



Audit Report

17/15

State funding for research, development and innovation

The audit was included in the audit plan of the Supreme Audit Office (the "SAO") for 2017 under number 17/15. The audit was managed, and the Audit Report drawn up by SAO member Mr. Petr Neuvirt.

The aim of the audit was to verify whether the state's funds for research, development and innovation meet the objectives contained in relevant strategic documents. To review the existence and set-up of a system that directs funds for research, development and innovation (R&D&I) in such a way that the Czech Republic's innovation performance grows in international comparison. Examine whether the benefits of money spent on R&D&I are sufficiently evaluated.

The audit of these audited entities was performed between October 2017 and April 2018.

The audited period spanned 2014-2016; both the previous and subsequent periods were also considered for contextual reasons.

The laws and regulations used in this Audit Report are applied in the version effective for the audited period.

Audited entities: The Office of the Government of the Czech Republic (hereinafter also "OG CR"); Ministry of Education, Youth and Sports (hereinafter also "MoEYS"); Ministry of Industry and Trade (hereinafter also "MoIT"); Ministry of Agriculture (hereinafter also "MoA"); Academy of Sciences of the Czech Republic, Prague (hereinafter also "ASCR"); Palacký University in Olomouc; Brno University of Technology; University of South Bohemia in České Budějovice; Mendel University in Brno; Biological Centre of the ASCR, České Budějovice; Institute of Physics of Materials of the ASCR, Brno; Institute of Scientific Instruments of the ASCR, Brno.

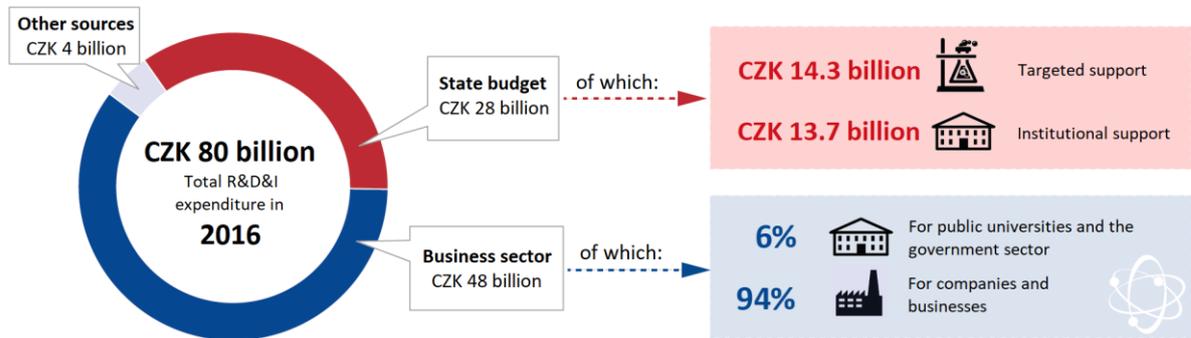
Objections lodged against the audit protocols by the Office of the Government of the Czech Republic, Ministry of Education, Youth and Sports and the Ministry of Agriculture were dealt with by the heads of the audit teams by means of decisions on objections. The Office of the Government of the Czech Republic appealed against the decision on objections and the appeal was dealt with by SAO Board resolution.

The **Board of the SAO** at its 9th meeting held on 16 July 2018,

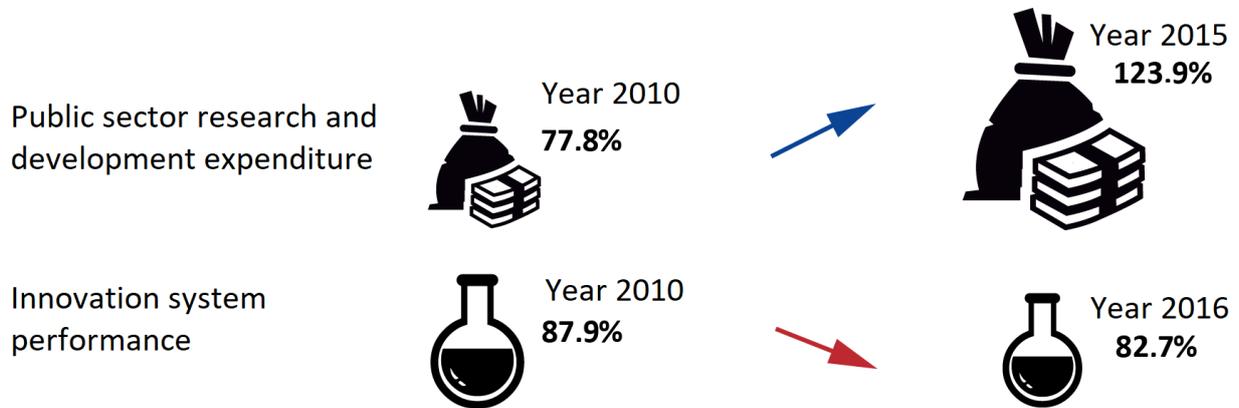
approved by resolution No. 8/IX/2018

the **Audit Report** as follows:

Key Facts



Comparison of the Czech Republic with the European average (EU = 100%)



Source: European Innovation Scoreboard 2017.

Evaluation of the main national strategy document 2013-2015

Achieved goals	1 of 4	★☆☆☆
Fulfilled measures	8 of 21	★★★★★★☆☆☆☆

I. Summary and Evaluation

The SAO audited the set-up and implementation of the system of support of research, development and innovation (hereinafter the "R&D&I"), in particular in terms of its effectiveness in relation to the fulfilment of national objectives and its efficiency measured by the public support provided and the innovation performance of the Czech Republic in international comparison. The method of evaluating the benefits of the funds spent by the providers and the Research, Development and Innovation Council (hereinafter as the "R&D&I Council") was also audited.

Having performed the audit, the SAO states the following:

Targeted support

The audit found significant deficiencies in the set-up, management and evaluation of programmes of targeted support for research, development and innovation. These programmes are key to ensuring that support is efficient and targeted primarily at the areas that need to be improved the most. Although the programmes were linked to national strategic documents, their focus was general. Specific sub-objectives and measurable indicators for their evaluation were missing.

The setting up of the programmes was not preceded by an analysis of the actual state of the given area. It was therefore not clear where from and how the programme was supposed to improve the area.

Programme indicators were not directly linked to the set goals. Achieving of these indicators did not provide the information of how the programmes' objectives were actually being met. It was therefore very difficult to monitor and manage the progress of the targeted support programmes.

The set-up of the programmes did not allow for a qualitative assessment of their benefits and impacts. The evaluation of the programmes by the providers and the R&D&I Council was thus only formal, based mainly on quantitative data from the R&D&I information system. The targeted support also did not sufficiently target the areas identified as priorities by the government.

Institutional support

Institutional support aimed at long-term strategic development has been distributed among an increasing number of research organisations without regard to their future direction and development strategies. R&D&I priorities were not taken into account in its provision. This showed that the state had not identified needs that were being met by the institutional support.

Institutional support was provided based on an evaluation of research organisations. Research organisations were evaluated by the R&D&I Council according to quantitative results from the R&D&I information system. However, it did not evaluate the research organisation in the context of its mission, its management and, in particular, did not pay sufficient attention to the quality of its research activities. The evaluation of research organisations by the R&D&I Council was delayed every year and the SAO audit also found a number of systemic deficiencies.

Only the ASCR used self-assessment, which placed more emphasis on the specific missions of research organisations and the quality of research activities, for institutional support. The MoEYS, as the provider, did not even set the conditions of institutional support that would guarantee its use for the long-term strategic development of the beneficiaries in the field of research activities.

Support system

The R&D&I support system was fragmented, with no clearly defined competences and responsibilities of individual institutions. This lack of clarity also had an impact on cooperation in the development of national strategy documents. The large number of support providers and programmes contributes to the fragmentation.

The whole system was highly dependent on quantitative results from the R&D&I information system, which were not directly linked to the quality of research activities.

Quality level of research, development and innovation

Due to the above shortcomings, R&D&I weaknesses such as a significant lagging behind in the area of patents and low levels of public-private cooperation have persisted for a long time. The R&D&I support system has been largely ineffective, as most of the objectives set out in the main national concept paper have not been met.

Even in international comparison, the support system is less efficient. Although the spending on R&D&I in the public sector is growing significantly, the innovation performance of the Czech Republic is lagging behind the European average. Also, The Czech Republic is not on track to meet the national goal of public expenditure on science, research, development and innovation in the Czech Republic of 1% GDP in 2020.

The overall evaluation is based on the following findings:

Targeted support

1. There were shortcomings in the set-up, management and evaluation of targeted support programmes. This is despite the fact that the preparation and evaluation of the programmes were carried out in accordance with the set rules, the opinions on them were issued by the R&D&I Council and subsequently approved by the government. The programmes did not include, for example, an analysis of the baseline situation and a statement of the status that the programme should achieve, or indicators with a direct link to the programme objectives. The subsequent evaluation was thus rather formal, without assessing the actual benefits and impacts of the programmes. In 2015, new rules were adopted to address similar shortcomings. However, only programmes approved by the government from 2020 onwards will be prepared and evaluated under these rules.
2. The Czech Republic failed to make use of potential development opportunities. In order to use public funds more efficiently, a strategic document was prepared setting out priority areas for focusing part of the R&D&I support. This document envisages a strategic orientation also in the area of basic research and institutional support. However, support of these areas lacks strategic focus.

3. The way projects are selected by the MoA creates a risk of non-transparency. The MoA significantly changed the ranking of project proposals resulting from expert meetings and external evaluators' opinions. This procedure is not in violation of the R&D&I Support Act¹, which gives providers the possibility to change the order of project proposals set by the expert advisory body, provided that they justify this decision in writing and publish their decision, which the MoA complied with. However, this procedure makes it possible to disregard the results of expert meetings and opposing opinions of external evaluators, including foreign ones, which should guarantee a professional, independent and transparent evaluation. The SAO has already pointed out this problem in previous audits.

The evaluation of project proposals under the targeted support at the MoEYS and the MoIT did not show any serious deficiencies.

