

## **National Centres of Competence 1: Support programme for applied research, experimental development and innovation**

### 1. NAME OF PROGRAMME

National Centres of Competence 1: Support programme for applied research, experimental development and innovation (hereinafter the "Programme").

### 2. LEGAL FRAMEWORK FOR THE PROGRAMME

The Programme shall be implemented with regard to:

- Act No. 130/2002 Coll., on the Support of Research, Experimental Development and Innovation from Public Funds and on the Amendment of Certain Related Acts (hereinafter the "Support of Research, Experimental Development and Innovation Act"), as amended;
- Treaty on the Functioning of the European Union 2012/C 326/01 (in particular Article 107, and possibly also Articles 93 and 106);
- Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty - Official Journal of the European Union L 187, 26.6.2014 (hereinafter the "Regulation"), in particular Articles 25, 28 and 29;
- Framework for State Aid for Research, Development and Innovation - Official Journal of the European Union C 198, 27.6.2014 (hereinafter the "Framework");
- And other related laws and regulations.

The Programme is exempt from the notification requirement of Article 108(3) of the Treaty on the Functioning of the European Union, as it fulfils the conditions of the Regulation.

This Programme excludes the disbursement of individual aid to an undertaking:

- Which is subject to an outstanding recovery order following a previous Commission decision declaring such aid illegal and incompatible with the internal market,
- Meeting the definition of an undertaking in difficulty referred to in Article 2(18) of the Regulation.

For undertakings awarded state aid exceeding EUR 500,000 under the Programme, the information on the beneficiary and the aid awarded (to the extent specified in Annex III of the Regulation) shall be published on a central website as provided in Article 9 of the Regulation.

The Programme shall be implemented in accordance with the National Research, Development and Innovation Policy of the Czech Republic for the years 2016-2020 (hereinafter the "NRDIP"), approved by Government Resolution No. 135 of 17 February 2016, the National Priorities of Oriented Research, Experimental Development and Innovation adopted by Government Resolution No. 552 of 19 July 2012 (hereinafter the "RDI Priorities"), the updated National Research and Innovation Strategy for Smart Specialisation of the Czech Republic, adopted by Government Resolution No. 634 of 11 July 2016, the principles of the Industry 4.0 Initiative acknowledged by Government Resolution No. 729 of 24 August 2016, and other national and sectoral strategies.

### 3. PROVIDER

The provider of the aid is the Technology Agency of the Czech Republic (hereinafter the “TA CR”).

### 4. PROGRAMME IDENTIFICATION CODE

For the purposes of registration in the information system for research, experimental development and innovation, the Programme was assigned a “TN” code.

### 5. PROGRAMME DURATION AND DATES OF ANNOUNCEMENT

The Programme is supposed to run from 2018 until 2022, i.e. for a period of 5 years.

The public tender in applied research and experimental development and innovation (hereinafter the “public tender”) for selecting projects eligible for the Programme shall first be open in 2018 and the aid shall first be distributed in 2018. On the basis of the evaluation of the course and results of the first public tender, further public tenders may subsequently be announced. The first public tender will support projects with a duration of up to 2020, with the option of extending them by two years, i.e. until 2022. The project duration must not exceed the duration of the Programme itself.

The National Centres of Competence 1 Programme will be directly followed by the National Centres of Competence 2 Programme for the period of 2020–2026. The National Centres of Competence 2 Programme will be prepared in 2018 so that it can be approved in accordance with the schedule for the preparation of the 2020 budget. The follow-up National Centres of Competence 2 Programme will reflect the experience of the National Centres of Competence 1 Programme, the ESIF funding after 2020, the new setting of the EU Framework Programme for Research Support following the Horizon 2020 Programme, the evaluation verification according to the Methodology for evaluating the results of research organisations and the results of completed programmes adopted by Government Resolution No. 107 of 8 February 2017 (hereinafter “Methodology 2017+”), the termination of the National Sustainability Programmes and the impact of the termination of state funding on research and development and the specification of the mechanisms for the management of the National Centres of Competence in the long term.

The National Centres of Competence 2 Programme will take into account, in particular, the following parameters: The duration of the Programme will be a maximum of 7 years, i.e. covering the period of 2020–2026. The first public tender under the Programme will be announced in 2020 with the start of project funding in 2021. Project authors within the National Centres of Competence 1 Programme will be able to participate in public tenders as part of the follow-up National Centres of Competence 2 Programme. For this follow-up Programme, linking part of the aid for the development of research organisations to applied research in conjunction with Methodology 2017+ and its Modules 3, 4 and 5 will be crucial.

