|   | Total   | EU   | SB   | OF  | Total                          | EU   | SB   | OF  |
|   | 110.9   | 55.5 | 49.9 | 5.5 | 40.5                           | 20.2 | 18.2 | 2.0 |
| ACCORD  | Slovak University of Technology in Bratislava                       |      |      |     | 105,417,261.89                 |      |      |     |
| OPVal-VA/DP/2018/2.2.1-01 - Support for centres of excellence of national importance  | Contracted  |      |      |     | Absorption                     |      |      |     |
|   | Total   | EU   | SB   | OF  | Total                          | EU   | SB   | OF  |
|   | 15.9  | 7.9  | 4.7  | 3.3 | 8.4                            | 4.1  | 2.1  | 2.1 |
| Research Centre for Data Protection and Analysis - Stage II   | Asseco Central Europe, a. s.  |      |      |     | 6,279,406.03                   |      |      |     |
| Centre for Research of Serious Diseases and their Complications - Stage II  | Milosrdní bratia, spol. s r. o. University Hospital with Polyclinic |      |      |     | 6,529,886.67                   |      |      |     |
| International Centre of Excellence for Research of Smart and Secure Information and Communication Technologies and Systems - Stage II | Atos IT Solutions and Services s. r. o.                             |      |      |     | 6,349,967.67                   |      |      |     |
| OPVal-VA/DP/2016/1.1.3-02 - University Science Park (USP) and Research Centre (RC) projects, Phase II, less developed regions         | Contracted  |      |      |     | Absorption                     |      |      |     |
|   | Total   | EU   | SB   | OF  | Total                          | EU   | SB   | OF  |
|   | 15.6  | 13.2 | 1.6  | 0.8 | 15.6                           | 13.2 | 1.6  | 0.8 |
| MediPark medical USP in Košice, Phase II  | Pavol Jozef Šafárik University                                      |      |      |     | 9,675,121.72                   |      |      |     |
| RC of the University of Žilina, Phase II  | University of Žilina  |      |      |     | 1,640,797.55                   |      |      |     |
| USP of the University of Žilina, Phase II   | University of Žilina  |      |      |     | 2,170,372.08                   |      |      |     |
| TECHNICOM USP for innovation applications supported by knowledge technology, Phase II   | Technical University of Košice                                      |      |      |     | 5,009,480.58                   |      |      |     |
| OPVal-VA/DP/2016/1.1.1-02 - University Science Park (USP) and Research Centre (RC) projects, Phase II, advanced region                | Contracted  |      |      |     | Absorption                     |      |      |     |
|   | Total   | EU   | SB   | OF  | Total                          | EU   | SB   | OF  |
|   | 5.3   | 2.6  | 2.4  | 0.3 | 5.3                            | 2.6  | 2.4  | 0.3 |
| USP of the Comenius University in Bratislava, Phase II  | Comenius University in Bratislava                                   |      |      |     | 2,019,030.16                   |      |      |     |
| USP of the STU in Bratislava, Phase II  | Slovak University of Technology in Bratislava                       |      |      |     | 3,547,013.16                   |      |      |     |

Source: [https://www.opvai.sk/vyzvy/va/zoznam\\_schvalenych\\_neschvalenych\\_projektov/](https://www.opvai.sk/vyzvy/va/zoznam_schvalenych_neschvalenych_projektov/), crp.sk, crz.sk, drawdown documentation by year of OP obtained from the MESRS SR

**The financing of national project implemented by the SCSTI for the RDI infrastructure support diverts resources that could otherwise be directly invested in research infrastructure.** This issue may persist in the upcoming programming period 2021-2027, where only EUR 68 million is allocated for infrastructure by the MESRS SR. Should the national projects continue, there might be a complete absence of resources to support research infrastructure. This problem arises from the fact that the operation of the Ministries and their subsidiary organisations is financed through some national ESIF projects.

**Table 3.12 National projects of the 2014-2020 programming period**

| OPVal-RO/NP/2018/1.1.1-03 - Mobilisation of knowledge and technology transfer from research institutions to practice (NITT SK II) | Recipient  |      |     |     | Approved grant amount |     |     |     |
|---|------------|------|-----|-----|-----------------------|-----|-----|-----|
|   | Contracted |      |     |     | Absorption            |     |     |     |
|   | Total      | EU   | SB  | OF  | Total                 | EU  | SB  | OF  |
|   | 20.6       | 10.4 | 1.8 | 0.0 | 5.7                   | 2.9 | 2.8 | 0.0 |
| National Infrastructure to Support Technology Transfer in Slovakia II   | SCSTI      |      |     |     | 17,292,785.00         |     |     |     |
| OPVal-VA/NP/2017/1.1.1-02 - Research and development information system - access  | Contracted |      |     |     | Absorption            |     |     |     |
|   | Total      | EU   | SB  | OF  | Total                 | EU  | SB  | OF  |
|   |            |      |     |     |                       |     |     |     |



|   |                   |      |     |     |                   |      |      |     |
|---|-------------------|------|-----|-----|-------------------|------|------|-----|
| <b>to databases for research institutions' purposes</b>   | 50.0              | 26.3 | 4.6 | 0.0 | 50.0              | 23.2 | 20.8 | 0.0 |
| Research and development information system - access to databases for research institutions' purposes     | SCSTI             |      |     |     | 41,150,000.00     |      |      |     |
| <b>OPVal-VA/NP/2016/1.1.1-01 - Horizontal ICT support and central infrastructure for RDI institutions</b> | <b>Contracted</b> |      |     |     | <b>Absorption</b> |      |      |     |
|   | Total             | EU   | SB  | OF  | Total             | EU   | SB   | OF  |
|   | 37.5              | 28.4 | 5.0 | 0.0 | 20.7              | 16.7 | 4.0  | 0.0 |
| Horizontal support for Slovakia's participation in the European Research Area                             | SCSTI             |      |     |     | 3,499,369.02      |      |      |     |

Source: MESRSSR

**Project funding schemes for financing research infrastructure are common abroad.** In the Czech Republic, state budget funds amounting to EUR 159 million were invested in research infrastructures in 2020 (and a total of EUR 1.7 billion for the period 2005-2020). Most of these funds were invested into sustainability<sup>134</sup> underscoring the importance of this aspect of funding neglected in Slovakia. In 2022, the Slovenian Research Agency invested over EUR 20 million from the state budget in research infrastructure, with a significant portion dedicated to the regular renovation and updating of research equipment.<sup>135</sup>

**Investments in research infrastructures must be coupled with the coordination of needs and the promotion of infrastructure utilisation.** In the Czech Republic, this issue is addressed by a dedicated department of nine staff members.<sup>136</sup> Slovenia and Austria have highly organised web-based tools for searching for available research infrastructure.<sup>137</sup> Despite over two years passing since the approval of the Research Infrastructure Roadmap (March 2021), the Government of the Slovak Republic has neither adopted the Action Plan prepared by the Ministry nor taken any other measures toward fulfilling the strategic ambitions in this domain.

**A comprehensive mapping of Slovakia's research infrastructure, as well as investment, utilization, and maintenance strategy, is currently lacking.** The Research Infrastructure Roadmap only covers selected large infrastructures financed by the ESIF, and there is no investment and maintenance strategy due to the non-approval of the Action Plan. For further development in this area, it is crucial to establish a specialised department within the relevant ministry dedicated to research infrastructures. Additionally, a permanent financing scheme to support research infrastructure operations is needed. It would be preferable for this scheme to be primarily funded through the state budget, with the ESIF serving as a supplementary source. This approach is favoured because lengthy processes related to design, procurement, and construction jeopardize the research aspect of grants. In many implemented projects, completing the capital investment within designated time frames poses a significant challenge, often resulting in the research component being neglected using the new infrastructure (e.g., the Biobank project). Furthermore, ensuring financial sustainability remains a critical issue, as recipients struggle to do so effectively due to the absence of institutional support, insufficient project funds, and limitations on collaboration with the business sector. Properly implemented measures outlined in the National Strategy concerning the Infrastructure Mechanism and the Shared Infrastructure Access and Management Concept have the potential to mitigate these challenges.

<sup>134</sup> Analysis of the state of research, development and innovation in the Czech Republic and their comparison with other countries in 2020 ([Office of the Government of the Czech Republic](#)).

<sup>135</sup> Poročilo o financiranju 2021 ([ARIS](#)).

<sup>136</sup> [Large research infrastructures](#).

<sup>137</sup> Slovenian Current Research Information System ([SICRIS](#)) and [Forschungsinfrastruktur in Österreich](#).

**Measure 3.17** Establish a funding model for the sustainability of research infrastructures using state budget funds, including for the projects financed by the ESIF and the RRP that have already been implemented.

**Measure 3.18** Evaluate the impact of investments in research infrastructure for the programming period 2007-2013 , and by 2026 at the latest, for the programming period 2014-2020.

## 3.6. Tax instruments

*The super-deduction of R&D expenses serves as a reliable tool to support corporate investments in R&D, especially when compared to grant-based instruments, which often suffer from the unpredictable timing of calls for proposals and administrative complexity. Currently, the RDI super-deduction leads to a loss of approximately EUR 40 million in state budget revenue. Expanding the range of deductible expenses to include services used in R&D and introducing the possibility of tax refunds could further enhance the potential of the R&D super-deduction to mobilize private investments in R&D support. This tax refund mechanism would improve access to support for young innovative firms, which often operate at a loss in their early years and rely on venture capital for survival. However, the design of other tax instruments does not address the needs of Slovakia's innovation ecosystem, including the need for increased financial support or risk mitigation in the initial stages of the innovation cycle.*

### 3.6.1. Tax relief for beneficiaries of incentives

**Businesses that have received incentives to support RDI activities according the Law on Incentives for R&D are entitled to additional support through corporate tax relief as per the Income Tax Act.**<sup>138</sup> The condition for eligibility is the attainment of taxable profit while utilising all available options for its reduction, such as depreciation, provisions, or tax losses. The relief can be applied for up to three consecutive tax periods, limited to the amount specified in the decision of approval of the R&D incentives. Once this amount is exhausted, the taxpayer cannot apply for further relief.

**Since 2010, eighteen businesses have utilised this tax relief, totalling EUR 290,000.** Nearly 85% of this amount was claimed in just two years, 2012 and 2020. Furthermore, over 70% of the support for the entire period (2010-2021) was utilised by only four entities.

**Considering the minimal utilisation and duplicative nature of the support, it is recommended to abolish this particular form of tax relief.** The provision of the incentive alone constitutes support for the entity's R&D activities. This is targeted funding of a specific project approved by an expert committee established by the MESRS SR. The tax relief represents a duplicative or additional benefit beyond R&D support, which, in terms of the design of R&D support measures, does not enhance the level of R&D in the company or reduce the risk associated with the R&D project. Both of these aspects are already covered by the direct incentive as the primary support instrument. Additionally, the Income Tax Act offers a more suitable form of support for investments in R&D through super-deduction of R&D expenses (Article 30c).

### 3.6.2. Deduction of R&D expenses

**Almost 500 companies currently benefit from the tax relief through the super-deduction of R&D expenses**<sup>139</sup>, **reducing the state's revenues by nearly EUR 40 million in 2022.** The super-deduction has been available since 2015, allowing companies to decrease their taxable profit for a given tax period by deducting eligible expenses related to R&D. Currently, these deductible expenses amount to 100% of the total R&D expenses and 100% of the increase in these expenses compared to the average of the two preceding years. Since 2015, approximately 800 entities in Slovakia have utilised the super-deduction option at least once.

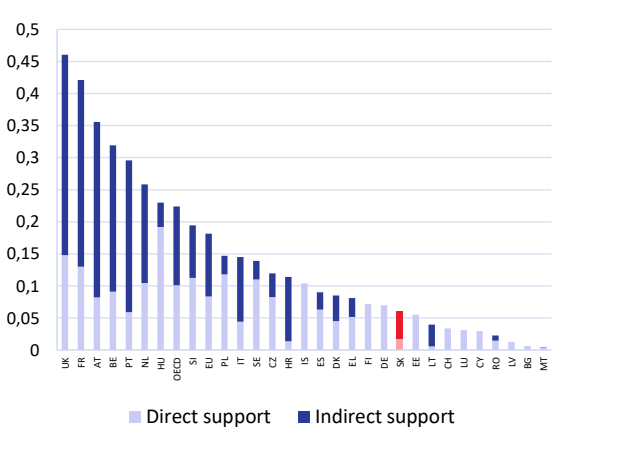
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<sup>138</sup> Based on Article 30b of the [Income Tax Act](#).

<sup>139</sup> Based on Article 30c of the [Income Tax Act](#).

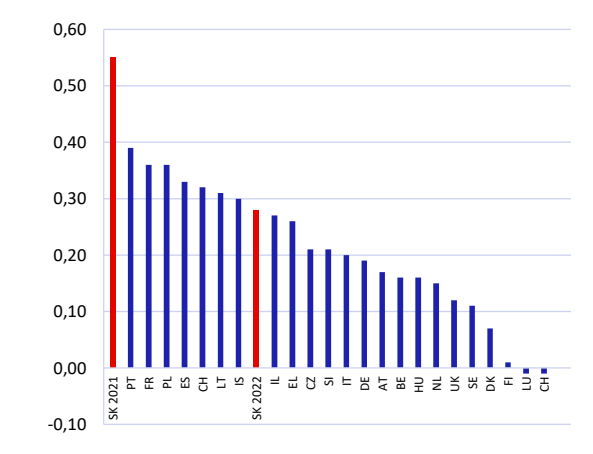
**In international comparison, the state's approach to supporting R&D in businesses, whether through tax instruments or grants, is highly diverse.** Grants offer targeted support for projects, facilitating the achievement of specific government objectives. However, their administration due to competitive nature of the process can incur significant cost for both the state and applicants. Tax instruments, on the other hand, delegate the allocation of R&D funds directly to businesses. They are typically easier to administer if the entity meets predefined conditions, which usually corresponds to lower intensity of support per euro invested. In Slovakia, indirect form of support through tax incentives dominates, largely due to their generosity and simplicity compared to the complex and unpredictable nature of grant financing.

**Graph 3.36 Direct and indirect support, 2020, % of GDP**



Source: OECD

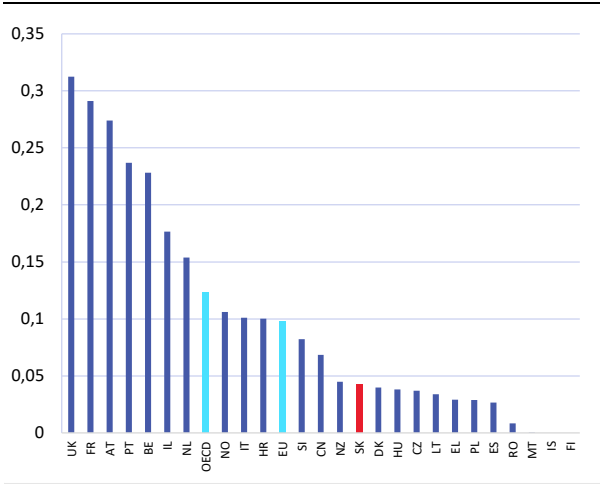
**Graph 3.37 Implicit rate (1-B index), 2021**



Source: OECD

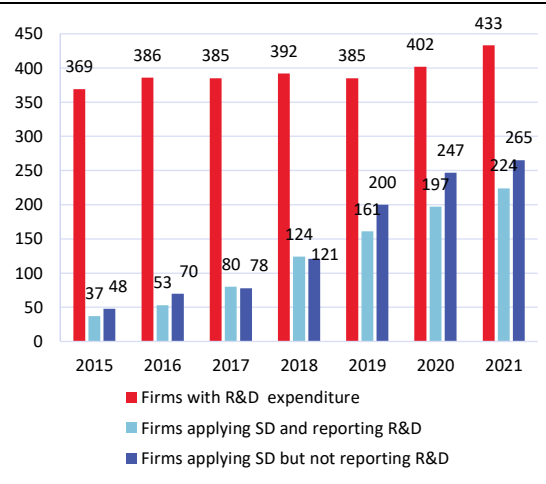
**Despite the substantial support for R&D investments through the super-deduction, compared to other countries Slovakia falls behind in total private R&D expenditure and the utilization of available R&D tax incentives.** Even with the reduction of the rate from 200% in 2021 to 100%, starting from 2022, tax relief for R&D investments remains competitive internationally. Feedback from companies indicates that for many entities, especially small and medium-sized enterprises, the 200% super-deduction often exceeded the taxable profit. The overall low level of business expenditure can be attributed to the economy’s low innovation performance and the limited number of businesses involved in R&D. Discussions with the sector actors also reveal that the potential of investment for R&D remains untapped due to stringent conditions for expense deductibility, which mandates that services be exclusively provided by formally certified R&D public or private institutions. This limitation originates from the initial philosophy underlying the super-deduction's introduction, which viewed R&D as internal activity involving only the entity’s employees. Current practice underscores the significance of outsourced research and solution development through collaborative efforts between businesses and external partners, alongside in-house personnel.

**Graph 3.38 R&D expenditure subject to tax relief, 2020, % of GDP**



Source: OECD

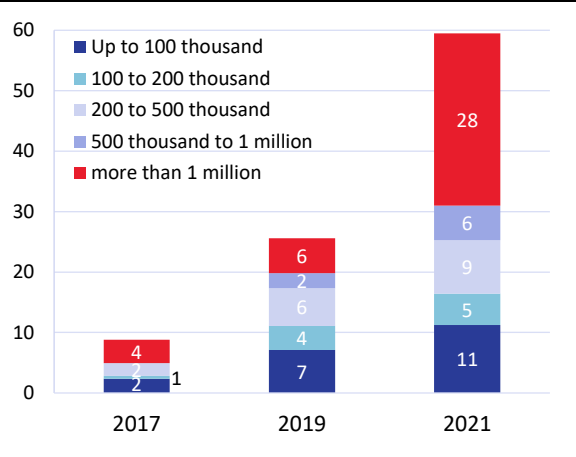
**Graph 3.39 Number of entities reporting R&D expenditure**



Source: VAIA, NBS

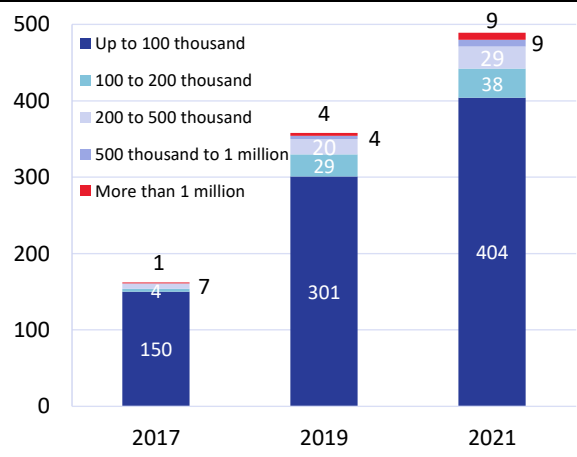
**Most of the total tax relief volume goes to large, established industrial players with predominant foreign ownership.** This trend persists despite the rise in the number of entities from 85 in 2015 to almost 500 in 2021, largely driven by the SMEs. Within the industry sector, particularly in metal manufacturing and processing, US Steel holds a prominent position. In terms of the number of entities, computer programming sector takes the lead, with nearly 20% of entities benefiting from the tax relief.

**Graph 3.40 Number of entities by super-deduction reducing corporate tax (EUR million)**



Source: VAIA, IFP, FDSR

**Graph 3.41 Number of entities by super-deduction range**

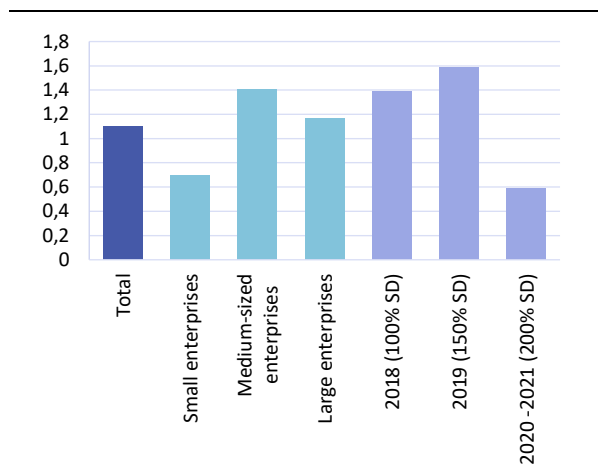


Source: VAIA, IFP, FDSR

**While in other countries the highest value for money is typically achieved by small businesses, the super-deduction in Slovakia has prompted significant additional investments primarily among medium and large enterprises.** The greatest added value from the super-deduction support (crowding-in effect) is observed in other countries in companies with low levels of R&D predominantly among SMEs. Conversely, large enterprises possess sufficient personnel and financial resources to absorb higher levels of risk and overcome barriers to R&D investment, even without additional support. In Slovakia, the super-deduction primarily attracts additional R&D investment in medium and large companies, indicating a lower level of R&D even among larger firms. Additionally, small and medium-sized enterprises often engage external suppliers for R&D project

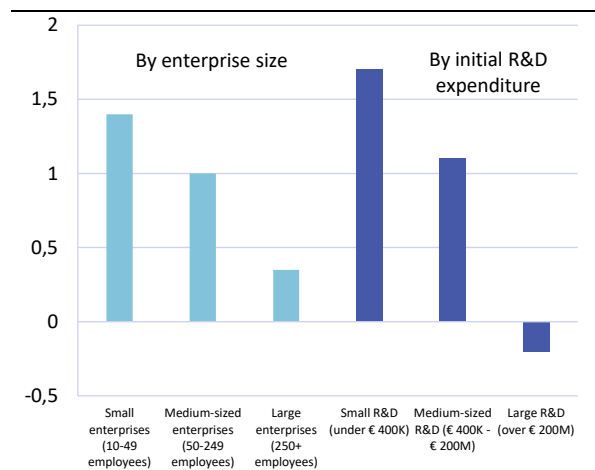
implementation. This practice is not reflected in the current legislation, potentially leading to lower additional investments compared to medium and large firms, which carry out more R&D internally without the need for involving external services.

**Graph 3.42 Additional R&D expenditure per euro of tax relief in Slovakia**



Source: VAI A, NBS

**Graph 3.43 Additional R&D expenditure per euro of tax relief abroad**

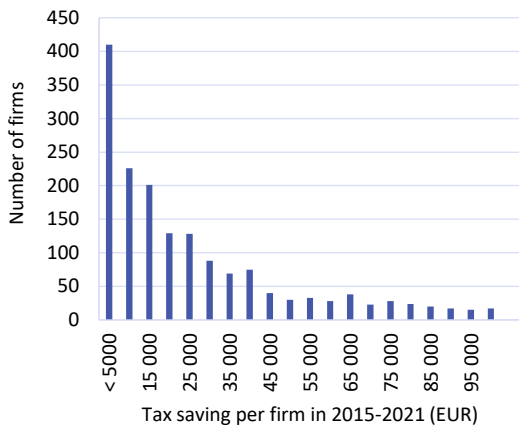


Source: OECD

**It is recommended to keep the super-deduction as the predominant form of support for R&D in companies, improving its targeting on SMEs, and reducing its one-time impact on income tax revenue.** Keeping in line with one of the primary goals of the National Strategy, which aims to increase private expenditure to 1.2% of GDP, it is recommended to keep the super-deduction and to refrain from reducing the basic rate of 100%, considering the prevailing trends in neighbouring countries. To enhance SME focus, introducing option of claiming the super-deduction through tax credit is advisable. SMEs and start-ups often face financial constraints and struggle to find the right business model, leading to economic losses and leaving tax savings option inaccessible. The option to claim tax credit while investing in R&D would allow obtaining a tax refund. This tax credit can be potentially capped between EUR 20,000 to EUR 50,000 per entity, a range sufficient to meet market needs, where up to 70% of firms have tax savings up to EUR 50,000 per firm (Graph 3.44). The current setup of super-deduction, characterised by a combination of a generous rate, its increase with a year-on-year rise in expenses, and a five-year carry-over option, creates a one-time negative impact on income tax revenue that does not accurately reflect actual R&D investment in a given year (Graph 3.45). To mitigate these effects, it is suggested to cap the tax savings at EUR 4.2 million per entity at the current rate, corresponding to expenses of EUR 20 million. Implementing a cap on maximum tax savings is a common practise in other countries<sup>140</sup>. Any restriction on the year-on-year increase option or abolition of the super-deduction carry-over option would significantly affect all SMEs.

<sup>140</sup> Denmark (EUR 0.73 million); Germany (EUR 0.5 million); Iceland (EUR 2.5 million for SMEs, EUR 1.8 million for large companies); Italy (EUR 4 million - the highest cap among the OECD countries). This link provides a comparison of OECD countries' tax incentive regimes for R&D: [https://www.oecd.org/sti/RDTaxIncentives\\_Compedium\\_2017.pdf](https://www.oecd.org/sti/RDTaxIncentives_Compedium_2017.pdf)

**Graph 3.44 Numbers of entities by tax savings range**



Source: VAIA, IFP, FDSR

**Graph 3.45 One-off impact of the super-deduction on corporate tax in selected years**



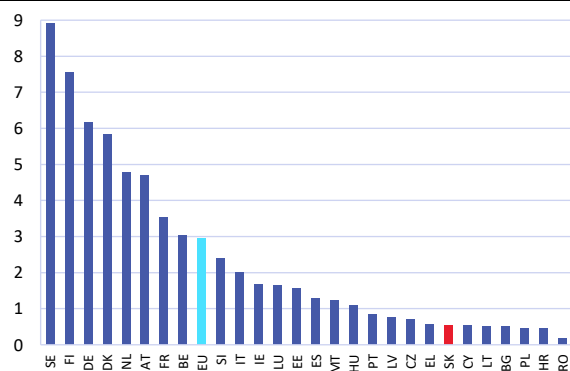
Source: VAIA, IFP, FDSR

### 3.6.3. Patent box<sup>141</sup>

**Currently, about 10 companies benefit from tax incentives under so-called patent box, reducing the state’s annual revenue by approximately EUR 1.2 million annually.** The patent box is a tax scheme allowing companies tax exemption up to 50% of payments for the use of patents, utility models, and software during their depreciation period. It is used internationally as a tax relief tool aimed at boosting level of intellectual property in the economy. Presently, 19 out of 37 OECD countries have implemented a similar scheme, with only the Czech Republic among the Visegrad Group (V4) countries not having any form of patent box.

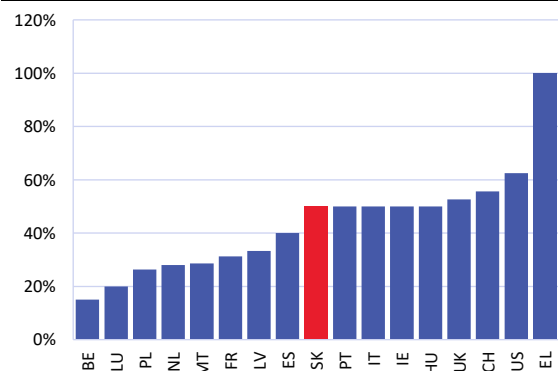
**The level of intellectual property in Slovakia has stagnated for a considerable period.** Both the rate of patenting (Graph 3.46) and the utilisation of the patent box reflect low innovation performance of the domestic economy. Insufficient investment in R&D, lack of experience in technology transfer, and a small number of companies engaged in R&D leads to small generation of intellectual property assets.

**Graph 3.46 Number of PCT patent applications per one billion of GDP in the EU countries (2021)**



Source: EIS

**Graph 3.47 Patent box: rate of tax relief in the OECD countries**



Source: OECD

<sup>141</sup> Income tax exemption under Article 13a or Article 13b of the Income Tax Act.

**The current setup of the patent box serves merely as a marketing tool without the potential to boost the level of intellectual property through increased patent activity among domestic entities or attraction of foreign patents.** In international comparison, the 50% exemption of income from intellectual property represents a relatively generous incentive (Graph 3.47), but it applies solely to intellectual property derived from a company's own R&D. Expanding this definition might increase the number of companies utilising the patent box, but it is unlikely to enhance innovative performance of the economy. The patent box primarily benefits the owner of intellectual property at final stages of the R&D process. It does not address barriers or reduce risks during the initial stages of R&D, which are crucial for successfully transforming innovative ideas into commercial ventures (Mazuccato, 2017). Economic literature shows limited impact of the patent box on patent activity without impact on overall innovation in the economy (Taxfoundation, 2021). It rather serves as a tool for tax optimisation.

**To enhance innovative performance and foster patent activity, it is recommended to establish support schemes allowing funding of the process of preparing patent documentation or international patent applications.** Through discussions with stakeholders, what is missing is a predictable and systematic form of grant financing to support proof-of-concept or proof-of-market phases. Such funding, depending on the needs of a particular product or service, would cover costs related to the protection of intellectual property rights.

**Measure 3.19** Abolish the tax relief for recipients of incentives under Article 30b of the Income Tax Act.

**Measure 3.20** Enhance targeting of the super-deduction for SMEs by introducing tax refunds and reducing its one-time impact on income tax.

**Measure 3.21** Revoke the patent box and increase grant support for financing the proof-of-concept/proof-of-market phase.



## 4. Ecosystem support for research, development and innovation

### 4.1. Ecosystem support of international excellence and cooperation in research

*The funding of activities aimed at strengthening links to the international research environment amounts to over EUR 20 million per year, and this package is set to grow further. There is room for improvement of the efficiency of funding through the selection of more suitable activities. For the financing of access to scientific databases (approx. EUR 7 million per year, a ESIF/SB funding mix), it is advisable to provide greater clarity on sources of financing and pricing, as well as the decision criteria regarding what should be financed from public funds. Connecting scientific and academic libraries will enhance the efficiency of the acquisition process and ensure the availability of comprehensive services to the research community in all regions. For greater success of the Horizon Programme, it is important to focus on connecting Slovak researchers with foreign partners. It is also necessary to bring more transparency to information about membership and participation possibilities for domestic researchers regarding international programmes other than the Horizon Programme, where clear information and performance indicators are absent despite almost EUR 13 million being spent on membership fees for 2021.*

#### 4.1.1. Access to scientific databases

**For researchers, access to scientific databases facilitates navigation; for Slovak users the access is financed from public sources.** Content of scientific publications, such as articles in scientific journals, monographs and other types, is made available in online scientific databases. There are databases providing access to full texts, and so-called bibliometric databases that index publications and provide metrics quantifying various characteristics of a publication (e.g. country of publication, author's affiliation, etc.) Access to private databases, which prevail, has historically been subject to a fee: the cost of content dissemination is borne by the end user in the form of subscription. Subscription to the most important world databases in Slovakia is centrally managed by the SCSTI as a subsidiary of the MESRS SR, for a consortium of public HEIs and the SAS. Remote access to paid content is unlimited for Slovak users, only a registration with the SCSTI Scientific Library is required.