Institutional support

4. Institutional support was provided based on an evaluation of research organisations (hereinafter also referred to as "ROs") carried out by the R&D&I Council. This evaluation suffered from a large number of systemic shortcomings, e.g:
 - was limited to an assessment of the quantitative results achieved and did not take into account the overall qualitative level of the ROs;
 - did not consider the future direction and development strategies, although institutional support was provided for the long-term strategic development of the ROs;
 - has led the ROs to produce valued easily achievable results instead of focusing on quality and long-term strategic development;
 - neglected the support of potential new or emerging fields and ROs;
 - did not take the differences in the mission of the different ROs and the different fields into account;
 - did not sufficiently motivate the ROs to produce results with practically applicable potential; instead, it motivated excessive production of publication results.

Institutional support for the long-term strategic development of research organisations was distributed among still-increasing number of these ROs. Since 2017, a new evaluation system for the ROs has been gradually introduced.

5. The scoring of research organisations for the provision of institutional support was significantly delayed each year and contained random and systemic errors in calculations.
6. Only the Academy of Science of the Czech Republic (ASCR) used the possibility to adjust the amount of institutional support distributed according to its own more detailed assessment. Its evaluation focused primarily on the quality of individual ROs. All other providers, including the MoEYS, distributed institutional support according to the evaluation of the ROs by the R&D&I Council and thus assumed its shortcomings. This

¹ Act No. 130/2002 Coll., on the support of research, experimental development and innovation from public funds and amending certain acts (the R&D&I Support Act).

assessment was also adopted by all audited universities in the redistribution of support among the individual faculties.

7. The MoEYS did not set conditions for the beneficiaries of institutional support that would guarantee the use of this support for the long-term strategic development of universities. In addition, the rules for reporting on the use of institutional support funds allowed beneficiaries to act in a way that made it unclear what the funds were actually used for.
8. Neither the MoEYS nor the ASCR considered the amount of indirect support provided to the ROs in previous years in the form of tax exemptions, although this is required by the R&D&I Support Act. However, the R&D&I Support Act does not specify how the amount of indirect support is to be considered.

Support system

9. The R&D&I support system is fragmented, with unclear competences and responsibilities of individual bodies:
 - Although the MoEYS is the central state administration body for research and development, it does not have responsibility and authority in key areas of research and development. The R&D&I Council is tasked with the responsibility of ensuring the key tasks under the R &D&I Support Act. The R&D&I Council is an expert and advisory body of the Government without legal personality and without direct assignable responsibility. The R&D&I Council only ensures the R&D&I projects, but by its very nature cannot be directly responsible for them. Thus, the ensuring of key research and development tasks is not connected with direct responsibility in the Czech Republic.
 - The R&D&I Support Act provides for cooperation in the preparation of the national R&D&I policy between the MoEYS and the R&D&I Council. The specific form of this cooperation is no longer regulated by law. The National R&D&I Policy was submitted to the Government by the Chairman of the R&D&I Council. However, the perception of mutual cooperation in the preparation of this document differed significantly. The MoEYS stated, during the audit and in the inter-ministerial comment procedure, that this document was not prepared in cooperation with the Ministry. The form of cooperation is also unclear within the definition of competences in the R&D&I system in the Czech Republic.
 - The responsibility for the support of innovation is not clearly defined. Industrial research and development of technology, which are entrusted to the MoIT under the Competence Act², are closely related to innovations. At the same time, the Technology Agency of the Czech Republic also deals with this area. However, their mutual competences and positions are not defined by law.
 - The large number of support providers and programmes contributes to the fragmentation of the system. In 2017, 12 providers supported R&D&I in the Czech Republic through some type of programme. In 2017, there were 62 of such ongoing

² Act No 2/1969 Coll., on the establishment of ministries and other central state administration bodies of the Czech Republic.

programmes. Inconsistent use of terms also leads to confusion that affects the whole R&D&I system.

10. The Research, development and innovation Information System (hereinafter also "R&D&I IS") was not fully functional for at least four months. Thus, it did not fulfil its¹ purpose in providing information on R&D&I. This situation arose due to the non-acceptance of the conditions for further cooperation between the Office of the Government of the Czech Republic and the hitherto exclusive supplier of the system.
11. The quality level of the strategy documents varied widely between providers and beneficiaries. The MoIT did not have a long-term R&D&I strategy despite being a provider of earmarked and institutional support. It did not have sufficient resources for systematic management of this area. The other audited providers had prepared their own strategic documents which were in line with the national strategic documents. Beneficiaries of institutional support from the ASCR developed strategies with specific objectives and indicators, which were subject to regular monitoring. The MoEYS did not require any strategic documents from the beneficiaries of institutional support. However, universities are obliged to prepare a strategic plan according to the Higher Education Act³. The R&D&I area is also part of the strategic plans, but the approach and quality of preparation of this area were very different.

Quality level of research, development and innovation

12. The identified weaknesses of the R&D&I system in the Czech Republic persist in the long term. The quality level of R&D&I is measured through annual comprehensive analyses, including international comparisons. However, no measures have been introduced that would lead to significant improvements in areas where the Czech Republic has long been underperforming in international comparison. This, for example, applies to the creation of patents, where this situation has been noted annually for at least 15 years.
13. In the area of R&D&I in the Czech Republic, the low level of cooperation between the private and public sectors has persisted for many years. Evaluations to date show that steps to promote this cooperation have not been taken or have been ineffective. The statistics do not show any increasing trend in the share of private sources in public R&D&I funding.
14. The established system of R&D&I support was largely ineffective. The evaluation of the implementation of the main strategic document at the end of 2015 showed that only one of the four main objectives have been met and only eight of the 21 measures had been implemented. There has been no significant progress in most areas of concern.
15. The R&D&I support system in the Czech Republic is less efficient compared to the European average. Every year, the European Commission compares countries' performance in the field of innovation. In 2016, the innovation performance of the Czech Republic was 82.7% of the European average. Over the last seven years, the innovation

³ Act No. 111/1998 Coll., on higher education and on amendments and additions to other acts (Higher Education Act).

performance of the Czech Republic has been declining, even though public sector R&D&I spending has increased very significantly over this period.

16. The Czech Republic is not on track to meet the national target it committed to in the EU-level strategy⁴. The national target is to achieve a level of public expenditure on science, research, development and innovation in the Czech Republic of 1% GDP in 2020. In 2016, this expenditure amounted to only 0.65% of GDP.

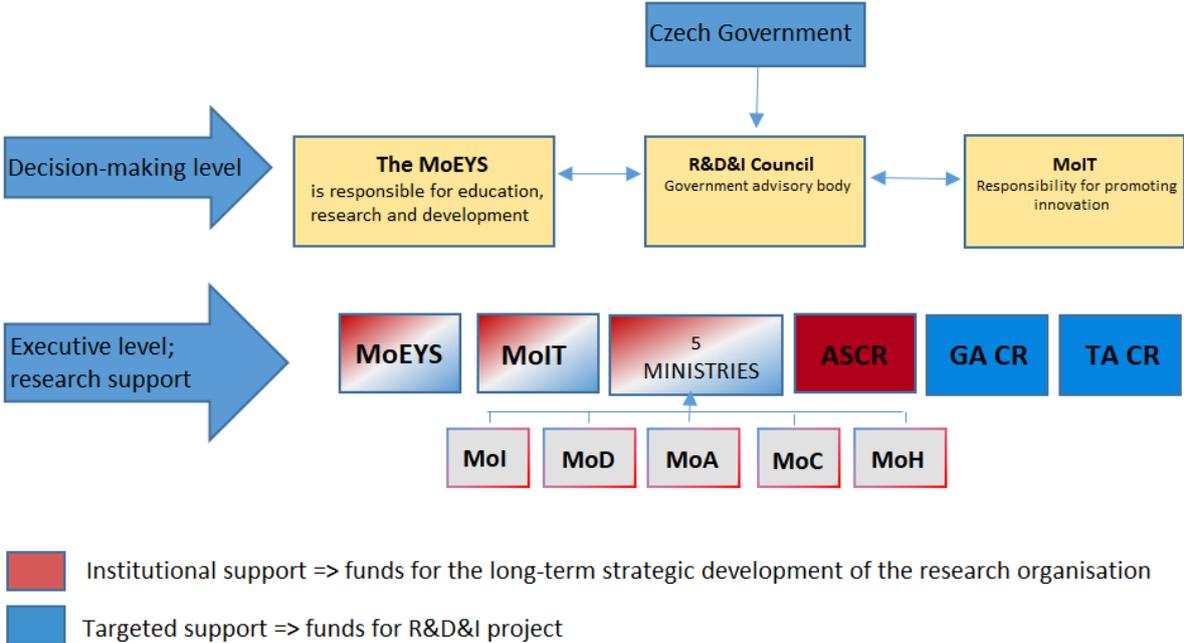
II. Information on the Audited Area

The area of R&D&I is regulated mainly by the R&D&I Support Act. *Update of the National Policy on Research, Development and Innovation for the Years 2009-2015 with a View to 2020* (hereinafter the "R&D&I Update") was the main strategic document for R&D&I in the Czech Republic in the period 2013-2015. Since 2016, the *National Policy for Research, Development and Innovation of the Czech Republic for the Years 2016-2020* (hereinafter also "2016 R&D NP") has been in force. Since 2012, the priority areas have been defined by the *National Priorities for Targeted Research, Experimental Development and Innovation* (hereinafter the "R&D&I Priorities"), which are valid until 2030. These strategic documents were approved by the government and their preparation is ensured by the R&D&I Council, in the case of 2016 R&D NP in cooperation with the MoEYS.

Funds for R&D&I are provided through the budget chapters of selected ministries, the ASCR, the Czech Science Foundation (hereinafter also "CSF") and the Technology Agency of the Czech Republic (hereinafter also "TA CR") in the form of targeted and institutional support. The R&D&I Council is an expert advisory body to the Government for the field of R&D&I in the Czech Republic. The R&D&I Support Act regulates the competences of individual R&D&I bodies. The following figure shows the current system of R&D&I support in the Czech Republic.

⁴*Europe 2020 – A strategy for smart, sustainable and inclusive growth* (hereinafter also the "Europe 2020 Strategy").

Figure No. 1: System of R&D&I support in the Czech Republic



Source: website of TA CR, our own analysis.

Explanatory notes: MoI - Ministry of Interior, MoD - Ministry of Defence, MoC - Ministry of Culture, MoH - Ministry of Health.