### 6. PROGRAMME FOCUS

The Programme is aimed at supporting long-term cooperation between the research and application spheres and strengthening the institutional basis of applied research. With a view to ensuring a long-term stability of the system, the National Centres of Competence 1 Programme will be followed by the National Centres of Competence 2 Programme for the period of 2020–2026.

In line with the National Research, Development and Innovation Policy of the Czech Republic for the years 2016–2020, the intention is to significantly strengthen the segment of research organisations focusing on applied research and to motivate the relevant existing research facilities to transform into research and technological centres where quality applied

research will be conducted according to the needs of the application sphere. The intention is to synergistically integrate the already existing successful centres, which have been created with the support of the TA CR (Centres of Competence), the Czech Science Foundation (the GA CR) (Centres of Excellence) and operational programmes (mainly the so-called RDI Centres), with other research centres and units into one integrated system. The Programme and the follow-up National Centres of Competence 2 Programme should also be part of addressing the funding of applied research after 2020 after the end of the current programming period of the European Structural and Investment Funds and part of the future financing of research infrastructures.

These facilities should work intensively with the application sector and should generate knowledge with a high potential for direct application in practice; they should also acquire a significant portion of their income from contractual research as well as from other sources. The intention is also to strengthen the research and innovation activities of undertakings, i.e. to stimulate the development of R&D activities and to increase the ability of undertakings to absorb the results of research carried out in research organisations. Furthermore, it is assumed that the Programme and the follow-up National Centres of Competence 2 Programme will contribute not only to a better cooperation and interconnection of the research and application spheres but also to a better cooperation within the research sphere as well as within the application sphere.

Among other things, the creation of large comprehensive application-oriented centres with international reach and a potential for breakthrough innovations, based on excellent teams, is expected. These centres should exceed the critical size for participation in larger projects with long-term funding. The intention is also to link sectors that have so far had little or no interactions between one another. In addition, the centres should substantially increase the efficiency of research by focusing on the supporting prospective sectors of the Czech economy with an above-average growth potential, reflecting the economic specialisation of the Czech Republic, and in which the results of research and development can be further developed and exploited.

The thematic focus of projects will be determined by a combination of the top-down and bottom-up approaches. In the announcement of the public tender in research, development and innovation, the topics/application sectors in which projects can be submitted will be identified. These topics/application sectors will be based on the National RIS3 Strategy, in line with the National Research, Development and Innovation Policy of the Czech Republic for the years 2016-2020, and will be selected using the results of the National Innovation Platforms discussion.

The Programme focuses on projects falling under the category of applied research according to Article 25(2)b) and c) of the Regulation and Article 1(3)e) of the Framework (including industrial research, experimental development or a combination thereof), the results of which have a high potential for application in many areas of social life in the Czech Republic.

The Programme directly fulfils the NRDIP, in particular Objective 3.1 Strengthen the institutional basis of applied research, Action 16 Create conditions for the emergence of applied research centres.

At the same time, the Programme fulfils the National RIS3 Strategy, namely Strategic Objective C.1 Increase the relevance of research (both Specific Objectives), B.1 Improve the quality and problem orientation of research in knowledge domains relevant to smart specialisation (especially Specific Objective B.1.1), and partly F.2 Encourage and make better use of the cooperation of local actors in addressing the needs in the field of employment, economic development and social inclusion in the regions of the Czech Republic.

The Programme will contribute to making public funds invested in applied research bring economic or other social benefits from their implementation. The knowledge gained will contribute to defining the factors and processes that determine and influence the functioning and development of Czech society in the context of the ongoing European integration and globalisation. The implementation of the Programme mainly assumes the application of industrial research projects (also involving the necessary activities in oriented basic research) as well as the support of projects with a predominance of experimental development.

At least in the initial phase of the operation of the centres, the creation of “virtual” centres (as financially independent units separated in terms of accounting) linking the best teams available in the Czech Republic is assumed. It is further assumed that the Programme will be managed by the Council of the National Centres of Competence Programme (with the power to propose to the provider to end unsuccessful projects on the basis of the established conditions), composed of representatives of the public administration and the research and application spheres. Some of the Council members will be from foreign facilities. The individual centres will then be managed by the Centre Council, which will be composed based on a similar principle. The Centre Council will determine the conceptual and strategic direction of the Centre of Competence and make fundamental decisions about its operation, especially oversee the implementation of the strategic research agenda and cooperation with the application sphere. The Centre Council reports to the Council of the National Centres of Competence Programme.