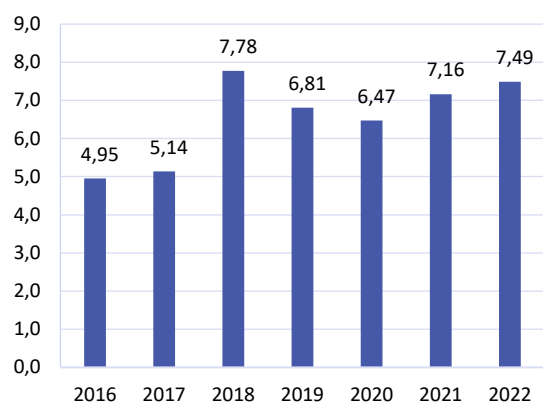
**Over EUR 7 million is spent annually on subscription to databases.** The advantage of centralizing the purchase of access through SCSTI for all relevant institutions lies in streamlining the public procurement process (one institution procures on behalf of the entire consortium) and providing a stronger negotiating position. The provision of access to electronic information resources (EIR, or e-resources) through consortia is a globally adopted system. For instance, in Slovenia, access to EIR is managed by the CTK Slovenia consortium, with Slovenia spending EUR 6.6 million in 2022 for foreign periodicals and subscription to databases.<sup>142</sup> In the Czech Republic, relevant institutions obtain access through the national consortium, CzechELib, or independently.<sup>143</sup> In Slovakia, the total annual spending on subscription grew by an average of 6% between 2016 and 2022.

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<sup>142</sup> Poročilo o financiranju 2021 (ARIS).

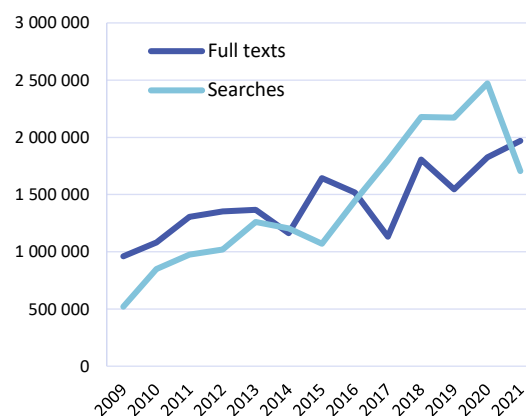
<sup>143</sup> License Agreements (CzechELib).

**Graph 4.1 Cost of subscription to databases, EUR million**



Source: CRC

**Graph 4.2 Number of searches and downloaded full texts from the SCSTI's databases**



Source: SCSTI

**Since 2008, central access to licensed databases in Slovakia has been primarily financed by national NISPEZ projects<sup>144</sup>.** The unstable financing under these national projects is supplemented by funding from the state budget. According to the Central Register of Contracts (CRC), during the NISPEZ IV project, which had an allocation of almost EUR 40 million for 2016-2023, overall EUR 51 million was spent on subscription packages. It is likely that other state budget funds were used, such as a portion of the institutional block subsidy for public HEIs (earmarked total amount of EUR 6.9 million for 2019-2022)<sup>145</sup>. Furthermore, HEIs or other public institutions also finance highly specialised databases from their own funds.

**Table 4.1 National projects for access to electronic information resources**

| Implementation time   | Total amount         | Funding access to databases |
|---|----------------------|-----------------------------|
| December 2008 – May 2014 (extended until May 2015) (NISPEZ) | 19,881,676.23        | 15,899,422.23               |
| March 2013 – October 2015 (NISPEZ II)                       | 8,191,848.51         | 8,191,848.51                |
| October 2015 – December 2015 (NISPEZ III)                   | 2,783,239.50         | 2,783,239.50                |
| January 2016 – December 2023 (NISPEZ IV)                    | 49,982,434.71        | 39,096,585.62               |
| <b>Total</b>  | <b>80,839,198.95</b> | <b>65,971,095.86</b>        |

Source: SCSTI

**Continuous analysis of the utilisation of each database is essential.** While the overall utilisation of the databases by Slovak entities has been increasing over time, it is important to monitor the utilisation of each database and each institutional user individually. Moreover, it is important to note that comparing total spending with other countries is not straightforward. Factors such as database content, the number of covered institutions, potential users, and negotiating position with providers or intermediaries vary.<sup>146</sup> This complexity means that other countries' spending cannot serve as a benchmark. Utilisation play a key role in negotiations regarding content and pricing with providers. Additionally, it is necessary to clearly define a strategy for providing access to scientific databases in

<sup>144</sup> National Information System of Research and Development Support in Slovakia - access to electronic information sources.

<sup>145</sup> According to documentation concerning the use of funds under the OPs obtained from the MESRS SR, EUR 44 million was utilised from the NISPEZ IV project allocation by the end of 2022, including EUR 23 million from the EU funds and EUR 21 million from the state budget, while the initially approved amount from the state budget was EUR 4.6 million.

<sup>146</sup> Cost based pricing is not applicable to digital products due to their zero marginal cost.

terms of target end-users, subject areas, and funding sources. This will help clarify the current model and bring stability to the entire system.

**The emerging open science model is driving a shift in the traditional model of financing the dissemination of scientific outputs.** Under this model, open science means unrestricted access to scientific outputs for end-users. With this model, the costs of dissemination are covered by the authors themselves, i.e. the scientists, through article processing charges (APC). These charges are largely funded by the institutions employing the scientists, or from grant schemes or other public sources. The proportion of open access publications is steadily increasing. In the Web of Science database, the proportion of Slovak open-access publications rose from 35% to 63% between 2017 and 2021. According to the SCSTI, the estimated spending on APCs for Slovak open access publications indexed in the Web of Science database in 2021 ranged from EUR 3.1 to 3.7 million.<sup>147</sup>

**The emergence of “transformative” contracts presents an opportunity for cost savings.** High and continuously increasing database subscription fees have prompted foreign universities to either cancel their subscriptions<sup>148</sup> or maintaining subscriptions to selected journals only, and shifting to a new type of contract known as a “read and publish” transformative contract<sup>149</sup>. As part of transition to open science, Slovakia has concluded its first such contract, which, in addition to providing access to electronic resources, also allows for the open-access publishing of a specified number of scientific publications by Slovak scientists.<sup>150</sup> Negotiating subscription fee at the average APC level requires continuous monitoring of the publication activity of Slovak scientists, including the APCs paid.

**Financial support for disseminating scientific outputs funded from public sources within open science will require new forms and increased supervision.** One consequence of transitioning from paid subscription to paid publication is the proliferation of aggressive practices by so-called predatory publishing houses, which bypass the standard quality review process and allow the publishing of low-quality outputs. The National Strategy for Open Science for 2021-2028 and its Action Plan for 2021-2022 addresses the principles of open science in Slovakia, approved by the Government.<sup>151</sup> This strategy includes measures to enhance grant volumes funded from public sources to cover APCs. This can be achieved by reallocating a portion of the current database subscription fees saved due to the introduction of transformative contracts. Another option is to establish a specific fund to support open access publishing, a practice already common abroad<sup>152</sup>. However, implementing the specific model will require setting appropriate rules for funding APCs to discourage or completely prevent publishing in predatory journals (Chapter 3.1.1. Universities).

**Measure 4.1** Conduct a detailed analysis of the pricing of access to electronic information resources.

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<sup>147</sup> The largest share is represented by publications of the MDPI publishing house. The institutions with the highest spending are TUKE (EUR 464 thousand), CU (EUR 448 thousand), and UNIZA (EUR 389 thousand) ([SCSTI and MESRS SR](#)).

<sup>148</sup> *Ako vyjednávajú ceny predplatného k vedeckým databázam zahraničné akademické inštitúcie?* [How do foreign academic institutions negotiate scientific database subscription fees?] ([SCSTI SR](#)), [SPARC](#).

<sup>149</sup> In addition to access, read-and-publish transformative contracts also include APCs. See examples for [US universities](#).

<sup>150</sup> This is the [contract with the Springer Nature publishing house](#) signed in March 2023.

<sup>151</sup> The National Strategy for Open Science for the years 2021-2028 and the Action Plan were approved in June 2021. The main principle of open science is to make publicly funded research available to the public. This includes not only publications, but also data, methodologies, review procedures, as well as open-source software, open educational resources and citizen science (involvement of general public in research activities).

<sup>152</sup> OA publication funds ([OAD](#)).

### 4.1.2. Scientific libraries

**Scientific and academic libraries are integral parts of the RDI support.** In Slovakia, libraries are regulated by the Act No. 126/2015<sup>153</sup> (Libraries Act), which categorises libraries into national, scientific, academic, public, school and special categories. Among these, scientific and academic libraries (libraries of HEIs) play the most significant role in meeting the needs of the research ecosystem. According to data from the SO SR, there were 7 scientific libraries and 60 academic libraries in Slovakia in 2021.<sup>154</sup> The library system as a whole forms an important network for regional outreach of science popularisation activities, currently underutilized.<sup>155</sup> However, the number of public libraries is continuously decreasing and there are 1,254 public libraries.<sup>156</sup>

**Scientific libraries in Slovakia are founded by various institutions, and the different sources of funding and management can affect their efficiency.** In Slovakia, there are 7 scientific libraries with 6 branches established by three different founders, one of which is the national library (Slovak National Library (SNL) in Martin). In addition to general scientific libraries, there are also specialised scientific libraries, such as the Slovak Economic Library (an academic library can also fulfil the role of a specialised scientific library). The existence of general scientific libraries falling under the jurisdictions of different founders raises issues of coordination, for example regarding acquisitions. Additionally, access to EIR for scientific libraries under the jurisdiction of the Ministry of Culture of the Slovak Republic (MC SR) is not covered by the consortium of the SCSTI, HEIs and the SAS.

| Name   | Founder               | State budget expenditures in 2022 in EUR |
|--|-----------------------|--|
| Slovak National Library in <i>Martin</i>           | Ministry of Culture   | 11,866,791                               |
| State Scientific Library in <i>Banská Bystrica</i> | Ministry of Culture   | 1,624,101                                |
| State Scientific Library in <i>Košice</i>          | Ministry of Culture   | 1,862,367                                |
| State Scientific Library in <i>Prešov</i>          | Ministry of Culture   | 1,372,094                                |
| University Library in Bratislava                   | Ministry of Culture   | 6,685,700                                |
| SCSTI Scientific Library                           | Ministry of Education | 516,419*                                 |
| SAS Central Library                                | SAS                   | 984,912                                  |
| <b>Total</b>                                       |                       | <b>24,912,383</b>                        |

\* SCSTI contract with the MESRS SR in 2022

Source: BIS

**The research expenditure in scientific libraries under the jurisdiction of the MC SR alone represents less than one percent of the total expenditure on scientific libraries financed from the state budget.** According to the Libraries Act, scientific libraries engage in research and participate in research projects within their specific subject area and specialisation. According to BIS data, the R&D expenditures of the scientific libraries under the MC SR amounted to less than EUR 200,000 in 2022. The total state budget expenditure of the MC SR budget chapter on scientific libraries was EUR 23.4 million. That implies that R&D spending accounts for a mere 0.8%.

**Interconnecting libraries, not only scientific ones, could enhance efficiency and overall improve the provision of library services to users.** Currently, Slovakia lacks a functional national

<sup>153</sup> Act No. 126/2015

<sup>154</sup> Libraries (DATAcube).

<sup>155</sup> Including centres of educational outreach, museums, etc.

<sup>156</sup> Commentary on the results of the statistical survey on the activities of libraries for 2021 (SNL), Results of the state statistical survey in the field of culture (MC SR).

library system that connects not only scientific libraries but also other types of libraries. A nationwide interconnected library system involving all libraries is needed to ensure the availability of comprehensive library services to a user. Additionally, interlinking and sharing library collections can increase efficiency of acquisition through specialisation. Digitisation of the library stock is essential to ensure user convenience. Presently, it is not customary for university libraries to allow access to non-university researchers.

**Universal science libraries need to redefine their mission.** According to the Culture Spending Review by the VfM Unit, the primary purpose of scientific libraries within the jurisdiction of the MC SR is unclear. There is ambiguity as to whether they are intended to serve the general public or a specific scientific community.<sup>157</sup> Given the existence of a large number of specialised academic libraries at universities, along with the Central Library of the SAS and the Scientific Library of the SCSTI, the universal scientific libraries under the jurisdiction of the MC SR appear duplicative. Their relevance as providers of access to scientific information, integral to the R&D infrastructure as stipulated in Article 7(2)(a) of the Libraries Act<sup>158</sup>, and their role as institutions involved in research, as specified in Article 7(2)(b) of the Libraries Act, is reduced due to limited access to EIR and a relatively low amount of actual research conducted.

**Measure 4.2** Interlink scientific and academic library collections to improve the efficiency of the acquisition process and ensure the availability of a comprehensive range of services for the research community in regions.

#### 4.1.3. Support for participation in the Horizon Programme

**The Horizon Programme stands as the flagship of research and innovation support in Europe and Slovakia.** Horizon 2020, the main grant programme in 2014-2020, aimed to support research and innovation and was accessible to both public and private entities worldwide, with a total allocation of EUR 68 billion.<sup>159</sup> Slovakia ranked 24th within the EU-28 in terms of the number of participants in Horizon 2020, 25th in terms of the contribution received for Slovak recipients (EUR 136.6 million), 25th in terms of the per-capita contribution.<sup>160</sup> The success rate of Slovak applicants was 12.5%, with a total funding volume of EUR 13.8 million, slightly below the European average was 14.4%. The rate of success in obtaining the required resources was 6.5%, compared to the European average of 9.2%.<sup>161</sup> In the period 2021-2027, the programme continues as Horizon Europe with a total budget of almost EUR 96 billion. Compared to its predecessor, Horizon Europe introduces several innovations, such as an emphasis on partnerships and a new “mission” tool involving the general public in identifying calls and research agenda. It also includes simplifications and adjustments to better achieve goals and enhance user comfort for participants.<sup>162</sup>

**Support for participation in the Horizon Programme is primarily financed by the ESIF.** The facilitation of Slovak entities' participation in the Horizon Programme is managed by the SCSTI

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<sup>157</sup> Culture Spending Review ([MF SR, MC SR](#)).

<sup>158</sup> [Act No. 126/2015](#)

<sup>159</sup> Horizon 2020 was the 8th framework research and innovation programme directly managed by the EU covering the years 2014-2020. Horizon Europe is a continuation of the programme for the years 2021-2027, also referred to as the 9th framework programme.

<sup>160</sup> The information concerning Slovakia's ranking in terms of the per-capita amount of funds obtained which is published in the interactive application [Horizon Dashboard](#) is incorrect.

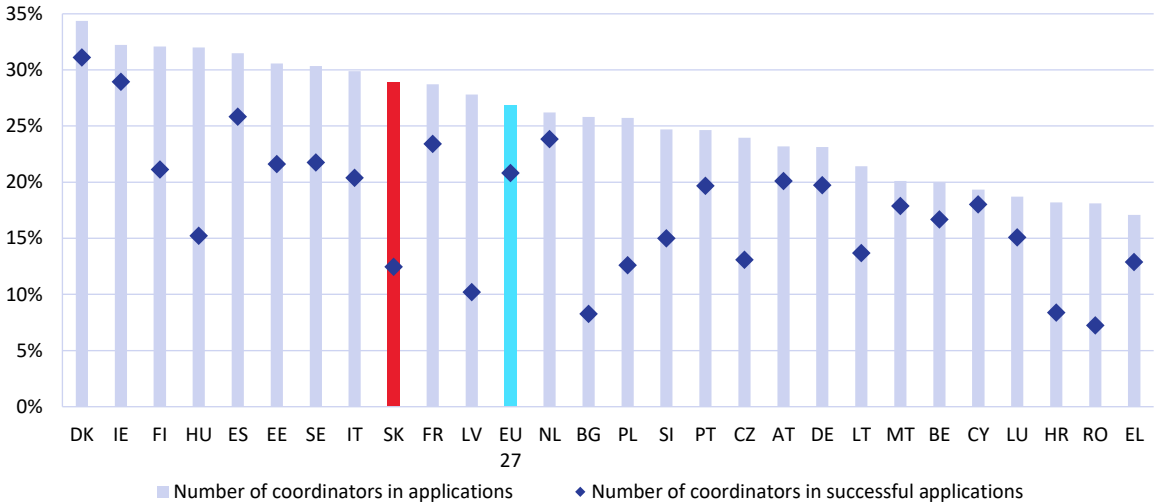
<sup>161</sup> Own calculations according to the eCORDA database downloaded in March 2023.

<sup>162</sup> HORIZON EUROPE Framework Programme: About the Programme ([ERA Portal Slovakia](#)).

through the Horizon National Office and the National Contact Points (NCPs) specific to each Programme area. Additionally, the Slovak Liaison Office for Research and Development in Brussels (SLORD), a part of the SCSTI<sup>163</sup>, offers these services free of charge. The mission of the Horizon National Office and the SLORD is to support Slovak organisations and individuals in participating in the Programme, and helping them network with foreign partners to increase interest in the Programme and increase success rate of Slovak proposals. These activities are co-financed under the NP SK4ERA. According to contracts between the MESRS SR and the SCSTI, EUR 1.7 million was allocated from the state budget to support the coordination of the operation of the NCP for 2019-2023 (contracts from previous years are not available). Additionally, the SCSTI participates in several projects aimed at supporting transnational cooperation between contact points, funded by the Horizon Programme. EUR 390 thousand was provided in Horizon 2020 Programme funds for this purpose<sup>164</sup>, and EUR 640 thousand is currently contracted under the Horizon Europe Programme (with an additional EUR 41 thousand is in the preparation phase). Participation in the Horizon Programme was further promoted by ESIF calls for proposals to support international research projects approved under the H2020 Programme or awarded the “Seal of Excellence”, and for the preparation of EIC applications, totalling tens of millions of euros (Chapter 3.2.4).

**Slovak applicants serving as coordinators have a notably low success rate**, impacting Slovakia’s overall success rate in the Programme. Data from the eCORDA database reveal that approximately one third of Slovak applications have a Slovak party in the role of "coordinator" of the project. However, only 12% of the total number of successful Slovak applicants assume the role of coordinators. The relatively low participation and success of Slovak applicants can be attributed to high requirements for project proposal quality, personnel capacities as well as previous experience with project coordination.

**Graph 4.3 Proportions of all and successful country’s proposal with the coordinator position**



Source: eCORDA, own calculations

**To help achieve a higher involvement of Slovak researchers, it is advisable to strengthen the Horizon Programme participation support policy by expanding its focus beyond ongoing activities.** This could include fostering better networking opportunities with successful consortia. Therefore, it is recommended to redirect efforts and resources from *ex-ante* support for applications

<sup>163</sup>HORIZON EUROPE Framework Programme (ERA Portal Slovakia).  
<sup>164</sup> Own calculations according to the eCORDA database downloaded in March 2023.

towards networking activities, such as bilateral cooperation projects with successful teams. By engaging in such collaborations, Slovak researchers can increase their chances of receiving future invitations to participate in consortia.

**Measure 4.3** Pilot measures to support networking with international partners, whether at the Horizon application submission stage, through bilateral cooperation or by joining ongoing research projects (hop-on).

#### 4.1.4. Support for further international cooperation

**Support for Slovakia's involvement of Slovakia in international scientific and technical cooperation falls mainly under the responsibility of the MESRS SR and the SRDA.** The aim is to increase international cooperation and networking of domestic teams. In addition to enhancing the quality of domestic research, international interaction also helps improve future cooperation in other projects, such as the Horizon Europe Programme. Cooperation thus brings new, often specific expertise and access to unique technology and talent. However, comprehensive analysis of the benefits and costs of individual cooperation initiatives is absent. The benefit cannot be narrowed down solely to the value of directly obtained grants.

**The foundation of international scientific and technical cooperation lies in membership in international organisations, which Slovakia supports with an amount of EUR 12 million.** The highest expenses are for membership in European Organisation for Nuclear Research (CERN) and European Space Agency (ESA), together totalling more than EUR 11 million. These memberships enable Slovak scientists and companies to participate in top scientific projects. A significant portion of the membership fees is returned directly in the form of assigned projects. For example, with ESA, 20% of the funds are allocated for the organization's overhead cost, while 80% of the membership fees are reinvested through projects assigned to domestic entities. Other organisations operate on a similar principle. In the future, an increase in membership to international organisations can be expected. In rapidly growing fields such as space research, neighbouring countries are already making significantly higher investments under ESA (Czech Republic EUR 46 million, Hungary EUR 21 million, Poland EUR 54 million). Nearly all member states' investments per capita are higher.<sup>165</sup>

| Abbreviated name   | Membership fees in EUR (2021) |
|--------------------|-------------------------------|
| EMBL               | 545,000                       |
| EUREKA             | 20,000                        |
| KDT (former ENIAC) | no membership fee             |
| CERN               | 6,878,800                     |
| ESA                | 4,500,000                     |
| EMBC               | 130,000                       |
| IIR                | 10,000                        |
| ICGEB              | 62,450                        |
| ITER               | 20,578                        |
| JPND               | 110,000                       |
| <b>Total</b>       | <b>12,276,828</b>             |

Source: S&T Section of MESRS SR, draft budget 2021

**Slovakia also actively participates in transnational research infrastructures within the framework of the European Strategic Forum on Research Infrastructures (ESFRI).** Presently, Slovakia is a member of seven European research infrastructures and appears to be a prospective member for another one, while also serving as an unofficial observer in five others. For infrastructures that are currently in the preparatory phase (ESFRI projects), Slovakia is a potential member in three groupings and an unofficial observer in two. Since these projects are in their initial stages, the fees have not yet been determined. To support participation in international research infrastructures, the Action Plan for the Research Infrastructure Implementation Roadmap for the period 2022 - 2025 was developed and submitted to the Government of the Slovak Republic,

<sup>165</sup> Annual Report 2022 (ESA).



proposing the establishment of a new budget scheme under the MESRS SR.<sup>166</sup> However, even two years after the adoption of the Roadmap, the Action Plan has not been approved.

| Table 4.4 Slovakia's participation in European ESFRI research infrastructures |  |                                  |  |
|---|--|----------------------------------|--|
| Abbreviated name  | Status – Roadmap Action Plan 2023-2026 | Annual membership fee (EUR)      | Annual contribution to national activities (EUR) |
| CESSDA ERIC   | Member                                 | 3,600                            | -  |
| EMP   | Member                                 | *currently paid by the SAS       | -*   |
| ESS ERIC  | Member                                 | 22,500                           | 104,150  |
| EST   | Member                                 | 20,000                           | 85,000   |
| European XFEL   | Member                                 | 1,589,040                        | -  |
| INSTRUCT-ERIC   | Member                                 | 52,020                           | -  |
| ILL   | Member                                 | 195,000                          | -  |
| NuPECC  | Member                                 | 6,000 *currently paid by the SAS | -*   |
| PRACE   | Member                                 | 83,531                           |  |
| EHRI  | Member                                 | Not yet determined               | 85,000   |
| eLTER   | Prospective member                     | Not yet determined               | 85,000   |
| EIRENE  | Prospective member                     | -*                               | -*   |
| DiSSCo  | Prospective member                     | 20,000                           | 85,000   |
| FNH-RI  | Prospective member                     | 180,000                          | 85,000   |
| DARIAH ERIC   | Prospective member                     | 3,000                            | 85,000   |
| ESRF  | Prospective member                     | 340,000                          | 88,800   |
| Euro-BioImaging   | Prospective member                     | 50,000                           | 85,000   |
| BBMRI ERIC  | Prospective member                     | 35,754                           | 65,800   |
| ECRIN ERIC  | Observer                               | 20,000                           | 500,000  |
| EPOS  | Unofficial observer                    | 73,000                           | 85,000   |
| CLARIN ERIC   | Unofficial observer                    | 13,554                           | 85,000   |
| EATRIS ERIC   | Unofficial observer                    | 60,000                           | 65,800   |
| ELIXIR ERIC   | Unofficial observer                    | 38,683                           | 65,800   |
| EuroCohort: Growing Up in Digital Europe                                      | Unofficial observer                    | Not yet determined               | 520,000  |
| LifeWatch ERIC  | Unofficial observer                    | 75,000                           | 85,000   |
| MEDem   | Unofficial observer                    | -*                               | -*   |
| MIRRI   | Unofficial observer                    | 20,000                           | 85,000   |

\*The amount of the contribution is not yet determined, or the contribution to national activities is paid directly by the institution concerned from its own funds.

Source: Research Infrastructure Roadmap 2020-2030 and MESRS SR

**A special form of international cooperation is represented by the “European Partnerships”.** An additional EUR 1.3 million is allocated annually for European Partnerships from the state budget, as part of the Action Plan of the National Strategy. The MESRS SR’s expenditures on these activities in from 2019 to 2022 amounted to EUR 4 million. These activities were predecessors of the “Innovative Partnership for SMEs” (formerly known as Eureka/Eurostars 2)<sup>167</sup> and KDT JU partnerships (formerly known as ECSEL).<sup>168</sup> Moreover, in the new programming period of 2021-2027, the MESRS SR is also involved in new European partnerships Driving Urban Transitions (DUT), the MH SR in the European Partnership on Health and Care Systems Transformation (THCS), and the MEnv SR in the European

<sup>166</sup> Funds allocated under this scheme would be administered through the SRDA. Planned financial costs for membership fees in international organisations are estimated at EUR 65,447,549 for the period 2023-2025. The planned funding for project activities within the framework of Slovakia's membership in the ESFRI research infrastructures, managed by the SRDA, amounts to EUR 41,250,000. The budget allocation for these items is provided under the approved Action Plan of the National Strategy.

<sup>167</sup> The main partnership scheme will be Eurostars 3. The partnership is one of the Eureka network, which continues with other programmes, including those outside the European partnership.

<sup>168</sup> The full name is “Key Digital Technologies Joint Undertaking”. It is to be renamed Chips JU in the future and focus on strengthening the position of the EU in the semiconductor industry.

Biodiversity Partnership (BiodivERSA+). As these are new partnerships, no spending has occurred yet. In total, Horizon Europe supports several dozen partnerships<sup>169</sup>, providing opportunities for Slovak entities to participate in international research and innovation networks.

**International cooperation in R&I is also supported under the regional Interreg programmes.**

Under the Interreg VA SK\_CZ programme, EUR 5.3 million was allocated (supporting 14 projects) to enhance the utilisation of applied research results (specific objective 1.2) by the end of 2022. EUR Additionally, 14.8 million was utilised (supporting 13 project) under the Interreg VA SK-AT programme (priority axis 1) by the year's end.<sup>170</sup> However, other Interreg VA programmes with Poland and Hungary do not provide funding to support research or innovation. Apart from bilateral Interreg programmes, support is also available under multinational Interreg programmes. Slovakia participated in 12 projects under the Interreg Central Europe programme<sup>171</sup> (with the City of Vienna as the managing body) and in 6 projects in the category of research and innovation capacities within the Interreg Europe programme.<sup>172</sup>

**Research teams also have the opportunity to apply for funding for international cooperation within the COST network.** In 2022, Slovak research teams organised 11 networking events under the COST programme, receiving EUR 201,574 from the COST association<sup>173</sup>. However, it is not possible to establish the amount of membership fees for the Slovak Republic from open source data and assess spending efficiency. From 2018 to 2022, Slovak teams annually led nine COST events.

**Another option to support Slovak research teams is through the EEA and Norway Grants, as well as the Swiss Financial Mechanism.** Both financial instruments were established for the purpose of supporting EU Member States that fall below the average EU development. EUR 564,706 was co-financed through the RA in the programming period 2014-2021 under the “Business Development, Innovation and SMEs” programme of the EEA and Norway Grants. This is the only programme directly involving R&D projects. Since 2007, the Swiss Financial Mechanism has provided the Slovak Republic with almost EUR 41 million for a total of 23 projects, one of which offered researchers an opportunity to study or reside in Switzerland.<sup>174</sup>

**Between 2018 and 2021, the SRDA supported projects totalling EUR 4.5 million through international bilateral and multilateral calls,** encompassing a total of 181 projects. The most represented fields among all projects were natural sciences (81) and technical sciences (71). The duration of most projects typically ranges from two to three years. The largest call, in terms of allocated funds, was the bilateral call with the Czech Republic worth, amounting to EUR 1.5 million. Multilateral calls also include those associated with the so-called Danube Strategy.

**In the Czech Republic, the agency responsible for supporting the non-EU international research under the DELTA 2 and KAPPA programmes and providing access to 20 European partnerships is Technology Agency of the Czech Republic (TA CR).** The DELTA 2 programme, succeeding the DELTA programme, focuses on applied research, experimental development and innovation. The total allocated funds for the entire duration of DELTA 2 (2020-2025) amount to EUR 63 million, with EUR 47 million funded from the state budget. Launched in 2019 for the period 2020-

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<sup>169</sup> European partnerships (ERA Portal Slovakia).

<sup>170</sup> Publication of the AIR and Summary for Citizens documents for 2022. ([Interreg SK-AT, 2023](#)).

<sup>171</sup> Interreg Central Europe 2014-2020 - news (MIRDI SR).

<sup>172</sup> [Interreg Europe](#).

<sup>173</sup> COST Slovakia Factsheet 2022.

<sup>174</sup> Federal Department of Foreign Affairs (FDFA)/Swiss Development and Cooperation (SDC) Agency.

2024, the KAPPA programme aims to foster cooperation with Norway, Iceland and Liechtenstein, primarily in industrial research. EUR 30 million is allocated to the KAPPA programme, with EUR 4 million from the Czech Republic’s state budget and the remainder from the financial instruments of the EEA and Norway.

**Finland participates in NordForsk, a Nordic research organisation and in three committees of the Nordic Research Board, promoting strong regional connectivity.** NordForsk projects must involve researchers from at least three Nordic countries or territories. The organisation is financed by contributions from member academies of sciences and technology agencies, having allocated EUR 214 million in the period from 2015 to 2021. The Academy of Finland is also engaged in the Joint Committees for Nordic research councils (NOS), providing various funding arrangements to support scientific disciplines. For humanities, for instance, the preferred form of funding is a grant for workshops that support networking among researchers based on shared research interests, leading to the creation of international teams and projects. In addition to specific Nordic infrastructures, Finland is a member of 27 other institutions. The annual budget of the Academy of Finland for memberships in these research infrastructures is EUR 18 million. However, it is not sufficient to cover all expenses, and the Academy of Finland also allocates a portion of the budget to pay membership fees in support of domestic scientific infrastructures. This allocation reached EUR 20 in 2021 and EUR 30 million in 2022.

