

# METHODOLOGY FOR INTERNATIONAL PEER-REVIEW ASSESSMENT OF BENEFITS OF MEMBERSHIP OF THE CZECH REPUBLIC IN INTERNATIONAL R&D ORGANISATIONS

## 1. INTRODUCTION

The *Methodology for International Peer-Review Assessment of Benefits of Membership of the Czech Republic in International R&D Organisations* aims to establish the **evaluation framework for assessing the benefits of the Czech membership in seven international R&D organisations** (hereinafter referred collectively to as the “IOs” and individually to as the “IO”). The methodology has been aligned with the methodology for international peer-review assessment of large research infrastructures of the Czech Republic, which is being performed in 2021 and which aim is to provide an expert basis for the adoption of informed and evidence-based political decision by the Government of the Czech Republic on public funding of large research infrastructures of the Czech Republic in the forthcoming multiannual financial framework 2023–2029.

The most recent [2019 update to the Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022](#) represents an executive summary of the large research infrastructure agenda development in the Czech Republic since 2009. The Roadmap provides with a comprehensive briefing on the roadmapping, policy-making and public funding of large research infrastructures in the Czech Republic in the past decade, including an overview of the typology of large research infrastructures of the Czech Republic, their internationalisation and international cooperation in the European Research Area and worldwide, and an introduction to the international peer-review assessments that were held in 2014 and 2017.

Besides a total of 48 large research infrastructure projects, implemented in a broad range of scientific and technological fields, which were approved for public funding until 2022 by the Government of the Czech Republic, the Roadmap also includes a landscape analysis and an **overview of membership of the Czech Republic in international research infrastructures and IOs**, including their specific research infrastructure projects and programmes.

The envisaged goal of the assessment exercise focused on evaluation of benefits of membership of the Czech Republic in IOs is to provide the Ministry of Education, Youth and Sports with an expert basis to **enhance the quality of Czech participation in IOs**, aligned with the strategy relevance and indisputable qualities of IOs. In a broader context, the evaluation shall deliver the inputs for informed and evidence-based policy-making procedures of the Ministry of Education, Youth and Sports, to **increase benefits, impacts and spill-over effects of Czech membership in IOs**.

Similarly to the participation of the Czech Republic in international research infrastructures, which are not operated under the public international law (such as *European Research Infrastructure Consortia*), the **strategy decisions on Czech membership in IOs are of utmost importance, and shall be evidence-based**, to ensure the maximum added value of Czech membership, contribute substantially to shaping the R&D and innovation ecosystem in the Czech Republic by increasing the quality of scientific and/or technical teams, and strengthen the international competitiveness of the Czech Republic in general.

A comprehensive evaluation provides the necessary evidence foundation for adoption of such strategy decisions, and it also offers a **guidance for further enhancement of membership of the Czech Republic in IOs**. The assessment of Czech membership in IOs has a particular importance in terms of:

- **Learning the efficiency, benefits, impacts, spill-over effects and overall quality of membership of the Czech Republic in an IO in terms of Czech involvement in the governance and management of an IO, and IO's educational, training, R&D, technology transfer and innovation activities, etc.;**
- **Understanding the potential and needs of the Czech R&D and innovation ecosystem for entering optional R&D programmes and projects, and non-mandatory activities in general, including the upgrades of facilities, which are developed by an IO, and may be joined on a voluntary basis;**
- **Drafting recommendations on developing the strategy for further enhancement of involvement and participation of the Czech Republic in an IO to maximise the efficiency, benefits, impacts and spill-over effects deriving from the Czech membership.**

In 2021, the Ministry of Education, Youth and Sports – being the central public authority of the Czech Republic responsible for research infrastructure policy-making and public funding, and international cooperation of the Czech Republic in R&D – is performing a comprehensive **international peer-review assessment of benefits of membership of the Czech Republic in IOs** as a complementary action to the international peer-review assessment of large research infrastructures of the Czech Republic. While the continuous process of evaluation of Czech large research infrastructures has been initiated in 2014, with subsequent rounds held in 2017 and 2021, the current assessment of benefits of membership of the Czech Republic in IOs is the second of its kind, following the first exercise, which took place in 2016.