The Programme shall be available for synergetic and complementary effects as part of international schemes such as the H2020<sup>1</sup>, and other EU programmes and international programmes complying with the focus of the Programme.

## 7. OBJECTIVE OF THE PROGRAMME

The objective of the Programme is to increase the efficiency and quality of the results of applied research and technology transfer in key areas with growth prospects, increase undertaking competitiveness, and strengthen the excellence and application relevance of research organisations.

The tool for achieving this objective is to build a sufficiently stable and long-term base of applied research (in the form of national centres of competence) through the concentration of research capacities and setting their strong focus on the application of their research results in practice. In order to ensure the long-term stability of the system, centres aided under the National Centres of Competence 1 Programme, which will be evaluated as successful on the basis of the established criteria, can be subsequently aided under the follow-up National Centres of Competence 2 Programme.

The sub-objectives of the Programme include (i) linking the existing research centres, (ii) focusing on the prospective sectors of the Czech economy according to the National RIS3 Strategy, (iii) securing interdisciplinarity and supporting long-term cooperation, (iv) promoting innovation through technology transfer, emphasising the applicability of results in practice, and (v) increasing the number of innovation leaders.

## 8. JUSTIFICATION OF THE OBJECTIVE OF THE PROGRAMME

The Programme should respond to changes and identified shortcomings identified in the evaluation of support for applied research. This is mainly the lack of cooperation and exchange of experience between research organisations and the application sphere.

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<sup>1</sup> Subsequently, this should be available within the Framework Programme for Research and Innovation, which will replace Horizon 2020 starting from 2021.

Generally, there is a lack of competitiveness of undertakings and research organisations in an international comparison.

In the Czech Republic, there are currently 34 Centres of Competence, 48 RDI Centres and 37 Centres of Excellence of the GA CR of different sizes and different focus<sup>2</sup>. Furthermore, there are large infrastructures for research, experimental development and innovation, which are often part of the European Research Infrastructures approved by the ESFRI (European Strategy Forum on Research Infrastructures) and listed in the so-called ESFRI Roadmap. At present, it is necessary to address activities that will lead to the concentration and integration of research capacities.

The reasons for the Programme are similarly captured in the National Research, Development and Innovation Policy of the Czech Republic for the years 2016–2020. According to that document, in the sphere of cooperation between the private and the public sector:

- There is no sufficiently developed public basis of applied research in the Czech Republic;
- The knowledge transfer centres and internal systems for commercialisation in research organisations are not sufficiently effective;
- There is a lack of incentives for research centres to implement research and development for users' needs;
- There is no long-term strategic cooperation between research organisations and undertakings.

## 9. CRITERIA FOR COMPLIANCE WITH THE PROGRAMME OBJECTIVES

The achievement of the objectives of the Programme shall be evaluated in accordance with the Methodology for evaluating the results of research organisations and the results of completed programmes valid at the time of evaluation of the Programme, or the conditions set by the provider. Achieving the objectives of the Programme shall be evaluated, among other factors, on the basis of a set of indicators designed to monitor the progress of the Programme implementation and to evaluate its overall performance and success.

The volume of public resources of each centre will be linked to the amount of funds it receives from non-public resources through contractual research, licences (with licence revenue linked to the project results being recognised, up to a maximum of 20 % of the volume of the non-public resources acquired), or other forms of commercial revenue. It is expected that the centres will continue to participate in projects of collaborative research funded by programmes of the TA CR and other aid providers according to Act No. 130/2002 Coll. as well as international programmes (such as Horizon 2020). The centres should therefore be financed mainly by three primary sources - (i) the National Centres of Competence Programme, (ii) subsidies for collaborative research, and (iii) contractual research and other commercial revenues.

The provider will annually evaluate the fulfilment of the specified criteria. The key and decisive criterion will be the volume of funding the centres from non-public resources. In addition, the fulfilment of the criteria as set out in Chapter 16 that are used for evaluating the project will be assessed. The provider will be entitled to adjust the centre's budget for the following year on the basis of that evaluation.

### **Table 9. 1: Programme indicators**

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<sup>2</sup> The statistical data are valid as of 23 May 2016 based on the data from the RDI IS and the portal of the MEYS.