**In 2022, the Slovenian ARIS allocated funds to support international participations at a level almost four times higher than the SRDA’s average allocation for the years 2018-2021, however, the actually utilised are comparable.** Slovenian research teams demonstrate the lowest degree of involvement in international projects within the framework of bilateral cooperation. As part of the Research Infrastructure Roadmap 2010-2020, the ARIS has funded capacity building and participation in 18 international research infrastructure projects over the past decade, with efforts towards participation in an additional 21 such projects.<sup>175</sup> The latest Research Infrastructure Roadmap envisages support for the involvement of Slovenia in 26 international research projects.

| <b>Table 4.5 Slovenia’s funding of international cooperation by ARIS, 2022</b> |                      |                          |                            |
|--|----------------------|--------------------------|----------------------------|
| <b>Category</b>  | <b>Plan (in EUR)</b> | <b>Absorption (in %)</b> | <b>Absorption (in EUR)</b> |
| <b>INTERNATIONAL SCIENTIFIC COOPERATION</b>                                    | <b>4,200,000</b>     | <b>34.76</b>             | <b>1,460,053</b>           |
| Cooperation within the EU area   | 700,000              | 86.11                    | 602,757                    |
| International projects, bilateral cooperation                                  | 2,700,000            | 9.14                     | 246,881                    |
| Support for applications for European projects                                 | 550,000              | 71.64                    | 394,000                    |
| International promotion of science   | 210,000              | 89.23                    | 187,376                    |
| Operation of Slovenian scientific associations in the world                    | 40,000               | 72.60                    | 29,040                     |

Source: ARIS – Poročilo o financiranju, 2022; own processing

**Measure 4.4** Provide transparent information about membership and international cooperation opportunities for researchers in one place.

<sup>175</sup> Research Infrastructure Roadmap 2030 - (Slovenian Government).

## 4.2. Innovation ecosystem: from an idea to its commercialisation

*Government support for the innovation ecosystem is primarily financed through the ESIF. The majority of the funding, totalling over EUR 100 million for the previous programming period, is redistributed through national projects such as NITT SK II, NBC BA and Regions and ZIVSE NP. These projects focus on supporting the competitiveness of SMEs and raising general awareness of the need for innovation in society. Additionally, a portion of the activities targets support for young, highly innovative companies (start-ups). To enhance innovation performance, it is necessary to complement existing projects aimed at promoting competitiveness and innovation awareness with the intensive support in the form of professional services focused on the creation, development and scaling up of highly innovative companies. Examples may include non-financial services, such as incubation and acceleration, as well as readily available funding for testing innovative ideas at the initial stage.*

**The innovation ecosystem is a sophisticated network comprising individuals, relationships, organizations, and activities working together to foster the creation, development, and scaling of innovative products and services (often referred to as the innovation funnel).** Effective innovation ecosystems offer an environment conducive to (1) collaboration, knowledge and insights sharing; (2) access to resources, including financial support, human capital, and shared infrastructure like databases and laboratories; and (3) well-designed legislation, including regulations on economic competition, which plays a crucial role in facilitating innovation emergence. The outcomes of the innovation ecosystem are frequently shaped by cultural and social norms, such as risk tolerance, fear of failure, and societal trust. The innovation performance of the ecosystem can be assessed through various measures, including composite indices (refer to Chapter 1) or more specific metrics such as the number of companies investing in RDI and the volume of venture capital. These indicators reflect the willingness of companies and private investors to allocate their own resources to projects generated within the innovation ecosystem.

### 4.2.1. Technology and knowledge transfer

**The objective of technology and knowledge transfer is to commercialise knowledge acquired in R&D.** This involves intellectual property protection, which can take various forms including licensing agreements, transfer of intellectual property rights, establishment of spin-off companies, or targeted public-private consortia. This process constitutes indirect transmission.<sup>176</sup> Additionally technology and knowledge transfer can occur directly through commissioned research, where an R&D institution conducts research at the request of a company (with the research result belonging to the contracting company).<sup>177</sup> An average of EUR 3.3 million per year was allocated for technology transfer within the framework of the national project NITT SK II during the years 2020-2022.

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<sup>176</sup> When a new outcome of R&D activities emerges, its novelty and potential for commercialization are initially assessed. Subsequently, it is safeguarded through a patent application, and the commercialization process proceeds with marketing and identification of entities that could benefit from the R&D in practice. The final step in this indirect process involves licensing, selling the R&D result, or establishing a company to further develop it.

<sup>177</sup> The conditions for acquiring shares in the generated output are agreed upon contractually, either based on the initial inputs of the research participants or through consultations (utilising existing knowledge to create and deliver the desired outcomes).

**The state provides public resources to PRIs for R&D, but it does not closely scrutinize how the outputs, namely intellectual property, are managed.**<sup>178</sup> These institutions are legally entitled to the intellectual property resulting from research conducted by their employees, and are formally obliged by the state to effectively manage this intellectual property. However, in practice, there is a lack of control or evaluation this effectiveness. Moreover, the current legislation hampers the transfer of technology and knowledge. Although the law currently does not limit the use of intellectual property by HEIs or the SAS, there is no framework in place to establish basic conditions and restrictions for shaping "good practice".

**Misaligned incentives relegate technology transfer to the sidelines of activities conducted by public research organizations.** The institutional funding criteria, which emphasise publications and, in terms of intellectual property, published patent applications (these patents only fulfil the function of a statistical record), pose problems. The financial reward for publishing patent applications motivates academics to apply for patents, regardless of whether there is any commercial interest in the technology. Consequently, a significant number of applications are filed without any real intention of entering the technology transfer process, resulting in minimal impact on the actual implementation of research and development results into practice.

**Technology transfer support in Slovakia is primarily facilitated by the Technology Transfer Centre under the Slovak Centre of Scientific and Technical Information (SCSTI TTC).** The main objective of the SCSTI TTC's activities is to create an enabling environment for systematic technology transfer, which involves implementing rules for handling intellectual property, establishing specialized facilities, and operating support tools at the national level. Additionally, the SCSTI TTC provides direct assistance in individual technology transfers within academic institutions. Since 2015, the SCSTI TTC has been managing the National Technology Transfer Centre of Slovakia (NTTC SR) to provide funding for the legal protection of industrial property rights, including patent fees, and to offer more effective support for research institutions. The association comprises seven domestic universities and the Slovak Academy of Sciences (SAS), representing a network of "local" technology transfer offices. Member entities of the association can seek funding from the patent fund established by the association for the protection of intellectual property and request assistance in transferring specific new technologies.

**Since 2010, technology transfer has primarily been funded through national projects.** The first project was the National Infrastructure for Technology Transfer Support in Slovakia (NITT SK), implemented from 2010 to 2015, with a total budget of EUR 8.2 million. Activities related to technology transfer under NITT SK directly involved the establishment and operation of the SCSTI TTC (where the National TT Support System was created) and raising awareness among the scientific community about intellectual property protection, which accounted for approximately 60% of the project costs. About 40% of the funds from the NITT SK project were allocated to ICT tools, which have applications beyond technology transfer. Following NITT SK, the NITT II SK project was launched in 2016 with a budget of EUR 20.6 million. Its main objective was to implement rules for the systematic handling of intellectual property in PRI, enhance expertise at local technology transfer points established under NITT SK, and introduce new support tools at the national level (e.g., the "Proof-of-Concept Fund"). After a change in the contract for the NFP in 2021, nearly 80% of the expenditures in NITT II SK are allocated to wage costs. Additionally, NITT SK II also allocates

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<sup>178</sup> Slovak Centre of Scientific and Technical Information and state policies in the technology transfer area (TTB, 2022).

funds for ICT tools, representing almost 20% of the project costs, with applications extending beyond technology transfer.

**The substantial funding provided for the technology transfer system through national projects has led to significant progress compared to 2010.** All relevant academic institutions have now adopted basic rules for the systematic management of intellectual property in accordance with best practices. They have also established technology transfer offices with varying levels of expertise, which were non-existent in academic institutions in 2010. Generally, there is now an established and enforced obligation to report the creation of intellectual property to academic institutions through formal notifications to the TTC. This has effectively reduced significant instances of intellectual property leakage from academic portfolios, a common occurrence before 2010. However, considerable leakages still occur in commissioned research. Currently, hundreds of cases undergo the systematic process of technology transfer at academic institutions each year, with tens of cases qualifying for patent protection and commercialization. In contrast, in 2010, none of these cases went through the technology transfer process.

**Following the change in 2021, the resources of the NITT SK II national project were primarily allocated to financing the salaries of personnel in scientific and research institutions.** This change also resulted in the establishment of duplicate technology transfer units alongside existing ones created under the NITT SK project. In many instances, these institutions set up local TTCs lacking the necessary competencies and human resources. Initially, these TTCs only handled basic tasks, with employees juggling these responsibilities alongside other duties. Additionally, scientific and research institutions did not grant sufficient decision-making authority regarding intellectual property to the TTCs. Despite the implementation of basic guidelines covering significant aspects of technology transfer, the absence of internal directives governing other crucial areas has had a direct negative impact. This lack of internal guidelines affects processes such as commissioned research, the establishment of non-university spin-offs, and the resolution of conflicts of interest.

**The combination of the aforementioned factors, coupled with the lack of financial resources to support the proof-of-concept or proof-of-market phases, places Slovakia at the bottom of rankings in terms of technology transfer performance.** Despite a significant increase in patent applications since 2010, Slovakia still lags behind both within the EU and regionally, alongside Poland. In other countries, revenue from selling licenses for proprietary intellectual property or establishing spin-off companies serves as a crucial funding source for research and development institutions. However, in Slovakia, successful innovations that generate income for academic institutions are rare occurrences.

**At the national level, it is imperative to define conditions for PRI to effectively manage intellectual property and establish a basic legislative framework for universities.** Research institutions must integrate rules and procedures for various aspects of technology transfer into their internal guidelines. Such a framework should establish a "minimum standard" for intellectual property management based on the experiences of more successful countries. Legislatively, it is essential to enact at least an amendment to the Act on the Management of Property of Public Institutions and an amendment to the Act on the Management of the State's Property. These amendments would define special rules for managing intellectual property generated through in-house research activities.

**Stimulating technology transfer could be enhanced by incorporating both financial and non-financial incentives.** According to the National Strategy, future rounds of VER will include an evaluation of the socio-economic impact, including technology transfer performance. Financial incentives will be tied to meeting the "minimum standard" requirements, enabling access to funding for the professional development of technology transfer office personnel, financial support for prototyping in proof-of-concept or proof-of-market phases, and the availability of other proposed motivational tools. Additionally, it is crucial to rectify the flawed motivations for patent application submissions within institutional funding frameworks and other relevant areas. Instead, the focus should shift towards evaluating obtained patents and income generated from successful technology transfers.<sup>179</sup>

**Measure 4.5** Amend the methodological guidelines of the MESRS SR for the preparation of a university's annual activity report for a calendar year to include a definition of and instructions for the separate documentation of revenue from contracts for commissioned research, joint research, consultations, and the number of such contracts.

#### **4.2.2. Support for the creation and development of innovations in the initial phase of a business**

**To transform an innovative idea or the outcome of research and development into a successful business model requires a synergy of funding, business advisory services, and essential infrastructure.** Successful innovation ecosystems offer innovative ideas a blend of grants and financial tools. Equally vital is infrastructure that brings together a community of innovators through creative workspaces and event organization, enabling nascent entrepreneurs to gain the necessary professional and business insights for idea development or access to private venture capital investors. Incubators and accelerators, serving as standard private or publicly funded ecosystem entities, facilitate the advancement of innovative concepts domestically and internationally by consolidating all supportive activities under one roof (Box 4.1).

**Public support for the development of ideas and innovation is currently only marginally provided by the SBA and the SIEA within national ESIF projects amounting to EUR 90 million.**

<sup>180</sup> This support primarily aims to enhance the competitiveness of small and medium-sized enterprises (SMEs) through the SBA and to increase societal awareness of innovation through the SIEA. Since 2005, approximately 65 incubators and accelerators have been established in Slovakia.<sup>181</sup> Presently, it is estimated that only 24 of these incubators or accelerators are active<sup>182</sup>, primarily due to the depletion of ESIF/state budget funds or the lack of systematic public support for these activities in the private sector. A notable issue with public support was the frequent placement of incubators in locations with questionable potential, or the inadequate skills of personnel in publicly

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<sup>179</sup> As an alternative, the U-Multirank (part of Knowledge Transfer) indicators could be used.

<sup>180</sup> The SBA project amounts to EUR 70 million, of which EUR 26 million is for the Bratislava Region and EUR 43 million for the other regions of Slovakia. The SIEA project amounted initially to EUR 32 million, but this was later reduced to EUR 19.5 million for the reason of the reallocation of a part of the funds to post-covid measures.

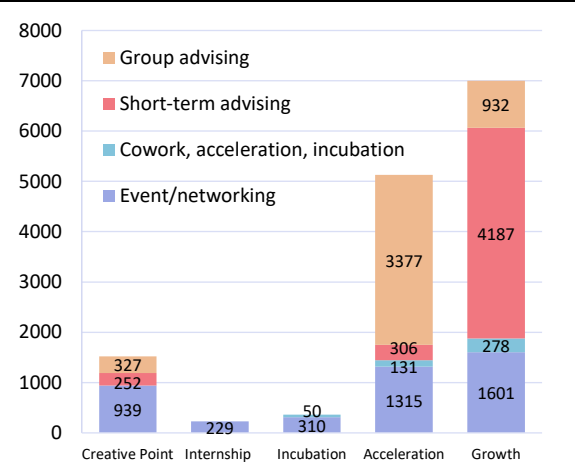
<sup>181</sup> Own elaboration based on publicly available data: History of incubators ( SBA, 2013 ); Incubator support ( SBA, 2011 ); A network of creative centres to be established in Slovakia ( MC SR, 2020 ); Business and technology incubators ( SBA, 2013 ); Concept of developing incubators and providing incubator care services to start-ups in Slovakia ( SBA, 2015 ); Spaceport\_SK ( SARIO, 2023 ).

<sup>182</sup> Ecosystem support map - Slovak Republic.

funded incubators.<sup>183</sup> Despite the implementation of two SBA National Business Centre projects aimed at promoting competitiveness among SMEs and aspiring entrepreneurs, there has been no significant change in the support for innovation development. These projects primarily provide broad-focused support and professional advice, with the sub-activities indicating the existence of intensive services for developing innovative ideas, such as incubation or acceleration. However, the specific services under these programs were characterized as rapid support initiatives targeting a broad mass of entrepreneurs, mainly providing group or short-term advising. This type of business consulting is more suitable for traditional, less knowledge-intensive business models (Graph 4.5.)<sup>184</sup>, as opposed to high-quality incubation or acceleration programs intended for technologically demanding ideas with high growth potential.

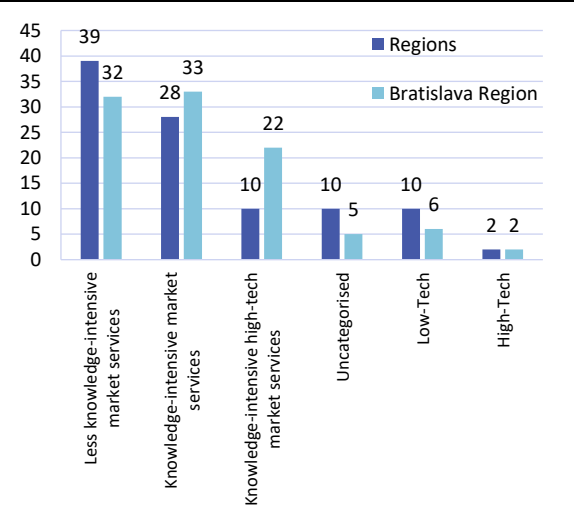
Similarly, the National Project to Increase the Innovation Performance of the Slovak Economy (ZIVSE NP), implemented by the SIEA agency, has not yet provided intensive and systematic support for innovation development and raising awareness about innovation. It primarily focuses on supporting entrepreneurs implementing process innovations and increasing awareness about innovation in secondary schools, universities, businesses, and the general public.

**Graph 4.4 Number of companies and natural persons supported through the programmes of the SBA projects**



Source: SBA (2022)

**Graph 4.5 Technological complexity of companies participating in SBA support**



Source: SAS CSPA Prognostic Institute

**The systematic shortcomings in public support for ecosystem activities are also reflected in the international position in the Global Entrepreneurship Monitor (GEM, Graphs 4.6 and 4.7).**

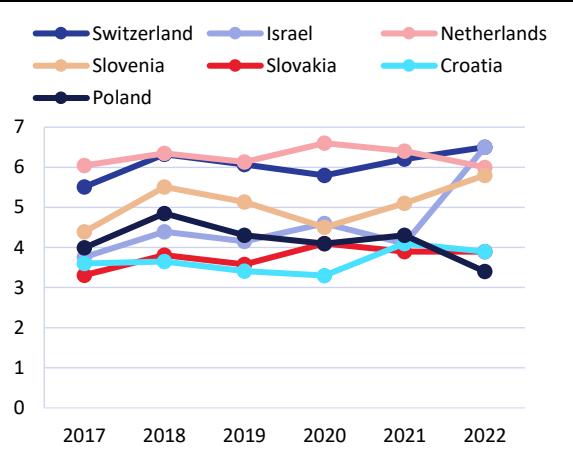
GEM monitors public policies based on a national expert survey using a uniform methodology. One of the indicators is the evaluation of the support system for start-up entrepreneurs and companies, which focuses on public financial and non-financial support in this area. According to the findings, there is a lack of direct and administratively simple funding for innovative ideas and quality

<sup>183</sup> Concept of developing incubators and providing incubator care services to start-ups in Slovakia ([analytical part](#)).  
<sup>184</sup> The total number of unique clients in regional National Business Centres (NBCs) was 8,600. The total number of unique clients in the Bratislava Region was 5,300.



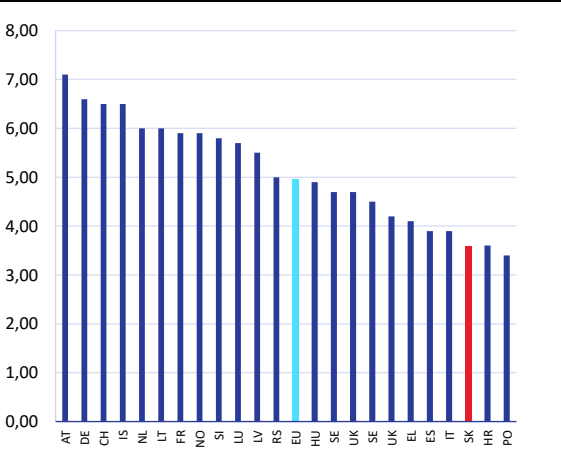
mentoring for team and project development. This necessitates targeted and long-term counselling lasting several months.<sup>185</sup>

**Graph 4.6 Evaluation index of the support system for start-up entrepreneurs and companies in selected countries**



Source: Global Entrepreneurship Monitor: Global Report 2017-2022

**Graph 4.7 Evaluation index of the support system for start-up entrepreneurs and companies in selected countries (2022)**



Source: Global Entrepreneurship Monitor: Global report 2017-2022

**To enhance Slovakia's innovation performance, it is crucial to intensify support for professional services focused on the creation, development, and scaling of highly innovative companies, as well as to enhance the availability of grant funding for the initial stages of innovative idea development.** Currently, the domestic innovation ecosystem lacks sufficient private resources to finance the testing and development of innovative ideas until they become profitable for investors. Therefore, the government needs to establish support schemes that combine easily accessible funding for idea testing, co-financing of quality ecosystem services provided by incubators and accelerators, and increased involvement of angel investors. These schemes should aim to foster greater collaboration between innovative companies and entrepreneurs with existing ecosystem players, including incubators, accelerators, financial intermediaries, and strategic innovation hubs. The goal is to systematically support innovation from the early stages of idea financing through grants, the provision of non-financial services to develop the idea, to direct investments in later growth and scaling phases of the company.

<sup>185</sup> Cumming DJ and Fischer E. (2011) . Publicly funded business advisory services and entrepreneurial outcomes. Mole K.F. et al. (2011). Broader or Deeper? Exploring the Most Effective Intervention Profile for Public Small Business Support.

#### Box 4.1 Incubators and accelerators

**Incubators guide fledgling companies and entrepreneurs from initial concept to a viable business model.** They typically provide facilities and resources for participants to work and collaborate with other companies. The funding for incubators is partially sustained through fees for leased spaces.

**Accelerators specialise in aiding companies that have developed a product or service and are seeking rapid revenue growth or business expansion.** Accelerator programs are often intensive and time-bound, offering funding, mentorship, education, and networking opportunities to help companies achieve specific goals within a set timeframe. Unlike incubators, accelerators commonly request a stake in the participants' business in exchange for support.

An ideal incubator or accelerator should include:

**Mentorship:** Guidance from experienced experts in founding and nurturing innovative ventures.

**Networking Opportunities:** Platforms to connect with individuals, ideas, and capital.

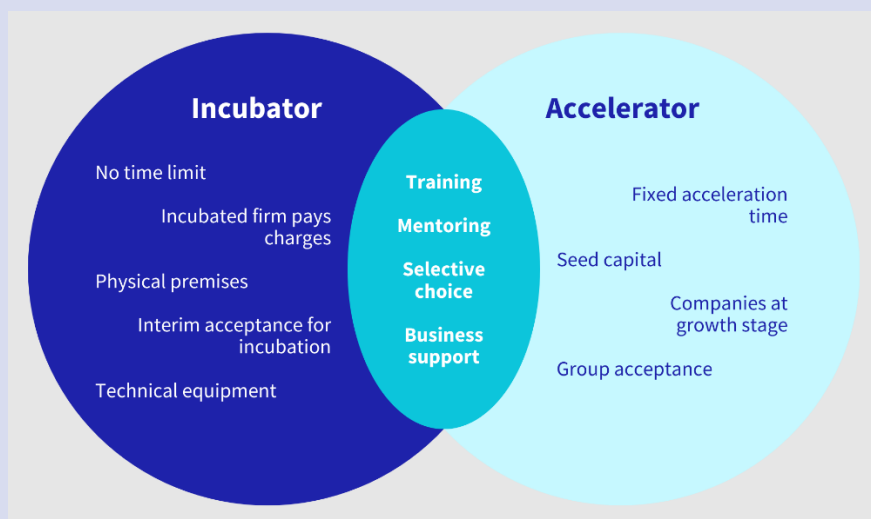
**Access to Capital:** Availability of funding sources such as venture capital, angel investors, or grants tailored for innovative ventures.

**Infrastructure:** Facilities like office space, reliable internet, and necessary equipment (more vital for incubators).

**Education and Training:** Beyond mentoring, providing materials and lectures to help entrepreneurs understand their industry.

**Flexibility:** Tailoring support to each incubated company's needs for optimal utilisation.<sup>186</sup>

**Diagram 4.1 Characteristics of and incubator and and accelerator**



**Incubators and accelerators can serve as vital tools in reversing brain drain in Slovakia while also contributing to the country's branding and reputation as a hub for innovative products and services.** For 45-55% of technological talent, the primary reason for relocation is the availability of job opportunities.<sup>187</sup> Government support for ecosystem activities is not uncommon abroad. States often assist in co-financing private or non-profit projects, with positive examples seen in countries like the Czech Republic, Slovenia, and Estonia. Globally, approximately 30% of funding for ecosystem activities comes from public budgets.<sup>188</sup>

**Measure 4. 6** Increase the availability of easily accessible grant funding for financing the initial phase of innovative ideas and design a support scheme to incentivise the connection of innovative ideas with private and established incubators and accelerators, as well as angel investors and venture capital intermediaries.

<sup>186</sup> Cohen S. et al. (2019). The design of start-up accelerators. Bone J. et al. (2017). Business incubators and accelerators: The national picture. Summary report on evaluation activities and evaluation results: OP II for 2021, the research and innovation part. ( MESRS SR and MTC SR, 2022 ).

<sup>187</sup> Lavian S. et al. (2022). Turning a Tech into a Talent Magnet.

<sup>188</sup> World Benchmark 19/20 Report : Data, Insights, and Best Practices of Business Incubators and Accelerators.

**Measure 4.7** Establish grant schemes to support ecosystem events such as start-up weekends, mentoring programs, and hackathons, as well as a proof-of-concept/market fund to provide administratively simple vouchers/grants with low amounts (up to EUR 50 thousand).

### 4.2.3. Technical standardisation, metrology, testing and conformity assessment

**The Slovak Office of Standards, Metrology, and Testing (SOSMT) plays a crucial role in the innovation ecosystem by facilitating introduction of innovative products to the market.**<sup>189</sup> In 2022, the SOSMT operated with an annual budget of EUR 8.7 million, including transfers of EUR 2.4 million to the Slovak Institute of Metrology (SIM) and EUR 0.8 million from the ESIF.<sup>190</sup> A comparison with the Czech Republic reveals that the SOSMT demonstrates similar cost efficiency in terms of state subsidisation and employment relative to the population. Despite having 96 employees compared to the Czech Office of Standards, Metrology, and Testing (COSMT)'s 58, the variance stems from differences in operational scope and authority.<sup>191</sup> When considering all employees of the SOSMT and its affiliated organizations, a total of 329 individuals work in this field, while in the Czech Republic, the number ranges between 698-1296 across various agencies and institutes (40 at the Czech Proof House for Arms and Ammunition, 58 at the COSMT, 100-199 at the Czech Standardisation Agency and 500-999 at the Czech Metrology Institute).

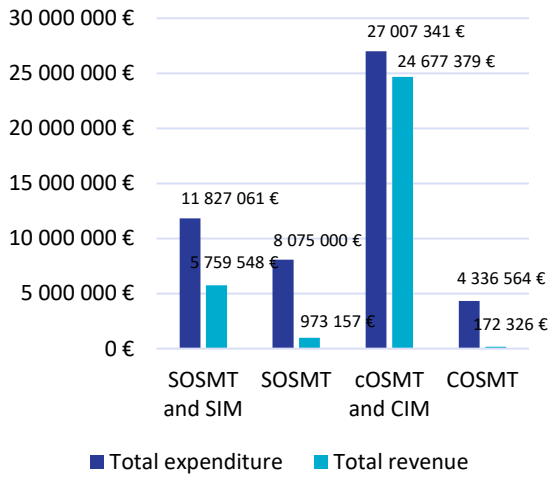
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<sup>189</sup> Technical standardisation and the application of technical standards are integral to the safety, quality, and reliability of innovative products and services. Metrology, with its key role in maintaining and developing a unified measurement system, is crucial for new scientific discoveries and innovations, international trade, industrial production, as well as environmental protection. Conformity testing and assessment are essential components of the product lifecycle during the marketing phase.

<sup>190</sup> ESIF financing is allocated for the implementation of the National Project for the Introduction and Support of Quality Management in Public Administration 2022-26. This project has been periodically repeated every 4 years since 2004, essentially providing funding for the competencies of the SOSMT in the area of methodological guidance for quality management in public administration.

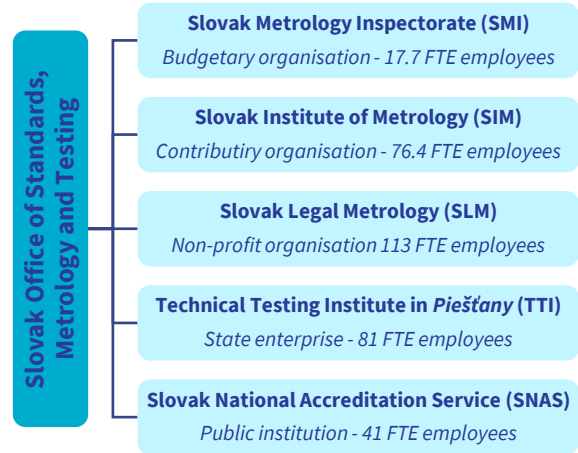
<sup>191</sup> In contrast to the Czech COSMT, the Slovak SOSMT has competencies in the preparation of legislation, management of technical standards, testing of small arms, and methodological guidance for quality management in public administration. The Czech COSMT currently has 58 employees; it had 105 employees until 2017 when it underwent division, leading to the establishment of the Czech Standardisation Agency (CAS), which took over activities related to the management of technical standards. Additionally, the control of weapons is handled by the Czech Proof House for Arms and Ammunition.

**Graph 4.8 Revenue and expenditure of the offices responsible for the standardisation, metrology and testing and their affiliated organisations (SR vs CR, in EUR millions, 2022)**



Source: SOSMT, COSMT, Czech Ministry of Industry, Finstat, Czech State Treasury, ATTC, SIM

**Diagram 4.2 SOSMT and the network of affiliated organisations**



Source: SOSMT, ATTC, SNAS, Finstat, BIS

**The Slovak model of metrology management allocates costs to the state and shifts the main revenue-generating activities to the non-profit organization Slovak Legal Metrology (SLM).** In contrast, in the Czech Republic, both scientific and legal metrology activities are conducted by the Czech Metrology Institute (CMI), whereas in Slovakia, these activities are divided between the Slovak Institute of Metrology (SIM) and the SLM. This division results in profit-generating activities (legal metrology) being concentrated under the SLM, while the state must subsidize the scientific metrology activities of the SIM almost entirely. In 2022, the SLM reported revenues of EUR 5.6 million and a total positive economic result of EUR 0.3 million.<sup>192</sup> Consolidating the institutions based on the Czech model could lead to more balanced financing through a combination of profitable activities and shared costs.

#### 4.2.4. Intellectual property protection

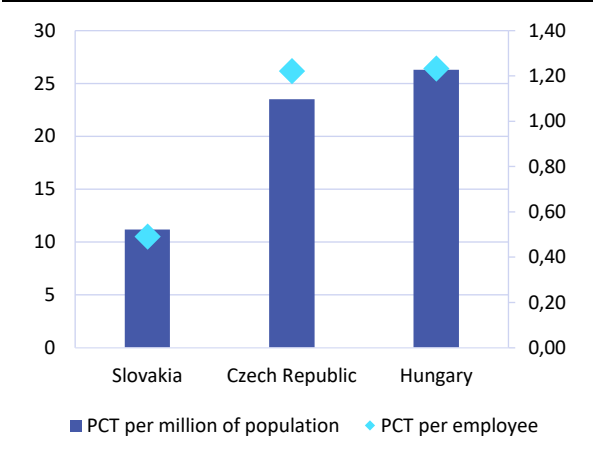
**The Industrial Property Office of the Slovak Republic (IPO SR) with a budget of EUR 4.7 million is the key organization responsible for the registration and protection of intellectual property rights, such as patents and trademarks.** According to the latest Annual Report, the IPO SR employs 119 personnel, while its Czech counterpart employs 202 and the Hungarian counterpart 207.<sup>193</sup> The level of employment is considered optimal when compared to neighbouring countries. Additionally, the institution's expenses are covered by its own revenues from fees, indicating a financially healthy operation. Concerning the employment structure, it is recommended to focus more on education in the field of intellectual property protection and related consultancy services. This aligns with IPO SR's ambition to align with the global trend of industrial property offices transitioning from registration authorities to innovation and intellectual property consulting agencies. In the long term,

<sup>192</sup>Register of Financial Statements, *Slovenská legálna metrológia*, n. o., *Annual Report 2022*.