The decision-making level is represented by the R&D&I Council together with the OG CR and by the MoEYS and the MoIT. These ministries also provide targeted and institutional support. The provision of targeted support at the MoA and of institutional support at the ASCR was also selected for the audit.

Office of the Government of the Czech Republic

Key tasks related to R&D&I, such as the preparation of the main strategic document, the elaboration of priorities, the assessment of the state of R&D&I or the proposal of expenditures, are carried out through the OG CR. R&D&I Support Act entrusts these tasks to the R&D&I Council, which is an expert and advisory body of the Government without legal personality. The R&D&I Council performs the tasks entrusted to it through the internal departments of the OG CR. The related activities of the R&D&I Council and the OG CR are financed through the institutional support of the budget chapter of the OG CR.

Ministry of Education, Youth and Sports

Under the R&D&I Support Act, the MoEYS is the central administrative authority responsible for research and development, except for areas within the responsibility of the R&D&I Council.

The MoEYS is responsible for the international cooperation of the CR in research and development, including the use of EU funds for research and development, for the strategy of support for large infrastructure, for specific university research and for the performance of the administrative function of the central administrative authority for research and development.

Ministry of Industry and Trade

Under the Competence Act, the MoIT is the central state administration body for small and medium-sized enterprises and for trade, industrial research and the development of technology and engineering. MoIT develops departmental research programmes and organises public competitions in R&D&I.

Ministry of Agriculture

The MoA is a provider of targeted and institutional support in the agricultural sector. The MoA ensures the preparation and implementation of agricultural research, development and innovation concepts and prepares departmental research programmes. Conceptually and methodologically, it manages the departmental research organisations.

Academy of Sciences of the Czech Republic

The ASCR establishes public research institutions on behalf of the CR (hereinafter also "PRI" or "institutes"). It conducts research through 52 research-oriented institutes and two institutes focusing on research and development infrastructure. The main mission of the ASCR and its departments is to conduct basic research into a wide range of natural, technical and social sciences and humanities. Since 2014, the ASCR has provided only institutional support.

State budget expenditure on R&D&I amounted to CZK 28 billion in 2016, approximately half of which was provided in the form of targeted support and half in the form of institutional support. The following table shows more detailed information.

Table 1: Expenditure on R&D&I from the state budget by budget chapter administrators (in CZK million)

Budget chapter administrator	2014		2015		2016	
	Institutional support	Targeted support	Institutional support	Targeted support	Institutional support	Targeted support
Ministry of Education, Youth and Sports	7,937.4	3,447.4	8,085.4	3,922.3	7,243.0	5,424.5
Academy of Sciences of the Czech Republic	4,452.3	0.0	4,693.7	0.0	4,777.9	0.0
Czech Science Foundation	86.8	3,338.2	80.6	3,561.7	85.6	3,841.9
Technology Agency of the Czech Republic	143.2	2,765.6	120.6	3,015.0	112.0	2,710.7
Ministry of Health	424.4	804.8	428.9	904.6	490.4	699.7
Ministry of Industry and Trade	555.0	1,045.7	486.7	359.6	226.3	304.3
Ministry of Agriculture	391.2	378.6	391.7	423.9	394.0	464.0
Ministry of the Interior	48.5	525.9	47.1	372.5	54.0	310.1
Ministry of Culture	74.2	403.8	94.8	374.6	100.4	275.2
Ministry of Defence	88.9	315.8	90.0	343.0	99.1	297.9
Office of the Government of the Czech Republic	48.1	0.0	25.3	0.0	62.5	0.0
Ministry of Justice	6.7	2.0	5.5	2.3	6.7	1.2
Institute for the Study of Totalitarian Regimes	0.0	0.0	0.0	0.0	0.0	2.9
Total	14,256.4	13,027.7	14,550.4	13,279.4	13,651.9	14,332.4

Source: 2014, 2015, 2016 state closing accounts.

Institutional support is provided mainly to research organisations for their long-term strategic development. The amount of this support is based on the evaluation of the achievements of research organisations carried out by the R&D&I Council. In this assessment, 223 research organisations achieved a positive score in 2016. Targeted support for R&D&I is implemented mainly through individual programmes. In 2017, 12 providers supported R&D&I in the Czech

Republic through some type of programme.⁵ There were 62 such ongoing programmes. Their distribution by provider is shown in the following figure.

Figure No. 2: Number of R&D&I programmes by individual providers in 2017



Source: R&D&I Information System.

III. Scope of the Audit

The audit focused on the set-up and execution of the R&D&I support system. In particular, the competences, strategic and conceptual work of the main bodies and the degree of implementation of the measures and objectives set at national level were examined. This audit was conducted at the OG CR, MoEYS and MoIT. The audit also focused on international comparisons of the level of innovation performance and its individual components in order to identify weaknesses in the R&D&I support system in the Czech Republic. The audited volume at the system level was based on R&D&I expenditure from the state budget and amounted to CZK 83 billion for the years 2014 to 2016.

In the framework of targeted R&D&I support, the audit focused, at the level of providers, mainly on the preparation and evaluation of individual programmes as the main instruments for the implementation of targeted support. This audit was carried out at the MoEYS, the MoA and the MoIT, where 16 programmes were examined. The SAO audited the evaluation system and the method of selection of supported projects in selected public competitions for the Complex Sustainable Systems (CSS) programmes at the MoA, TIP and TRIO programmes at the MoIT, and RETURN, EUPRO II, EUREKA CZ and KONTAKT II programmes at the MoEYS. The setting of programmes, their objectives and indicators, or the evaluation of completed programmes was audited for the CSS and RAC programmes at the MoA, TIP and TRIO at the MoIT, and COST CZ, INGO, EUREKA, EUPRO, EUPRO II, EUREKA CZ, INGO II and CONTACT II, ERC CZ, RETURN, NPU I, NPU II programmes at the MoEYS.⁶

The audit was extended to the area of institutional support. This support is intended mainly for the long-term strategic development of research organisations, as opposed to targeted support. In the context of institutional support, the audit at the level of providers focused mainly on the way this support was distributed. This audit was conducted at the MoEYS and ASCR. In the audited period from 2014 to 2016, these providers together granted over CZK 37 billion in institutional support, which represents approximately 88% of all institutional support provided in this period.

⁵ According to the R&D&I IS, the term "programme" means the following four types: a group of grant projects, operational programme R&D&I, an R&D&I programme and public procurement in R&D&I.

⁶ Details of the focus and an alphabetical list of the individual targeted support programmes are provided at the end of this audit report.

Four selected universities and three public research institutions, as representatives of the main beneficiaries of institutional support, were also audited. These institutions were examined in particular for compliance with the conditions for spending of this support and its use. The audited volume of funds for the selected beneficiaries amounted to EUR 666 million. This represents 15% of the institutional support received between 2014 and 2016.

The audit therefore examined the R&D&I support system as a whole, from its management and set-up, through the activities of individual providers of targeted and institutional support, to the use of institutional support by the main beneficiaries. The added value of this audit resides in a comprehensive view of the set-up and functioning of the R&D&I support system in the Czech Republic and identification of weak points.

IV. Detailed Facts Ascertained by the Audit

1. Due to insufficient preparation and poor set-up of targeted support programmes, providers could only formally evaluate these programmes without identifying their actual benefits

Providers are responsible for the functioning of the programmes and the achievement of the set objectives. In order to effectively evaluate the benefits of the programmes and the funds spent, objectives must be set, the achievement of which can be monitored and evaluated using measurable indicators.

The SAO audited the preparation and evaluation of the programmes at the MoEYS, the MOA and the MoIT as the selected providers of targeted support. The SAO also examined how the rules for the evaluation of completed programmes were set up by the R&D&I Council.

The preparation of the programmes was carried out by individual providers of targeted support. The R&D&I Council issued its opinions on the individual programmes before they were approved by the government. Completed programmes were evaluated by their administrators and subsequently also by the R&D&I Council according to the applicable methodology for the evaluation of completed programmes, the preparation of which was ensured by the R&D&I Council.

The MoEYS and MoA did not base the setting of the programmes on an analysis of the current situation, nor did they define the desired state to be achieved by the implementation of the programmes. Thus, no concrete progress was evident to which the programmes should contribute. For the evaluation of the TIP programme, the MoIT set and used, among other things, a global criterion in the form of the aggregate level of competitiveness of the CR among the 61 economies evaluated. The competitiveness of the Czech Republic is influenced by a number of factors, so the criterion set out in this way does not say much about the extent to which it has been influenced by the implementation of the programme. For all three providers of targeted support, the objectives of the programmes were set at a general level. The general objectives included, e.g., increasing participation in international R&D&I programmes, increasing the competitiveness of Czech industry, strengthening effective cooperation in R&D&I between businesses and research organisations, increasing the production potential of agricultural crops. The programme indicators were not directly linked to the set objectives and thus did not indicate the extent to which they were being met. The indicators included, e.g., number of supported projects, percentage of successfully completed projects, number of

expected results. The actual benefits and impacts of the programmes have not been identified and the programmes cannot be comprehensively evaluated.

For all audited providers, the evaluation of the programmes was based mainly on quantitative data on results reported in the R&D&I IS. The achieved results of individual projects are not always accurately reported in the R&D&I IS, nor do the data on the actually spent funds from the state budget presented in the R&D&I IS correspond to the reality, as the returns to the state budget were not deducted. Thus, the publication of results in the R&D&I IS is not always complete and the reporting of results is a rather formal task performed for the sake of meeting project requirements. The above-mentioned shortcomings may affect the evaluation of the programmes and, consequently, the evaluation of the whole R&D&I system.

The MoEYS monitored the progress of the programmes and public competitions only by checking the interim and final reports of individual projects.

Since the MoEYS will evaluate the COST CZ, EUPRO II, EUREKA CZ, INGO II, and KONTAKT II programmes comprehensively after their completion, no evaluation of the results and benefits achieved by the implementation of individual projects in relation to the objectives of the selected programmes was carried out as at the completion of this audit. The audited programmes of the MoEYS are to be evaluated in 2018. For programmes already completed in 2012, the MoEYS carried out an evaluation according to the R&D&I Support Act and the *Methodology for the Evaluation of Results of Research Organisations and Evaluation of Results of Completed Programmes* valid for the years 2013 to 2016, according to which programmes completed in 2012 were evaluated. Although the evaluation by the provider fulfils all the requirements set out in the methodology and is approved by the government, it is a rather formal evaluation, and it is not possible to assess whether the funds spent have delivered the expected benefits. The programmes have been running since the 1990s, they did not have set objectives, and the evaluation of the completed programmes did not cover the entire duration of the programmes.