## **2. DEFINITION OF INTERNATIONAL R&D ORGANISATION**

The Czech Republic is a Member State of a number of international research infrastructures of macro-regional, pan-European and global nature and impact. These international research infrastructures are established and operated under various legal frameworks as follows:

- a) **Research infrastructures established and operated under the public international law and, thus, characterised as “international R&D organisations”** (e.g. *European Organisation for Astronomical Research in the Southern Hemisphere – ESO*, etc.);
- b) **Research infrastructures established and operated under the legal framework of the European Research Infrastructure Consortium** (e.g. *European Infrastructure of Open Screening Platforms for Chemical Biology – EU-OPENSUREN ERIC*);
- c) **Research infrastructures established and operated under national legal frameworks of their host countries, where their statutory seats are located** (e.g. *Facility for Antiproton and Ion Research – FAIR GmbH – Gesellschaft mit beschränkter Haftung*).

**In the case that the international research infrastructure is not established and operated under the public international law as an IO, the obligation of Member States to contribute to its operation and investment costs is diverse.** These contributions may be either of mandatory or optional nature, with variable components depending e.g. on the level of involvement of a Member State in the international research infrastructure capacity use, etc. On the contrary, **in the case that the international research infrastructure is established and operated under the public international law as an IO, the obligation of its Member States to contribute to the operation and investment costs takes usually the form of a membership fee**, which is, in general, also the only direct obligation of a Member State.

The presented **evaluation methodology focuses on assessment of the benefits of Czech membership in international research infrastructures established and operated under the public international law as IOs**. Therefore, the scope of the methodology covers the pool of seven IOs, which the Czech Republic is a Member State of, and the Ministry of Education, Youth and Sports is in charge of the performance of membership rights and obligations:

- **CERN** (*European Organisation for Nuclear Research*);
- **EMBC** (*European Molecular Biology Conference*);
- **EMBL** (*European Molecular Biology Laboratory, including ELIXIR*);
- **ESA** (*European Space Agency*);
- **ESO** (*European Southern Observatory, including ELT*);
- **JINR** (*Joint Institute for Nuclear Research*);
- **VKIFD** (*Von Karman Institute for Fluid Dynamics*).

The main purpose of membership of countries in IOs is, generally, to provide the research community with **long-term opportunities to carry out world-class R&D in an internationally competitive and/or cooperative environment**, increase the performance of national research sector, foster the innovative skills and international competitiveness of national businesses and industries, provide the training and education opportunities for national students, graduates, researchers and scientists, and promote the internationalisation and international cooperation of national R&D and innovation ecosystem.

Therefore, membership and an active participation and involvement of the Czech Republic in the IOs' governance and management structures, as well as activities developed by the IOs in the area of R&D, innovation, education and training, should be considered a very **important element of the Czech R&D and innovation policy**, and a vital prerequisite to maintain the competitiveness of the Czech Republic and visibility of the Czech Republic internationally.

### **3. EVALUATION AND MONITORING CRITERIA**

The international peer-review assessment of benefits of membership of the Czech Republic in IOs will be based on a **comprehensive set of evaluation and monitoring criteria**. The definition of each of the criteria and instructions to provide the envisaged information and data is described in detail within the **assessment form**, to be completed as the main information source for performing the evaluation.

Despite diverse scope of individual IOs that the Czech Republic is a Member State of, the memberships also evince a number of common features. These **features shall be reflected by and integrated in the evaluation process**. The documentation to be submitted for the evaluation will comprise, in particular, the following set of information.

#### **A. Description of the international R&D organisation**

- The documentation shall comprise a **comprehensive presentation of the IO**, description of mission and role of the IO, knowledge expertise and technologies used and developed by the IO, long-term strategy development plans of the IO, IO's governance and management structure, membership policy and budget of the IO, and positioning of the IO in the European Research Area and beyond.