<sup>193</sup> Facts & Figures ( [HIPO, 2021](#) ), Annual Report 2021 ( [IPO SR, 2022](#) ), Annual Report 2022 ( [IPO CR, 2023](#) ).

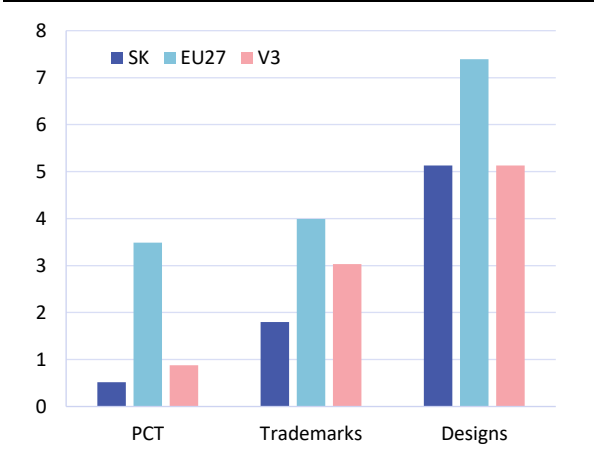
the IPO SR's goals should encompass both national and international targets for intellectual property protection, as outlined in the National Strategy.

**Graph 4.9 Number of PCTs per million of population and number of patent office employees (2021)**



Source: IPO SR, IPO CR, HIPO

**Graph 4.10 Number of protective elements per billion euros of GDP in PPP**



Source: European Innovation Scoreboard

**Today, the Industrial Property Office of the Slovak Republic (IPO SR) is taking necessary steps to enable the provision of the IP scan service as an external service through accredited patent representatives and lawyers.** The IPO SR is the national partner of the European Union Intellectual Property Office (EUIPO), an EU agency that facilitates grants for small and medium-sized firms to support the protection of intellectual property rights. This support includes partially covering fees for trademarks and designs within and outside the EU, fees for state-of-the-art search reports prior to patent application, and fees for online registration of Community rights to plant varieties at the EU level. The reimbursable costs also include an intellectual property audit known as IP scan. An analysis of IP scan provision revealed two trends: it is provided either internally by a designated office or externally by private patent lawyers. Out of the 11 examined countries, IP scan is delegated to private law firms in seven. Slovakia is poised to join the latter group; the IPO SR will serve as a service administrator and controller of outputs prepared by external entities (a new role for IPO SR). Additionally, the IPO SR acts as a consultant for external entities (especially SMEs), providing information about services available under the "SME Fund".

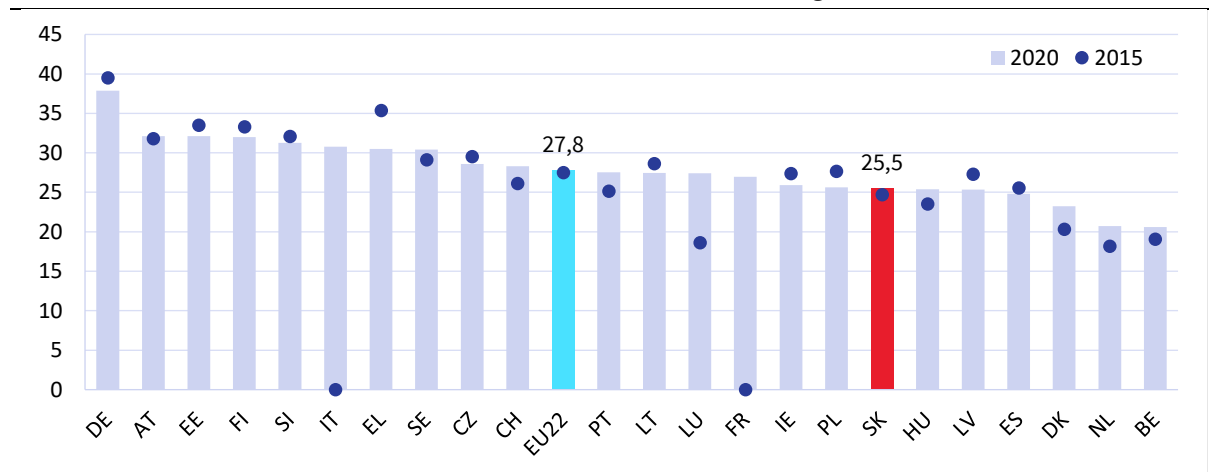
### 4.3. Popularisation of science and technology

*The goal of popularisation of S&T is to present results of scientific exploration to the general public and enhance the attractiveness of scientific or technical careers for young people. Popularisation activities financed from public funds are primarily organised by the subsidiary organization of the Ministry of Education - the Slovak Centre of Scientific and Technical Information (SCSTI), along with other actors, without strategic management. It is recommended to establish strategic management at the ministry level and diversify implementing entities to strengthen the regional outreach.*

**The aim of popularising S&T is to present the results of scientific research to the general public.** When appropriately implemented, popularisation activities enhance not only the attractiveness of scientific careers for young people, but also interest in technical fields of study, support social dialogue on the utilisation of science for the benefit of the society, and also contribute to raising the society-wide recognition of scientists and researchers.

**Interest in new discoveries in Slovakia is below the European average, with the lowest levels observed among young people.** According to the Eurobarometer survey, the share of population in Slovakia that expressed a strong interest in new scientific knowledge and technological discoveries increased by 5 pp between 2010 and 2021. Nevertheless, this is still below the EU average (27% versus 33%). In the population aged 15-24, the share was only 23% in 2021.<sup>194</sup> According to OECD data, the share of new students enrolled for STEM and ICT study programmes has increased by one percentage point since 2015 to 26% and is slightly below the EU 22 average of 28% (EU-OECD countries).<sup>195</sup>

**Graph 4.11 Proportion of new entrants in tertiary STEM and ICT programmes**



Source: OECD, *Education at a Glance 2022*, Tab. B4.2.

**In Slovakia, S&T popularisation responsibilities are *de facto* transferred to a subsidiary organisation of the Ministry of Education.** The publicly funded activities and events are managed by the National Centre for the Popularisation of Science and Technology in Society (NCPST) operating under the SCSTI<sup>196</sup>, which was established in 2007 pursuant to the Strategy for the

<sup>194</sup> Compared to the EU average of 38%. [Eurobarometer](#).

<sup>195</sup> Even through using interest in technical fields of study as one of performance indicators of the popularisation of S&T may imply disregard for other fields, we believe that measures in the S&T popularisation area can contribute to addressing the persisting problem of a lack of experts in this area by inciting interest in technical studies.

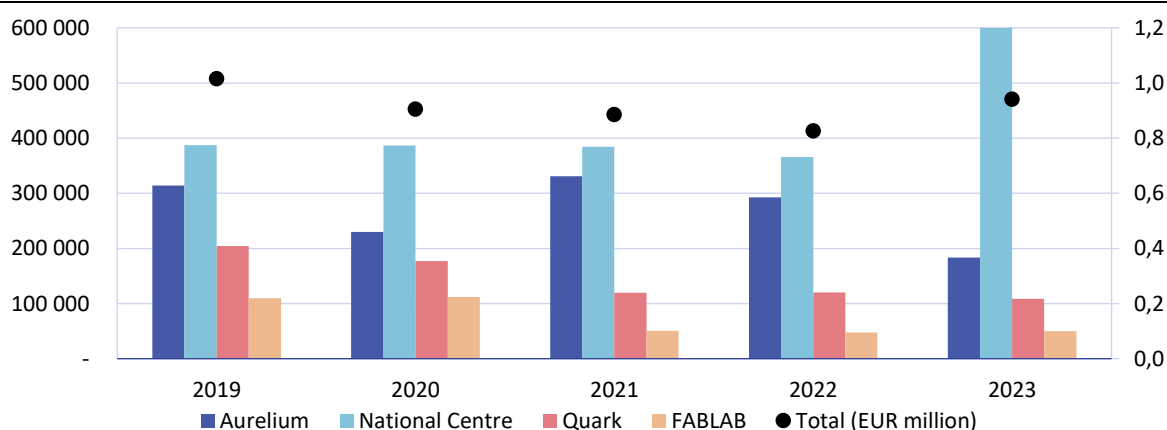
<sup>196</sup> National Centre for the Popularisation of Science and Technology in Society ([SCSTI](#)).

Popularisation of S&T in the Society.<sup>197</sup> According to the Strategy, the concept and programme of the National Centre’s activities should be drafted by the Steering Committee for the Popularisation of S&T in Society<sup>198</sup> as an advisory body to the Deputy Prime Minister of the Slovak Republic and the Minister of Education, whose members are, according to the Statute, representatives of Ministries, the SAS, industrial associations, public media, journalists and publishers. In the absence of an annual update of the concept of the National Centre's activities developed by the Steering Committee and the Ministry of Education, it seems that the management of this area is presently fully handled by the National Centre alone. Despite the fact that the National Centre annually submits to the Ministry of Education a Draft Concept of NCPST Activities and a Report on NCPST’s Activity, without a functional Steering Committee, strategic links to other Ministries and stakeholders are absent.

**Typical instruments for the popularisation of science are events targeting the general public.**

Activities of the NCPST include the organisation and implementation of the Slovak S&T Week in Slovakia, participation in the organisation of the pan-European event Researchers' Night, organisation of regular lectures within “Science in the CENTRE” and “Science Confectionery” events, building and operation of science centres (*Aurelium*), publishing magazines (*Quark*), operation of popularisation portals (*vedanadosah.sk*), building awareness and popularisation of S&T via social networks, various publications, creation of audio-visual works (e.g. documentary films) and podcasts, preparation and placement of exhibitions, organisation of discussions, conferences, and organisation of award events to recognise important scientific personalities (“Scientist of the Year of the Slovak Republic” and “Prize for Science and Technology”) to promote the prestige of these important professions. An example of other activities of the SCSTI outside the NCPST is FABLAB creative workshops.

**Graph 4.12 State budget funding for S&T popularisation tasks of the SCSTI**



Source: SCSTI, MESRS SR

**The annual state budget expenditure on the popularisation of S&T amounts to almost one million euros; project funding in this area is almost negligible.**

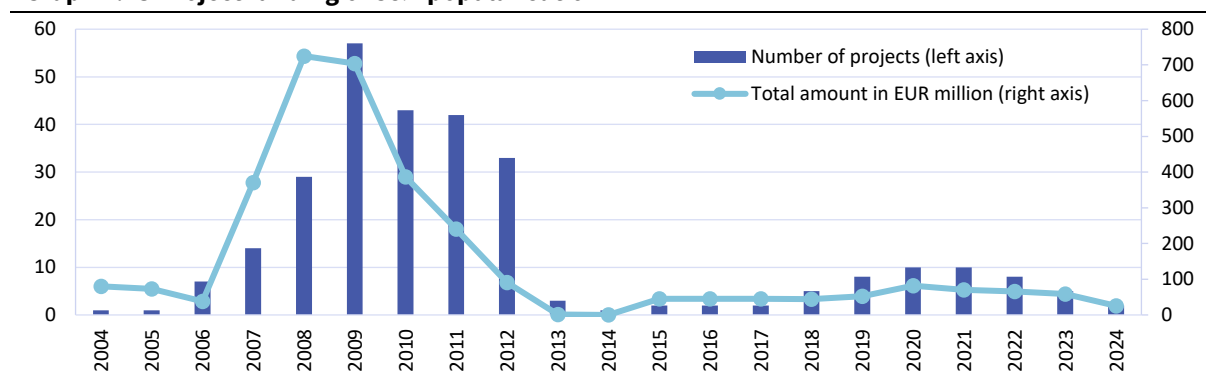
The state budget allocation is used to finance the regular activities of the SCSTI. These activities (except the FABLAB workshop) are a continuation of the activities of the NP Popularisation of S&T (PopVAT) national project implemented in the years 2013-2015 with a total budget of EUR 15 million. In addition to the state budget, the NCPST’s activities are funded by the Horizon Programme. For example, a total amount

<sup>197</sup> Strategy for the Popularisation of Science and Technology in Society .

<sup>198</sup> Steering Committee for the Popularisation of Science and Technology in Society ( SCSTI, 2008 ).

of EUR 1.15 million was used for the Night of Researchers event in 2014-2020.<sup>199</sup> The PopVAT NP II with a planned allocation of EUR 37 million was cancelled. One of the key activities of the NP was the construction of experience centres in *Nitra*, *Žilina* and *Košice*. According to the Central Information System for Research, Development and Innovation (SK CRIS), further 78 science popularisation projects are registered for the period from 2004 to 2024 conducted by various institutions, such as schools, universities, civic associations, non-profit organisations, the SAS PRIs, etc. with funding through the SRDA, state R&D programmes, and VEGA and KEGA. The total funding amounted to EUR 3.2 million.

**Graph 4.13 Project funding of S&T popularisation**



Source: SK CRIS

**It is recommended to develop a new S&T Popularisation National Strategy and Action Plan (a measure outlined in the National Strategy).** Ideally, this strategy should reflect strategic objectives such as digitisation, lifelong learning, citizen science within the open science framework, combating disinformation, and increasing students' interest in research careers. Reactivating the Steering Committee, or an equivalent body that includes representation from relevant state and public administration bodies, the professional community, and other stakeholders, is essential for better coordinating the various methods of popularisation and effectively reaching the target groups. Joint decision-making on the allocation of resources for popularisation projects will help ensure the transparency and review of funding of a whole spectrum of activities. Regular monitoring of effectiveness these activities, including pilot projects, in line with international practice, will enable a better allocation of resources in the future.

**Measure 4.8** Ensure the uniform monitoring and analytical evaluation of popularisation activities to support the decision-making on their further funding (e.g. by introducing satisfaction questionnaires, monitoring attendance, applying methods used to measure the effectiveness of marketing strategies, etc.).

**Measure 4.9** Introduce a grant scheme for popularisation projects with wider support for innovative approaches to complement the activities of the SCSTI and strengthen the regional reach.

**Measure 4.10** Introduce a financial top-up for the popularisation of results of research and innovation activity.

<sup>199</sup> The main organiser of the Night of Researchers is the Slovak Organisation for Research and Development Activities (SORDA).



#### 4.4. Information systems and registers supporting research, development and innovation

*RDI information systems, databases and websites are currently scattered, insufficiently interlinked, and offer limited opportunities for structured data export. Apart from the SCSTI, total expenditure on IT is negligible. It is recommended to prioritise the building of a one-stop shop for grants and RDI information in a user-friendly way.*

**On average, EUR 3.5 million is spent on information systems, of which EUR 3.4 million is funded through the ESIF.** This amount is almost entirely absorbed by the SCSTI (EUR 3.4 million represents the average spending under the Horizontal ICT Support and Central Infrastructure for R&D Institutions NP during the years 2017-2022); other expenditures are negligible (less than EUR 100 thousand per year), with the SRDA spending the most, EUR 80,000 euros per year (of which around EUR 40,000 is for software). The Ministry of Education spends almost exclusively on education, not on R&D. The information systems and registers enable research evaluation, project funding processing and registration of organisations, researchers, projects, infrastructure and R&D results. An important function is the provision of information to professionals as well as the general public.

**The SRDA's information system<sup>200</sup> enables the complete administration of project management** from project submissions, applications evaluation to the submission of subject-matter and financial reports on projects. The costs of its operation are negligible (around EUR 80,000), but it is an older system that does not support an effective connection to other information systems and, with regard to the platform and the vendor, the implementation of major changes is also not possible. The upgrade of the information system is set for deployment in September 2023, but it is not registered in the META-IS. Expectations of the upgrade include increased security, direct connection to SCSTI databases as well as other state registers (verification of ID number and the like) improved user friendliness and better editing options.

**The VEGA information system<sup>201</sup>** is similar to the SRDA system in that it also enables the complete project management, including the submission of projects, evaluation of applications and submission of content and financial project reports. The costs of its operation are negligible. It is also an older and user-unfriendly system that offers limited administration options from the user's point of view. It also supports the export of data for SCSTI. These are essentially two separate but mutually compatible information systems, one administrated by the Ministry of Education, the other by the SAS.

**The RA uses the ITMS system for project management,** which serves the administration of the ESIF funding across operational programmes and supports the whole project management process. In addition, various types of data are made publicly available through open API accesses.

**The ME SR uses the ITMS system for the ESIF and ISPO to administer calls for proposals under the RRP.** The SIEA uses its own simple information system (not registered in the Meta-IS) for voucher administration. The administration of calls of other Ministries (including the Government Office) as well as minor calls of the Ministry of Education is distributed across several locations on Ministries' websites.

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<sup>200</sup> SRDA.

<sup>201</sup> e-VEGA system for [the SAS](#) and the [MESRS SR](#)

**Most registers and databases are managed by the SCSTI.** The Register of Organisations, the Register of Researchers, the Register of Projects and the Register of R&D Results are all operated under one information system, SK CRIS. The addition of a register of research infrastructure is underway. Although it is not a perfect solution from the user's point of view, the data are not regularly updated and there is no API access, it is still possible to build on these databases and advance them further. This, however, requires regular maintenance and analytics. An important challenge is interfacing these data with other databases, such as with registers outside the SCSTI, or with information systems for submission and evaluation of projects, for institutional evaluation of research, or with systems conveying information to the general public.

**Online information about RDI is scattered across several websites.** In addition to each institution having information published on its official website, specific websites are created for almost every national project, which despite efforts to interlink them cannot capture all information. The sites concerned include, for example, vedatechnika.sk (the official central information portal for RDI), eraportal.sk, slord.sk, nptt.cvtisr.sk, cointt.sk, patlib.cvtisr.sk, skcris.sk, app.crepc.sk, app.creuc.sk, otvorenaveda.cvtisr.sk, crzp.cvtisr.sk, vedanadosah.cvtisr.sk, iss.cvtisr.sk, nvk.cvtisr.sk, kniznicepreslovensko.cvtisr.sk, katalog.cvtisr.sk, eiz.cvtisr.sk, edc.cvtisr.sk, ver.cvtisr.sk, vaia.gov.sk, opii.gov.sk, inovujme.sk, vytvor.me, or the non-updated sites opvai.sk, crepc.sk, nitt.cvtisr.sk, or the discontinued sites dc.cvtisr.sk, nispesz.cvtisr.sk.

**It is recommended to establish a single central portal for project funding management similar to the Horizon Europe programme.** As a general aim, it needs to bring greater user comfort for researchers and innovators, and reduction in the administrative burden for applicants and the grant agencies' personnel. Currently, information systems for project funding management are not at all interfaced, which prevents the attainment of the administrative control KPI "time-to-grant reduction to 7 months", as set in the National Strategy. Investment 7 in Component 9 of the initial RRP (before the 2023 revision) envisaged the creation of a unified central solution. The new information system was supposed to integrate and speed up project evaluation, including enabling communication with evaluators in English, evaluation by an international panel, or the use of EC evaluations. The unrealistic time plan set during the preparation of the RRP (launch of call in the new system in Q1/2023) necessitated the omission of this investment from the RRP and search for additional funds from other sources. This additional time needs to be used to design a cost-effective and more user-friendly environment.

**It is recommended to transform the central information portal on research and innovation in Slovakia, vedatechnika.sk.** The portal should be reformed to integrate all the information now distributed across multiple portals, provide it in a user-friendly way and be subject to regular updates.

**Measure 4.11** Create a one-stop shop for grant support (following the example of Horizon Europe) as well as providing information about RDI with a user-friendly interface.

## 5. Competencies in the administration of research, development and innovation (as-is status)

**Strengthening funding for research and innovation in Slovakia hinges on clarifying respective jurisdictions and coordinating actors within the Slovak RDI system.** Higher investment in a high-quality system stands as one of the three primary pillars of the National Strategy. Therefore, any increase in expenditure must be coupled with improved coordination of activities and clear delineation of individual actors' competencies. This is deemed a necessary prerequisite for ensuring a high-quality system.

**The competencies and financing within the RDI sector are currently fragmented and unclear.** In line with recommendations of the European Commission during the preparation of the RRP, there has been pressure to reform and defragment the administration of Slovak research and innovation policies, as well as consolidate implementation capacities. Fragmentation can lead to duplication, or, conversely, omission of certain functions, their misallocation, or insufficient representation.

**One of the first steps towards improving the coordination of the actors in the field of R&D is the transformation of the Government Council for Science, Technology and Innovation (GCSTI).** The council performs the role of the Government's advisory expert and coordination body for research and innovation policies.<sup>202</sup> The Research and Innovation Authority (VAIA) was established as an executive unit of the Council under the Government Office of the Slovak Republic (GO SR). Historically, the policy-making authority for research was with the Ministry of Education and the policy-making authority for innovations, together with the responsibility for funding of the innovation ecosystem, was carried by the Ministry of Economy. With the setting-up of the Office of the Deputy Prime Minister for Investments and Informatisation (later the Ministry of Investments, Regional Development and Informatisation of the Slovak Republic (MIRDI SR)), a part of the responsibilities of the predecessor of the GCSTI<sup>203</sup>, part of the responsibilities of the Ministry of Education and, in particular, the agenda concerned with the Research and Innovation Strategy for Smart Specialisation of the Slovak Republic were transferred to the new Ministry. In 2022, the Resolution of the Slovak Government No 460/2022<sup>204</sup> of July 2022 assigned the authority and responsibilities concerning the RIS3 to the GO SR. In addition to the Ministries of Education and of Economy and the GO SR, participants in the process of research and innovation policy-making and RDI support also include other central government bodies and their subsidiary organisations, the SAS and other institutions from the public and private sectors.

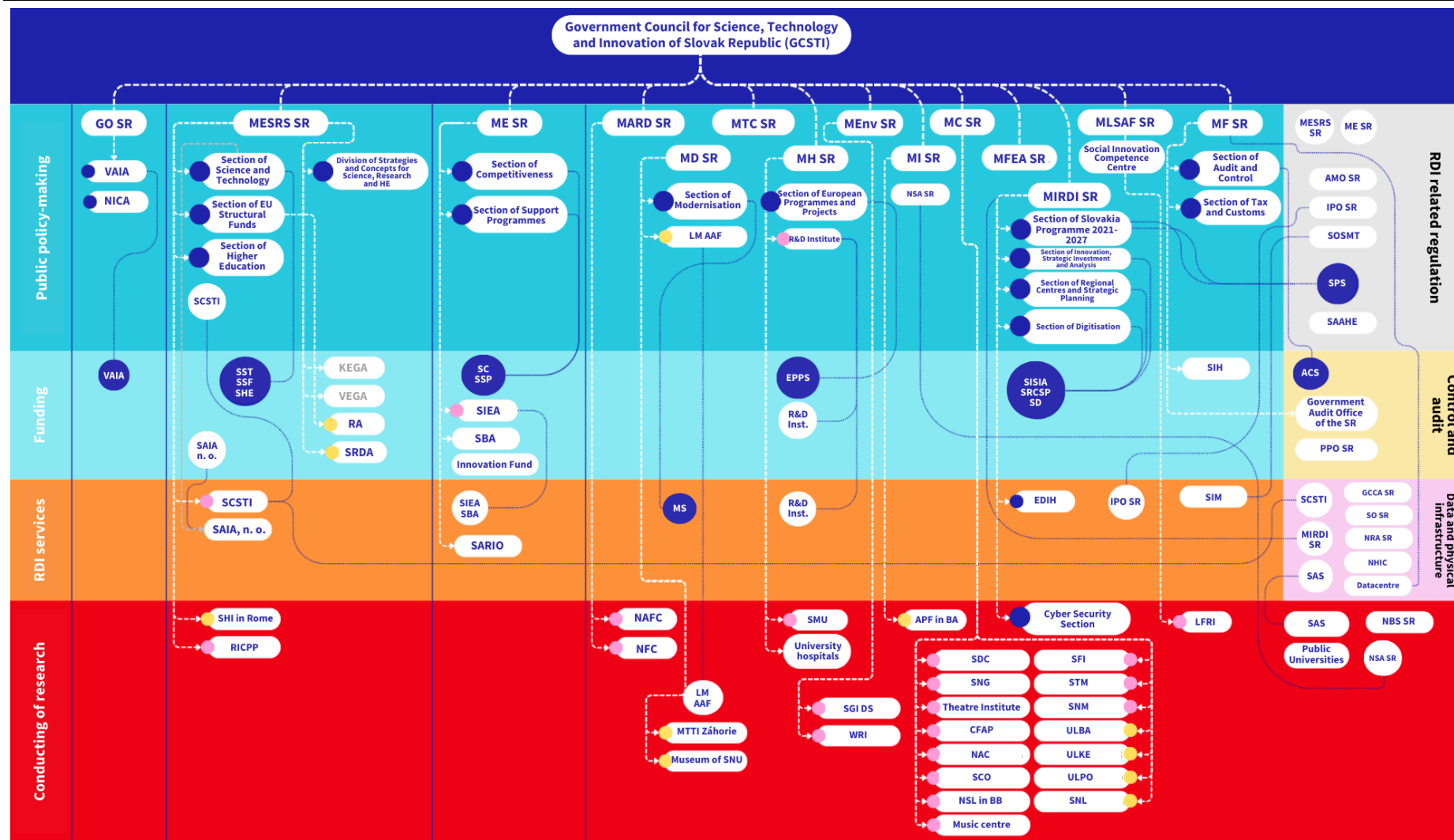
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<sup>202</sup> [Act No. 575/2001](#) on the organisation of the Government's operation and on the organisation of central government.

<sup>203</sup> At the time of transformation of the Office of the Deputy Prime Minister for Investment and Informatisation into the MIRDI SR, the Slovak Government Council for Science, Technology and Innovation operated under the MESRS SR.

<sup>204</sup> [Statute](#) of the Slovak Government Council for Science, Technology and Innovation.

**Diagram 5.1 Distribution of competencies for RDI in Slovakia**



Own calculation

## 5.1. Public policy-making and regulation in research, development and innovation

*There is a significant degree of institutional fragmentation of RDI policy-making, resulting in duplicated and overlapping competencies. Examples include the coordination role between the MESRS SR and the GO SR, the collection of statistics by the MESRS SR and the SO SR, and duplication and overlap of competencies between different sections within Ministries. Competencies related to research infrastructures, particularly, seem to be inadequately covered. Delegation of policies to implementing organisations, such as open science, technology transfer, and science and technology popularization, is notably unsuitable. It is recommended to undertake a significant reorganisation of competencies, especially in the areas of policy-making and project funding. Additionally, certain activities, such as administrative eligibility checks, should be removed from the relevant legislation and the tasks of the MESRS SR.*

**The main policy-making actor is the MESRS SR.** This is based on legislation<sup>205</sup>, but also comes from the volume and nature of the competencies carried out by the Ministry and its subsidiary organisations in relation to research and innovation policy making. Last but not least, this results from the volume of R&D funding, the distribution of which falls under the Ministry's strategic decision-making powers.

**The MESRS SR is responsible for the majority of strategic documents and legislation in R&D.** The Ministry drafts, updates and presents several strategic materials related to R&D at the national level<sup>206</sup>, participates in the preparation of inter-ministerial strategies<sup>207</sup>, participates in the preparation of relevant bills, regulations and ordinances<sup>208</sup> and on the development and implementation of grant schemes. As an important function in this context, the Ministry manages the cooperation and coordination of central authorities, subsidiary organisations and agencies and cooperation with universities, the SAS PRIs, sectoral research institutions as well as the non-profit and private sectors.

**R&D competencies are divided within the Ministry between the Section of S&T, the Section of HE, the Section of EU Structural Funds and the autonomous Division of Strategies and Concepts for Science, Research and Higher Education** (hereinafter referred "Division of Strategies and Concepts"). The Section of HE focuses mainly on HE education, scholarships, certification of qualification documents<sup>209</sup> and communication with HEIs and their representative bodies. Its engagement in research policy making is marginal. On the other hand, the Division of Strategies and Concepts is responsible for the most important conceptual issues, in particular the Long-term Intention in Education, Research, Development, Arts, and Other Creative Activities for HEIs, evaluation of the creative activity of HEIs and the SAS (VER), implementation of performance

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<sup>205</sup> [Act No. 575/2001](#) on the organisation the Government's operation and on the organisation of central government, as amended; and [Act No. 172/2005](#) on the organisation of state support for research and development.

<sup>206</sup> Research Infrastructure Roadmap - SK VI Roadmap 2020 – 2030; National Strategy for Open Science for 2021-2028 and Action Plan for Open Science for 2021-2022; Strategy for the Popularisation of Science and Technology in Society

<sup>207</sup> Recovery and Resilience Plan; Programme Slovakia, National Strategy for RDI 2030; RIS3 SK

<sup>208</sup> [Act No. 172/2005](#) on the organisation of state support for research and development and on amendments to the Act No 575/2001 on the organisation of the Government's operation and on the organisation of central government, as amended; [Act No. 243/2017](#) on public research institutions and on amendments to certain laws; [Act No. 131/2002](#) on universities and on amendments to certain laws; [Act No. 185/2009](#) on research and development incentives and on amendments to the Act No. 595/2003 on income tax as amended.

<sup>209</sup> This function is carried out through the Document Recognition Centre.

contracts, determination of block subsidy allocations for HEIs, and, in cooperation with the other sections, also for legislation and other tasks. The section has 8 FTE. The Section of EU Structural Funds creates policies mainly through its Division of Research Programming and partly through the Division of Methodology.<sup>210</sup> It has a total of 10 FTE.

**The widest portfolio of activities concerned with research policies within the MESRS SR is administered by the Section of S&T.** It manages development and implementation of the state's policy for S&T and plays a coordinating role vis-à-vis the SRDA, the Ministry's relevant subsidiary organisations (especially the SCSTI, the Slovak Historical Institute in Rome) as well as other general government bodies, the SAS and HEIs. It prepares annual reports on the state of R&D and drafts legislation relevant to this area. A large part of the agenda consists in international scientific and technical cooperation, membership in international R&D organisations<sup>211</sup> and international research infrastructure organisations<sup>212</sup> and cooperation with the OECD, bodies of the Council of the EU, the European Commission and the Permanent Representation of the Slovak Republic to the EU in Brussels. Some of the duties are “stamping” duties, such as the preparation of supporting documents for decision-making by the Slovak Committee on Scientific Ranks (in respect of the “DrSc” title), consideration of applications for permits to hire foreigners to perform R&D activities and assessment of persons' qualifications for engagement in R&D. The Division of Space Office/Space Policy also operates under this section and its main mission is to ensure bilateral cooperation with the ESA and coordinate space policies and activities at the national and international levels. The section's policy-making personnel is equivalent to 12 FTE. Moreover, additional FTEs administer the funding of some grant schemes.