The MoA set the expected results according to the experience of previous programmes. The Research in Agricultural Complex (RAC) programme had a minimum threshold of 280 total results for programme success, with a total of 2,186 results achieved. The indicator for the number of applied programme results was exceeded by 78%. Such a high exceedance of the expected results of the programme points to setting of indicators of the programme's success that lacks ambition or to a poor response to the current developments in R&D&I.

When evaluating the RAC programme, the MoA made incorrect calculations concerning the share of actual expenditure from public sources and the share of co-financing. In its evaluation of the RAC programme, the R&D&I Council relied on the MoA's evaluation of this programme, including the adoption of miscalculated baseline data and its interpretation.

The audit found that the preparation and evaluation of targeted support programmes were carried out in accordance with the relevant legislation and the applicable methodology, opinions were issued by the R&D&I Council and subsequently approved by the Government of the Czech Republic. Nevertheless, the preparation and evaluation of the programmes contained the above-mentioned shortcomings. Similar shortcomings in the preparation and evaluation of programmes have already been pointed out, among others, by the international audit of research, development and innovation in the Czech Republic (hereinafter the "2011 International Audit"), which was carried out for the MoEYS by an international team in 2010-2011.

On 13 May 2015, the Government approved⁷ the document *Basic Principles for the Preparation and Evaluation of Programmes and Groups of Grant Projects for Research, Development and Innovation* (hereinafter the "Evaluation Principles"). According to the Evaluation Principles, the system of programme evaluation in the Czech Republic did not meet the standards of developed countries. In addition to criticizing the current situation, the Evaluation Principles set out rules for the design and method of evaluation of programmes and groups of grant projects in response to the identified unsatisfactory situation. Nevertheless, it took approximately 1 year and 9 months (until 8 February 2017) for the Evaluation Principles to become part of a generally binding document (*Methodology for the Evaluation of Research Organisations and the Evaluation of Programmes of Targeted Support for Research, Development and Innovation*, hereinafter also referred to as "Methodology 2017+"). In addition, according to the Evaluation Principles, only programmes approved by the Government from 2020 onwards will be prepared and evaluated, i.e., more than 4.5 years after the Government approved the Evaluation Principles and more than 8 years after the identification of shortcomings in programme preparation and evaluation in the 2011 International Audit.

2. Contrary to the national concept paper, neither basic research support nor institutional support was strategically oriented

Priority areas of R&D&I are set in the Czech Republic. Strategically orienting part of the support to these areas will allow better targeting of limited resources to areas with identified high potential. The strategic orientation of the support should be implemented in accordance with the established rules.

The SAO examined how priority areas were identified and how R&D&I support was strategically oriented to these areas.

According to the R&D&I Support Act, the R&D&I Council ensures the elaboration of applied R&D&I priorities. Government Resolution No. 552 of 19 July 2012⁸ approved the R&D&I Priorities. As part of the R&D&I Priorities proposed until 2030, a total of six priority areas⁹ are defined and within them 24 priority sub-areas with 170 defined specific objectives. The application of the R&D&I Priorities should lead to a more efficient use of public funds for targeted R&D&I support, which will thus better respond to the key needs of the development of Czech society.

Strategic orientation of support to priority areas is particularly important in applied research. The main contribution and purpose of the national strategic document Priorities in R&D&I states that also part of basic research should be strategically oriented to the defined priority areas that will help solve the fundamental current and foreseeable future problems and challenges faced by the Czech Republic and will make it possible to use the potential of opportunities for balanced development of the Czech Republic. Nevertheless, no part of the basic research in these areas was strategically oriented in the decision to provide support.

⁷ Resolution of the Government of the Czech Republic of 13 May 2015 No. 351, *on the basic principles for the preparation and evaluation of programmes and groups of grant projects for research, development and innovation*.

⁸ Resolution of the Government of the Czech Republic of 19 July 2012 No. 552 *on National Priorities of Oriented Research, Experimental development and innovation*.

⁹ 1 - *Competitive knowledge-based economy*, 2 - *Sustainability of energy and material resources*, 3 - *Environment for quality of life*, 4 - *Social and cultural challenges*, 5 - *Healthy population*, 6 - *Safe society*.

The provisions of the R&D&I Priorities also imply that it is necessary to reflect the R&D&I Priorities partly also in the provision of institutional support for the development of ROs. Nevertheless, the R&D&I Priorities were not considered in the institutional support.

The R&D&I Priorities also proposed a number of systemic measures, the implementation of which is an important prerequisite for the fulfilment of the set priority objectives. However, nowhere has it been specified who is responsible for the implementation of these measures and by what deadline, nor have indicators been set to evaluate the implementation of these measures. In the framework of the preparation of the 2016 R&D NP, the OG CR commissioned an evaluation of the implementation of the measures of the NP R&D&I Update. In some cases, these measures were partly identical in content to those listed in the R&D&I Priorities. However, despite the SAO's request, the evaluation of the implementation of individual specific measures listed in the R&D&I Priorities was not provided by the OG CR.

3. The way projects are selected by the MoA creates a risk of non-transparency

The key elements of independent peer evaluation of project proposals include peer reviews and the set criteria for evaluating project proposals and specific preferences that are known in advance to all participants.

The SAO audited the set-up and implementation of the evaluation of project proposals and the transparency of their selection at the providers of targeted support: the MoA, the MoEYS and the MoIT.

The MoA audited the 2014 and 2015 public tenders (hereinafter referred to as "PT") of the CSS programme. Out of the 29 projects supported in PT under the 2015 CSS programme, the ranking of 9 projects was changed by the Programme Committee compared to the ranking approved by the working group, which resulted in the projects being included in the CSS programme. Thus, approximately one third of the supported projects of the CSS programme in PT in 2015 were supported only after the evaluation of the programme committee. In both PT, changes on the part of the provider were approved, which were supported by written justification. The MoA defines in the TD that the expert advisory body - the programme committee could adjust the order in accordance with the announced priorities of the provider, the priorities of the CR or the EU. The set-up of the project evaluation and selection system brings the risk of non-transparency. In the final approval of the order of supported projects, in addition to the previously known criteria, changes are made according to preferences (changes in accordance with the declared priorities of the provider, the priorities of the Czech Republic or the EU). This general formulation gives the power to decide in essentially any way.

The changes in the ranking of the project proposals evaluated by the provider compared to the ranking based on independent expert opinions were already detected by the SAO in previous audits in the field of R&D&I. Significant changes were found especially in TA CR within Audit No. 15/27¹⁰ and partly also in CSF as part of Audit No. 16/19¹¹. In the case of MoA, TA CR and CSF, this procedure even was not in violation of the R&D&I Support Act, which gives providers the possibility to change the order of project proposals set by the expert advisory

¹⁰ Audit No.15/27 - *State funds allocated to targeted support of research and development through the budget chapter of the Technology Agency of the Czech Republic*; the AC was published in Issue 4/2016 of the SAO Bulletin.

¹¹ Audit No.16/19 - *State funds allocated to targeted support of research and development through the budget chapter of the Grant Agency of the Czech Republic*; the AC was published in Issue 3/2017 of the SAO Bulletin.

body, provided that they justify this decision in writing and publish their decision. However, this procedure makes it possible to disregard the results of expert meetings and opposing opinions of external evaluators, including foreign ones, which should guarantee a professional, independent and transparent evaluation.

In 2012, the MoIT followed a transparent approach in accepting project proposals in PT under the TIP programme. The evaluation and selection of project proposals that were in line with the announced rules was verified by a sample of supported projects by a group of reviewers. However, it is difficult to retrospectively evaluate the assessment and selection of projects for the whole PT, as there is no longer a comprehensive list with the scoring of project proposals by individual opponents and the final evaluation by the reviewer.

PT under the EUPRO II, EUREKA CZ and RETURN, CONTACT II programmes organised in 2012 and the PT under the RETURN programme organised in 2013 were subject to the audit at the MoEYS. The audit found that the evaluation and selection of project proposals for support was carried out in a transparent manner.

4. Institutional support was provided based on an evaluation of research organisations, which suffered from many systemic shortcomings.

Institutional support represents approximately half of all R&D&I support from the state budget. The largest part of this support is for the long-term strategic development of the research organisation (hereinafter referred to as "LSDRO"). The system for the distribution of this support should, with regard to the set priorities, reflect in particular the strategy and preconditions for the future development of these research organisations.

The SAO audited the way institutional support is distributed to research organisations for their strategic development.

Under the R&D&I Support Act, institutional support can be provided for international cooperation, operational programmes in R&D&I, organisation of public tendering, material or financial awards for the results or popularisation of R&D&I, costs associated with the activities of the R&D&I Council, CSF, TA CR and ASCR, and in particular for the LSDRO on the basis of the evaluation of the organisation's results. Section 7(7) of the R&D&I Support Act specifies the following procedure for providing institutional support:

"Institutional support will be provided by the provider to the research organisation on the basis of an evaluation of the results achieved by the research organisation in such a way that its share in the total amount of institutional support for research organisations from the state budget in a given year corresponds to its share in the value of the results achieved by all research organisations in the past 5 years according to the evaluation carried out annually by the R&D&I Council. The provider may adjust the amount of support according to a more detailed assessment using internationally recognised methodologies, which the provider will publish together with the results of the more detailed assessment and the rules for adjusting the aid before it is granted. In terms of institutional support, the provider will also take into account the amount of indirect support granted to the research organisation in previous years in the form of tax exemptions. "

The evaluation of the ROs was carried out by the R&D&I Council according to its own methodology, which the R&D&I Council submits to the Government for approval. In the audited period, the evaluation of the ROs was carried out according to the *Methodology for the Evaluation of Results of Research Organisations and Evaluation of the Results of Completed*

Programmes, originally in force for the years 2013 to 2015, which was subsequently extended to 2016 (hereinafter also the "2013 Methodology").

The actual and approved expenditure on institutional support for the ROs, as per the assessment of their results according to the 2013 Methodology amounted to almost CZK 44 billion in total between 2015 and 2018.