## **B. Governance of the membership in international R&D organisation**

- As regards the **IO's relations with the Czech R&D and innovation ecosystem**, the alignment with the needs of the Czech Republic and the IO's relevance for the development of the Czech R&D and innovation ecosystem shall be thoroughly described, as well as the overlaps and/or synergies with other IOs, (international) research infrastructures and research performing organisations, and R&D programmes and projects, which are participated by the Czech Republic at the Governmental level and/or by the Czech R&D and innovation stakeholders.
- The description of the relationship shall comprise also information on a total budget of the IO, and the **level of the Czech financial contribution to the IO, as well as to other costs resulting from the membership in the IO**, such as participation in optional IO's R&D programmes and projects, non-mandatory costs related to participation in the IO's particular experiments, etc.
- The documentation shall comprise an in-depth **description of the governance and management structure ensuring the Czech participation in the IO**. It shall be transparent how the Member State participates in the governance and management of the IO within the framework of the IO's internal policies, and how the delegates of the Member State to IO's governance and management bodies (i.e. General Assembly/Council, Committees, Boards, etc.) are linked to the Ministry of Education, Youth and Sports and/or to an advisory body, which makes recommendations on the participation of the Czech Republic in the IO.
- It must be transparent **how the Member State seizes the opportunities presented by the IO** (i.e. access to experimental facilities of the research infrastructure, access to data, participation in R&D programmes and projects, participation in procurements, vacancies, scholarships, etc.), and how the information on opportunities, resulting from the Czech membership in the IO, is distributed by the Ministry of Education, Youth and Sports, and other cooperating stakeholders within the Czech R&D and innovation community.

## **C. Benefits of the membership in international R&D organisation**

- Whereas the parts A and B are focused mostly on the description how efficiently the Member State participates in the IO's governance and management, how the Ministry of Education, Youth and Sports is linked to the IO, and how the opportunities for joining the IO's activities are disseminated within the Czech R&D and innovation community, the part C focuses mainly on the benefits of the Czech membership in the IO, based on the **actual outcomes of the Czech participation in the IO**.
- There is a wide range of outcomes, which may result from a country's membership in an IO. These attributes are subject to the assessment, and shall be verifiably documented. The documentation submitted for the expert evaluation shall include a broad range of information covering particularly (but not exclusively) benefits resulting from the Czech participation in the IO in terms of **science, research, technology development and innovation outcomes, and education, human resources, and business and industrial development**. The most important evaluation and monitoring criteria are the following ones:
  - **Rate of the experimental / measuring / access time assigned to Czech users**, and how is such access to the IO's research infrastructure experimental facilities really used by the Czech user community;

- **Intensity of the usage of data / data sets resulting from the IO's activities** by the Czech user community (i.e. number of downloads and accesses to data, etc.) and how the potential to use data collections of the IO is actually capitalised by Czech users;
- **Number and percentage of a total of publications with participation of Czech scientists**, and their average citation index according to the Web of Science, and most important publications published by Czech scientists, resulting from the collaboration with the IO;
- **R&D programmes and projects with Czech participation** developed and implemented by the IO, and other relevant contributions of the Czech R&D and innovation community, including to development of the IO's experimental facilities;
- **Contracts assigned by the IO to Czech businesses and industries** (i.e. supplies provided to the IO by Czech enterprises in the framework of tenders for delivery of high-tech products and other services procured by the IO to ensure the IO's operations and investment development);
- **Knowledge and/or technology transfer and innovation activities developed by the IO with Czech participation**, resulting from the knowledge expertise and technologies reached and/or developed by using the IO's research infrastructure and its experimental devices;
- **Number and percentage of a total of employees of the IO coming from the Czech Republic** (i.e. management, scientific, technical and administrative personnel; permanent, seconded, as well as external experts hired by the IO, etc.);
- **Bachelor, Master and Ph.D. students from the Czech Republic** educated / trained in the IO, and participating in R&D programmes and projects of the IO, and **number and percentage of a total of Czech researchers and students** involved in the IO's R&D programmes and projects.