**The SCSTI plays a big role in R&D policy-making.** The SCSTI serves as the National Reference Point for Open Science, the National Technology Transfer Centre of the Slovak Republic and the National Centre for the Popularisation of S&T. It develops all conceptual and strategic materials for the relevant areas. The SCSTI collects and processes data for central government bodies, in particular the MESRS SR and the SO SR, and international organisations. The SCSTI is also the administrator and operator of the information systems and registers<sup>213</sup>, falling under the jurisdiction of the MESRS SR. It also carries out some duties in the field of international scientific cooperation. The SCSTI also performs analytical activities for the Ministry, the Accreditation Agency or other bodies. In addition, it has several assignments in the area of ecosystem services (for more see Chapter 5.1.4).

**The strategic and methodological coordination of R&D is carried out by the GO SR through the Research and Innovation Authority (VAIA).** This is a new agency set up at the end of 2021<sup>214</sup> within the RDI policy management reform. Except a small number of employees dealing with the implementation of calls for proposals<sup>215</sup>, the agency's primary responsibility (carried out by approximately 30 FTE) is public policy-making. This mainly involves the preparation and updating of strategic documents (National Strategy for Research, Development and Innovation 2030, Strategy

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<sup>210</sup> The other departments of the EU Structural Funds Division focus on financing, control and audit activities, or policy-making for education.

<sup>211</sup> CERN, EUREKA, JPND, ECSEL JU, SUJV Dubna, ICGEB, EGI, ICGEB, ESA, etc.

<sup>212</sup> ESS ERIC, ALLEGRO, etc.

<sup>213</sup> Integrated System of SCSTI Services; Central Information System for Research, Development and Innovation (CIP VVI), Slovak Current Information System (SK CRIS); Central Register of Theses (CRT); Anti-plagiarism System (APS); Central Register of Publication Activity (CRPA); and others.

<sup>214</sup> Until November 2022, it operated under the name Research, Development and Innovation Division.

<sup>215</sup> The employees administer the RDI funding, namely two RRP calls for proposals: “Call for proposals for support for researchers threatened by the conflict in Ukraine” and “Call for proposals for transformation and innovation consortia”.

for Smart Specialisation), the implementation of some measures outlined in those strategic documents and monitoring of the implementation of measures being implemented by other entities. The agency's agenda also includes participation in the preparation of strategic and legislative materials of other public administration entities. The second pillar is the preparation and implementation of mandatory methodology for the management, financing and evaluation of RDI support. The third pillar of the agenda is the preparation of a Preliminary Financing Plan. Closely related to this is the role of reform implementation and investments under the RRP and the setting of objectives for public calls for proposals.

**The VAIA also carries out the functions of an analytical unit for R&I policies.** The aim is to provide analytical support and *ex post* evaluation of R&I calls for proposals an essential part of evidence-based policy making. The Analytical Unit is currently not integrated in the network of analytical units of the government.

**The MF SR has competencies in RDI in public policy-making, mainly through its Section of Audit and Control, Section of Tax and Customs and Section of International Relations.**<sup>216</sup> This concerns cross-cutting policies that have extensive and direct impact on the RDI ecosystem. In addition to control activities, the Audit and Control Section is in charge of legislation concerning audit and control.<sup>217</sup> It is the main actor in efforts to streamline administration of grant schemes. The Tax and Customs Section influences RDI ecosystem mainly through designing tax legislation instruments.<sup>218</sup> The Section of International Relations co-manages SIH and thus sets policies for the utilisation of financial instruments to support the RDI ecosystem. Since these are cross-cutting policies, the quantification of allocated personnel is not done.

**Two units of the ME SR are engaged in innovation policy-making, namely the Section of Support Programmes and the Section of Competitiveness.** For both of them, innovation is covered by a larger policy package. The Competitiveness Section manages among other policies relevant to business environment those covering start-ups, innovation, digital economy and industrial policy. As a part of its engagement in international RDI cooperation, it represents Slovakia in boards, working groups and committees of the EU, OECD and the Danube Strategy working group. The Ministry has bilateral agreements with Israel, Korea and Taiwan. The Section also coordinates the activities of the SIEA, SBA and SARIO in the subject areas falling under its jurisdiction and manages the Innovation Fund's operation. As one of its support instruments, the Ministry organises the Innovative Act of the Year competition. The Section of Support Programmes manages the regional investment aid policy, carries out the intermediary body function for the ESIF and provides guidance to the SIEA within the area of its authority. Approximately 23 FTE are assigned to the RDI policy-making.<sup>219</sup>

**The MIRDI SR is also partially engaged in RDI policy-making.** The main subject areas covered by the MIRDI SR are digital innovation and smart cities. The Section of Innovation, Strategic Investments and Analysis develops and implements the Strategy for Smart and Sustainable Mobility of Slovakia and the smart cities and regions policy, defines objectives for public calls for proposals in relevant areas and sets the direction of the Just Transformation Fund. The Section of Digitisation

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<sup>216</sup> The International Relations Section is involved through its Financial Instruments and International Institutions Division.

<sup>217</sup> [Act No. 357/2015](#) on financial control and audits

<sup>218</sup> [Act No. 595/2003](#) on income tax

<sup>219</sup> 18 FTE in the Support Programmes Section, 5 FTE in the Competitiveness Section.

creates and implements the Digital Transformation Strategy of Slovakia and defines objectives for public calls for proposals in the digital innovation area. The Regional Centres and Strategic Planning Section manages the functioning of and support for regional innovation centres. Approximately 27 people are engaged in RDI policy-making (some of them at the same time carry out funding-related duties or other activities).

**The MIRDI SR also wields significant influence through regulations administered by the Section of Programme Slovakia 2021-2027 and the Section of Public Administration Information Technology.**<sup>220</sup> The Section of Programme Slovakia 2021-2027 is responsible for activities and tasks arising from the Ministry's position as the managing body for the programming and implementation, development and approval of the programme management documentation process and the coordination and supervision of the Programme's intermediary bodies. The Section's responsibility is to negotiate and decide on terms of investment of the funds available under the Programme. The Data Office Division under the Section of Public Administration Information Technology is in charge of open public data policy.

**Statistical data concerning RDI are collected by the SO SR and the MESRS SR using a total of three questionnaires.** The SO SR performs collection of two sets of data that are crucial for both national and international statistics on RDI. The Annual Research and Development Statement (VV 6-01) is used to gather information on research personnel, structure of legal entities' and natural persons' R&D activities, expenditures and their structure, and project funding. Information on the innovation activity of businesses is collected through the Statistical Survey on Innovation (Inov 1-92), which is carried out every two years. It collects basic information about companies and their innovation activities and strategy, innovation expenses, forms of financing, as well as cooperation in innovation activities with other companies and factors limiting innovation activity. The outputs from SO SR's surveys are further used for assessment of the current state of RDI system, and for international comparisons. Reporting obligation with regard to the statistical statements described above is laid down in the Act No 540/2001 on state statistics. Further, the SO SR also collects data on the productivity of companies in the R&D sector, but these serve as a starting point for the preparation of national accounts, not as information on the R&D performed.<sup>221</sup> The MESRS SR collects selected data through the Annual Research and Development Potential Statement (VVP 1-01) for which reporting obligations are laid down in the Act No172/2005. The data are further forwarded to the SO SR and the MF SR. The statistical surveys carried out by MESRS SR cover in greater detail some of the questions included in VV 6-01 and Inov 1-92 statements, but they also include information that is not collected by the SO SR, especially in modules 5 to 7 which gather, for example, information on the state of laboratory equipment, publication activity, memberships in international organisations and assignments under international scientific and technical cooperation. The MESRS SR also collects data for the Slovak R&D Report, for assessments of ability to conduct R&D, for monitoring and evaluation of MESRS SR's sub-programmes, research and publication activities. Analytical documents are prepared mainly for the MESRS SR.

**The Industrial Property Office of the Slovak Republic (IPO SR) is the central authority for industrial intellectual property protection.** It carries out administration of the protection of inventions, utility models, semiconductor topography rights, designs, trademarks, designations of

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<sup>220</sup> The Central Coordination Body (CCB) Section was abolished and most of its agenda was transferred to the Slovakia 2021-2027 Programme Section.

<sup>221</sup> Annual Statement of Research and Development Production Industries (Roc VV 1-01) and Annual Statement of Small Enterprises' Research and Development Production Industries (Roc V 2-01).



origin of products and geographical indications. It represents Slovakia in international organisations, namely the World Intellectual Property Organisation (WIPO), the European Patent Organisation (EPO) and the European Union Intellectual Property Office (EUIPO). At the same time, the IPO SR drafts legal regulations in the field of intellectual property protection and related methodologies and guidelines. The IPO SR maintains central stock of patent and trademark documentation and makes it available to the public; maintains an electronic register of objects of industrial property rights; and acts as a specialised patent information centre in the Slovak Republic. The efficiency assessment of the IPO SR's functioning is provided in Chapter 4.2.4.

**Pursuant to law<sup>222</sup>, the Slovak Office of Standards, Metrology and Testing (SOSMT) performs the role of central government body responsible for technical standardisation, metrology, quality, conformity assessment and accreditation of conformity assessment bodies.** The responsibilities of the SOSMT include development of state policy, methodical activity and supervision of the fulfilment of tasks in this area. The efficiency assessment of the SOSMT's functioning is provided in Chapter 4.2.3.

**Pursuant to the law,<sup>223</sup> the Anti-monopoly Office of the Slovak Republic (AMO SR) is a state aid coordinator.** As such, the AMO SR cooperates with state aid providers in the preparation of RDI support measures, mainly through the assessment of proposals for aid schemes and ad hoc aid measures as well as aid measures not subject to the rules applicable to state aid. The AMO SR coordinates the preparation of Slovak authorities' comments on the EU legislation on RDI.

**Pursuant to the law<sup>224</sup>, the Recovery Plan Section of the Government Office carries out the function of the National Implementation And Coordination Authority (NICA).** NICA's task is to ensure drafting and submission of opinions of the Slovak Republic on bills of legally binding EU acts, EU's strategic documents, and other documents for the implementation of the RRP. The NICA manages preparation of the RRP and its submission to the EU and conducts RRP-related communication. NICA provides guidance to entities on the implementation of the RRP and controls potential overlapping between expenditures under different mechanisms.

**The Slovak Accreditation Agency for HE (SAAHE) manages accreditation of HEIs.** The MESRS SR, in contrast, manages assessments of HEIs' research (VER) serving different purpose. The SAAHE sets the "minimum standard" for the study programmes, while VER assesses the level of research excellence of HEIs' departments (one of the criteria on which research funding decisions are based). The SAAHE assesses internal quality assurance systems of HEIs, supervises compliance with standards and oversees compliance of study programmes with standards applicable to the programme and accreditation applications for the study programmes concerned. It also performs methodical, consulting and training activities in relation to the accreditation processes.

**Other general government bodies also engage in policy-making in the field of RDI within the boundaries of their specific jurisdictions, but this involvement is limited.** The Ministry of Health (MH SR) develops (through the Institute of R&D) a long-term strategy for development of R&D in the health sector, with a special focus on biomedicine, and directs and coordinates research activities in the health area and sets the focus, priorities and goals of research in this area. An important role

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<sup>222</sup> [Act No. 575/2001](#) on the organisation of the Government's operation and on the organisation of central government

<sup>223</sup> [Act No. 358/2015](#) governing certain matters in the area of state aid and *de minimis* aid and amending certain laws (State Aid Act)

<sup>224</sup> [Act No. 368/2021](#) on the Recovery and Resilience Facility and on amendments to certain laws.

in this context is also played by the European Programmes and Projects Section which sets the objectives of calls under Programme Slovakia. The MH SR also exercises authority vis-à-vis the state Slovak Medical University. The Ministry of Agriculture and Rural Development of the Slovak Republic (MARD SR) carries out coordination, methodological guidance and facilitation of R&D in the fields of agriculture, plant and animal production biotechnology, forestry and research to support quality and safety of food. The MARD SR manages its sectoral research institutes, the National Agricultural and Food Centre and the National Forestry Centre. These are the largest sectoral research institutions in Slovakia. The Ministry of Defence of the Slovak Republic (MD SR) carries out R&D tasks aimed at ensuring defence and security of the Slovak Republic (including those related to the NATO Innovation Fund and DIANA Accelerator) mainly through its Modernisation Section. The MD SR also exercises authority vis-à-vis the state Academy of the Armed Forces. The Ministry of Culture of the Slovak Republic (MC SR), the Ministry of the Environment of the Slovak Republic (MEnv SR), the Ministry of Labour, Social Affairs and Family of the Slovak Republic (MLSAF SR), the Ministry of Transport and Construction of the Slovak Republic (MTC SR) and the Ministry of Interior of the Slovak Republic (MI SR) carry out coordination and methodological guidance of RDI and, jointly with their cooperating organisations, conduct research within subject areas falling in their respective jurisdictions. Ministry of Foreign and European Affairs of the Slovak Republic (MFEA SR) contributes to the European-level policy-making through the Permanent Representation in Brussels, namely the Secretary II for Research, Innovation and Space.

**There is an array of ambiguities around the current set-up of scopes of competencies in the RDI area.** First of all, there is a competence inconsistency between jurisdictions of the MESRS SR and the GO SR agency (VAIA): pursuant to the Act 172/2005 on the organisation of state support for RDI, the MESRS SR is supposed to “coordinate activities of central authorities, the SAS and HEIs in the preparation and implementation of the state S&T policy and in the preparation of the draft general government budget ... in the field of S&T”; and at the same time, according to the same Act, the GO “strategically and methodically coordinates (a) policy-making for the financing, management and evaluation of support in the field of RDI;... .. and (d) the activities of general government entities in the field of RDI...”. The MESRS SR is also responsible for the development and implementation of strategic documents for S&T and the GO SR (VAIA) is responsible for the two most important strategic documents, the National Strategy for Research, Development and Innovation 2030 and the Strategy for Smart Specialisation.

**Many competence discrepancies also exist vis-à-vis other Ministries.** Pursuant to the Act on Competencies, the Ministry of Transport is responsible for development and implementation of the smart mobility policy, while the MIRDI SR is responsible for development and implementation of the Strategy for Smart and Sustainable Mobility in Slovakia. Cyber security falls under the jurisdiction of the National Security Authority of the Slovak Republic (NSA SR), while, at the same time, funding for cyber security is also provided to the CSIRT government unit<sup>225</sup> of the MIRDI SR, including from the EU funds. Several other topics also sit at the boundary of jurisdictions of the MESRS SR and the ME SR; this includes, for example, support for companies’ RDI, participation in the Horizon Europe programmes, European partnerships and international S&T cooperation in general.

**Despite the number of organisations and activities involved in the RDI policy-making, management of research infrastructures seems to be an under-represented function.** Although the topic falls under the jurisdiction of the Section of S&T of the MESRS SR according to its

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<sup>225</sup> Computer Security Incident Response Team Slovakia

Organisational Rules and the section has prepared the Research Infrastructures Roadmap and Action Plan, in reality, not a single FTE is assigned to this topic. This is despite the fact that the Action Plan foresees funding four FTE employees, and this requirement was also included in the National Strategy Action Plan of January 2024. In the Czech Republic, for comparison, this topic is handled by a separate Department for Research Infrastructures with eight employees.<sup>226</sup>

**One example of misallocation of competencies is the delegation of policy-making powers from a Ministry to its subsidiary organisations.** For the MESRS SR, this has happened with regard to open science, technology transfer and popularisation of S&T, which are in reality managed by the SCSTI.

**In contrast, it is advisable to remove some bureaucratic duties from the competencies of the MESRS SR.** This includes preparation of supporting documents for the decision-making by the Slovak Committee on Scientific Ranks (in respect of the “DrSc” title), evaluation of permit applications to hire foreigners for R&D and assessment of persons’ qualification to conduct R&D. For example, the whole agenda of awarding of the “DrSc” scientific rank could be delegated to the autonomous authority of the academic sector (as is the case with other ranks). The administrative procedures in the competence of the MI SR and the MESRS SR in respect of the hiring of R&D personnel should be simplified and the MESRS SR should be released from the administrative burden of verifying applications from foreigners seeking to work in R&D. The R&D evaluation of ability to conduct research by the MESRS SR is redundant, since this ability is already performed as part of R&D project evaluation. For comparison: no such proof of the ability to conduct research is required for participation in Horizon Europe calls for proposals. This activity poses a burden not only for the MESRS SR, but also other entities concerned. In addition, many innovative start-ups that could otherwise participate in calls for proposals do not possess such proof. Removal of these duties from the MESRS SR’ agenda must also be aligned with other related legislation.

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<sup>226</sup> *Oddělení pro výzkumné infrastruktury* (Research Infrastructure Unit of the Ministry of Education, Youth and Sports of the Czech Republic).

**Box 5.1 Examples of the organisation of policy-making in other EU countries**

RDI policy-making is usually covered by one, or no more than two Ministries. The Czech Republic uses a model most similar to Slovakia.

**In Denmark, there is a separate Ministry of Higher Education and Research,** which is also in charge of innovation policy. It has existed in various forms since 1993. The Danish Ministry of Economy is in charge of industrial, trade and competitiveness policy with its business agency. It cooperates with the Ministry of Higher Education and Research.

**Hungary has the Ministry of Innovation and Technology and the Office for RDI under that Ministry.** However, it administers a mix of policy-making and funding. The higher education policy also falls under this Ministry.

**In Switzerland, RDI policy is the responsibility of the State Secretariat for Education, Research and Innovation (SERI)** which, together with other bodies, is a part of the wider Federal Office for Economic Affairs, Education and Research (EAER). In the regional education system, SERI administers only secondary vocational education and the rest is the responsibility of cantons. The EAER also includes an innovation agency, Innosuisse.

**Cyprus and Romania are very interesting examples:** while they are countries of a different size, **both have a Ministry of Research, Innovation and Digitisation.** This is a relatively new form of institutional management for both: Cyprus since 2018 and Romania only from 2021. In Cyprus, the Ministry is led by a Deputy Prime Minister, which has certain benefits for policy coordination. Also falling under the Ministry is the Chief Innovation Officer who also chairs the only government funding organisation (Research and Innovation Foundation) and the Council for Research and Innovation (similar to the GCSTI). In recent years, Cyprus has been the fastest advancing country in the EIS ranking.

**Slovenia has its own Ministry of Higher Education, Science and Innovation.** However, there is still the Ministry of Economy with a similar scope of responsibilities as in Slovakia and the Ministry of Digital Transformation, which is in charge of digital innovations. In implementation terms, however, Slovenia's system is better organised: it involves a minimal number of agencies and funding is provided solely through these agencies (with the exception of the ESIF). There is only one agency under the Ministry of Science and Innovation - the Research and Innovation Agency of Slovenia (ARIS), which also provides institutional funding and all types of grants. Support for innovation is about to be transferred to it in 2023.

**Many traditional leading innovators or large countries use variations of a dual regime that involves Ministry of Science and Ministry of Economy,** agencies follow this regime. Such model can be found in Finland, Austria, Sweden, Estonia, but also in large countries such as Germany and France, among others.

**A fragmented model most similar to that of Slovakia is used by the Czech Republic.** In addition to the Ministry of Education, which also has HEIs and research in its portfolio, RDI administration also involves the Ministry of Industry and Trade (the Czech counterpart of the Slovak Ministry of Economy), the Deputy Prime Minister for Digitisation and Local Development (the Czech counterpart of the MIRD SR) and the Minister for Science, Research and Innovation without a Ministry (a body equivalent to the VAIA, but with a stronger mandate).

**Measure 5.1** Reorganise civilian-RDI policy-making as outlined in Chapter 6 of the Review.

**Measure 5.2** Remove the Assessment of Ability to Conduct Research from legislation (Article 26a of Act No 172/2005).

**Measure 5.3** Terminate the role of the MESRS SR in the Slovak Committee on Scientific Ranks and transfer the entire agenda to the SAS.

**Measure 5.4** Significantly simplify and automate permission process for hiring of foreigners for R&D (Article 26b of Act No 172/2005).

## 5.2. Funding of research, development and innovation

*Project funding for RDI is currently administered by a multitude of actors, including the Ministries of Education, Economy, Informatisation, Healthcare and Defence, and the GO SR. Furthermore, providers are dispersed across various sections within the Ministries. In addition to these sections, grants are also dispensed by specific agencies established for this purpose, such as the SRDA, Research Agency (RA), SAIA and SIEA. As part of the reorganisation, it is recommended to clearly segregate the administration of project funding from the Ministries, whose primary focus should be policy-making. Simultaneously, the number of funding agencies should be streamlined to two, each catering to a distinct type of priority recipient, namely research institutions and businesses.<sup>227</sup>*

**Main actors in the funding of the Slovak ecosystem are the Ministry of Education for research and science, and the Ministry of Economy for innovation and support for SMEs and start-ups.** However, institutional and project funding is also provided by several other Ministries.

### 5.2.1. Institutional funding

**Institutional funding is mainly provided by MESRS SR** (for public HEIs, research institutions and subsidiary organisations of the MESRS SR providing S&T services), but also in a limited form by other Ministries and central government bodies (sectoral state HEIs, research institutions and organisations providing S&T services within their respective jurisdictions). The MF SR has a specific position, as it directly decides on the funding of the SAS.

**The MESRS SR provides institutional funding for public HEIs and research organisations within its jurisdiction**, which are the Slovak Historical Institute in Rome and the Child Psychology and Patho-psychology Research Institute (CPPRI). This funding is earmarked for the operation of the institutions.

**The ME SR provides institutional funding for the operation of the sectoral contributory organisation SIEA**, and for a part of the operation of SBA and SARIO. It does not directly provide institutional funding for any research institutions.

**More than a third of organisations of the MC SR participate in sectoral research activities**, namely four budgetary organisations<sup>228</sup> and ten contributory ones.<sup>229</sup>

**The MARD SR institutionally funds two sectoral contributory organisations, namely the National Agricultural and Food Centre (NAFC) and the National Forestry Centre (NFC).** The Ministry's management makes decisions on funding allocations through by approving research objectives of NFC and NAFC for a five-year period. The actual conduct of research and delivery on these objectives are supervised by the MRDS SR's organisational unit under whose responsibility the organisations fall. Thereafter, projects to implement the specific research objectives are approved.

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<sup>227</sup>This requirement only applies to civilian research. Given the Ministry's specific task of state defence, the administration of RDI grants under the Ministry of Defence is subject to special arrangements.

<sup>228</sup> Slovak National Library in Martin; University Library in Bratislava (ULBA); State Scientific Library in Košice (ULKE); State Scientific Library in Prešov (ULPO).

<sup>229</sup> Slovak National Gallery (SNG); Theatre Institute (TI); Slovak National Museum (SNM); Slovak Film Institute (SFI); National Education Centre (NEC); Music Centre (MC); Slovak Technical Museum (STM); Centre for Folk Art Production (CFAP); Slovak Central Observatory (SCO); State Scientific Library in Banská Bystrica (SSL)

To be approved, every R&D project within the MARD SR's authority must have an established customer from business or from the state executive. This ensures the connection of every sectoral R&D project with practice, as the sectoral research institutes conduct applied research.

**A subsidiary organisation of the MEnv SR conducting research and receiving institutional funding is the Dionyz Stur State Institute of Geology.** R&D expenditure in the budgetary chapter of the Ministry is entirely reported as expenditure of the Institute. In addition to state geological service in the area of basic and regional geological research, the Institute functions as the Central Geological Library and conducts publishing activities. The Water Management Research Institute and the Slovak Hydro-meteorological Institute also conduct research, but they do not report any R&D expenditure in the BIS.

**The Ministry of Labour, Social Affairs and Family of the Slovak Republic (MLSAF SR) provides institutional funding to its own contributory organisation, the Labour and Family Research Institute (LFRI).** It conducts research in social and family policy, social security, employment and labour market policy.

**The MD SR provides institutional financing to two organisations.** It signs annual contracts with the Military Technical and Testing Institute in *Záhorie* (MTTI) for research and operation of R&D infrastructure<sup>230</sup>; with the Academy of Armed Forces in *Liptovský Mikuláš* (LM AAF) for research in support of state defence in individual projects, for the conduct of international cooperation under international conventions and the membership of the Slovak Republic in NATO and the EU/EDA and for operation of the National Distribution Centre for NATO STO documents.<sup>231</sup> From the beginning of 2022, the Museum of the Slovak National Uprising was also transferred to the MD SR's jurisdiction as a budgetary organisation.

**The MH SR supports contributory organisations from the public health insurance funds.** The organisations reporting research expenses financed in this way are the National Institute of Rheumatic Diseases, the University Hospital in Martin and the L. Pasteur University Hospital in *Košice*. The Slovak Medical University in Bratislava is a contributory organisation receiving transfer from the MH SR budget. The budgetary organisations of the MH SR involved in the conduct of R&D also include selected Regional Public Health Offices and the Slovak Medical University.

**The Academy of the Police Force in Bratislava is a budgetary organisation of the MI SR and receives institutional funding** to support its research focused on modern technologies and development trends in forensic sciences for police use.

**A specific type of funding is allocation of institutional funding through projects, which is provided under the VEGA and the KEGA schemes.** The SAS VEGA is an internal grant scheme of the SAS and the MESRS SR VEGA and MESRS SR KEGA are schemes for public HEIs. In all three cases, the process of processing applications, documents preparation and budgetary measures are managed by the Section of S&T of the MESRS SR.

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<sup>230</sup> The [SEM0D-EL76/6-104/2023-OdMSaPV](#) contract for 2023 signed between the Slovak Ministry of Defence and the *Záhorie* MTTI.

<sup>231</sup> The [SEM0D-EL76/9-242/2023-OdMSaPV](#) contract for 2023 signed between the Slovak Ministry of Defence and LM AAF.

## 5.2.2. Project funding

**The Ministry of Education provides the largest volume of R&D project funding.** The Ministry of Education provides project funding either directly or through two agencies, the RA and the SRDA or indirectly through the non-profit organisation SAIA.

**Funding through the RA was provided exclusively under the operational programmes of the ESIF, EEA and Norway financial mechanisms, and the RRP.** The largest programme was the Operational Programme Integrated Infrastructure 2014-2020 (OP II after merging with the of OP Research and Innovation in 2020) in which priority axes 9, 10 and partially axis 13 were focused on R&D and priority axes 11, 12 and partially axis 13 on innovation.<sup>232</sup> The calls for proposals under the priority axes mentioned above were managed by three entities, namely the Ministry of Education, the Ministry of Economy and the RA. The predecessors of OP II, or OP Research and Innovation (OP R&I)<sup>233</sup> in the programming period 2007-2013 were the OP R&D and the OP Competitiveness and Economic Growth (OP CEG). The agency has 140 employees.

**The SRDA provides R&D project funding under so-called General Call for Proposals, the Agency's programmes, and through international S&T cooperation agreements and programmes.**<sup>234</sup> The highest amount of project funding is annually provided by the SRDA through the General Call for Proposals for basic and applied R&D. Calls under the “SRDA programmes” are focused on various thematic aspects of scientific activity, namely strengthening of Slovakia's participation in European R&D cooperation (PP MSCA PF 2022, PP H-EUROPE 2021, PP H2020), support for R&D to combat the coronavirus pandemic ( PP COVID 2020) and support for young scientists (YS 2019). International cooperation projects include bilateral calls, bilateral research calls and multilateral calls. Their aim is mainly setting up new, or intensifying already existing, scientific and technical cooperation (publications, conferences, organisation of joint scientific events, sharing of instrumentation and laboratory technology, etc.).<sup>235</sup> The SRDA's headcount is 35 people.

**The Ministry of Education also initiates or administers calls for proposals directly,<sup>236</sup> without intermediation by agencies.** Such calls for proposal are initiated and administered by two different sections of the Ministry. The Section of S&T administers calls for proposals for the funding of projects of international communities (JPND, EUREKA SK, EURAXESS, ECSEL JU, EUROSTARS 2), calls for proposals for R&D incentives for business,<sup>237</sup> or calls for proposals of VEGA and KEGA. This is handled by eight FTE employees. The Section of EU Structural Funds manages selected calls for proposals under the structural funds. The estimated number of employees assigned to the implementation of the calls is 38. In the new programming period, the Section is to act as the intermediary body for all calls for proposals in the Ministry's jurisdiction instead of the RA.

**Project funding is also provided by the ME SR in the form of subsidies, especially in the area of innovation and support for SMEs and start-ups;** the calls are implemented partly by the ME SR

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<sup>232</sup> PA 9 Support for research, development and innovation; PA 10 Support for RDI in the Bratislava Region; PA 11 Strengthening the competitiveness and growth of SMEs; PA 12 Development of the competitiveness of SMEs in the Bratislava Region; PA 12 Technical R&I assistance.

<sup>233</sup> The European Commission decided on the merger of the OP II and the OP R&I with effect from 13 December 2019. The contents and funding of the former OPs were transferred under the new OP.

<sup>234</sup> Grant schemes (SRDA).

<sup>235</sup> [Annual Report of the SRDA's Activity 2021](#).

<sup>236</sup> Partially through the so-called state programmes

<sup>237</sup> [Act No. 185/2009](#) on incentives for research and development and on amendments to the Act No. 595/2003 on income tax, as amended.

alone, partly through the SIEA<sup>238</sup> and partly through the SBA<sup>239</sup>. About 142 FTE employees carry out the call management at the ME SR (Support Programmes Section); they provide the ESIF funding not only under the RDI objective, but also within the framework of support for the competitiveness of SMEs. In 2013, the ME SR entered into a cooperation agreement with Israel<sup>240</sup> aiming to support international cooperation of business entities in industrial research and experimental development projects. Related public call for proposals was launched in 2016, 2017, 2018. The implementer is the SIEA.

**Since 2013, the ME SR has been implementing calls for proposals to support businesses<sup>241</sup> in the form of innovation vouchers.** In 2013 and 2014, the SIEA was implementing the scheme, in 2015-2020 this was done by the Ministry alone. Since 2021, innovation vouchers have again been managed by SIEA under the NP Improving the Innovative Performance of the Slovak Economy.<sup>242</sup> This is financial support for access to professional skills, services and knowledge, support for the development of new or improved products, or support for the application of knowledge and technology in practice.<sup>243</sup> With effect from July 2023, SIEA also administers innovative and digital vouchers financed from the RRP.

**RDI clustering is supported by a scheme targeting industrial cluster organisations,** which aims to intensify information transfer, expert activities, presentations of industrial cluster organisations and their involvement in international projects and networks; the Amendment No. 2 also extended the Business Networking Support Scheme<sup>244</sup>.