Institutional support was provided based on an evaluation of ROs. This evaluation was limited to an assessment of the achieved results. In the framework of the evaluation of the ROs and the resulting provision of institutional support to the LSDRO, the overall quality level of individual ROs was not evaluated and considered in any other way, nor was, for example, the degree of cooperation with the private sector or foreign partners. Although institutional support was provided for the long-term strategic development of individual ROs, the R&D&I Council did not consider the future direction and development strategy of these ROs in any way in the evaluation of the ROs. The whole system was set up retrospectively, considering results applied in the five years preceding the year of evaluation. Compared to the long-term strategic development, the ROs were motivated primarily to produce evaluated, quickly achievable results. The system of providing institutional support was not set up to support new or emerging fields of science and ROs.

The set system of scoring ROs' results motivated research organisations to produce many results rather than to focus on their quality. The set system was rather ineffective in providing incentives for improvement of the quality of research organisations.

The set system of evaluation of ROs mainly according to the achieved publication results did not reflect the differences in the mission of individual ROs and in individual fields. It has especially favoured fields of science for which frequent publication is natural and, on the other hand, disadvantaged disciplines where this is not the case.

The set scoring system for individual types of ROs' results motivated especially the production of publication results. The method of distribution of institutional support did not motivate the ROs to focus their activities more on the production of applicable results in the form of non-publication results of applied research, especially patents. The set system of providing institutional support did not respond to the long-identified shortcomings of the state of R&D&I, causing the Czech Republic to lag in the creation of patents and the low cooperation with the private sector, where the focus is rather on the creation of practically applicable results in the form non-publishable results of applied research rather than on publication as such. Cooperation with the private sector is a prerequisite for the subsequent use of results in innovation.

The number of ROs that have achieved a positive score based on their results has increased significantly in recent years. Institutional support for the strategic development of ROs has thus been fragmented among an increasing number of these ROs.

In 2017, the new Methodology 2017+ was approved. This methodology introduces a different system of evaluation of ROs, based largely on the evaluation applied by the ASCR in the evaluation of its research institutes. The transition to this method of evaluation of the ROs will be gradual, with the implementation period covering the years 2017-2019. The allocation of funds in this period is based on the assessment under both the 2013 Methodology and Methodology 2017+. Methodology 2017+ is of a framework nature and should be complemented by a set of other hierarchically subordinate documents.

5. The scoring of research organisations, based on which institutional support was granted, was carried out annually with considerable delays, and there were random and systemic errors in the scoring.

The provision of institutional support is based on the assessment of the ROs. To decide on this support and plan this expenditure, it is essential to meet the time limits set for the approval of the results of this evaluation. The set evaluation rules must be respected in this evaluation.

The SAO examined whether the evaluation of research organisations was carried out within the set time limits and rules.

The original deadlines for approval of the results of the ROs evaluation according to the 2013 Methodology were always set for the December R&D&I Council meeting of the respective year, with the exception of the first evaluation in 2013, when the deadline was set for the January 2014 meeting. These deadlines were not met even once. In the first year of the evaluation, the R&D&I Council at least met a deadline extended by four months pursuant a government resolution. In the other three years, the R&D&I Council approved the results of the ROs' evaluation with at least one-year delay compared to the original deadline and in 2015 it did not meet the deadline extended by three months pursuant a government resolution by one year. The evaluation of the results of the ROs provided by the R&D&I Council determines the annual provision of institutional support to these ROs by the respective providers.

In addition, the group of auditors found random and systematic errors in the calculations of the scores for the years 2015 and 2016, which were prepared by the OG CR. The errors in the 2015 evaluation were subsequently carried over into the 2016 evaluation and were thus duplicated. This was both a direct non-compliance with the rules of the 2013 Methodology and a consequence of their ambiguity, e.g.:

- double counting of points for a monograph and a chapter in the same monograph, both for the same submitter and for different submitters of these results;
- not recalculating the points originally awarded when another submitter delivered the result – the sum of the shares in the result was in some cases >1, and the sum of the points shares in the result for individual submitters was then higher than the points for the whole result;
- submitters also received scores for results where there is reasonable doubt that they are identical results reported and scored as different results;
- incorrect transfer of the scores from the 2015 evaluation to the 2016 evaluation – in some cases, for the type of result, the chapter in the monograph exceeded the maximum possible score for the entire book, which was set at 120 points by the 2013 Methodology, when it was, e.g., 400.91 points or 300 points.

Based on this evaluation, the amount of institutional support is determined so that the share of the ROs in this support corresponds to its share in the value of the results of all ROs. The institutional support for the LSDRO was thus provided to the ROs based on not entirely correct RO scores. The frequency and significance of these identified errors is below the 1% significance level in both years, according to the OG CR. This support was provided annually. On the basis of the results of the evaluation for 2015 and 2016, the institutional support for the ROs was set by the State Budget Acts for 2017 and 2018 in the aggregate amount of almost CZK 24 billion. In addition, based on these results, support to the ROs is to be provided in the following years until the full implementation of the 2017+ Methodology.

By failing to ensure the evaluation of the results of ROs, the R&D&I Council in cooperation with the OG CR, according to the rules and deadlines set out in the 2013 Methodology, the RVVI did not fully comply with the provisions of Section 35(2)(d) of the R&D&I Support Act.

6. Only the Academy of Science of the Czech Republic used the possibility to adjust the amount of institutional support distributed according to its own more detailed assessment.

The R&D&I Support Act allows providers to carry out their own more detailed evaluation of ROs and to adjust the amount of institutional support distributed on the basis of this evaluation. Individual providers have a better overview of the quality of the ROs under their remit than the R&D&I Council, which evaluates all ROs collectively. By adjusting the amount of support calculated based on a mechanical evaluation of individual ROs, many of the above-mentioned shortcomings of this system can be mitigated.

The SAO examined whether the providers used the legal possibility to adjust the amount of institutional support distributed based on their own evaluation.

The ASCR used the possibility to adjust the amount of institutional support distributed according to its own more detailed assessment. The ASCR provides institutional support to its departments based on evaluations with the participation of foreign evaluators. The evaluation takes place at regular intervals of six years, considering the results achieved over the last five years. The quality and results of scientific activity, the importance and specific contribution of the institution, the position of the institution in the international and national context of the field, etc. were considered.

The audit found that the MoEYS, as the largest provider of institutional support, did not use the possibility to adjust the amount of institutional support. With the exception of the ASCR, no other provider used this option according to the document *Analysis of the state of research, development and innovation in the Czech Republic and their comparison with abroad* (hereinafter also "R&D&I Analysis") for 2015. Thus, these providers allocated institutional support to the ROs under their remit based on the results of the evaluation of the ROs, which showed the above-mentioned limitations and shortcomings. Neither applicable laws nor the MoEYS required that the support provided be linked to the long-term development strategy of the university as a research organisation.

Within the framework of the evaluation of the ROs according to the 2013 Methodology, the individual organisational units of each RO were also evaluated. The results of this evaluation were also taken over by all audited universities, and the received institutional support was distributed among their faculties according to their scores. The evaluation of the ROs according to the 2013 Methodology and the related distribution of institutional support by the R&D&I Council was thus adopted with all its shortcomings by the MoEYS as the provider of this support and subsequently by all audited universities in the distribution of this support among individual faculties.

7. Rules set by the MoEYS allow non-transparent use of institutional support

The granting of support to beneficiaries must be accompanied by the provider's setting of rules for the use of that aid. In order to ensure transparent spending, the provider must clearly define the purpose and use of these funds.

The SAO audited the MoEYS and the ASCR and seven beneficiaries for compliance with the rules for the use of institutional support.

The audit of the institutional support for the LSDRO found that the MoEYS provided funds on the basis of the decision to provide institutional support for the LSDRO. Neither applicable laws nor the conditions set by the MoEYS in the decisions on the use of institutional support funds for LSDRO guaranteed that the funds spent were demonstrably used for LSDRO. The R&D&I Support Act defines eligible costs in very general terms with applicability to all providers. The decisions did not specify which costs could be covered by the aid and which could not beyond the scope of the R&D&I Support Act. In the decisions to provide institutional support for the LSDRO, the MoEYS did not set out detailed conditions of use, nor did the decision contain a specific and unambiguous formulation of the purpose. This approach allows the beneficiaries of the LSDRO support to use the funds almost freely, as long as they ensure that they are even remotely related to R&D&I.

The audit of the beneficiaries of institutional support for LSDRO from the MoEYS found, among other things, that individual faculties and rector's offices of universities approach the use of institutional support differently. In some cases, the use of institutional support funds was only reported by recharge accounting documents at the end of the year, without any follow-up to the original documents. However, the audit of the selected sample of accounting documents did not reveal any breach of the conditions laid down in the decisions on the provision of institutional support to the LSDRO.

The above-described system of providing institutional support to the LSDRO is not transparent and does not allow verification of the actual use of the funds received. However, the current wording of the decision to provide institutional support to the LSDRO allows for such reporting. Although the MoEYS found this fact already in 2014, it did not take any measures to eliminate the deficiencies for the next period.

The ASCR provided institutional support in a transparent manner. Beneficiaries were informed in advance of the conditions for providing institutional support and the evaluation criteria. The evaluation system involved mainly evaluators without employment with the ASCR, including foreign ones. The results of the evaluation were published on the website of the ASCR.

The MoEYS and the ASCR carried out financial audits of beneficiaries in the legally required amount of at least 5% of the targeted and institutional support provided in a given calendar year.

The SAO did not find any significant deficiencies in the audit of the institutional support to the beneficiaries of the LSDRO. Minor shortcomings were found in particular in the area of non-compliance with legal time limits in the award and implementation of public contracts. The audited beneficiaries used a total of 73% of the institutional support received to cover staff costs between 2014 and 2016. One university used almost 93% of the institutional support received to cover staff costs.

8. The R&D&I Support Act obliges providers to take into account the amount of indirect support in institutional support without specifying how this should be done, and neither the MoEYS nor the ASCR took the amount of indirect support into account in institutional support

The basic rules for the provision of institutional support are laid down in the R&D&I Support Act. A prerequisite for the correct application of these rules is that they are unambiguous and, if necessary, elaborated in more detail in additional material.

The SAO examined whether the rules for the provision of institutional support are clearly established and followed.