<b>Indicator</b>	<b>Value</b>
1. Average rate of aid for the Programme	80 %
2. Minimum number of projects supported	5
3. Minimum volume of contractual research carried out in centres and other revenue collectively over the duration of the Programme	CZK 366 million
4. Minimum number of candidates involved in the activities of each centre	4
5. Minimum number of outputs achieved	100
6. Minimum number of outputs applied	80

It will be considered appropriate where the centres consist of at least 6 entities. The maximum allowable aid intensity (within the meaning of Section 5(2)c) of the Act) per project is 90 %.

#### 10. EXPECTED RESULTS AND BENEFITS OF THE PROGRAMME

Mostly projects that can reasonably be expected to accomplish usable outputs, including publications, and whose application will contribute to meeting the objectives of the Programme and benefits for the society (social and economic benefits) shall be supported under this Programme. The Programme shall make it possible to achieve the following outputs in the form of results in compliance with the Methodology and the RIV (Register of Information on Results) valid at the time of their application:

P - patent;

G - technically realised results - prototype, functional sample;

Z - pilot production, proven technology;

R - software;

F - industrial and utility model;

H - results reflected in the legislation and standards and results reflected in non-legislative directives and regulations binding within the competence of the respective provider;

N - certified methodologies, procedures and specialised maps with professional content;

O - miscellaneous.

However, due to the specific focus of the Programme, there is a whole range of knowledge and skills in accordance with Section 2(2)k) of the Support of Research, Development and Innovation Act, which are expected to be the results of public tenders. For this reason, the Programme shall be evaluated not only on the basis of outputs according to the current Methodology for evaluating the results of research organisations and the results of completed programmes, but also according to the knowledge and skills gained, as specified during the preparation of this type of research project.

Among the expected benefits of the Programme are mainly the improvement of the quality and number of research and development results that shall be put to practice in the form of innovative products, procedures, processes or services.

Another expected benefit of the Programme is that research organisations will gain the experience and ability to orient research (i.e. the strategic research agenda) at the needs of the application sphere. On the other hand, the Programme should contribute to the increased ability of undertakings to work with the results of publicly funded research (implemented by research organisations). These two effects should ultimately contribute to an increased independence of the centres built on public funds. A long-term financial sustainability plan of the centre must also be included in the project outputs.

For collaborating research organisations, the benefits of the Programme will materialise, for example, in an increased number of the results applied, in the number of patents commercialised, and a growing commercial potential. A secondary effect can be seen in strengthening the effective transfer of know-how and technologies into practice.

## 11. CANDIDATES AND PROOF OF ELIGIBILITY

Eligible candidates, or, beneficiaries of aid for projects pursuant to the Support of Research, Experimental Development and Innovation Act, the Framework and the Regulation are:

**Research and knowledge dissemination organisations (hereinafter the “research organisations”)** - legal entities that meet the definition of a research organisation pursuant to Article 2(83) of the Regulation and the Support of Research, Experimental Development and Innovation Act and which manage the project alone or in collaboration with other participants.

**Other individuals and legal entities** of public and private law, irrespective of their legal form or method of financing, which shall carry out activities for which the aid is provided outside the state aid scheme, i.e. they shall not be undertakings.

In addition, project partners, i.e. participants in the project without aid from the state budget, may be:

**Undertakings** - legal entities and individuals who are engaged in an economic activity, regardless of legal form (Annex 1 of the Regulation), and carry out the project alone or in collaboration with other participants and demonstrate the ability to co-finance the project from non-public sources.

Only those candidates who meet the eligibility conditions set out in Section 18 of Act No. 130/2002 Coll. may obtain aid for a project implemented under the Programme. If more than one candidate are involved in one project, eligibility must be proven for all of them. Eligibility shall be substantiated by the candidate in accordance with the Support of Research, Experimental Development and Innovation Act, as determined by the provider in the tender specification.

The tender specification for the public tender may narrow down the range of candidates compared to the Programme.

The Programme will support the establishment and operation of research, development and innovation centres with the cooperation of research organisations and undertakings. Further specification of the form and conditions for the involvement and cooperation of the individual entities will be specified in the tender documentation for the public tender.

## 12. EXPENDITURE ON THE PROGRAMME

The total Programme expenditure is set for the duration of the Programme in accordance with the experience with the implementation of the Centres of Competence Programme, with the expected gradual announcement of individual public tenders in research, development and innovation and the process of preparation and creation of the individual centres.