#### **D. Public relations, marketing and media outreach**

- An important element related to membership of the Czech Republic in the IOs is **communication of achievements reached by the IO**, and by Czech scientists, innovators and students with the IO's contribution. The information flow aimed at both expert and lay public helps advocate and justify the public spending on Czech membership in the IOs.
- The documentation shall, therefore, comprise information on the **popularisation activities linked to Czech membership in the IO** (i.e. communication and/or public relations strategy of the Ministry of Education, Youth and Sports, and other relevant R&D and innovation stakeholders; overview of the key scientific and industrial events; outcomes in media, such as TV, magazines, radio, etc.).

#### **4. INTERNATIONAL ASSESSMENT COMMITTEE**

For the purpose of evaluation, an **international assessment committee** will be appointed, comprising impartial, renowned and internationally recognized experts, with an expertise in international research infrastructures and R&D policy-making. The absence of conflict of interest of international assessment committee members shall be sufficiently proved by an affirmation that will be a part of the agreement to complete a job, to be concluded between the members of international assessment committee and the Ministry of Education, Youth and Sports.

The international assessment committee will consist of **3 scientific panels per 3 members responsible for the assessment of Czech membership in each coherent group of IOs**. A member of each scientific panel will be appointed the Chair of the scientific panel to coordinate the work of other scientific panel

members and to deliver the consensus report, recording the overall evaluation results. To oversee the work of scientific panels so that each applies the assessment criteria to the same extent and with the same relevance, a **Chair of the entire international assessment committee** will also be appointed.

- The **1st scientific panel** of the international assessment committee shall evaluate the benefits of Czech membership in **CERN** (*European Organisation for Nuclear Research*) and **JINR** (*Joint Institute for Nuclear Research*).
- The **2nd scientific panel** of the international assessment committee shall evaluate the benefits of Czech membership in **ESA** (*European Space Agency*), **ESO** (*European Southern Observatory*) and **VKIFD** (*Von Karman Institute for Fluid Dynamics*).
- The **3rd scientific panel** of the international assessment committee shall evaluate the benefits of membership of the Czech Republic in **EMBC** (*European Molecular Biology Conference*) and **EMBL** (*European Molecular Biology Laboratory*).

## 5. EVALUATION PROCEDURE

The benefits of Czech membership in IOs will be evaluated by the international assessment committee, based on the completed forms of **assessment documentation**. Inputs necessary for the preparation of the documentation, which will be provided to scientific panels of international assessment committee for their expert evaluation, will be **delivered by the Ministry of Education, Youth and Sports in a close cooperation with the IOs and representatives of the IOs' Czech user communities**. Assessment forms will include all information and data needful for a thorough and comprehensive evaluation, according to the monitoring criteria stipulated by the assessment methodology.

To inform the scientific panels of international assessment committee on the results of international peer-review assessment of the benefits of Czech membership in IOs held in 2016, the scientific panels of international assessment committee will be provided with consensus reports, recording respective outcomes. The **2016 consensus reports** will be of auxiliary nature only, but may help the reviewers to consider the progress in enhancing the features of membership of the Czech Republic in IOs since the last assessment exercise, and consider how Czech stakeholders projected the recommendations given back then in their future strategy-making approaches. In this regard, the Ministry of Education, Youth and Sports will elaborate the **summary briefing, explaining how the recommendations, resulting from the 2016 international assessment exercise, have been followed and implemented**.

Besides the above-mentioned documentation for the evaluation, scientific panels of the international assessment committee will also receive **external international peer-review reports**, which will involve **3 reviews per membership in an IO**. International reviews will be arranged and delivered to scientific panels of the international assessment committee by the Ministry of Education, Youth and Sports. The primary goal of external reviews will be to obtain additional independent expert opinions, but external reviews will be of consultative relevance only and cannot be interpreted as having straightforward and direct implication on the overall assessment results. The summary decision on outcomes of assessment will remain the exclusive responsibility of the scientific panels of international assessment committee.

Another input to the international assessment peer-review procedure will be the **hearings/interviews** between the scientific panels of international assessment committee on one hand, and the Ministry of Education, Youth and Sports and representatives of the Czech IOs' user communities on the other one, in order to enable the international evaluation committee to address additional questions on the Czech membership in IOs, which might not be clearly described in the documentation for evaluation.