In the area of institutional support, the R&D&I Support Act obliges providers to also take into account the amount of indirect support granted to the ROs in previous years in the form of tax exemptions. However, the Act does not specify either the period or the specific way in which indirect support should be reflected in the institutional support provided. The OG CR, as the drafter of the R&D&I Support Act, does not specify the method of taking indirect support into account and does not monitor the implementation of this legal provision by individual providers of institutional support. The audit found that neither the MoEYS nor the ASCR considered the amount of indirect support in the institutional support, citing an unspecified procedure for taking indirect support into account.

9. The R&D&I management and support system is fragmented, with unclear competences and responsibilities of individual bodies

The basic requirement of effective and efficient provision of R&D&I support is a clear definition and fulfilment of competencies and responsibilities of the bodies responsible for the creation and implementation of strategies.

The SAO examined whether the competences and responsibilities of the main R&D&I authorities are clearly defined and how these authorities cooperate.

According to the provisions of Section 7(1) of the Competence Act, the MoEYS is the central state administration body for, among other areas, science policy, research and development, including international cooperation in this area, and for scientific degrees. Under Section 33 of the R&D&I Support Act, the MoEYS is the central administrative authority responsible for research and development, except for areas within the responsibility of the R&D&I Council in accordance with Section 35 of this Act. The R&D&I Council ensures, among other things, the preparation of the national policy on research, development and innovation (the main policy document in the field of research, development and innovation), control of its implementation in the form of opinions on the compliance of research and development programmes submitted by providers, the elaboration of priorities for applied research, development and innovation, the elaboration of regular annual analyses and evaluations of the state of R&D&I in the Czech Republic and their comparison with abroad, the proposal of the amount of total expenditure on R&D&I of individual budget chapters and the elaboration of the draft medium-term outlook for R&D&I support. From the list of tasks within R&D&I Council's responsibility, it is clear that these are key tasks in the setting of the entire system of functioning of R&D&I in the Czech Republic.

Although the MoEYS is the central state administration body for research and development, it does not have responsibility and authority in key areas of research and development. The R&D&I Council is tasked with the responsibility of ensuring these key tasks under the R&D&I Support Act. However, the R&D&I Council does not have the financial and personal resources to ensure the performance of these tasks. The tasks entrusted to R&D&I Council are performed through the OG CR and its budget chapter. The R&D&I Council is an expert and advisory body of the Government without legal personality and without direct assignable responsibility. The R&D&I Council only ensures the key R&D&I projects, but by its very nature cannot be directly responsible for them. This responsibility is transferred to the government. Thus, the ensuring of key research and development tasks is not connected with direct

responsibility in the Czech Republic. This issue was already highlighted by the 2011 International Audit, yet the situation described above remains unchanged.

According to the provisions of Section 35 (2) (a) of the R&D&I Support Act, the R&D&I Council ensures the preparation of the national research, development and innovation policy in cooperation with the MoEYS. The specific form of this cooperation is not prescribed by law. Within the framework of cooperation on the preparation of the R&D&I NP Update, a working group with representatives of the R&D&I Council, the MoEYS and the MoIT was established. The education and industry and trade ministers jointly submitted the R&D&I NP Update for government approval. Within the framework of cooperation on the preparation of the 2016 R&D&I NP, a working group with representatives of the MoEYS has not been established. Only the Deputy Prime Minister for Science, Research and Innovation, who was also the Chairman of the R&D&I Council, was the submitter of the 2016 R&D&I NP. Within the framework of the audit and also within the framework of substantial comments in the inter-ministerial comment procedure on the 2016 R&D&I NP, the MoEYS stated that this document was not prepared in cooperation with the MoEYS. The TA CR and the Ministry of Regional Development of the Czech Republic also submitted comments in the same vein. According to the statements of the OG CR in the framework of the audit and in the clearing of comments, this cooperation was ongoing, especially at the level of deputy ministers. The R&D&I Support Act requires the R&D&I Council and the MoEYS and Science to cooperate in the preparation of the national policy on research, development and innovation as the most important strategic document at the national level, which sets the main directions in the field of R&D&I and covers other related strategic documents. In the case of 2016 R&D&I NP, the opinions of both institutions on the implementation of this cooperation differed significantly.

The MoIT is closest to the field of innovation by virtue of its entrusted area of competence. However, responsibility for this area is not clearly anchored in law. The MoIT is not a central authority in the field of R&D&I under the R&D&I Support Act; however, according to the provisions of Section 13 (1) (d) and (f) of the Competence Act, it is a central state administration body for the affairs of small and medium-sized enterprises and for trades, industrial research and development of technologies.

Pursuant to the provisions of Section 36a(3)(a) of the R&D&I Support Act, the preparation and implementation of applied research, development and innovation programmes, which include industrial research, is ensured by the TA CR. The TA CR is used by administrative authorities to implement their programmes, which, according to the Act on the State Budget of the Czech Republic, do not provide support from their budget chapter. Administrative authorities that are authorised to provide support from their budget chapter, which is also the case of the MoIT, are responsible for the preparation and implementation of programmes within their area of competence. The mutual competences and position of the MoIT and TA CR are not stipulated in the R&D&I Support Act. Similarly, none of the national strategic documents addressed them in the audited period. Nevertheless, there was mutual cooperation between these bodies.

The individual providers of R&D&I support also have responsibilities within their area of activity. In 2017, 12 providers supported R&D&I in the Czech Republic through some type of programme.⁵ In 2017, there were 62 of such ongoing programmes. The number of R&D&I support providers is naturally reflected in the number of conceptual materials they produce.

The confusion that affects the whole R&D&I system is also caused by inconsistent use of terms. The R&D&I Support Act defines the terms "research" (basic and applied), "experimental development" and "innovation". The Czech Statistical Office uses only the terms "research" and "development" in monitoring expenditure. In contrast, the government's resolution on the *Europe 2020* strategy defines spending on science, research, development and innovation. The term "science" is not defined in the R&D&I Support Act. In the framework of the R&D&I Priorities, the concept of "oriented research" was also introduced. This document also works with the term "experimental development"; i.e., according to the definition of the R&D&I Support Act. In other national strategic documents, including the national R&D&I policy, the term "development" is especially used.

10. The R&D&I information system was not fully operational for at least four months and did not fulfil its legal purpose

The R&D&I IS ensures in particular the collection, processing, provision and use of data on R&D&I supported by public funds. Its purpose is to provide information on R&D&I supported by public funds to the public and to providers.

The SAO audited the administration and operation of the R&D&I IS in relation to the fulfilment of its basic purpose of providing information on R&D&I.

The role of the administrator and operator of the R&D&I IS is fulfilled by the R&D&I Council. The development and operation of the R&D&I IS was from the beginning provided by a third party. The last contract was made for a fixed term from 1 June 2012 to 31 May 2016. No economic analysis or study has been prepared by the OG CR which would show the optimal economical and efficient solution to the given need. According to the statement of the OG CR, the alternative solution was not realistic.

In ensuring the functioning of the R&D&I IS for the period from 1 June 2012 to 31 May 2016, the OG CR caused a state of exclusivity of a single supplier by failing to ensure the possibility of modification of the R&D&I IS by third parties and by failing to provide source codes for the R&D&I IS. The OG CR thus caused that in order to continue the operation of the existing R&D&I IS, it was necessary to use the negotiated procedure without (prior) publication (hereinafter referred to as the "NPwPP") with the existing supplier. According to the OG CR, the provision of source codes and the provision of the possibility of modifying the R&D&I IS by third parties was not part of ensuring the functioning of the R&D&I IS in the past and their provision would make the solution disproportionately expensive. By way of contract, the OG CR secured the ownership right to the individual data contained in the R&D&I IS, the processed results and the applications developed by the contractor for the needs of the contract subject.

As part of ensuring the administration and operation of the R&D&I IS after the expiry of the contract, the OG CR awarded a public contract for the settlement of the copyright to the software for the R&D&I IS and for the execution of minimum necessary operational changes in the form of a NPwPP. The rights granted to the contracting authority were to include a non-exclusive, time-limited licence to use the work (the created software) and its modifications by the contracting authority and third parties designated by the contracting authority. The agreement was not reached in accordance with the terms of the NPwPP and the operation of R&D&I IS was terminated on 31 May 2016. Subsequently, the OG CR started to take steps to ensure the operation of the R&D&I IS by its own means.

The R&D&I IS was not fully operational at least from 1 June 2016 to the end of September 2016; i.e., for approximately four months. The R&D&I IS did not fulfil its basic purpose within the meaning of Section 30(2) of the R&D&I Support Act, which is to provide information on R&D&I. The inclusion of data on R&D&I projects and activities in the R&D&I IS was also a condition for granting support. Since October 2016, the OG CR has been operating the R&D&I IS using its own resources.

11. The conception of strategic activities varies widely among the different providers and beneficiaries of institutional support

The provider's activity must be in line with all documents binding for the provider. The provider shall also manage its activities in accordance with its own more detailed strategic materials, which must comply with binding regulations and documents.

The SAO examined strategic activities of individual providers and beneficiaries of institutional support.

The MoIT is a provider of targeted and institutional support and is also an important body in the field of innovation. However, the MoIT did not have any long-term concept in the field of R&D&I (which would be approved by the Government of the Czech Republic), and thus did not have sufficient assurance of planned management of this entrusted area of public administration.

The MoEYS, the MoA and the ASCR prepare strategic documents at the provider level that are in line with national strategic documents. The strategy of each provider proposes specific measures to meet the objectives of their respective strategies.

Individual departments of the ASCR as beneficiaries develop their own strategies. Strategies for individual institutes were specific, had set goals and were monitored every two years. The amount of institutional support was directly related to the setting of these concepts and their subsequent implementation.

The MoEYS does not require universities to have any strategy for the use of this support and for the development of each university as a research organisation in connection with the provision of institutional support for LSDRO. Universities are obliged by the Higher Education Act to prepare a strategic plan, which includes an area dedicated to research and development. The grasp of this area varied greatly at the audited universities and showed some shortcomings, such as the failure to establish a baseline and a desired state or the absence of measurable indicators that could be used to evaluate the fulfilment of the set objectives.

12. Long-term identified weaknesses of the R&D&I system cannot be eliminated

A good analysis of the current situation is essential for strategic management. Targeting support based on these analyses leads to the elimination of identified weaknesses. Ongoing monitoring provides information on the effectiveness of the measures put in place.