The total expenditure on individual projects and undertakings are calculated according to Article 4 of Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty, the so-called General Block Exemption Regulation.

**Table 12. 1: Programme budget [in millions CZK]**

<b>Year</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>Total</b>
Total expenditure	125	287.5	810	598.75	470	2,291.25
Public funds	100	230	700	447	356	1,833
Non-public resources	25	57.5	175	111.75	89	458.25

For the follow-up National Centres of Competence 2 Programme, the following funding is expected (in millions CZK):

<b>Year</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>Total</b>
Total expenditure	558.75	770	1,340	1,340	1,340	1,340	6,688.75
Public funds	447	616	1,072	1,072	1,072	1,072	5,351
Non-public resources	111.75	154	268	268	268	268	1,337.75

### 13. AMOUNT OF AID

An average total aid intensity of 80 % is expected for the Programme. The maximum allowable aid intensity per project is 90 %. The aid intensity, set as a percentage of the project's recognised costs, will be calculated for each project and for each beneficiary and any other participant.

It is assumed that an integral prerequisite for providing aid will be securing a major part of funding from other sources (non-public resources, EU programmes etc.). This prerequisite will be specified in the tender documentation for the public tender.

### 14. ELIGIBLE AND RECOGNISED COSTS

The aid shall be granted against the eligible costs of the project, i.e. the eligible costs which the provider approves, which are justified and remain within the amounts necessary for the purposes of the project. The candidate may suggest as eligible costs only costs defined in accordance with the Support of Research, Experimental Development and Innovation Act,



and, in case of aid under the regime of state aid depending on the aid category, i.e. in accordance with the Regulation. A more detailed specification of the eligible costs shall be part of the tender specification for the relevant public tender.

## 15. INCENTIVE EFFECT

In order to meet the objectives of the Programme and the conditions of the Regulation, the provider shall assess the presence of the incentive effect of the aid under Article 6 of the Regulation as part of the initial evaluation of projects.

## 16. METHOD AND GENERAL CRITERIA FOR EVALUATING PROJECTS

### **Evaluation of project proposals**

The project proposals shall be comprehensively evaluated by the TA CR in accordance with the Support of Research, Experimental Development and Innovation Act. Each project proposal shall be evaluated by several independent opponents. Foreign evaluators will be involved in the evaluation of project proposals. In order to evaluate the project proposals applying for the public tender, the TA CR shall establish a specialised advisory body.

Suggested general criteria for assessing project proposals:

- Compliance with the conditions of the public tender;
- Usefulness of the project and its contribution to meeting the objectives of the Programme and relevant national strategies;
- The feasibility of the project and its implementation procedure;
- Compliance with the announced topics;
- The existing quality, results and experience of the participants / implementation team (including international experience and cooperation), also with regard to the centre's focus;
- The scope and nature of cooperation within the partnership, the method of organising the centre's activities and an effective cooperation between undertakings and research organisations;
- The application potential of the selected focus of the centre and the proposed way of working with the application sphere and the long-term vision of the centre;
- The overall project budget and its adequacy for the project implementation proposal;
- Volume of cooperation with the application sphere.

More details on the evaluation of project proposals, scoring and the threshold values for individual evaluation criteria are set out in the tender specification for the relevant public tender.

In order to assess possible duplicities, links, complementarities and synergies with various other projects and project proposals already implemented, the provider shall use data management and analytical tools. To avoid potential duplication of projects, the setting up of a specific public tender will be carried out in cooperation of the TA CR with the Ministry of Education, Youth and Sports, the Ministry of Industry and Trade and, if necessary, other RDI aid providers. Project proposals will be comprehensively evaluated in accordance with the Support of Research, Experimental Development and Innovation Act.

### **Evaluation of admitted projects**

The total minimum and maximum duration of projects will be specified in the tender documentation for the public tender. In order to ensure the conditions for long-term RDI cooperation, the individual projects will be evaluated each year, in particular the criteria for the financing of centres from non-public resources, and the provider will be entitled to adjust the budget of each centre for the following year on the basis of that evaluation.

For the purpose of providing aid for the following period, the projects will have to meet the requirements set out in the Programme and the tender specification.