To provide members of scientific panels of the international assessment committee with opportunity to get together beyond virtual meetings, the Ministry of Education, Youth and Sports will also organise a **2-day in-person meeting** in Prague, Czech Republic. The meeting will combine plenary sessions of all members of the international assessment committee with break-out sessions of its individual scientific panels.

When the sessions have been over, the scientific panels of international assessment committee will be expected to record outcomes of the overall assessment by using the **consensus report template**, which will be provided by the Ministry of Education, Youth and Sports.

Outcomes of the evaluation exercise shall consist, in particular, in comments made by the international assessment committee and written down in the consensus report, pointing out the strong and/or weak features of the Czech membership in IOs, as well as opportunities and/or threats for the future Czech membership in IOs, and concrete **recommendations** on improvement of the state-of-play.

The **figure assessment indicators** will be applied for both the individual evaluation criteria and overall summary evaluation. The assessment scale will be based on **six quality values**. The figure assessment indicators shall be, however, of supplementary nature only. The assessment procedure outcomes shall not be narrowed down and/or reduced to a limited set of number figures. The assessment outcomes shall consist particularly in remarks by the scientific panels of international assessment committee and **recommendations on the definition of future strategy-making for membership of the Czech Republic in IOs**. The assessment scale is defined as follows:

- 5 – Excellent quality;**
- 4 – High quality;**
- 3 – Good quality;**
- 2 – Low quality;**
- 1 – Very low quality;**
- 0 – Insufficient quality.**

## **6. ASSESSMENT TIMETABLE**

The **indicative timetable** of the international peer-review evaluation of benefits of membership of the Czech Republic in IOs is as follows. The **actual timetable** may be slightly adjusted during the assessment procedure by the Ministry of Education, Youth and Sports, depending on the progress of the evaluation exercise in each individual assessment phase and international assessment committee scientific panel.

- a) The Ministry of Education, Youth and Sports, jointly with the IOs and representatives of Czech user communities, will prepare the **assessment documentation**. The set of documentation will include, among other parts, also the reports on how the recommendations from the previous international assessment exercise, held in 2016, have been followed and implemented by the respective Czech stakeholders. The documentation will be prepared by **31st May 2021** at the latest.
- b) By **31st May 2021**, also the **international assessment committee**, to perform the evaluation tasks, will be appointed by the Ministry of Education, Youth and Sports, and agreements to complete the job will be concluded with the members of international assessment committee within the same timeframe. Members of the international assessment committee will be provided with the set of documentation for the evaluation shortly after the appointment of all committee members.



- c) Simultaneously to the work of the international assessment committee, the Ministry of Education, Youth and Sports will organise the **external international peer-review**, consisting in 3 reviews per each membership of the Czech Republic in IO. The outcomes of external international peer-review will be sent to the scientific panels of international assessment committee on a continuous basis, and no later than by **30th September 2021**.
- d) The envisaged **2-day in-person meeting** of the international assessment committee will be held in Prague, Czech Republic, in **October/November 2021**, depending on the availability of international assessment committee members and their term preferences. On this occasion hearings/interviews between the scientific panels of international assessment committee, Ministry of Education, Youth and Sports and representatives of Czech IOs' user communities will be arranged too.
- e) **Summary conclusions and recommendations** of scientific panels of the international assessment committee, reported in the way of **consensus report**, prepared per each membership of the Czech Republic in IO, shall be finalised by **mid-December 2021** at the latest, and afterwards submitted to the Ministry of Education, Youth and Sports.

## **7. FOLLOW-UP STEPS**

Once the definitive versions of the consensus reports on the international peer-review assessment of benefits of membership of the Czech Republic in IOs are finalised, an **executive summary of outcomes** will be prepared and presented to Minister of Education, Youth and Sports, and top executive officers of the Ministry of Education, Youth and Sports.

The Ministry of Education, Youth and Sports will **monitor the implementation of recommendations, resulting from the international peer-review assessment**, on enhancing the benefits of membership of the Czech Republic in IOs once every 2 years.