**The MD SR annually opens a public call for subsidy applications for R&D projects to support the defence of the state<sup>245</sup>.** The subject of the call is the provision of state aid for basic research, industrial/applied research and experimental development projects aimed at the defence of the Slovak Republic to contribute to improved competitiveness of the economy, creation of new innovative (high-tech) SMEs and creation of new jobs.<sup>246</sup>

**The support for R&D projects of the MH SR is managed by the Institute of Research and Development (IR&D) as well as the Section on European Programmes and Projects (SEPP).** Support from the state budget provided through the IR&D took the form of a general call for proposals in 2018 and 2019 and a specific “Onco” call opened in 2019. The SEPP will also initiate calls under the Programme 2021-2027. In 2018, the IR&D’s activities were carried out by 3 permanent employees. In the last programming period, the SEPP did not open any R&I calls.

**Starting from 2022, with the launch of the RRP, the number of institutions opening calls for proposals to support RDI has further increased.** The MIRDI SR and the GO SR began to open calls.

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<sup>238</sup> The SIEA administers calls under the Operational Programme Integrated Infrastructure that are aimed at supporting the innovation and technology transfer and technological and applied research. As a part of the ZIVSE National Project and the RRP Call, the SIEA implements e.g. innovative, creative or digital vouchers.

<sup>239</sup> Examples include the Start-up Support Programme and Scheme, Family Business Support Scheme, Business Education Support Scheme, SME Monitoring and Research Programme.

<sup>240</sup> Innovations for Slovakia and Israel international cooperation programme

<sup>241</sup> [MH SR’s support instruments](#) .

<sup>242</sup> Innovation vouchers (IV) for the Self-governing region of *Banská Bystrica* (2021); IPCEI IV (2021); Slovakia IV (2021), Healthy Society IV (2022) Slovakia 2.0 IV (2022); Slovakia 3.0 IV (2022); Healthy Society 2.0 IV (2023).

<sup>243</sup> Improving the Innovative Performance of the Slovak Economy national project ([SIEA](#)).

<sup>244</sup> *De-minimis* Support Scheme for Industrial Cluster Organisations ([2022-2023](#) ) , Business Networking Support Scheme (2020-2023).

<sup>245</sup> Except 2020.

<sup>246</sup> Concept of the Focus and Support in Defence Research and Development with Outlook by 2025 ( [MD SR](#) ).



For the MIRD SR, approximately 14 people are assigned to the funding (some of them also carrying out policy-making responsibilities); and about 7 FTE handle this agenda at the GO SR.

**The MIRD SR provides project funding under the RRP and the Programme Slovakia**, primarily for computerisation and digitisation projects. In the fourth quarter of 2022, the MIRD SR opened a call<sup>247</sup> aimed at supporting the organisation of hackathons, aimed at the development of digital solutions (for example, IT applications). In June 2023, the MIRD SR opened another call<sup>248</sup> intended to facilitate the networking of European Digital Innovation Centres and support them. No RDI calls have been opened yet under the Programme Slovakia 2021-2027. The calls will be managed by the Section of Digitisation, the Section of Informatisation Projects Implementation and the Section of Regional Operational Programme.

**GO SR opened two calls for proposals through the VAIA.** In 2022, there was a call for Ukrainian scientists; and in 2023, a call for transformation and innovation consortia. All other calls were delegated through intermediation contracts to the RA, MESRS SR, SIEA and ME SR.

### 5.2.3. Financial instruments

**Repayable forms of RDI support are provided by SIH, the ME SR, the SBA and the SCSTI.**

**The SIH is the major provider of financing in the form of financial instruments according to the operational programs specifying their design and objectives.** The support is primarily focused on the competitiveness of SMEs and bank guarantees (EUR 720 million). In addition, approximately EUR 189.1 million is allocated in the National Development Fund II (NDF II) for support for investments that is provided primarily through equity and quasi-equity instruments<sup>249</sup>. Moreover, SIH is a 100% shareholder of the Slovak Asset Management, which is the manager of the Venture to Future Fund investing along with private investment funds.

**The ME SR supports RDI via repayable instruments through the Innovation Fund, but also through the SBA.** The Innovation Fund is a non-investment fund operating on the principle of repayable financial assistance provided under favourable interest terms. The Innovation Fund supports applied RDI projects and the use and protection of patents, industrial models and utility models. The last call was opened in 2019. The Fund holds EUR 1.8 million in bank accounts and another EUR 1 million in outstanding receivables. In addition to grant and non-financial support, the SBA also provides capital investments through the National Holding Fund and the Innovation and Technology Fund, and so-called micro-loans in an amount of up to EUR 50,000 targeting small and micro entrepreneurs. However, micro-loans are not intended primarily to support innovation.

**The SCSTI created a minor financial instrument, the so-called Patent Fund to support technology transfer.** The Patent Fund supports nine institutions under the National Technology Transfer Centre of the Slovak Republic (NTTC SR). If an institution uses the Patent Fund support and commercialises its technology, it is required to transfer a part of its revenues back to the Patent Fund in accordance with the NTTC SR Association Agreement. Even the first successful commercialisation

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<sup>247</sup> RRP, Component 17: Digital Slovakia, Investment 5: Grants with simplified administration ("Fast grants") - Hackathons; Call Code: 17105-04-V01.

<sup>248</sup> RP, Component 17, Investment 3: Involvement in European cross-border projects ("multi-country projects") leading to the building of the digital economy; Call Code: 17103-04-V01.

<sup>249</sup> Equity investment involves direct capital participation in a company whereby the investor becomes its co-owner. Quasi-equity financing represents a hybrid investment in a company that combines elements of a loan (debt) and equity.

of MicroRNA as an output of the UPJS and the CU will bring a significant contribution to the Fund in an amount of tens of thousands of euros.

**Box 5.2 Examples of the organisation of RDI project funding in similar EU countries**

When organising support for research and innovation, Slovakia can draw inspiration from the countries that lead the EIS ranking. Among the new Members States are Estonia, Cyprus and Slovenia.

**Estonia**

Estonia<sup>250</sup> has only one agency providing institutional and project funding for research, the Estonian Research Council. Besides, there is another agency, “KredEx”, providing financial instruments and one agency supporting entrepreneurship and start-ups, Enterprise Estonia”.

**Cyprus**

Cyprus has only one agency, the Research and Innovation Foundation under the Ministry of Research, Innovation and Digitisation, which is headed by the Chief Scientist.<sup>251</sup> Other Ministries only have the so-called research and innovation coordinators, but only this one agency provides funding.

**Slovenia**

Slovenia has only one agency, the Slovenian Research Agency under the Ministry of Tertiary Education, Science and Innovation. The agency manages institutional and project funding as well as the financing of infrastructures and other ecosystem activities. The only exception is funding from the ESIF, which is managed by the Ministry. Starting from this year, in addition to funding RDI, the agency will also handle financial support for innovations. In addition, there is an institution under the Ministry of Economy that supports entrepreneurship, Spirit Slovenia, and an organisation managing financial instruments, the Slovenian Enterprise Fund”.

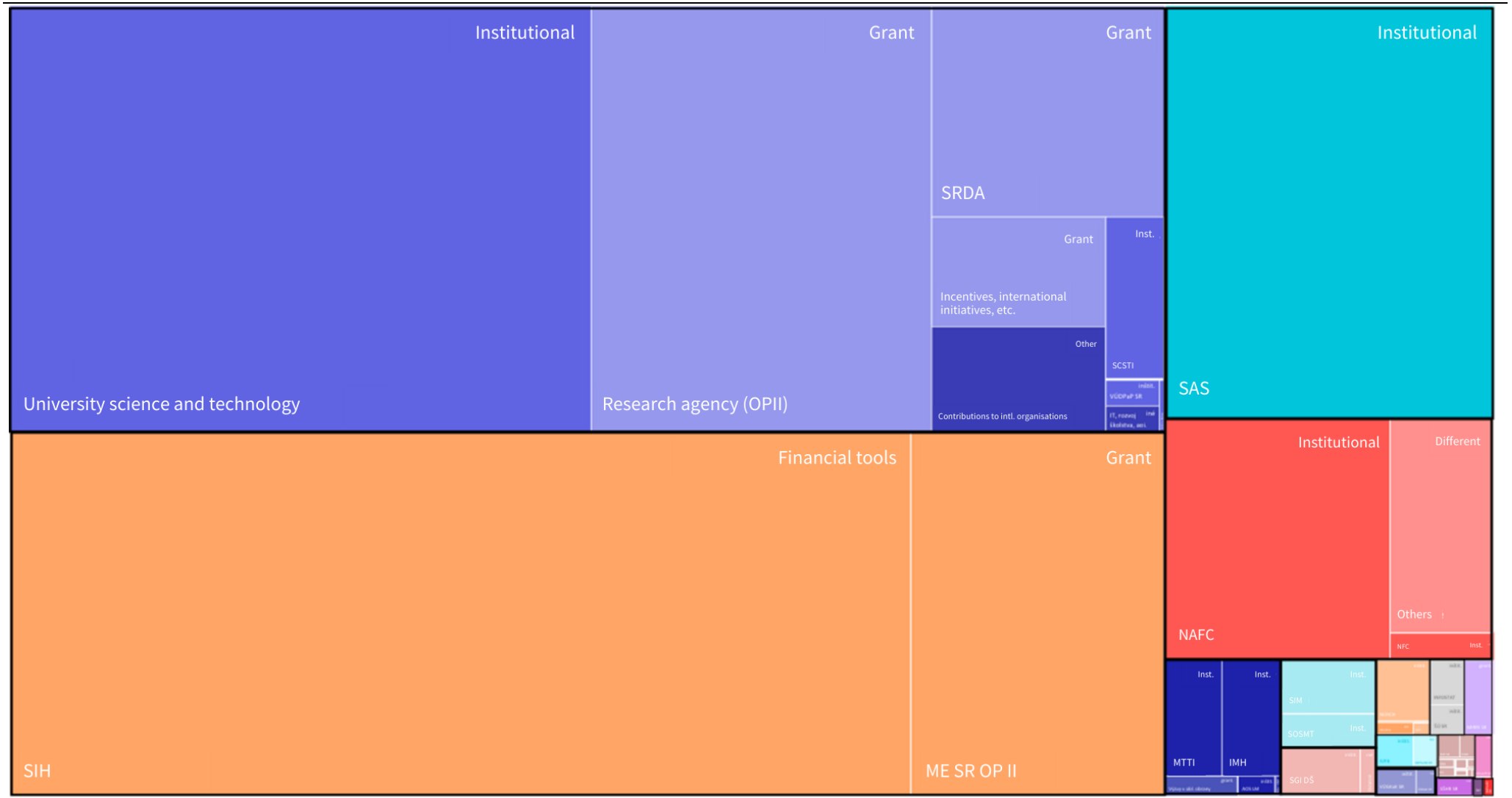
Larger countries with populations of around 10 million and more tend to have two separate agencies (in addition to institutions providing repayable financing), one of which focuses on research support and the other on innovation/applied research support. In the Czech Republic, for example, there are the GA CR and TA CR twin agencies; in Austria, there are the FWF and FFG agencies.

**Measure 5.5** Reorganise RDI funding as outlined in Chapter 6 of the Review.

<sup>250</sup> Peer review of the Estonian RDI system, Final Report ([European Commission](#)).

<sup>251</sup> Chief Scientist for Research and Innovation. [Republic of Cyprus](#).

**Diagram 5.2 Research expenditure by state budget chapter**



Source: BIS, SIH, own calculations

Note: Breakdown by sector and purpose; the size corresponds to the research expenditure volume

### 5.3. Control and audit

*The extensive financial control and auditing conducted in Slovakia significantly impacts RDI grants. For RDI projects, reporting a large volume of small expenses is often necessary. RDI grant support relies on expert evaluation, which already selects the best projects and considers efficiency and purpose of expenditures. Therefore, it is recommended to amend the Act on financial control and audits to allow simplified cost reporting for all funding sources and auditing of only selected transactions based on risk analysis. It is also recommended to analyse options to simplify the public procurement of technologies used for research purposes, similar to a model employed in relation to other creative activities.*

**Financial control and audit is an integral part of any public funding.** Pursuant to the law<sup>252</sup>, every public administration body and legal entity providing public funding must carry out financial control, which takes form of a basic financial control, an administrative financial control and on-the-spot financial control. ‘Financial control’ refers to a set of activities carried out to verify the efficiency, effectiveness, and purposefulness of financial transactions or their parts prior to, during the activity, until their full settlement, clearance, and the achievement of results and objectives of financial transactions or their parts. Further, the law defines a financial transaction or its part as the revenue, provision or use of public funds, a legal act or another act involving property.

**The MF SR, as the central government body responsible for financial control and audits,** drafts bills of laws and generally binding legal regulations in this area and directs, coordinates performance of both financial control and audits, and conducts government audits. The Section of Government Audit and Control of the MF SR manages the conduct of various types of audit, plans audits, coordinates, monitors and provides methodological guidance. At the same time, the Section cooperates with external entities of the EC, the European Defence Agency (EDA) and other bodies.

**The Government Audit Office is a budgetary organisation of the MF SR whose task is mainly to carry out government audits,** make decisions in proceedings concerning breaches of financial discipline in the handling of funds and impose and enforce charges and fines in this regard.

**In addition, pursuant to the law, each central government body has its own internal audit unit.**<sup>253</sup> These units can audit not only the organisational units within the scope of their respective budget chapter, but also organisations falling under its jurisdiction and organisations that have received funding from its budget.

**For funding under the ESIF as well as the RRP, the control function is carried out by the respective managing/coordinating bodies.** In the new programming period, it is the MIRDI SR for the EU funds<sup>254</sup> and the NICA for the RRP .

**Pursuant to the law,**<sup>255</sup> **another entity involved in the control of project funding under the ESIF until 2023 is the MF SR acting as the official certification body.** If deficiencies in the action by the managing body or the payment unit are suspected, the certification body is authorised to suspend

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<sup>252</sup> Act No. 357/2015 on financial control and audits and on amendments to certain laws.

<sup>253</sup> Article 16 of the Act No. 357/2015 on financial control and audits.

<sup>254</sup> Act No. 121/2022 on grants provided from the funds of the European Union and on amendments to certain laws.

<sup>255</sup> Article 9 of the Act No. 292/2014 on grants provided from the European Structural and Investment Funds

or reject payments for the Operational Programme, project or their parts. There is no certification body in the new programming period 2021 - 2027.

**The body with the authority to control the exercise of state administration is the GO SR.**

Pursuant to the law<sup>256</sup>, in connection with the control of the provision of funds, the GO SR (its Section of Control) also controls the use and efficiency of state budget funds and, within the scope of its jurisdiction, of the process of the provision and use of EU funds (National Office for OLAF). The GO SR further cooperates and coordinates control activities with other general government bodies in accordance with the Act.

**Pursuant to the law,<sup>257</sup> the Public Procurement Office of the Slovak Republic (PPO SR) exercises its control powers through the supervision of public procurement.** This involves oversight of compliance with the contracting authorities' obligations and with obligations imposed through the PPO SR's decision. The PPO SR issues opinions on the compliance of documents, issues decisions and may impose sanctions for administrative offences related to public procurement.

**The Supreme Audit Office of the Slovak Republic (SAO SR),<sup>258</sup> as an independent state body, controls the management of state budget funds and the state's property,** management of the state's property rights, assessment and recovery of taxes, charges and fines, and exercise of rights and obligations of a financial and economic nature that concern the state. The SAO SR controls compliance with generally binding legal regulations with regard to the principle of economy and efficiency<sup>259</sup>.

**Pursuant to the law,<sup>260</sup> the Anti-monopoly Office of the SR (AMO SR), as the aid coordinator, is authorised to audit the provision of *de-minimis* aid by the provider, including on the provider's premises.** To that end, the aid coordinator is also authorised to check the necessary facts with the recipient of the *de-minimis* aid, or with the implementer of the scheme. The audits are carried out on the basis of an annual audit plan and cover *de-minimis* aid schemes or ad hoc *de-minimis* aid measures.

**An R&D project may be a subject of multiple, overlapping controls.** It starts with a basic financial check and an administrative financial check of individual payments, and an on-the spot check, where appropriate. In addition to financial controls, in case of R&D projects, the funding agency also controls interim and final delivery on the objectives, as well as future financial sustainability. Any payment may be audited by the Audit Authority, Government Audit Office, the SAO SR, the PPO SR, the AMO SR and the GO SR. Further controls may be performed at the European level by the European Commission authorities, the European Court of Auditors or the European Anti-Fraud Office. A potential irregularity can be identified by any of these bodies. Of course, in addition to financial audits, a grant agency (or other provider of funds) may be subject to a system audit, an

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<sup>256</sup> [Act No. 10/1996](#) on general government control.

<sup>257</sup> [Act No. 343/2015](#) on public procurement

<sup>258</sup> [Act No. 39/1993](#) on the Supreme Audit Office of the Slovak Republic

<sup>259</sup> Methodology for economy and efficiency control of public procurement ( [PPO SR](#) ).

<sup>260</sup> *De-minimis aid* means aid provided under the Commission Regulation (EU) No 1407/2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the EU to *de minimis* aid. The total amount of *de minimis* aid granted to a single undertaking must not exceed EUR 200,000 over a period of three fiscal years (the current fiscal year and two previous fiscal years). The definition of a single undertaking is provided in Article 2(2) of the Commission Delegated Regulation (EU) No 1407/2013.

information system audit, a performance audit or an audit of compliance with generally binding legal regulations.

**Excessive burden of financial control and audits is a serious issue.**<sup>261</sup> Despite the existence of the Working Group on Cooperation in Coordination of Control Activities within the MF SR as an audit body, there can be, and still is, an overlap and clash of several checks and audits of project implementing entities. In addition, these checks and audits are very detailed, at the level of individual receipts and invoices. To remedy the situation, solution is a wider use of risk analysis and simplified cost reporting (SCR), as recommended by the European Court of Auditors. The use of sampling and a risk analysis in controls was also recommended by the Analysis of the Management and Implementation of the ESIF.<sup>262</sup> In the past, SCR was used for 5% of ESIF expenses, while the EU average reaches 30%. An extended use of SCR would allow grant agencies to focus on reviewing fulfilment of project objectives and KPIs instead of time-consuming checking of payment documents. Currently, the law allows this option for the ESIF and the RRP, but not for projects financed from the state budget. The situation is particularly critical with RDI projects, since the use of funds most often involves a large number of microtransactions on the recipient's part. In a sample of 20 projects of the SRDA General Call, 25% of invoices amount to less than EUR 100 and 37% to less than EUR 200. Wages and taxes payment documents account for up to 51% of all documents. The introduction of SCR would help researchers focus on their RDI activities instead of accounting ones.

**Public procurement rules largely tie hands of researchers when procuring very specific technologies or software.** Although the Public Procurement Act includes over 70 public procurement exceptions,<sup>263</sup> the procurement of unique technologies used for research follows strict rules. Experience of researchers suggests<sup>264</sup> that while the differences in details of alternative technologies are often crucial, the preference for a particular technology is usually not accepted by auditors in practice. In addition, the current public procurement rules can lead to higher prices for some purchases (due to the involvement of intermediaries in public procurement, the academic sector often loses discounts otherwise offered to academic sector buyers). Another complication is a significantly longer public procurement process in comparison with other countries, and the common practice of not respecting the legal time limits for control.<sup>265</sup>

**Measure 5.6** Amend Act No. 357/2015 on financial control and audits to allow a limited administrative financial control for RDI projects with simplified cost reporting and auditing of only selected operations and their parts based on risk analysis.

**Measure 5.7** Analyse options to simplify public procurement rules for technologies used for research purposes and implement the selected options into practice.

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<sup>261</sup> The burden of controls and audits was also highlighted in, for example, the National Strategy for Research, Development and Innovation 2030 or the Strategy for Research, Development and Innovation for Smart Specialisation of the Slovak Republic 2021-2027.

<sup>262</sup> Analysis of the current state of the management and implementation of the ESIF in Slovakia, including a comparison of Slovakia's ESIF management and implementation system with best-practice management and implementation systems in selected areas (Ernst & Young, 2020).

<sup>263</sup> Article 1 of the [Act No. 343/2015](#) on public procurement.

<sup>264</sup> Described in the interviews held during the preparation of the RDI National Strategy 2030.

<sup>265</sup> Analysis of the current state of the management and implementation of the ESIF in Slovakia, including a comparison of Slovakia's ESIF management and implementation system with best-practice management and implementation systems in selected areas ([Ernst & Young, 2020](#)).

## 5.4. Services for research, development and innovation

***The R&D ecosystem services in Slovakia are mainly administered by the SCSTI, with partial support from the SAIA. Innovation ecosystem services are distributed among three agencies: the SIEA, SARIO and SBA.<sup>266</sup> As part of the consolidation of competencies, it is recommended to align with international best practices by consolidating support services for the innovation ecosystem.***

**While S&T services are well defined in Slovakia, the extent of their provision by the state varies.<sup>267</sup>** S&T services include a wide range of activities, such as providing and disseminating scientific and technical information (including library services), supporting technology and knowledge transfer, licensing, raising awareness of research ethics and integrity, supporting international scientific and technical cooperation, improving the quality of R&D infrastructure, and lifelong learning in R&D. In addition, the Act lists regulated activities, such as metrology services, technical standardisation and compliance assessment of products or patent activity. According to the legislation, S&T services also include other activities with limited state intervention, such as advisory and expert examination services in R&D, monitoring, research, collection and analysis of data, information and knowledge, forensic activity, translation and interpretation related to R&D. Innovation support services are not covered by the Act.

**The Act is unnecessarily rigid in its detailed regulation of the provision of subsidies for S&T services.** This is despite the fact that the state finances these services only through institutional funding or through national projects under the ESIF, or not at all. Activities funded from the state budget could be regulated by including specific terms in a particular call for proposals.

**An important position in the popularisation of S&T in Slovakia is held by the SCSTI,** which since 2007 has fulfilled the role of the National Centre for the Popularisation of Science and Technology in Society (NCP S&T). The essential task of the NCP S&T is to manage the conveying of scientific knowledge to the general public in an understandable way, through media outputs or by mediating direct contact of the scientific community with the general public at events, conferences and lectures, such as the Science and Technology Week, Scientific Confectionery, Scientist of the Year and Science in the CENTRE. Based on the contract<sup>268</sup> with the MESRS SR, the SCSTI manages the operation and future development of the *Aurelium* science centre. The SCSTI manages and operates several RDI-related information systems, websites and social networks,<sup>269</sup> and publishes *Quark*, a printed periodical promoting RDI in Slovakia. Aiming to ensure effective coordination and cooperation of relevant entities in the field of popularisation of S&T in 2020, the NCP S&T prepared the Strategy for the Popularisation of Science and Technology in Slovakia for the years 2021-2027 as a follow up to the document of 2007.<sup>270</sup>

In addition to the SCSTI, the Slovak Historical Institute in Rome is another institution within the jurisdiction of the MESRS SR to engage in the popularisation of S&T.

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<sup>266</sup> This mainly concerns services such as the operation of incubators and accelerators, support for start-ups, long-term individual consulting and networking of actors.

<sup>267</sup> [Act No. 172/2005](#) on the organisation of state support for research and development and on amendments to the Act No. 575/2001 on the organisation of operation of the Government and on the organisation of central government, as amended

<sup>268</sup> [Contract](#) between the MESRS SR and the SCSTI for 2022.

<sup>269</sup> [CRDI Central Information Portal](#); [SK CRIS](#); [Science within Reach](#); [Science and Technology Week](#), [Aurelium](#); etc.

<sup>270</sup> The prepared Strategy for the Popularisation of Science and Technology in Slovakia for the years 2021-2027 has not yet passed the public consultation process.

**The popularisation, provision and dissemination of scientific and technical information and knowledge are also partially administered by other Ministries and their subsidiary organisations,<sup>271</sup> HEIs and the SAS.** Library services are also considered to play a role in the popularisation of research. In addition to libraries, institutes and museums, library services are also provided by other organisations, such as the SCSTI, NAFC and NFC, IPO SR (patent literature library), PatLib Centres and others.

**Important role in support of RDI is played by services supporting international scientific and technical cooperation** through mobility and involvement in international programmes, projects and partnerships. This area is largely covered by the MESRS SR, the SRDA and the SCSTI. The Ministry initiates, facilitates and coordinates the participation of Slovakia in individual international scientific and technical cooperation partnerships and programmes and subsequently monitors and reviews the fulfilment of obligations resulting from signed international agreements and memberships. Financial support of projects is implemented either directly through the MESRS SR,<sup>272</sup> or through the SRDA. The SRDA supports projects under contracts and programmes by subsidies for researchers taking part in bilateral and multilateral calls.

**The support for international cooperation managed by the SCSTI is facilitated by, among others, the Slovak Liaison Office for Research and Development in Brussels (SLORD)<sup>273</sup> and the National Contact Points for the Horizon Europe programme.** Their efforts aim to increase the participation of Slovak entities in RDI programmes. The National Horizon Office (NHO) is the main support structure in Slovakia that provides free advice to those interested in Horizon programmes and is made up of individual researchers, the so-called National Contact Points (NCPs). In addition to information and promotion events, the NCPs support applicants/recipients across all stages of the project cycle, from the research and innovation idea, through mentoring services (or their mediation) to the documented administrative completion of the project implementation. The SLORD provides consulting services and support to Slovak researchers and research organisations in connection with their participation in framework programmes and research consortia in the European research area. The SLORD also provides information, organises professional training courses, conferences, information days, internships, or premises for contact meetings in Brussels.<sup>274</sup> The SLORD provides its services and premises to Slovak researchers free of charge. The SCSTI also processes and provides outputs for international statistics, organises partner information events and the like.

**International scientific mobility is supported by the SAIA, a non-profit organisation, on the basis of a contract with the MESRS SR.** It administers multiple mobility programmes for researchers and university teachers (e.g. National Scholarship Programme; Action Austria-Slovakia; CEEPUS, etc.). The SAIA is also the national coordinator of the EURAXESS network in Slovakia and as such it provides information and custom advice to foreign researchers coming to Slovakia and actively communicates with relevant authorities in this regard (e.g. Border and Foreign Police Office, public health insurance funds, Central Office of Labour, Family and Social Affairs of the SR, etc.).

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<sup>271</sup> MARD SR (and NAFC, NFC), ME SR (and SIEA, SBA), IPO SR, and others.

<sup>272</sup> For example: Eureka, Ecsel JU, JPND, Eurostars 2 projects, etc.

<sup>273</sup> The SLORD was set up by the MESRS SR and the SCSTI in 2014.

<sup>274</sup> [Annual Report](#) of the SCSTI 2020.



**The individual Ministries involved in RDI represent Slovakia** in various working groups and international organisations, partnership agreements, joint projects or events within their particular subject areas.

**The education, consultancy, project preparation and public procurement services which indirectly support RDI activities in Slovakia are fragmented, or little known, or of insufficient quality.** These activities are provided to some extent by, for example, the SCSTI, SAIA or SBA. The functioning of the NCPs for Horizon programmes and the coordination of their operations are managed by the SCSTI. The SCSTI together with the NCPs carry out advisory and consulting activities and provide information on the conditions and rules of participation in the programmes, administrative procedures, obligations arising from grant contracts and agreements, or financing mechanisms.

**Educational services in RDI are also provided by the SIEA.** With the *inovujme.sk* project, it creates educational programmes for secondary and tertiary level schools focused on the development of new solutions and their application to cater for the needs of entrepreneurs in the regions. At the same time, in addition to education, the SIEA organises research and innovation popularisation events, e.g. in the form of a series of programmes produced in cooperation with TV JOJ.

**The SARIO organises tailor-made workshops for companies aiming to help them innovate their technological processes.** It also provides these services abroad. SARIO's innovation services focus on industry, product development and the service sector. The Agency also actively connects universities and research centres with the business sector, and local technology companies in the Industry 4.0 sector with production or logistics firms that plan to introduce new innovative solutions. SARIO also provides consultations on investment assistance or localisation services of supplier networks.

**In order to support the innovative activity of SMEs, the SBA provides advice through a one-stop-shop,** which is the National Business Centre. It offers consultancy in the preparation of projects for participation in EU programmes (e.g. Horizon, Erasmus+, Creative Europe).

**The activities of the SBA, SIEA and SARIO overlap in several areas.**<sup>275</sup> The support and services for RDI are covered not only by the SIEA alone, but also by SARIO (Space Office, connecting the Academy with companies) and the SBA (incubator operation, support for start-ups, Creative Point, consulting for participation in EU programmes). The actors in the areas of support for digitisation innovation include the SIEA (ZIVSE NP, Support for the Development of Creative Industry in Slovakia (PRKP) NP, Expandi 4.0 digital innovation hub) or the SBA (support for entrepreneurs in the transition from a physical form to an on-line form of business, process audit). In addition to SARIO, the SIEA is engaged in attracting foreign investments (assessment of applications for investment assistance). The SBA also provides financial instruments (micro-loan programme, venture capital funds) that compete with SIH's activities. Some of the remaining activities of the SBA can be considered the outsourcing of the state's policy-making (Better Regulation Centre), and the rest - general business consulting - represents a unique service of the state. Due to the fact that these agencies often provide services to the same clients in overlapping areas, we deem it most appropriate to merge these services into a single agency following examples from other countries (Business Finland, Enterprise Estonia, BPI France).

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<sup>275</sup> Contract between the ME SR and the SIEA; SARIO Annual Report; supporting documents obtained from the ME SR.

**The MIRDI SR supports digital transformation of companies, especially SMEs, through the European Digital Innovation Hubs (EDIH).** EDIHs are single points of contact that help companies to use digital technologies to become more competitive. The Digital Innovation Hubs are generally broad-based associations covering the academic sector, the corporate sector, clusters and public institutions. EXPANDI 4.0 is one of five such hubs in Slovakia, for which the SIEA is the coordinator responsible for project management and advising for the Access to Find Investments service.

**An essential service for the ecosystem is also provided by the Ministry of Foreign and European Affairs of the Slovak Republic (MFEA SR).** It supports international cooperation in RDI by presenting Slovak research and innovation capacities abroad through events and activities of the representative offices of the Slovak Republic, but also at home, in Slovakia. An example is the regular Innovation Days event at which the Ministry of Foreign Affairs of the Slovak Republic presents domestic research and innovation capacities to foreign ambassadors accredited in Slovakia.

**Measure 5.8** Consolidate selected tasks of the ME SR, SIEA, SBA and SARIO into a single agency providing services to foster innovation and competitiveness of enterprises.