- The project will be further evaluated by the provider at the beginning of the third year of the project implementation (with the involvement of foreign evaluators) in terms of meeting the objectives of the strategic research agenda and the objectives of the Programme and fulfilling other conditions pursuant to Section 13 of the Act. The progress of the centre in the given criterion over the relevant period will be evaluated. Suggested criteria for assessing project proposals:
  - The volume of contracted research, business investment and other commercial revenues of the relevant centre;
  - The volume of subsidies and other resources for the implementation of collaborative research projects (e.g. from other national or European grant programmes) of the centre;
  - The number of cooperating entities in the application sphere (participants in the project, i.e. partners) and the method of cooperation (clearly defined centre management rules) of the centre;
  - International reach / cooperation;
  - The number of applied results used in practice and the amount of income from them.
- The beneficiary will submit a project proposal for the following period; the project proposal will be positively evaluated by the provider. Suggested criteria for assessing project proposals:
  - The proposed way of implementing the strategic research agenda;
  - The application potential of the expected R&D results;
  - The adequacy of the costs of implementing the strategic research agenda;
  - The scope and nature of cooperation within the partnership;
  - The method of organising the centre's activities;
  - The total project budget including the degree of co-financing by candidates or partners.

In the event of non-fulfilment of the conditions stipulated in the public tender, the provider will terminate the project on the basis of the decision of the Programme Council.

The centres aided under the National Centres of Competence 1 Programme, which will be evaluated as successful on the basis of the established criteria, can be subsequently prioritised in the follow-up National Centres of Competence 2 Programme.

## 17. COMPARISON OF THE CURRENT SITUATION IN THE CZECH REPUBLIC AND ABROAD

In the years 2007–2014, the resources of the state budget of the Czech Republic and, in particular, the EU Structural Funds were used to significantly expand the research base in

the Czech Republic. Under the Centres of Competence Programme of the TA CR, the establishment and operation of 34 application-oriented research centres, in which both public research institutions and business sector entities operate, were aided. An interim evaluation of the Centres of Competence Programme, which is one of the bases for this Programme, was carried out in 2015 and was subsequently published on the TA CR website. In addition, 48 projects of European Centres of Excellence and regional R&D centres were aided under the OP RDI, implementing both basic research of current knowledge and applied research with practical applications. There are also dozens of infrastructure facilities in the Czech Republic that have high-quality research equipment (often unique in Europe) and that can be used by other facilities. The GA CR also contributed to the strengthening of research capacities; the GA CR aided projects to support excellence in basic research where top multidisciplinary basic research was conducted in the years 2011 and 2013.

The existing R&D centre and infrastructure system is still fragmented. The centres operate separately and often lack the critical size, experimental equipment and experience to enable the implementation of demanding and extensive RDI projects that require multidisciplinary research. Currently, there is no mechanism to ensure the coordination of their activities and stimulate the implementation of demanding and strategic RDI projects with a greater impact on the development of the international competitiveness of the Czech Republic.

It also appears that some centres have not yet created sufficient links to the application sector, and many application-oriented centres have no strategic partners to work with in longer-term and larger-scale RDI projects. This is reflected in a small volume of contractual research and dealing with contracts of a limited scope (both financially and in terms of impact). The interim evaluation of the OP RDI also shows that the revenues of newly created centres from contractual R&D are lower than expected, which may have implications for the sustainability of these research infrastructures.

As stated in the NRDIP 2016–2020, there are a number of weaknesses in applied research, knowledge transfer and the use of new research and development findings. A major problem of the current RDI system is mainly the underdeveloped basis of applied research, which is related to the liquidation of the applied research basis in the 1990s. In the Czech Republic, there is still a shortage of research organisations whose primary activity would be to carry out research and development for the application sector and to produce results with a high potential for innovation; this is manifested, among other things, in the low number of international patent applications submitted by research organisations and undertakings from the Czech Republic.

Therefore, according to the NRDIP, it is necessary to restore the institutional basis of applied research. In order to improve applied research and to increase its impact on the application sector and the society, it is necessary to suitably transform a part of the research capacities of the Czech Republic into high-quality applied research facilities, which will intensively cooperate with the application sector and where knowledge with a high potential for direct application in innovation will emerge (and for which revenue from the application sector will constitute a significant part of their R&D budget).