The SAO examined whether and how the R&D&I area was analysed and whether measures were implemented to address the identified shortcomings.

Since its establishment in 2002, the R&D&I Council, in cooperation with the OG CR, has been preparing R&D&I Analyses. The R&D&I Analyses are based on a range of indicators and underlying analyses. They represent an annual detailed and comprehensive assessment of the state of R&D&I in the Czech Republic and comparison with foreign countries.

In all R&D&I Analyses since 2002, the Czech Republic has been identified as significantly lagging behind in the creation of patents. This fact has been mentioned in R&D&I Analyses every year for at least 15 years, yet no measures have been implemented that would lead to a significant improvement of this unsatisfactory situation.

Shortcoming such as a fragmented support system and a low level of cooperation between the private and public sectors have also been identified for many years, yet no measures have yet been implemented that would demonstrably lead to their elimination or significant mitigation. In 2016 and 2017, concept papers containing individual measures to address these shortcomings were approved. This includes, in particular, 2016 R&D&I NP. The impact of these measures can only be assessed in the years to come.

13. The private sector's share in R&D&I funding is increasing, but the private-public cooperation remains very low

Part of the Czech Republic's national objective under the *Europe 2020* strategy is also the government's commitment to take all steps to adequately increase the share of the private sector in R&D&I funding. Better involvement of the private sector in R&D&I funding will help compensate for the limited financial resources from EU funds. Cooperation between the private and public sectors is also a prerequisite for the practical application of research results.

The SAO examined the development of the private sector's share in R&D&I funding and the development of private-public cooperation.

The share of business funding sources in total research and development (R&D) expenditure has been increasing over the long term, reaching 60.2% in 2016 (51.8% in 2005). The vast majority of business sector spending was also made in this sector. Moreover, between 2005 and 2016, there is a clear trend towards an increased importance of this phenomenon, with 83.1% of business funding of R&D in 2005 and 92.6% in 2016, which represents an increase of 9.5 percentage points.

The business sources of R&D funding in 2016 amounted to CZK 48.2 billion, of which CZK 2.8 billion, or 5.9%, was spent in the government and higher education sectors combined. In 2005, this share was 6.6%. Between 2005 and 2016, the R&D funding sources from businesses implemented in the government and higher education sectors combined ranged from 5.2% to 6.9% of the total business R&D funding sources of those years, i.e., without significant fluctuations.

The evaluations of the implementation of measures to support cooperation between the private and public sectors in the field of R&D carried out so far show that these measures have not been successfully implemented in most cases. The statistics on funding sources and sectors of R&D implementation do not show any increasing trend in the share of business sources of R&D funding implemented in the public sector. Only within the university sector is there a clear increase in business funding, but it is still a minimal share of total R&D expenditure of businesses. In the Czech Republic, the low level of cooperation between the private and public sectors in research and development continues.

A lower willingness to co-finance R&D by the private sector was found by the audit, among other entities, at the MoA, where the expected co-financing rate in the RAC programme was 17%, but in reality, it was only 9%. This was due to the lower interest of the user community in co-funding research projects from non-public sources, which points to the low effectiveness of measures to promote cooperation with the private sector.

14. The system of support for research, development and innovation was largely ineffective

A prerequisite for the effective provision of R&D&I support is that this support will be used to implement the set measures and will subsequently lead to the fulfilment of the set objectives.

The SAO examined whether the use of public funds and the support system that has been set up ensured an optimal level of achievement of the objectives in fulfilling the set tasks.

The National Policy on Research, Development and Innovation of the Czech Republic is a strategic document at the national level, which sets the main directions in the field of R&D&I and covers other related strategic documents of the Czech Republic. In the years 2013 to 2015, the R&D&I NP Update was in force. The evaluation of the implementation of individual measures and the progress in meeting the objectives of the R&D&I NP Update, which was carried out by the R&D&I Council at the end of 2015, showed that only 8 out of 21 measures were implemented, i.e., 38%. Out of the four main objectives, only one - *Quality and Productive Research System* – has been achieved, and that too with the exception of the area of internationalisation. On the other hand, the remaining three objectives, namely *Effective dissemination of knowledge and its use in innovation; Strengthening of corporate research, development and innovation and increasing the innovative performance of the corporate sector in the Czech Republic;* and *Stable, efficient and strategically managed R&D&I system,* were not fulfilled. There has been no significant progress in most of the identified problem areas. The set system of R&D&I support, which, until 2015 did not lead to the fulfilment of most of the objectives and measures of the 2013 R&D&I NP Update, can thus be evaluated as largely ineffective. The evaluation of the follow-up 2016 R&D NP will be carried out in the following years.

15. Despite significantly increasing R&D expenditure in the public sector, the Czech Republic's innovation performance is lagging behind the European average – the support system in the Czech Republic is thus less efficient

An efficient support system ensures that the maximum possible level of R&D&I is achieved in relation to the funds spent.

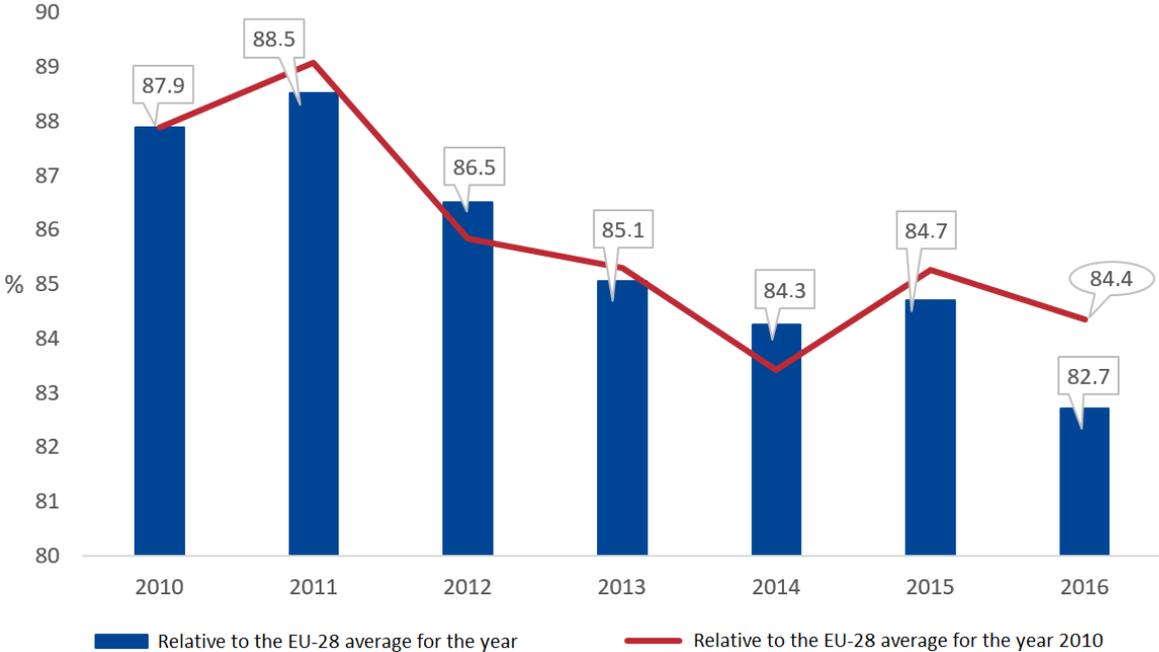
The SAO compared the level of inputs and outputs in R&D&I in the Czech Republic with the European average and evaluated the effectiveness of the set system.

The *European Innovation Scoreboard*, published annually by the European Commission is a key analytical tool for comparing the innovation performance and overall R&D&I performance of European countries. It is a statistical tool which, based on aggregated data for indicators representing the essential aspects of the innovation process, allows to measure, compare, and subsequently evaluate the innovation capacity of the EU in terms of the capacity of the national innovation systems of the EU Member States and the capacity of the Europe-wide innovation system. The collected statistical data are used for comparative assessment of current innovation performance and for analysis of its short-term trends.

The measurement framework of the European Innovation Scoreboard, according to the most recent edition at the time of the 2017 audit, distinguishes between four main types of indicators and ten dimensions of innovation and includes a total of 27 different indicators. Based on the performance of the innovation system, the Czech Republic was ranked third out of four categories and was among the moderate innovators.

The development of the performance of the innovation system of the Czech Republic in relation to the performance of the innovation systems of the average of the 28 EU Member States (hereinafter also “EU-28”) is shown in Chart 1.

Chart 1: Performance of the innovation system of the Czech Republic in 2010-2016 as compared to the EU-28 average



Source: European Innovation Scoreboard 2017.

Compared to 2010, the performance of EU-28 innovation systems has increased by 2 percentage points. At the level of individual Member States, the performance of innovation systems increased in 15 countries and decreased in 13 countries. In the Czech Republic, the performance of the innovation system has declined compared to 2010. In 2010, the performance of the innovation system of the Czech Republic was 87.9% of the EU-28 average; in 2016 it was only 84.4% of the EU-28 average from 2010 and 82.7% of the EU-28 average from 2016. Compared to the EU-28 average in 2010, the performance of the innovation system in the Czech Republic fell by 3.5 percentage points in 2016 and by 5.2 percentage points compared to the EU-28 average in 2016.

Weaknesses of the Czech Republic are mainly in the area of intellectual property, which is represented mainly by the production of patents and trademarks, and the area of relationships, which is represented mainly by the cooperation of the private and public sphere in research and innovation, their implementation, production of outputs and financing.