## 5.5. Conduct of research

*In addition to the higher education and business sectors, which hold dominant positions, approximately 5,000 employees in the government sector are involved in research. Among these, around 2,000 individuals work at SRIs that have a variety of missions and functions, not solely research-oriented ones. The incorporation of SRIs into the VER 2027 will enable the mapping of their R&D activities in terms of performance and impact.*

**Research in Slovakia is carried out by various actors and their activities contribute to the development of research and innovation in the country.** The aim of research is to increase knowledge and support innovation which contribute to the sustainable development of the country. The main actors in the Slovak research environment are HEIs, the SAS, the SRIs and private companies.

**Pursuant to the legislation,<sup>276</sup> research is carried out in five sectors, including the government sector, the HE sector,<sup>277</sup> the business sector and the non-profit sector.** The government sector consists of the SAS and organisations founded by central government bodies. The HE sector consists of public, state and private HEIs and legal entities founded by them conducting R&D. The non-profit sector consists of civic associations, non-profit organisations, and associations of legal entities and natural persons conducting research.

**According to the latest available statistical data,<sup>278</sup> the highest number of researchers are employed in the HE sector.** For public HEIs, the Comenius University has the highest number of researchers.<sup>279</sup> A total of 18,012 researchers work at HEIs, but the FTE headcount is only 9,780 FTE; nevertheless, this is still more than a half of all researchers in Slovakia.

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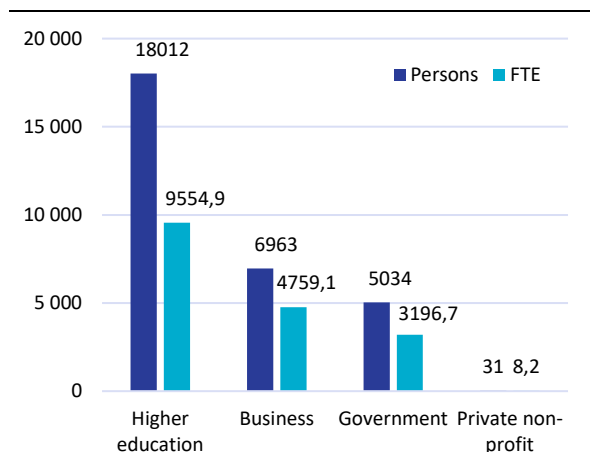
<sup>276</sup> Act No. 172/2005 on the organisation of state support for research and development and on amendments to the Act No. 575/2001 on the organisation of operation of the Government and on the organisation of central government, as amended

<sup>277</sup> National and European statistical indicators see public research institutions as a part of the government/state sector and we accordingly refer to only four sectors in the following sections of the Review.

<sup>278</sup> SO SR [vt2028rs\_data], Eurostat [RD\_P\_PERSOCC], MESRS SR Register of University Employees.

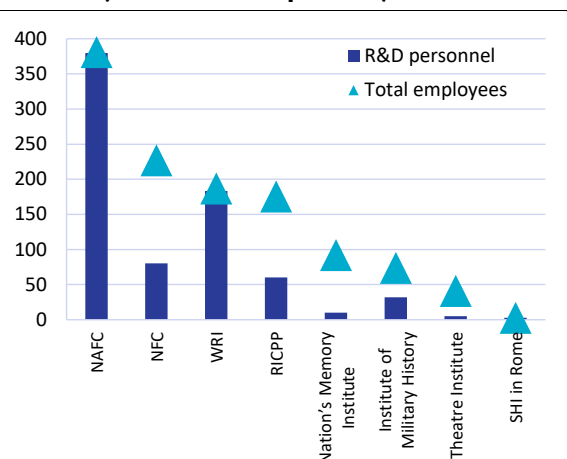
<sup>279</sup> Professors, associate professors, assistant professors, research workers - support staff, research workers - technicians, research workers - researchers.

**Graph 5.1 Number of researchers by sector in 2021**



Source: SO SR – Persons employed in R&D by sector and job classification – Researchers 2021[vt2028rs\_data]  
 Note: Government sector including public research institutions

**Graph 5.1 Employment in sectoral research institutes (FTE number of persons) in 2022**



Source: Data obtained from the institutions concerned  
 \* The NAFC and the NFC associate six and three research institutes of the MARD SR, respectively

**According to the SO SR, another quarter of Slovak researchers work in the business sector,** while the difference between the number of persons and FTE in this sector is significantly lower than in the HE sector. This significant difference in the HE sector is probably caused by the more frequent use of part-time work arrangements and fragmentation of the time worked (teaching, research work, administrative work, etc.). Although the conduct of research in the private sector is not limited or determined by law, eligible recipients of specific-purpose financial contributions from the state budget are only entities that have a certificate of ability to conduct research.<sup>280</sup>

**The key entities conducting research in the government sector are the SAS and the SRIs,** which are legal entities/organisations set up by central government bodies. The SAS as a self-governing research institution focuses on the development of science and it carries out its research through PRIs. The SAS's PRIs engage in basic research, applied research and experimental development and, also, provide access to physical and data research infrastructure.

**While the SAS has a relatively clear definition as an institution, there is significant ambiguity around SRIs.** Even the lists of these organisations kept by the different Ministries vary.<sup>281</sup> The legislation does not provide their definition, although the term “sectoral research institutes” is widely used. The subject areas of the individual institutes/organisations outlined in Chapter 3 of this review are derived from the founding Ministries.

**In terms of the budget size and employment, the largest SRIs are the National Agricultural and Food Centre (NAFC) and the National Forestry Centre (NFC)** founded by the MARD SR<sup>282</sup>. Like the Ministry itself, the areas research conducted by the two research organisations are agriculture, forestry, food, plant and animal production. The NAFC embraces 6 research sites of the MARD SR, namely the Plant Production Research Centre in *Piešťany*, the Animal Production Research Centre in *Nitra*, the Soil Science and Soil Protection Research Institute, the Food Research Institute, the

<sup>280</sup> Act No. 172/2005 on the organisation of state support for research and development and on amendments to the Act No. 575/2001 on the organisation of operation of the Government and on the organisation of central government, as amended

<sup>281</sup> BIS, MESRS SR, SCSTI, websites of the Ministries.

<sup>282</sup> See Chapter 3.1.3 Sectoral research institutes

Agricultural and Food Economics Research Institute and the Agricultural Technical and Testing Institute. The NFC consists of three research institutes, namely the Forestry Research Institute in Zvolen, the Institute of Forest Resources and Informatics and the Forest Management Institute in Zvolen, and two specialised centres, the Forestry Knowledge Transfer and Pedagogy Centre and the Expert Centre.

**The SRIs in the jurisdiction of the MEnv SR include the Water Research Institute (WRI), the Slovak Hydro-meteorological Institute (SHMI) and the State Geological Institute of Dionýz Štúr (SGI).** The WRI conducts research, development, expert analyses and standardisation activities in the field of water management.<sup>283</sup> At the same time, it performs the function of the National Reference Laboratory for water. The Water Meter Calibration Laboratory also operates under the WRI. The research of the SMHI is focused on meteorology, hydrology and air quality. The SGI is Slovakia's institute of geological research and surveying. The SGI performs monitoring and rehabilitation, and ensures the development and operation of information systems in geology and geological works. The Institute performs the functions of the Central Geological Library, the publisher of geomaps and, also, a reference geoanalytical laboratory.

**Three organisations with research activity operate under the Ministry of Education.** The Research Institute of Child Psychology and Pathopsychology (RICCP) with 3 FTE employees engages in research in personality development in children and youth from an early age to the end of education and training and, in the recent period, in mapping and addressing consequences of COVID 19. Based on the contract with the Ministry of Education, the SCSTI had in 2022 five FTE employees allocated to research assignments, research data management and open publishing of research data in Slovakia. According to the annual reports, the SCSTI also performs other research tasks. The Slovak Historical Institute in Rome, as the smallest of the research organisations of the MESRS SR with three FTE employees conducts research concerning Slovak documents stored in the archives of Italy, the Vatican, San Marino and the Sovereign Order of the Knights of Malta.

**The LFRI under the Ministry of Labour conducts research in social and family policy, social security, employment and labour market policy, and occupational health and safety.** Most of the LFRI's research projects have been conducted under the contract with the Ministry. The LFRI has also implemented other projects supported by European schemes, national projects, bilateral agreements, or in cooperation with other Ministries. The LFRI also includes the DISSO library fund with publications and statistical documents on social policy, insurance, economy and taxes, or safety and health protection at work available to the general public.

**Research is also conducted by the SO SR through the INFOSTAT contributory organisation.** In addition to coordinating and conducting research in the use of innovative data analysis methods in the field of state statistics, INFOSTAT also conducts applied research in demographic development and processes, analytical and prognostic activities, and develops methodologies in the area of demography.

**In the cultural sector, research is conducted by subsidiary organisations of the MC SR, but also by archives that do not fall under the Ministry.** R&D in design is led by the INOLAB Department of the Slovak Design Centre (SDC). INOLAB also includes a library of materials documenting samples of materials and their occurrence, production, properties and use. Research in materials is conducted by the SDC's internal staff, the SAS's experts, bioplastics development experts and students of

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<sup>283</sup> the WRI does not officially report research and development expenditures in the budget information system.

technology and visual arts schools. The Slovak National Archive (SNA) serves as the main research and training institution the Slovak Republic in the field of archiving.

**The Geodesy and Cartography Research Institute in Bratislava (GCRI)**, falling under the jurisdiction of the Geodesy, Cartography and Cadastre Authority of the Slovak Republic (GCCA SR), is a centrally managed organisation. Its main mission is to conduct of systematic and coordinated research in the field of geodesy, cartography and real estate cadastre. Apart from the GCRI, there is no other SRI or unit of the SAS engaged in development of this field.

**The International Laser Centre** of the SCSTI performs consulting and advisory activities, market monitoring and development of new technologies in the area of lasers and photonics. The affiliation under the SCSTI stems from the organisation's historical development, but its operation as a SRI is questionable. It is advisable to consider its transfer to the HE sector or the SAS.

### **Box 5.3 Methodology of data collection for the Chapter concerning competencies**

#### **Mapping the research ecosystem**

The primary sources of information for the Chapter related to RDI competencies were organisational rules, statutes, annual reports, contracts and the organisations' and Ministries' websites. Included organizations were identified by R&D expenditure reported in the budgetary information system, final accounts, and monitoring reports.

The RDI ecosystem mapping led to identification of approximately 500 competencies, classified into 45 categories, which were defined in accordance with the questionnaire survey. A total of 161 subjects were mapped.

#### **Questionnaire survey**

As an additional resource to the ecosystem mapping, a survey was made using a questionnaire that was sent to the identified Ministries and organisations performing RDI related activities. The questionnaire consisted of 8 subject-matter sections, namely: Public Policy-Making, General Regulation Affecting RDI, RDI Regulation, RDI Funding, RDI, Services, Research and Data Infrastructure, RDI Control and Audit, and Conduct of Research.

The questionnaire survey was completed by 93 subjects across Ministries and their organisations and a total of 425 areas of responsibility were identified. More than a half of all respondents saw their responsibilities as falling under Public Policy-Making; approximately one third categorised their responsibilities as RDI Services and Conduct of Research; and a quarter of respondents identified their responsibilities as RDI Funding and RDI Control and Audit.

Despite the large number of completed questionnaires, the outputs were of varying informative capacity and the qualitative (descriptive) part was completed only by a part of the respondents.

Institutions had the opportunity to identify not only their responsibilities, but also the personnel capacities available to them to carry out the responsibilities. Unfortunately, most institutions either did not provide the personnel data at all, or provided them inconsistently. For that reason, an additional brief survey was conducted to collect specific information about the numbers of employees, especially for SRIs.

## 6. Options for the reorganisation and consolidation of competencies (TO-BE status)

*There are three potential scenarios for the reorganisation of RDI competencies. They include (a) improvement of the existing model; (b) fundamental strengthening of coordination and political position without establishing a new Ministry; and (c) reorganisation of competencies across Ministries. The proposed reorganisation options are based on an evaluation of the current organisation and funding of the RDI ecosystem against best practice principles. The scenarios outline possibilities for an overall institutional and competence reform of the system to enhance and uphold those principles. The recommended scenario in this review advocates for redistributing competencies among Ministries so that a single entity can ensure the integrated development and implementation of relevant policies without the necessity for coordination among multiple actors. Such a reorganisation can be executed without imposing additional staffing or operational expenses.*

### 6.1. Good practice principles in the organisation and funding of the research, development and innovation system

**A well-designed system meets basic principles of best practice.**<sup>284</sup> Twelve principles listed below are mainly based on the RRP, the National Strategy, findings described in previous Chapters, international mapping during the preparation of this material, and an axiomatic approach (so-called first principles). Five of them are not applied in the existing system in Slovakia and the rest is applied only partially.

**Table 6.1 Summary of the implementation of the good practice principles in the organisation and funding of the RDI system in Slovakia**

| No | Best practice principle  | Current situation   |
|----|--|---------------------|
| 1  | Institutional architecture supports integrated approach to RDI across Ministries, sectors and national borders.  | Partially applied   |
| 2  | Integrated management of RDI policy covers the entire public policy cycle.   | Not applied         |
| 3  | Conceptualisation of innovation provides a balance for both technological and social innovations.  | Not applied         |
| 4  | Adequate institutional capacity, in both quantitative and qualitative terms, is provided for different activities (public policy-making, funding, regulation).                     | Cannot be evaluated |
| 5  | Accountability at the entire RDI system level is precisely defined and enforceable.  | Partially applied   |
| 6  | RDI funding decisions are made with emphasis on input quality control.   | Partially applied   |
| 7  | Effective implementation supports minimisation of total administrative (transactional) cost.   | Not applied         |
| 8  | Provision of RDI funds is institutionally separated from the RDI public policy-making and regulation, ensuring their implementation.   | Partially applied   |
| 9  | Organisation of the provision of resources is transparent and institutionally integrated as much as possible, but with respect for the needs of different organisational cultures. | Not applied         |
| 10 | Decision-making on RDI funding respects public policy priorities, but is autonomous in relation to a specific project.   | Partially applied   |
| 11 | Funds earmarked for RDI are used to finance RDI activities.  | Partially applied   |

<sup>284</sup> This Chapter is based on the expert opinion of people who have been working in the central government for an extensive time period and are experienced in public policy-making.

|    |   |             |
|----|---|-------------|
| 12 | Institutional funding of RDI is dependent on the institutions' RDI performance measured over extended period. | Not applied |
|----|---|-------------|

**Principle 1: The institutional architecture supports integrated approach to RDI (linking research and innovation, integration between RDI sectors, internationalisation of RDI) and the RDI public policy is supra-ministerial.**

The supra-ministerial nature of the public RDI policy can be captured through the following criteria: a single strategic document, single responsibility for its implementation, and strong coordination. Historically, the Slovak Republic has not met these criteria. With establishing of the VAIA, the reform of the Government Council for Science, Technology and Innovation (GCSTI), the adoption of the National Strategy and other steps, Slovakia began supporting an integrated approach to RDI. As a result of these changes, a basic supra-ministerial institutional architecture emerged. Several shortcomings still persist, the following are seen as the most serious:

- Limited mandate of the central coordinating authority (VAIA)
- Competence conflict between the GO SR and the MESRS SR
- Insufficient support for crossing of borders between sectors and from an internationalisation perspective (new calls for proposals under the RRP address this issue to some extent; otherwise, it is present only to a low degree - standard schemes do not cover or even actively exclude foreign partners. Cooperation across sectors is to large extent possible and the number of schemes that explicitly support it is gradually increasing. Investments in project funding for international cooperation are very low).

**Principle 2: The integrated management of RDI policy covers the entire public policy cycle (plan, implement, evaluate, learn).**

The public RDI policy provides a relatively clear distribution of responsibilities for implementation (although there are problems here as well, as noted elsewhere in this document). However, a more serious problem is the insufficient institutional anchoring of planning, evaluation and learning. This is due to the overall fragmentation of the RDI policy, but also to the fact that planning was largely linked to the ESIF programming and the evaluation was to a big extent done only formally, as part of reviews of the use of the European funds. While a chain of evaluation leading to learning (as to what works and what doesn't work), and learning leading to changes in planning does exist, it is rather formal and superficial, seeking only to fulfil requirements related to the European funds. The management of R&I policies is at the margin of the Ministries' attention and is limited to sections of Ministries responsible for the management of the ESIF, which means that policies are often made by the ESIF implementing units. In Slovakia, ESIF implementation units' primary objective is to maximise spending of funds. By having ESIF implementation units at the helm of the cycle of planning, implementation and feedback, the policies tend to focus primarily on maximising "absorption".

**Principle 3: The conceptualisation of innovation provides a balance for both technological and social innovations.**

In Slovakia, the public policy still tends to view innovation as predominately technological innovation stemming from technological progress. Social innovations are largely ignored and their



institutional coverage is fragmented and without anchor. The Austrian Grant Agency for Applied Research, for example, operates special programmes for social innovations.

**Principle 4: An adequate institutional capacity, in both quantitative and qualitative terms, is provided for the different activities (public policy-making, funding, regulation).**

There is no system comparing necessary capacities on a quantitative level and benchmarking authorities against each other. There is no summary data on the number of people managing and implementing RDI policies, neither a system to ensure a minimum quality standards for human resources, nor processes. The findings in the previous Chapters point to insufficient staffing in the public policy-making area, which was addressed to some extent by establishing the VAIA. However, there are still topics, such as research infrastructures, that remain insufficiently covered.

**Principle 5: Accountability at the entire RDI system level is precisely defined and enforceable.**

To enforce accountability, it must be clear what the goal is, what KPIs are measured, who is responsible for their achievement, and whether those responsible have the motivation and the necessary tools to achieve the goals and KPIs (including the enforceability of tasks against other actors). Strategic goals and KPIs exist, most recently formulated in the National Strategy. Even when responsibility is determined at the level of specific tasks, departmentalism often complicates clear delineation of responsibility. This problem concerns not only Ministries, but also individual organisations where competencies and accountability are fragmented among units with a subject-area focus and units in charge of funding (mainly under the European Funds). The most serious issue is the motivation and enforceability, i.e. the consequences of not implementing the National Strategy. Those most motivated are the VAIA as the guarantor of the National Strategy and, in relation to research, the MESRS SR because of its close interaction with public HEIs and political responsibility for research. The enforceability of the measures against other entities depends not only on funding provided for the given measure, but mainly on the conviction of the given entities about potential benefit to their own KPIs.

**Principle 6: RDI funding decisions are made with an emphasis on input quality control.**

Input quality control in RDI means putting an emphasis on strict selection of projects, activities or institutions according to the quality of applicants and excellence of proposals, but also flexible access to their subsequent use. In RDI, this access is an important factor given the creative and unpredictable nature of RDI activities, excellence as an essential basis of RDI and the difficulty measuring the quality outputs. Today, this approach is mainly applied to grants. For institutional funding, it is practically not applied at all; and only to a very limited extent to the ESIF funding.

**Principle 7: The effective implementation supports minimisation of total administrative (transactional) cost to the state as well as recipients/partners.**

The state does not measure recipients' costs for preparation and administration of projects at all and does not evaluate the appropriateness of schemes in terms of such costs (e.g. VEGA). Such a philosophy is absent, current data on the situation are missing, and so is the ability to quantify benefits of potential changes.

**Principle 8: The provision of RDI funds is institutionally separated from the RDI public policy-policy making and regulation, ensuring their implementation.**

The RDI policy-making and regulation should be separated from the decision-making regarding funding of particular RDI projects. This is because they have different demands in terms of organisational culture and skills, and also with regard to the arm's length principle (see below). In Slovakia, this principle is applied only partially: policy-making and regulation are usually carried out at the Ministry level and funding at the level of agencies. However, it is generally not applied to the ESIF, as not only the overall management, but also the management of calls for proposals and projects are handled by sections of Ministries. The same problem is also with VEGA and KEPA schemes, or, in the past, with the R&D incentives for business.

**Principle 9: The organisation of the provision of resources is transparent and institutionally integrated as much as possible, but with respect for the needs of different organisational cultures.**

An integrated approach requires that RDI funding be organised such that it covers the full spectrum of activities (basic research, applied research and experimental development, technological and social innovations) as uniformly and jointly as possible. Today, however, it is fragmented: similar RDI programmes are managed by the SARD, the MESRS SR and the RA, and for innovation, the ME SR itself and the SIEA. Financial instruments, in contrast, are suitably integrated under a single organisation (SIH), which also performs certain functions in the seed and scaling-up areas, but not systematically.

However, there is a tension between integration (one-stop shop) and the need to accommodate different organisational cultures and approaches:

- Research grants: emphasis is on research excellence, peer review and predictable administration;
- Grant support for innovation, building of an innovation ecosystem: emphasis is on flexibility, support and networking;
- Seed and scaling up: emphasis is on a business approach similar to the private sector (venture capital), especially with an emphasis on risk acceptance and risk management, and skills with managing investments.

It is quite difficult to successfully combine such diverse organisational cultures within a single organisation, which is why these functions are often performed separately. On the other hand, it is not an absolute principle; if the highest priority is the one-stop-shop principle (i.e. all services for the same type of “clients” in one place), it is possible to integrate different approaches within one organisation with the acceptance of the fact that some of them may not be performed as well as when performed by separate organisational units. Therefore, the application of this principle involves a trade-off between two goals.

**Principle 10: The decision-making on RDI funding respects public policy priorities, but is autonomous in relation to a specific project.**

The “arm's length principle” is to be applied to RDI funding, which implies a requirement for the government and political actors to be able to ensure enforcement of RDI public policy priorities, while leaving the selection of specific projects to expert evaluation, without direct political interference. In reality, the SAS and public HEIs today operate fully autonomously, which prevents disproportionate interference, but, at the same time, the state does not have functional mechanisms to enforce public policy priorities. SIH and the SRDA are partly autonomous (the SRDA's Presidium and Councils; SIH's procedural rules and operation through transparently selected intermediaries). The SIEA, SARIO, the SBA and the RA, on the other hand, are significantly subordinated to political actors and their management can be subject to frequent changes and political cycles. This can be mitigated by transparent selection procedures (to cater for the need for at least partial autonomy) and clearly defined KPIs (to fulfil public policy priorities).

**Principle 11: Funds earmarked for RDI are used to finance RDI activities.**

Even though the administrators of the budget chapters and the MF SR monitor the amount of funds earmarked for science (not for RDI, but for S&T), there is no effective system to ensure that these funds are actually spent on basic or applied research or experimental development activities. For some institutions, there is a discrepancy between the research expenditure registered in the budget information system and the reality. Therefore, it is likely that non-RDI activities are financed from the RDI funds. This concerns, for example, the institutional funding of sectoral research institutes, or project funding from the ESIF, where a large discrepancy is observed between the reported RDI spending from funding organisations and the RDI expenditures reported by recipients.

**Principle 12: The institutional funding of RDI is dependent on the institutions' RDI quality performance measured over extended period.**

Evaluation of research performance has already been used for public HEIs (Complex Accreditation 2014). This is supposed to be strengthened by the VER. However, results are used only to a small extent in case of the SAS (the comprehensive evaluation by an international expert panel has a very low weight), and not at all in case of sectoral research institutes.

## 6.2. Coordination and management arrangements: institutional scenarios

This section outlines three scenarios for institutional coordination and management of RDI in Slovakia. They are based on the findings of this Review and the evaluation of compliance to the best practice principles in the organisation and funding of RDI. All three scenarios aim to maintain the current number of Ministries and address the need for better coordination and management through better organisation of the existing system, including:

- A. Improvement of the current competence model;
- B. Fundamental strengthening of coordination and the coordinating body's political position, without setting up a new Ministry;
- C. Reorganisation of competencies across Ministries.

### A. Improvement of the current competence model

**The improvement of the current competence model builds on the existence of two independent Ministries with a significant cross-ministerial responsibility RDI (MESRS SR, ME SR), and anchors the VAIA's dominant position in the approval of RDI calls for proposals.** The mandate of the MIRDI SR in relation to RDI will be limited primarily to the function of the managing body of the Programme Slovakia. Actions of the Ministries and other central bodies relevant to RDI will be coordinated by the VAIA (under the GO SR) and the GCSTI. The coordinated Ministries will continue to handle the ministerial support for RDI.

**Such an approach existed for a long time in the Czech Republic, but in 2021 a model with a special minister was adopted** (see below). This model mostly arose from efforts to bridge the historical institutional separation of education and research on the one hand, and innovation and business on the other. Its advantage is in that it necessitates the smallest amount of changes against the current state in Slovakia and is thus the most implementable in political terms. The drawback, which is also confirmed by the VAIA's experience, is in that such model hardly leads to effective coordination and performance assurance (including the representation of the Slovak Republic in international structures, especially in the Council of Ministers). This drawback is more prominent in the case of a coalition government and in a mode of governance characterised by strong ministerial and sectoral autonomy, which are both typical for Slovakia. These adverse factors are partially mitigated by the direct subordination of the VAIA to the GO SR and, accordingly, the Prime Minister; but given the collective and coalition-based model of governance, the status of a Slovak Prime Minister is not comparable to, for example, the British Prime Minister, but rather to the Prime Ministers in Nordic countries.

For this model to be maintained and ensure the successful implementation of the RDI policy, the following changes need to be made:

- Conceptual and legislative anchoring of the integrated state policy approach to RDI as a basic principle;
- Continued direct oversight by the Prime Minister, not by another Ministry;
- A clearer division of competencies between the VAIA and the Ministries.

In practice, the necessary changes can be categorised as follows:

**Institutional and legislative authority and competencies:**

The following competencies should be carried out directly by the VAIA as the central government body responsible for RDI, including social innovation:

- Policy learning (evaluation/*ex post* evaluation, connection to planning);
- RDI strategies;
- Reduction in the administrative burden and financial control rules in relation to RDI activities;
- RDI ethics;
- One-stop shop for RDI support information;
- Technology transfer;
- Statistics and reporting.

As a central body under the GO SR, the VAIA, mandated by relevant laws, would be authorised to issue generally binding implementation regulations, or propose regulations to the Government.

Coordination of other central government bodies in relation to the following competencies:

- Internationalisation and international representation of the Slovak Republic in the RDI area;
- Popularisation of S&T and awareness building;
- Integrated support for the innovation ecosystem (from an idea to scale-up), linking research with practice, technology transfer and intellectual property in the context of innovation support.

In these areas, the VAIA would be authorised to collect information and data, evaluate them and propose binding solutions once approved by the GCSTI or the Government.

**Financial authority and competencies:**

- An inter-ministerial budget programme for RDI to be administered by the GO SR/VAIA;
- The VAIA's authority to issue standards that must be met by organisations allocating public funds to RDI and to control/accredit compliance with the standards;
- An equal authority in relation to institutional funding + gradual move to the unification of institutional funding.

**RDI quality assurance:**

- Responsibility for the state quality assessment policy;
- Responsibility for the definition of what constitutes RDI (research organisation, research activity, research money, research staff) and oversight of compliance;
- All RDI organisations (HEIs, the SAS, SRIs) must participate in the quality assessment system;
- Definition of the necessary RDI capacities (state interest) and the method of their financing and organisation.

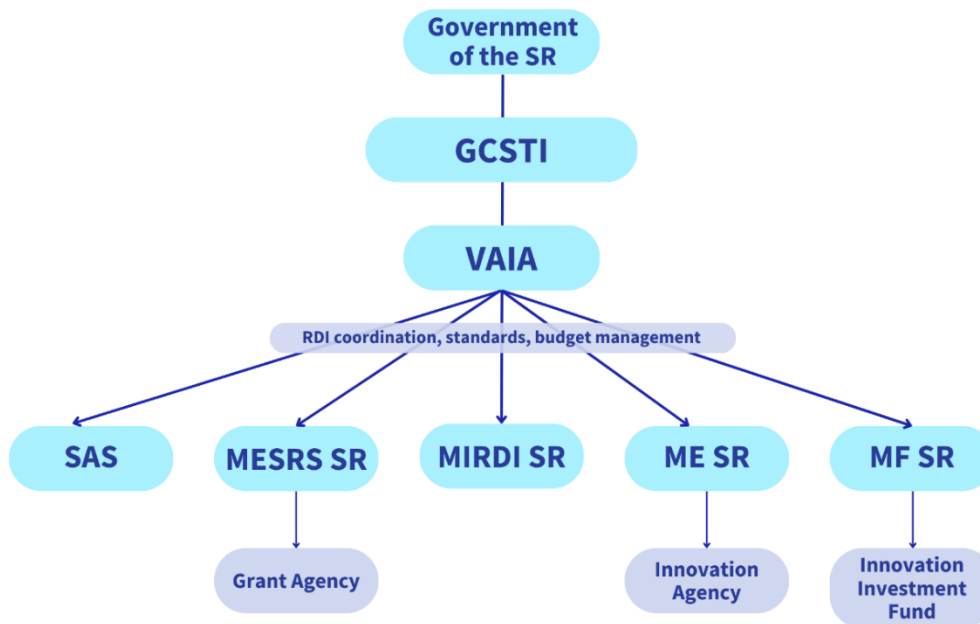
**Defragmentation of funding and support agencies:**

- It is advisable to set up a Grant Agency with the primary purpose of providing non-repayable aid for RDI activities, where the recipients are primarily HEIs, the SAS and the non-profit sector, as well as other services for academic research and development activities. The Grant Agency would gradually take over the authority and competencies of the SRDA and the RA as well as the support schemes directly administered by agencies of the MESRS SR (VEGA, KEGA, European

Partnerships, or their successors), or by the VAIA (RRP). The Grant Agency would focus primarily on supporting scientific excellence.

- It is advisable to set up Innovation Agency with the primary purpose of supporting ecosystem activities and, in particular, funding the creation, implementation and dissemination of innovations in the business sector, and social innovations. The Innovation Agency would gradually take over the implementation of all support schemes targeting business innovation which are implemented under the ME SR and the SIEA, as well as similar programmes of other Ministries, and support for social innovation. The Innovation Agency would organise and/or finance mentoring, acceleration and fundraising activities for innovation in the business sector. The Innovation Agency would focus primarily on supporting setting up and scaling up highly innovative new businesses and on increasing competitiveness and productivity in existing businesses through innovation, digitisation and decarbonisation. Both the Grant Agency and the Innovation Agency would finance cooperation between the HE sector and the business sectors, where the Grant Agency would be in charge of initiatives where the primary recipient is the HE sector and the Innovation Agency, on the other hand, those where the primary recipient is the business sector.
- It is advisable to transfer public policy-making responsibilities from the SCSTI to the MESRS SR (open science) and to the Grant Agency (transfer of technology, popularisation of science) and concentrate the SCSTI's activities on library and information services, where the SCSTI could assume the coordination responsibility for the scientific library system and scientific and technical information.
- The SARIO would retain its cross-cutting role in relation to investments and trade, take over some functions from the SBA in the internationalisation of SMEs (e.g. individual advising and coaching on expansion to foreign markets, support for participation in international conferences), which would contribute to their defragmentation.
- As part of defragmentation and efforts to establish a comprehensive system of support, as described above, the state would withdraw from the SBA, and support general development of entrepreneurship, when and as appropriate, through a transparent and competitive funding scheme.
- There is also a question of repayable funding through EximBanka and the Slovak Guarantee and Development Bank (SZRB), but the financing of innovative activities today represents only a small part of their activities. An amalgamation of the two, or merger with SIH, would make sense if a political decision was made to reorient their focus on funding of business activities that involve a substantial element of innovation.