Specific Objective 3.1 of the NRDIP is to strengthen the institutional basis of applied research. This Objective is addressed, in particular, by Action 16 Create conditions for the emergence of applied research centres, in which mechanisms and procedures should be developed, with the use of which some research facilities, including research centres aided under the Operational Programme Research and Development for Innovation (OP RDI) and other programmes, will be motivated to transform into research and technology-oriented centres whose main mission will be applied R&D for the needs of undertakings and the society. According to the NRDIP, these centres will intensively cooperate with the application sector and obtain a significant part of their income from contractual research. At the same

time, the conditions for the dissemination of knowledge from research organisations will be improved and their cooperation with the application sector will be stimulated in accordance with Action 17.

Strategic Objective 4 of the NRDIP is to increase the innovation performance of undertakings in the Czech Republic by enhancing research activities and introducing new technologies and procedures aimed at streamlining business processes. Part of Objective 4.1 Strengthen the research and innovation activities of undertakings is also stimulating undertakings to start their own R&D activities and to develop their cooperation with research organisations, which should also contribute to increasing the ability of undertakings to absorb the results of R&D conducted in these institutions. This area is addressed by Action 18 Stimulate undertakings to initiate and develop R&D activities.

In line with Strategic Objective 5, it is also necessary to strategically target the support of applied research at the current and potential future needs of undertakings and the society. In this context, the involvement of undertakings, research organisations, the public administration and the civil sector must be strengthened in identifying these needs, as well as setting up targeted support tools for research responding to these needs (Specific Objective 5.1). Action 25 Develop and implement principles for defining the main directions of applied research and preparing follow-up RDI programmes stipulates in this context that an operational process must be set in which strategic intelligence elements such as evaluation, consultations with expert platforms, trend analyses and outlooks will be used, to identify the main directions of applied research and to prepare or modify the existing RDI programmes that will support these main directions of applied research.

Specific Objective 5.2 is to develop a concept of support for applied research, which will be linked to the identified needs of the society and the application sphere, and which will stimulate the development of strategic and long-term cooperation between companies, research organisations, the public administration and the civil sector. Action 28 will set out the main directions for the support of applied research, which will be aided through a coordinated tool system (Action 29). At the same time, specific milestones and objectives will be set, the performance of which will be evaluated. In all tools to support applied research, long-term and strategic-oriented cooperation between undertakings and research organisations should be encouraged in line with the NRDIP, which will allow for the development of products with a high added value.

Foreign experience in this area of support of the so-called Centres of Competence is discussed by the TA CR on a long-term basis, especially within the network of the TAFTIE European Innovation Agencies. In particular, this concerned the (Task Force) CompAct Project that reviewed the principles and outputs of programmes to support the Centres of Competence across most European countries. The final report from that project was published in May 2016 and is available on the TAFTIE website ([http://www.taftie.org/sites/default/files/Taftie\\_TF\\_CompAct\\_Final\\_Report%20LV.pdf](http://www.taftie.org/sites/default/files/Taftie_TF_CompAct_Final_Report%20LV.pdf)). Programmes to support the Centres of Competence focus on the development of applied R&D. They support long-term multilateral cooperation between research organisations and undertakings to generate knowledge that will boost the innovation performance and competitiveness of the corporate sector. The Centres of Competence are seen as an important tool of the national innovation policy that enhances technological excellence and innovation of undertakings (including their competitiveness) while contributing to structural changes in economies and increasing their global competitiveness.

A specific example of effective support for research with a strong focus on the use of results in practice is the German model of the Fraunhofer Society, which consists of a system of the so-called Fraunhofer Institutes. The TA CR also communicates with the representatives of the Fraunhofer Society in the long term and discusses the parameters of this model with them. The Fraunhofer Society is a public law company established by the state. It is not

analogous to business companies as they are known in the Czech legal environment. The Fraunhofer Society is an umbrella entity to which the Fraunhofer Institutes are linked under contractual relationships (acceptance at the request of those Institutes). These Institutes focus on specific areas of research and development, and are established and disestablished according to needs and performance in a given segment.

A key aspect is the funding model, with approximately 70 % of the funds coming from the Institutes' own activities, and 30 % being distributed on the basis of the results achieved (mainly the volume of revenues from contractual research) as aid from state funds through the Fraunhofer Society. This model originated in Germany in 1949 and proved to be a powerful motivational tool for effectively directing research to the real needs of the economy. This model of funding centres has also been taken over by some other countries in their schemes of support for cooperation between research centres and the business sector (for example, the United Kingdom under the so-called Catapult Centres). A support scheme analogous to that of the Fraunhofer Society (especially in the area of the financing model) has so far been missing in the Czech Republic.