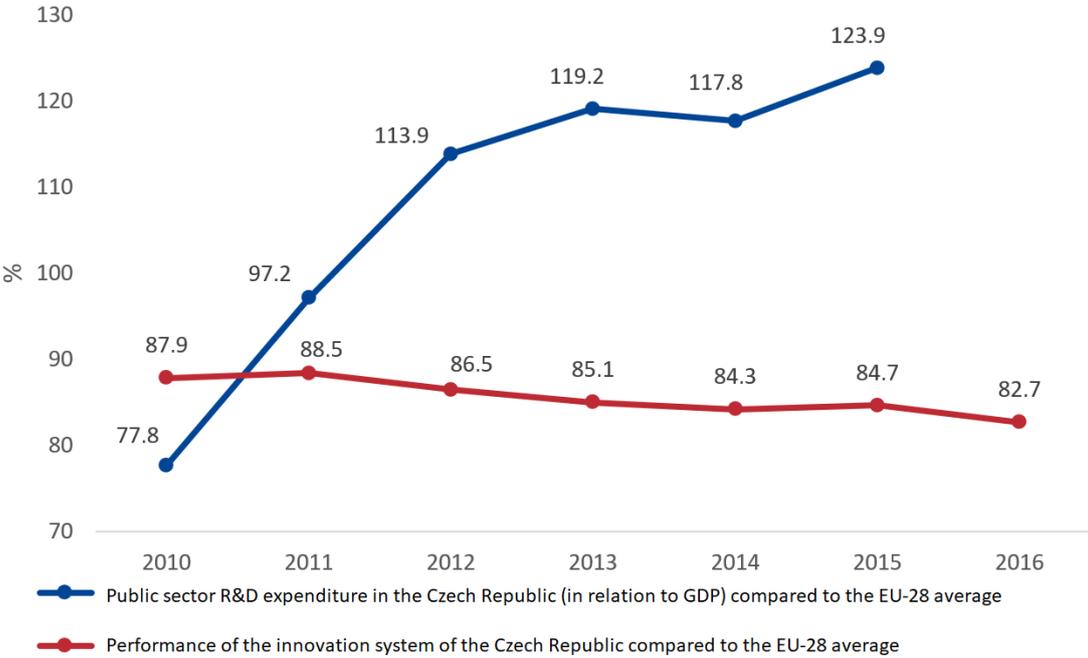
The latest available data for 2015 and 2016 show that the Czech Republic significantly exceeded the EU-28 average in the number of scientific publications with at least one non-EU co-author in relation to the country’s total population (139.5%). On the other hand, in the number of scientific publications produced in cooperation between the private and public spheres in relation to the total population, the Czech Republic reaches only about a third of the EU-28 average (35.7%). Moreover, the Czech Republic’s standing in terms of this indicator has been deteriorating, as in 2010 it was 65.1% of the EU-28 average. The low level of cooperation between the private and public spheres is also evidenced by the indicator of

public R&D expenditure financed by the private sector (relative to GDP), where the Czech Republic is slightly above half of the EU-28 average (58.0%). Moreover, the Czech Republic's standing in terms of this indicator has been improving, as in 2010 it reached 32.9% of the EU-28 average. The low level of production of practically applicable results is evidenced by the indicator of the number of PCT patent applications¹² compared to GDP, in which the Czech Republic reaches 29.1%; i.e., only about one third of the EU-28 average (21.6% in 2010), and also the indicator of the number of trademark applications (compared to GDP in purchasing power parity), in which the Czech Republic reaches 67.6%; i.e., only about two thirds of the EU-28 average (62.6% in 2010). The low quality of research outputs is reflected in the share of the top 10% of the world's most cited publications in the total number of publications, where the Czech Republic reaches only about two-thirds of the EU-28 average (66.7%, 60.2% in 2010).

Overall, according to the latest available data for 2015 and 2016, the Czech Republic was below the EU-28 average in 20 indicators, below the EU-28 average in one indicator and above the EU-28 average in six cases. In most of the indicators revealing the weaknesses of R&D&I in the Czech Republic, there has been an improvement since 2010. In most cases, however, these were only slight improvements of a few percentage points. There has been no significant change over the past six to seven years, and the Czech Republic continues to lag far behind the European average in these indicators.

The evolution of R&D expenditure in the public sector and the performance of the innovation system in the Czech Republic and the EU-28 is shown in Chart 2.

Chart 2: Public sector R&D expenditure and performance of the innovation system in the Czech Republic in 2010-2016 compared to the EU-28 average



Source: European Innovation Scoreboard 2017.

¹² PCT patent application = an international application under the Patent Cooperation Treaty (PCT) where a single application filed with the Industrial Property Office can obtain protection in almost 150 contracting states.

Public sector R&D expenditure (in relation to GDP in the CR) increased significantly. In 2010, this indicator was 77.8% of the EU-28 average, in 2015 it was 122.2% of the 2010 EU-28 average and 123.9% of the 2015 EU-28 average. Research and development expenditures in the public sector in the Czech Republic were predominantly financed from public sources.

Although the Czech Republic achieves a good level of support for research and development, e.g., in the dimension of business investment and in the indicator of research and development expenditure in the public sector, it lags behind the EU-28 average in terms of outputs representing the overall level of performance of the innovation system or, e.g., in terms of practically applicable results in the form of patents and trademarks. Moreover, between 2010 and 2016, there is a clear trend of increasing underperformance of the innovation system compared to the European average. A comparison of these years shows that the performance of the innovation system in the Czech Republic decreased in 2016 both relatively to the EU-28 average and in absolute terms compared to the performance of the innovation system in the Czech Republic in 2010. The decline in the performance of the innovation system has occurred even though public R&D expenditure has increased significantly over this period, both compared to the European average and in absolute terms. A comparison of public sector R&D expenditure and the level of innovation performance shows a lower efficiency of the support system set up in the Czech Republic compared to the European average.

16. The Czech Republic is not on track to meet the national target of achieving public spending on science, research, development and innovation in the Czech Republic at 1% of GDP in 2020

As part of the EU strategy, the Czech Republic has committed itself to the national target of achieving a level of public spending on science, research, development and innovation of 1% of GDP in 2020.

The SAO examined whether the Czech Republic is on track to meet its national R&D&I target.

In March 2010, the European Commission published *Europe 2020 - A strategy for smart, sustainable and inclusive growth*, which sets out the EU's main economic reform agenda for 2020. It defines five main objectives, which were passed by the European Council on 17 June 2010. At the same time, Member States were invited to set analogous national targets based on the main targets and to implement, at their respective levels, the policies and instruments necessary to meet these targets. As the national target, the government aims to achieve a level of public expenditure on science, research, development and innovation in the Czech Republic of 1% GDP in 2020.

The share of R&D expenditure financed from domestic public sources in GDP in the Czech Republic did not show any upward trend between 2010 and 2016, when it was at around 0.6% of GDP, thus reaching similar values to the EU-28 average. Even when EU funds are included, the share of publicly funded R&D expenditure in 2016 was only 0.65% of the GDP. From the above-mentioned data, it follows that the Czech Republic is not on track to meet the national target of achieving public spending on science, research, development and innovation in the Czech Republic at 1% of GDP in 2020. This target will be difficult to meet and, above all, difficult to maintain in the coming years. 2016 is characterised by a significant decrease in EU funding. There may only be a fluctuation in the use of these funds. At the same time, however, this year partly simulates the situation after 2023, when the financial resources from EU funds will most likely be reduced. Lower EU R&D&I spending is expected in the new programme period.

After the end of the programme period, there is a risk of a complete loss of EU funding after 2023. Thus, there would have to be a massive increase in national R&D&I spending to meet the target of 1% of public R&D&I spending to GDP.

List of abbreviations and terms

ASCR	Academy of Sciences of the Czech Republic
Competence Act	Act No. 2/1969 Coll., on the establishment of ministries and other central state administration bodies of the Czech Republic
CSF	Czech Science Foundation
EU-28	28-member states of the European Union
2011 International Audit	International audit of research, development and innovation in the Czech Republic
LSDRO	Long-term strategic development of a research organisation
2013 Methodology	Methodology for the evaluation of results of research organisations and the evaluation of the results of completed programmes (valid for the years 2013 to 2015, subsequently extended to 2016)
Methodology 2017+	Methodology for the evaluation of research organisations and evaluation of programmes of targeted support for research, development and innovation
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoD	Ministry of Defence
MoEYS	Ministry of Education, Youth and Sports
MoH	Ministry of Health
Mol	Ministry of the Interior
MoIT	Ministry of Industry and Trade
NPwPP	Negotiated procedure without (prior) publication
OG CR	Office of the Government of the Czech Republic
PRI or institution	Public Research Institution
Principles of evaluation	Basic Principles for the Preparation and Evaluation of Programmes and Groups of Grant Projects for Research, development and innovation
PT	Public tendering
R&D	Research and Development
R&D&I	Research, Development and Innovation
R&D&I Analysis	<i>Analysis of the state of research, development and innovation in the Czech Republic and comparison with foreign countries</i>

R&D&I Council	Research, Development and Innovation Council
R&D&I IS	Information system for research, development and innovation
R&D&I Priorities	<i>National Priorities of Oriented Research, Experimental Development and Innovations</i>
R&D&I NP Update	<i>Update of the National Research, development and innovation Policy for 2009-2015 with a view to 2020</i>
R&D&I Support Act	Act No. 130/2002 Coll., on the support of research, experimental development and innovation from public resources and amending certain acts (the R&D&I Support Act)
2016 R&D NP	<i>National Policy for Research, Development and Innovation of the Czech Republic for the Years 2016-2020</i>
RO	Research organisation
TA CR	Technology Agency of the Czech Republic

Targeted R&D&I support programmes

CONTACT II	Programme to support individual projects for international bilateral cooperation in research and development, with particular emphasis on bilateral cooperation with countries outside the European Union
COST CZ	Programme for financing basic research projects of Czech research institutions in the COST international research cooperation programme
CSS	Complex Sustainable Systems
ERC CZ	Programme to support programme-based projects in the field of basic research
EUPRO and EUPRO II	Programme for financing projects supporting the participation of Czech research institutes in EU framework programmes and bilateral cooperation on the basis of intergovernmental agreements
EUREKA and EUREKA CZ	Programme to support projects of international cooperation in applied research and development, whose aim is to promote international cooperation in applied research, growth of competitiveness of Czech companies and creation of new innovative products and services, which were included by EUREKA programme among the approved projects of this programme
INGO and INGO II	Programme to support the cooperation of Czech research institutions with international research institutions and to cover the fees for membership in international non-governmental

	research organisations and the costs of participation in meetings of the governing bodies of international scientific societies
NPU I	Programme aimed at the development and sustainability of projects of new European Centres of Excellence, regional and other types of research centres built in the Czech Republic in 2007-2015
NPU II	Programme to support the sustainability of large centres' projects
RAC	<i>Research in the agricultural complex</i> programme
RETURN	Programme to support programme-based projects in the field of basic or applied research
TIP	Programme for research and development of products, technologies and information and control systems
TRIO	Programme aimed at developing the potential of the Czech Republic in the field of key technologies