Diagram A



**The major advantage of this reorganisation model would be the supra-ministerial influence of the GO SR, with the VAIA as its unit.** This would simplify the coordination function towards the Ministries and other public administration bodies. The disadvantage of the model, in contrast, is the need for a higher number of staff to coordinate the system and possible lengthy decision-making. Almost every area must be expertly covered by the respective Ministry as well as directly at the VAIA so that the latter is able to fulfil its strategic role.

#### **B. Fundamental strengthening of coordination and the political position of the coordinating body through a special Minister, without the creation of a new Ministry**

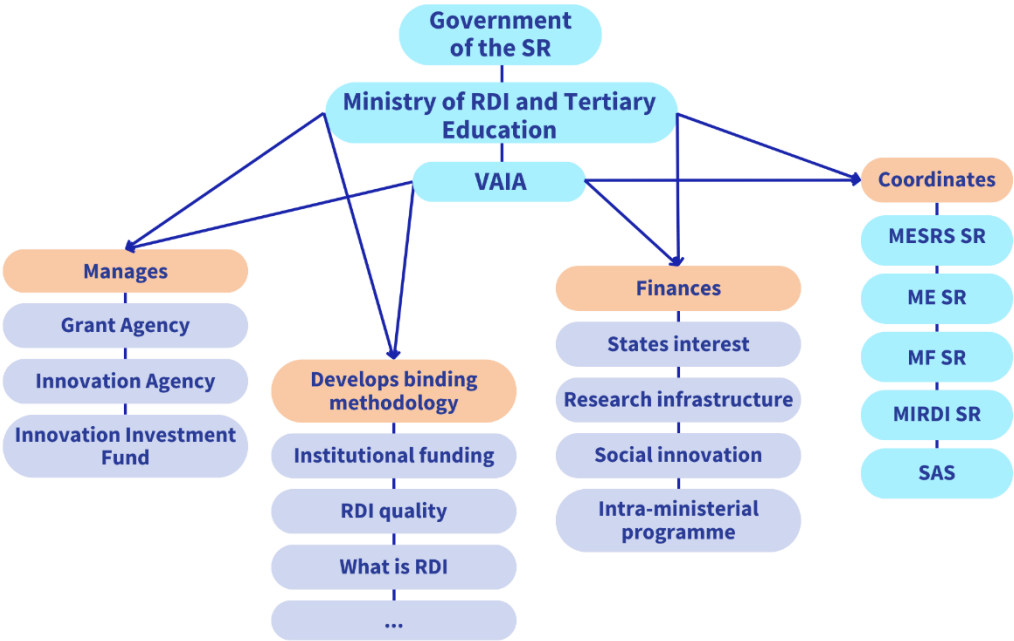
**The main feature of Scenario B is the mandate strengthening through a special Minister/Deputy Prime Minister without a Ministry.** With this scenario, the existence of two separate Ministries with a significant cross-ministerial responsibility for RDI (MESRS SR and ME SR) would be continued and the competence of the VAIA vis-à-vis the MIRDI SR with regard to the Programme Slovakia would be clearly defined. The work of the Ministries and other central bodies relevant to RDI will be coordinated by a special Minister or Deputy Prime Minister without the creation of a special Ministry. This Minister will manage the VAIA and chair the Government Council for Science, Technology and Innovation (GCSTI). The coordinated Ministries would continue to handle sectoral support for RDI.

**Such approach can be found, for example, in the Czech Republic where there is a Minister for Science, Research and Innovation since 2021, who has also been managing the Science, Research and Innovation Section of the Government Office since 2022.** The advantage of this arrangement is that it markedly strengthens the political weight and coverage of RDI without necessitating a more fundamental institutional change.

**With this scenario, the respective powers of the Minister and the VAIA will be strengthened as described in scenario A, with the following additions:**

- Regarding the funding of RDI, the key funding agencies (Grant Agency, Innovation Agency) will be transferred under the jurisdiction of the new Minister, but their operational autonomy will be maintained or strengthened;
- The VAIA will play a key role in the RDI institutional funding as the manager of the inter-ministerial budget programme and the owner of a binding methodology for the allocation of institutional funding to be implemented by individual managers of the budget chapters after approval by the Government.
- The planning and financing of the research infrastructure will be fully within the authority of the new Minister and the VAIA,
- The Minister and the VAIA will not only coordinate, but also finance the necessary RDI capacities (as a matter of state interest) and social innovation.

**Diagram B**



**The scenario with a special Minister does not bring many positives beyond the strengthened VAIA.** While the new head of the institution would now wield political influence, which the current Chief Innovation Officer does not, under this arrangement the topic of RDI would lose the weight of “the Prime Minister’s topic.” Moreover, in case of coalition governments, coordination will also be hampered by political disunity and difficulty of pushing certain topics against other authorities. The disadvantage of the model is the need for a higher number of staff to coordinate the system and lengthy decision-making.

**C. Reallocation of competencies between Ministries**

**The third institutional alternative is the reallocation of competencies between Ministries so that there is a clear and unified cross-ministerial responsibility for the public RDI policy and its**



**implementation.** Variations of such model exist in Slovenia, Hungary, Switzerland, Romania, Denmark and Cyprus, among others (see Box 5.1).

**In this scenario, the competencies listed below are consolidated under one Ministry, whose Minister may (ideally) also be a Deputy Prime Minister:**

- Research, Development and Innovation;
- HEIs;
- Competitiveness;
- Digitisation of society (It is suggested that the currently used term “informatisation of society” is replaced).

The scope of the key authority and competencies of the Ministry in RDI and the HE sector will be as follows:

- Given the role of HEIs in research and their connection to RDI system, the new Ministry will ensure the connection between RDI and the HE policy along the lines of the Slovenian model. The Ministry will be responsible for the state’s HE and RDI policies, including all the areas mentioned above, as well as the ESIF and the RRP in relation to RDI and HEIs;
- The Ministry will manage key funding institutions, namely the Grant Agency and the Innovation Agency;
- The Ministry will play a key role in the institutional funding of RDI capacities, acting as the:
  - Manager of the inter-ministerial budget programme;
  - Owner of the binding methodology for the allocation of institutional funding to be implemented by individual managers of the budget chapters after approval by the Government;
  - Provider of funding for HEIs.
- The Ministry will coordinate and provide funding for social innovation.

The presented alternative further proposes merging RDI competencies and functions with those concerned with competitiveness and digitisation. This proposal is based on a strategic vision of building Slovakia’s competitiveness on innovation and digitisation. We suppose the competitiveness responsibilities and functions to include those currently performed by the ME SR, including:

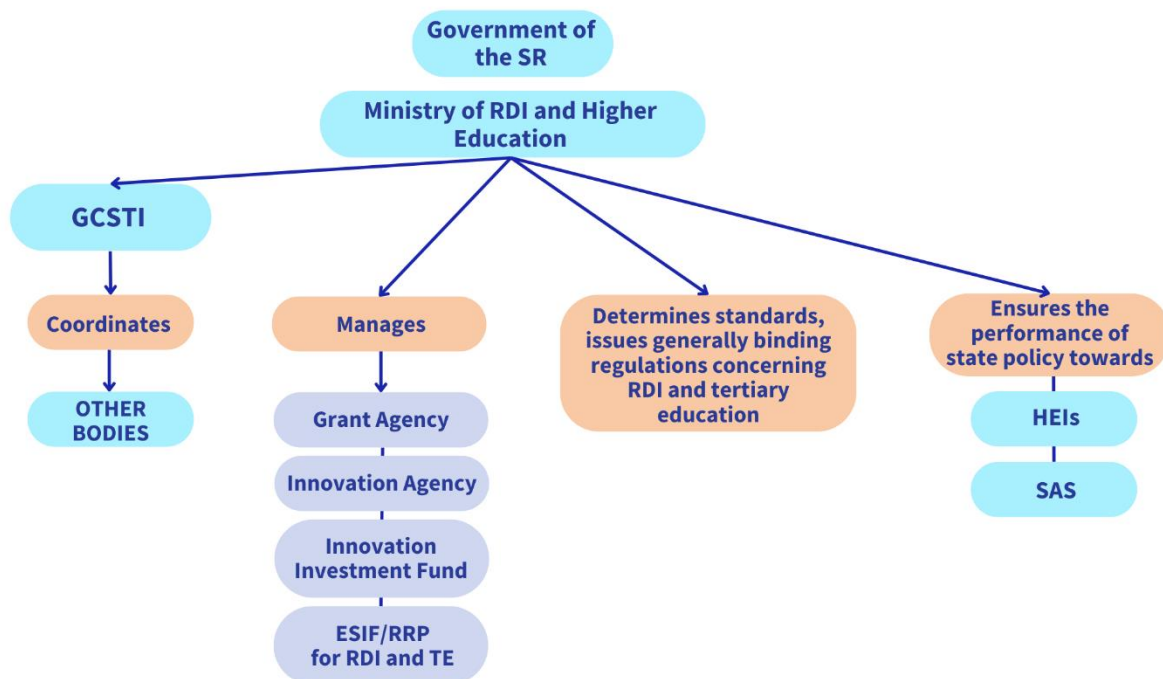
- The business environment strategy and support, including support for food industry, the products of which are not covered by Annex I to the Treaty on the Functioning of the European Union, and in wood processing and biotechnology;
- The strategy of creating and implementing innovation in selected areas;
- Industries, except wood processing, biotechnology, food and building products;
- Support for SMEs, including support for food products not covered by Annex I to the Treaty on the Functioning of the European Union and support for wood processing and biotechnology;
- Domestic trade and foreign trade, including trade in defence products, and development of foreign trade policy; consumer protection, except consumer protection in the provision of financial services, and coordination of the internal market policy of the European Union;
- Denationalisation and privatisation of state property and administration of the state property in the business sector;

- Screening of foreign investments to protect security and public order in the Slovak Republic, and security and public order in the European Union.

The digitisation is more closely related to RDI rather than to management of European funds and regional development. The 2030 Strategy for Digital Transformation of Slovakia (SDTS) as the core document is mainly concerned with process (digital) innovation in the business sector and in public administration, social innovation, the use of data and RDI in general. The EIS includes four indicators, out of 32, that are directly focused on digitisation; and digitisation is also embedded in many others. Therefore, we propose transferring the MIRDI SR's responsibilities in this area, including the:

- Central management of the digitalisation of society and development of the single digital market policy;
- Decision-making regarding general government spending on information technology, the central architecture of the integrated information system of public administration and the coordination of tasks concerned with the digitisation of society.

**Diagram C**



**As a part of the practical reorganisation of personnel, it would require transfer from mainly from the MESRS SR, ME SR, VAIA and the MIRDI SR.**

Regarding RDI competencies:

- It would pertain to the MESRS SR, the Section of S&T, the Section of HE, the Division of Strategies and Conceptions for Science, Research and HE, and the Research Programming Department of the Section of EU Structural Funds. The implementing units would be transferred to the newly established Grant Agency.

- In case of the ME SR, part of the Support Programmes Section (namely the OP Management and Methodology Division) and part of the Section of Competitiveness (namely the Innovation Department) would be transferred. The implementation capacities reserved for the Programme Slovakia would be transferred to newly established Innovation Agency.
- The VAIA would be transferred as a whole, with the exception of the implementing units managing the Call for Transformation and Innovation Consortia and the Call for Support for Researchers Threatened by the Conflict in Ukraine.

For other competencies, the following would be transferred:

- From the ME SR, the Section of Competitiveness, the Section of Foreign Trade Policy and European Affairs and a substantial part of the Section of Support Programmes.
- From the MIRDI SR, mainly the Sections in charge of digitisation (namely the Section of Public Administration Information Technology, the Section of Digitisation, the Section of Informatisation Projects Implementation).
- A proportional number of personnel providing relevant services would also be transferred from all these Ministries (economic sections, legislative-legal sections, IT sections) to avoid increasing the total number of FTEs in the central government sector.

**The primary benefit of reallocation of competencies to a single Ministry is faster decision-making and significantly easier coordination.** It will eliminate time- and personnel-intensive inter-ministerial coordination. Since this scenario omits establishing a completely new Ministry and targets the consolidation of competencies under one of the existing Ministries, no increase in the total number of personnel is expected. A drawback is a lower weight at the inter-ministerial level, which may be of particular relevance in the case of coalition governments. It would be more pronounced if the Ministry was to be led by a non-Deputy Prime Minister.

#### **Induced option for central government reorganisation:**

- **Merger of the MEnv SR with part of the ME SR.** With the interest not to increase a number of Ministries and taking into regard status of green transformation as a fundamental political topic, which will be an important factor in the Government's decision-making, and the need for an integrated approach, we recommend combining other competencies of the ME SR (energy and mining in particular) with the MEnv SR into a Ministry for Green Transformation. This would involve finding a solution for institutional consumer protection and market supervision.
- **Merger of the MIRDI SR and the NICA (GO SR).** In the interests of strategic, coordinated and timely use of the European Union funds in RDI, but also cross-sectionally, we also recommend considering the merger of the two central bodies responsible for the management of those funds (the MIRDI SR and the NICA under the GO SR) into one Ministry.
- **Merger of the MESRS SR and the MC SR.** A third option for improving policy coordination is to combine the topics of regional education, care for the youth and sports with the topics of libraries, museums and arts in general. Such combination is found in Finland. A partial amalgamation of these topics already exists today in the form of the KEGA scheme.

**Compared to the current state, all three scenarios represent a significant improvement in terms of compliance of organisation and funding of the RDI system with the best practice principles.** The most significant progress is represented by Scenario C, which, compared to the other two, brings a more integrated approach to RDI, a more adequate institutional capacity to cater

for different activities and a greater guarantee that the institutional funding for RDI will be linked to the institutions quality performance measured over an extended period.

| <b>Table 6.2 Evaluation of conformity with the good practice principles by Scenario</b> |  |                          |                   |                   |                   |
|---|--|--------------------------|-------------------|-------------------|-------------------|
| <b>No</b>   | <b>Best practice principle</b>   | <b>Current situation</b> | <b>Scenario A</b> | <b>Scenario B</b> | <b>Scenario C</b> |
| 1   | Institutional architecture supports integrated approach to RDI across Ministries, sectors and national borders.  | +                        | +                 | +                 | ++                |
| 2   | Integrated management of RDI policy covers the entire public policy cycle.   | -                        | ++                | ++                | ++                |
| 3   | Conceptualisation of innovation provides a balance for both technological and social innovations.  | -                        | ++                | ++                | ++                |
| 4   | Adequate institutional capacity, in both quantitative and qualitative terms, is provided for different activities (public policy-making, funding, regulation).                     | 0                        | 0                 | 0                 | +                 |
| 5   | Accountability at the entire RDI system level is precisely defined and enforceable.  | +                        | ++                | ++                | ++                |
| 6   | RDI funding decisions are made with emphasis on input quality control.   | +                        | ++                | ++                | ++                |
| 7   | Effective implementation supports minimisation of total administrative (transactional) cost.   | -                        | +                 | +                 | +                 |
| 8   | Provision of RDI funds is institutionally separated from the RDI public policy-policy making and regulation, ensuring their implementation.  | +                        | ++                | ++                | ++                |
| 9   | Organisation of the provision of resources is transparent and institutionally integrated as much as possible, but with respect for the needs of different organisational cultures. | -                        | +                 | ++                | ++                |
| 10  | Decision-making on RDI funding respects public policy priorities, but is autonomous in relation to a specific project.   | +                        | ++                | ++                | ++                |
| 11  | Funds earmarked for RDI are used to finance RDI activities.  | +                        | ++                | ++                | ++                |
| 12  | Institutional funding of RDI is dependent on the institutions' RDI performance measured over extended period.  | -                        | +                 | +                 | ++                |

Note: (-) principle not applied, (0) cannot be evaluated, (+) partially applied, (++) applied

### 6.3. Recommendations for the consolidation of competencies

**Each of the models outlined above has its benefits and drawbacks.** Common to all scenarios is consolidation of agencies and decoupling of the policy-making from funding. Potential disadvantages of the individual scenarios can be mitigated by clearly defining competencies in legislation, but also by using the “whole of government” approach.

**The decision on the model consolidating competencies in RDI must be made by the new Government at the moment of its formation.** Decisions made later will be extremely difficult to implement for multiple reasons, one of which being the coalition character of the Government.

**The recommended scenario** is reorganisation of the competencies between Ministries so that a single entity ensures integrated management of relevant policies without the need for coordination between multiple actors. Such reorganisation can be implemented without additional demands on personnel and operating expenses. The decision on the model to be adopted should also provide for the development of the management consolidation plan (Measure 1.1.1.2 of the Action Plan of the National Strategy). Such plan will further elaborate the details of the consolidation and reorganisation of functions, as recommended in this Review. The distribution of competencies and functions must also be incorporated in the new RDI Act.

**Measure 6.1** Develop the Competences Consolidation Plan for the Ministries, existing agencies and institutions in charge of RDI policy-making and support.

**Measure 6.2** Draw up the new RDI Act.

**Measure 6.3** Establish the Grant Agency of the Slovak Republic and the Innovation Agency of the Slovak Republic, and gradually transfer all calls for proposals from existing agencies and Ministries to these Agencies.

## Abbreviations

| Abbreviation | Meaning  |
|--------------|--|
| AMO SR       | Antimonopoly Office of the Slovak Republic   |
| APC          | Article Processing Charge  |
| APF in BA    | Academy of Police Force in Bratislava  |
| ARIS         | Slovenian Research Agency  |
| AS CR        | Academy of Sciences of the Czech Republic  |
| ASMR SR      | Administration of State Material Reserves of the Slovak Republic   |
| AWS          | Austrian Wirtschaftsservice Gesellschaft (bank)  |
| BBSGR        | Banská Bystrica Self-Governing Region  |
| BIS          | Budget information system  |
| BSGR         | Bratislava Self-governing Region   |
| CFAP         | Centre for Folk Art Production   |
| COFOG        | Classification of Expenditure by Function of Government  |
| COLSAF SR    | Central Office of Labour, Social Affairs and Family of the Slovak Republic   |
| COSMT        | Czech Office of Standards, Metrology and Testing (Úřad pro technickou normalizaci, metrologii a státní zkušebnictví) |
| CR           | Czech Republic   |
| CRPA         | Central Register of Publication Activity   |
| CSIRT        | Computer Security Incident Response Team Slovakia (Government unit to resolve computer incidents in Slovakia)        |
| CU BA        | Comenius University in Bratislava  |
| DS           | Danube Strategy  |
| EC           | European Commission  |
| EDIH         | European Digital Innovation Hubs   |
| EEA          | European Economic Area   |
| EIC          | European Innovation Council  |
| EIR          | Electronic Information Resources   |
| EIS          | European Innovation Scoreboard   |
| EPO          | European Patent Organisation   |
| ERA          | European Research Area   |
| ERDF         | European Regional Development Fund   |
| ESA          | European Space Agency  |
| ESIF         | European Structural and Investment Funds   |
| EU           | European Union   |
| EUIPO        | European Union Intellectual Property Office  |
| FSBA         | Final State Budget Account   |
| FTE          | Full Time Equivalent   |
| GA CR        | Grant Agency of the Czech Republic   |
| GBARD        | Government Budget Allocations for R&D  |
| GBER         | General Block Exemptions Regulation  |
| GCCA SR      | Geodesy, Cartography and Cadastre Authority of the Slovak Republic   |
| GCRI         | Geodesy and Cartography Research Institute in Bratislava   |

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|---------------|---|
| GCSTI         | Government Council for Science, Technology and Innovation of the Slovak Republic  |
| GDP           | Gross Domestic Product  |
| GERD          | Gross Domestic Expenditure on R&D   |
| GO SR         | Government Office of the Slovak Republic  |
| HEIs          | Higher education institutions   |
| ICT           | Information and Communication Technology  |
| IO            | International Organisation  |
| IPO SR        | Industrial Property Office of the Slovak Republic   |
| ISPO          | Recovery Plan Information and Monitoring System   |
| ITMS          | IT Monitoring System  |
| KEGA          | Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sports of the Slovak Republic |
| KPI           | Key Performance Indicator   |
| LFRI          | Labour and Family Research Institute  |
| LM AAF        | Armed Forces Academy of General Milan Rastislav Štefánik  |
| MARD SR       | Ministry of Agriculture and Rural Development of the Slovak Republic  |
| MC SR         | Ministry of Culture of the Slovak Republic  |
| MD SR         | Ministry of Defence of the Slovak Republic  |
| MDPI          | Multidisciplinary Digital Publishing Institute  |
| ME SR         | Ministry of Economy of the Slovak Republic  |
| Menv SR       | Ministry of Environment of the Slovak Republic  |
| MESRS SR      | Ministry of Education, Science, Research and Sport of the Slovak Republic   |
| META-IS       | Central Meta-information System of Public Administration  |
| MF SR         | Ministry of Finance of the Slovak Republic  |
| MFEA SR       | Ministry of Foreign and European Affairs of the Slovak Republic   |
| MH SR         | Ministry of Health of the Slovak Republic   |
| MI SR         | Ministry of Interior of the Slovak Republic   |
| MIRDI SR      | Ministry of Investments, Regional Development and Informatization of the Slovak Republic                                |
| MLSAF SR      | Ministry of Labour, Social Affairs and Family of the Slovak Republic  |
| MTC SR        | Ministry of Transport of the Slovak Republic  |
| MTTI Záhorie  | Military Technical and Testing Institute Záhorie  |
| Museum of SNU | Museum of Slovak National Uprising  |
| NAC           | National Awareness Center   |
| NAFC          | National Agricultural and Food Centre   |
| NATO          | North Atlantic Treaty Organisation  |
| NBC           | National Business Centre  |
| NBS           | National Bank of Slovakia   |
| NCP S&T       | National Centre for the Popularisation of Science and Technology in Society   |
| NCPs          | National Contact Points   |
| NDF I         | National Development Fund I   |
| NFC           | National Forestry Centre  |

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| NFG        | Non-repayable Financial Grant   |
| NHIC       | National Health Information Centre  |
| NHO        | National Horizon Office   |
| NICA       | National Implementation and Coordination Authority                          |
| NISPEZ     | National Information System of Research and Development Support in Slovakia |
| NITT SK II | National Infrastructure to Support Technology Transfer in Slovakia          |
| NP         | National Project  |
| NPs        | Natural Persons   |
| NRA SR     | Nuclear Regulatory Authority of the Slovak Republic                         |
| NS RDI     | National Strategy for Research, Development and Innovation                  |
| NSA SR     | National Security Authority of the Slovak Republic                          |
| NSL in BB  | National Science Library in Banská Bystrica                                 |
| NTTC SR    | National Technology Transfer Centre of the Slovak Republic                  |
| OECD       | Organisation for Economic Cooperation and Development                       |
| OF         | Own Funds   |
| OP         | Operational Programme   |
| OP II      | Operational Programme Integrated Infrastructure                             |
| PCT        | Patent Cooperation Treaty   |
| PP         | Programming Period  |
| PPO        | Public Procurement Office   |
| PPP        | Purchasing Power Parity   |
| PRIs       | Public Research Institutions  |
| R&D        | Research and Development  |
| R&D Inst.  | Research and Development Institute  |
| R&I        | Research and Innovation   |
| RA         | Research agency   |
| RC         | Research Centre   |
| RDI        | Research, Development and Innovation  |
| RICPP      | Research Institute of Child Psychology and Pathopsychology                  |
| RRP        | Recovery and Resilience Plan  |
| S&T        | Science and Technology  |
| SAAHE      | Slovak Accreditation Agency for Higher Education                            |
| SAC        | Section of Audit and Control  |
| SAIA       | Slovak Academic Information Agency  |
| SAO SR     | Supreme Audit Office of the Slovak Republic                                 |
| SARIO      | Slovak Investment and Trade Development Agency                              |
| SAS        | Slovak Academy of Sciences  |
| SBA        | Slovak Business Agency  |
| SC         | Section of Competitiveness  |
| SCO        | Slovak Central Observatory  |
| SCR        | Simplified Cost Reporting   |
| SCSTI      | Slovak Centre of Scientific and Technical Information                       |
| SD         | Section of Digitisation   |



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| SDC         | Slovak Design Centre   |
| SEPP        | Section of European Programmes and Projects                    |
| SFI         | Slovak Film Institute  |
| SGI         | State Geological Institute of Dionýz Štúr                      |
| SHE         | Section of Higher Education                                    |
| SHI in Rome | Slovak Historic Institute in Rome                              |
| SIEA        | Slovak Innovation and Energy Agency                            |
| SIH         | Slovak Investment Holding                                      |
| SIM         | Slovak Institute of Metrology                                  |
| SISIA       | Section of Innovation, Strategic Investment and Analysis       |
| SK CRIS     | Slovak Current Research Information System                     |
| SLORD       | Slovak Liaison Office for Research and Development in Brussels |
| SM          | Section of Modernisation                                       |
| SMEs        | Small and Medium-sized Enterprises                             |
| SMU         | Slovak Medical University                                      |
| SNA         | Slovak National Archive  |
| SNG         | Slovak National Gallery  |
| SNL         | Slovak National Library  |
| SNM         | Slovak National Museum   |
| SO SR       | Statistical Office of Slovak Republic                          |
| SoE         | Seal of Excellence   |
| SOSMT       | Slovak Office of Standards, Metrology and Testing              |
| SR/SK       | Slovak Republic/Slovakia                                       |
| SRCSP       | Section of Regional Centres and Strategic Planning             |
| SRDA        | Slovak Research and Development Agency                         |
| SRI         | Sectoral Research Institute                                    |
| SSF         | Section of EU Structural Funds                                 |
| SSP         | Section of Support Programmes                                  |
| SPS         | Section of Slovakia Programme 2021-2027                        |
| SST         | Section of Science and Technology                              |
| SB          | State budget   |
| STEM        | Science, Technology, Engineering and Mathematics               |
| STM         | Slovak Technical Museum  |
| SZRB        | Slovak Guarantee and Development Bank                          |
| TA CR       | Technology Agency of the Czech Republic                        |
| TFP         | Total Factor Productivity                                      |
| TI          | Theatre Institute  |
| TRC Finland | Technical Research Centre of Finland                           |
| TRL         | Technology Readiness Level                                     |
| TTC         | Technology Transfer Centre                                     |
| TTO         | Technology Transfer Office                                     |
| UL BA       | University Library in Bratislava                               |
| UL KE       | University Library in Košice                                   |

|          |   |
|----------|---|
| UL PO    | University Library in Prešov  |
| UPJS     | Pavol Jozef Šafárik University  |
| USP      | University Science Park   |
| VAIA     | Research and Innovation Authority   |
| VEGA     | Scientific Grant Agency of the Ministry of Education, Science, Research and Sports of the Slovak Republic |
| VER      | Verification of Excellence in Research  |
| VFF      | Venture to Future Fund  |
| WIPO     | World Intellectual Property Organisation  |
| WoS      | Web of Science  |
| WRI      | Water Research Institute  |
| ZIVSE NP | Improving the Innovative Performance of the Slovak Economy National Project                               |

| Abbreviation | Meaning  |
|--------------|--|
| ArU          | SAS Institute of Archaeology SAS, PRI                |
| AsU          | SAS Astronomical Institute, PRI                      |
| BMC          | SAS Biomedical Research Centre, PRI                  |
| CBRB         | SAS Plant Science and Biodiversity Centre, PRI       |
| CBv          | SAS Centre of Biosciences, PRI                       |
| CEM          | SAS Centre of Experimental Medicine, PRI             |
| CEMEA        | SAS Centre for Advanced Materials Application, PRI   |
| CSC          | SAS Centre of Operations, PRI                        |
| CSPV         | SAS Centre of Social and Psychological Sciences, PRI |
| CVU          | SAS Art Research Centre, PRI                         |
| EkU          | SAS Institute of Economic Research, PRI              |
| EIU          | SAS Institute of Electrical Engineering, PRI         |
| FilU         | SAS Institute of Philosophy, PRI                     |
| FU           | SAS Institute of Physics, PRI                        |
| GgU          | SAS Institute of Geography, PRI                      |
| HU           | SAS Institute of History, PRI                        |
| ChU          | SAS Institute of Chemistry, PRI                      |
| JULS         | SAS Ludovit Stur Institute of Linguistics, PRI       |
| MU           | SAS Mathematical Institute, PRI                      |
| NiU          | SAS Institute of Neuroimmunology, PRI                |
| PaU          | SAS Institute of Parasitology, PRI                   |
| SocU         | SAS Institute of Sociology, PRI                      |
| SUJS         | SAS Jan Stanislav Institute of Slavistics, PRI       |
| UACH         | SAS Institute of Inorganic Chemistry, PRI            |
| UEF          | SAS Centre of Experimental Physics, PRI              |
| UEL          | SAS Institute of Forest Ecology, PRI                 |
| UEt          | SAS Institute of Ethnology, PRI                      |
| UGt          | SAS Institute of Geotechnics, PRI                    |
| UH           | SAS Institute of Hydrology, PRI                      |
| UHV          | SAS Institute of Musicology, PRI                     |
| UI           | SAS Institute of Informatics, PRI                    |

|         |   |
|---------|---|
| UK      | SAS Central Library, PRI                                |
| UKE     | SAS Institute of Landscape Ecology, PRI                 |
| UM      | SAS Institute of Measurement Science, PRI               |
| UMB     | SAS Institute of Molecular Biology, PRI                 |
| UMMS    | SAS Institute of Materials and Machine Mechanics, PRI   |
| UMV     | SAS Institute of Materials Research, PRI                |
| UOr     | SAS Institute of Oriental Studies, PRI                  |
| UPol    | SAS Polymer Institute, PRI                              |
| UPV     | SAS Institute of Political Science, PRI                 |
| USIL    | SAS Institute of Slovak Literature, PRI                 |
| USTARCH | SAS Institute of Construction and Architecture, PRI     |
| USvL    | SAS Institute of World Literature, PRI                  |
| USaP    | SAS Institute of State and Law, PRI                     |
| UVSK    | SAS Institute for Research in Social Communication, PRI |
| UVZ     | SAS Earth Science Institute, PRI                        |
| UZ      | SAS Institute of Zoology, PRI                           |