ESFRI

European Strategy Forum
on Research Infrastructures

# ESFRI Report

## Funding of Research Infrastructures

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### Prepared by

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## Main findings

European Research Infrastructures (RIs), crucial for the European Research Area, have seen strategic planning by ESFRI and national roadmaps development across EU Member States. The ESFRI 2021 roadmap highlights the diversity and expansion of RIs, with 63 identified entities.

Following the insights from the 2022 ESFRI questionnaire, which aimed to deepen the understanding of RI financing, this report compiles responses from 54 RIs across 19 Member States, to the follow up questionnaire issued by ESFRI in 2023, addressing the call for more detailed, country-specific information. It uncovers significant funding mechanism disparities between distributed and single-sited RIs, highlighting a broader challenge: a pervasive lack of detailed knowledge concerning funding sources and the calculation of access costs, despite the evident necessity for greater funding transparency and effectiveness. This executive summary, therefore, not only recounts the survey's findings but also connects these insights with putative actionable recommendations (for discussion with the RI forum) and emphasizes the necessity for collaborative effort and follow-up work to foster sustainable, efficient funding models for European RIs.

Crucially important is the role of both national roadmaps and the ESFRI roadmap for developing both a national and European RI strategy, underpinned by evaluation, coherence and corresponding funding allocations.

## Emphasizing collaboration

The necessity of collective effort in addressing the complexities of RI funding cannot be overstated. Therefore, the implementation of workshops for Member States and initiatives for RIs is proposed to enhance coherence in funding strategies, alignment with National RI Roadmaps as well as sharing best practices among RIs.

## Follow-Up Work

The report underscores the need for detailed follow-up surveys and case studies reflecting the situation also for the different disciplines to refine these recommendations further. This continued effort will enable a deeper understanding of RI funding landscapes, addressing the critical need for sustainable, efficient funding models that can adapt to the evolving needs of European RIs.

In conclusion, the path forward requires a coordinated, collaborative approach to overcome the identified funding challenges. Through shared innovation, strategic planning, and continuous engagement, we can ensure the long-term sustainability and success of European RIs.

Another useful input to the debate about funding at the level of ESFRI is the ongoing ESFRI Monitoring exercise for the landmark RIs which also considers funding issues and was able to generate useful insight and derived recommendations for both RIs as well as Member States. These individually identified findings could be aggregated for an overall debate across RIs.

## Summary of recommendations

Based on the analysis of the data of both surveys and taking into consideration the results of the ESFRI stakeholder forum meeting, it is possible to identify some recommendations, which can be divided into those for RIs, Member States, and funders at all levels: regional, national and European.

### For Research Infrastructures:

- **Develop a better understanding and overview of national funding sources,** particularly for distributed RIs, to enable effective monitoring and planning of activities, investments, and operations. This approach aims to facilitate smoother discussions with national funders and support more successful funding applications.
- **Establish a clear methodology for calculating RI costs for** concept development, design, preparation, implementation, construction, operation, major upgrades, reorientation, decommissioning and termination and also including costs of access to the facilities**,** to ensure accurate long-term budgeting and financial planning. This is especially important for funders to understand the long-term financial needs of national nodes in distributed RIs.
- **Share their experiences with national funding sources**, enhancing their ability to secure and manage funds effectively and in a sustainable way. This could feature case studies, webinars, and forums focusing on successful funding applications and operational efficiencies. **Develop a series of best practice guides and training sessions** for human resources management within RIs, addressing recruitment, training, and motivation challenges. These resources could be shared through an online platform dedicated to RI staff development.

### For Member States:

- **Implement funding monitoring instruments in the frame of an overall RI funding strategy**, to capture the spectrum of RI costs as far as possible and their funding sources, supporting informed decision-making and multi-annual financial planning.
- **Increase coherence of national funding strategies with National RI Roadmaps or equivalent national strategies** where appropriate, reflecting differences across different MS and associate states in funding cycles, enhancing coherence in funding allocation and complementarity between national and European research priorities. Acknowledging that heterogeneity of funding sources retains resilience of funding systems.
- **Implement workshops** that bring together Member States to share insights and advancements in funding monitoring instruments including ESFRI monitoring and strategies for implementing best practices for National RI Roadmaps. These workshops would serve as a forum for discussing best practices in funding allocation and multi-annual financial planning.

### For funders at all levels:

- **Commit to long-term engagement and planning** for the sustainability of European RIs, including established RIs and landmarks. This includes planning for upgrades and ensuring ongoing operational funding.
- **Promote synergy among funding sources** at regional, national, and EU levels, making **different existing EU funding sources more comprehensive and perceivable**, and emphasizing the support of national nodes and the operational costs of RIs. Encourage the integration of funding streams to support the full lifecycle of RI projects.
- **Foster community development** by encouraging funding models that support cooperation between RIs and align with EC missions. This includes supporting curiosity-driven research and facilitating access to RIs for top researchers across Europe.
- **Reinforce the EU financial support to European RIs in connection to the European challenges.** This will contribute to develop common approaches and to extend, upgrade or link the existing RIs, not necessarily to create the new ones.
- **Provide EU funding support to public missions and services of European RIs**, which go beyond the access provisions to researchers.
- **Enhance support for human resources** by developing targeted funding mechanisms at European and national levels for the recruitment and training of skilled staff across European RIs. Address the challenges of staffing and motivation to maintain high levels of research and technical excellence.
- **Share and discuss innovative funding models that support the sustainability of RIs**. This could include success stories of integrated funding streams and examples of effective long-term engagement strategies and could be based on scientific studies on funding methodologies of RI.

# Introduction

European Research Infrastructures (RIs) are fundamental to the advancement and innovation within the European Research Area, exemplifying the essence of scientific progress across the continent. Over the past two decades, the European Strategy Forum on Research Infrastructures (ESFRI) has been at the forefront of strategic planning and development of these facilities, fostering a collaborative environment that has led to the establishment of national roadmaps in most EU Member States. This collective endeavour has mobilized over €24 billion in national and regional investments, significantly augmented by EU contributions, underlining the shared commitment to enhancing scientific infrastructure.

The culmination of the ESFRI roadmap in 2021, with the identification of 63 RIs, marks a significant milestone in the journey towards transformative investments in the European scientific landscape. This roadmap has been instrumental in the initiation and enhancement of RIs, highlighting the necessity of a coordinated European effort to ensure the long-term sustainability and progress of these vital scientific assets.

In response to the evolving policy and funding landscapes, this report incorporates the latest developments and outcomes from discussions and initiatives post-2022. It emphasizes the importance of including recent policy changes, funding opportunities, and the outcomes of significant conferences and meetings that have occurred since the drafting of this report. By staying abreast of these developments, the report ensures its relevance and applicability to the current context of European research infrastructures.

The inclusion of stakeholder perspectives, particularly from the research community, industry partners, and policymakers, enriches the narrative around RI funding sustainability, challenges, and opportunities. These viewpoints offer invaluable insights into the diverse expectations and requirements of the stakeholders involved in the development and utilization of RIs. The report highlights the consensus on the need for sustainable funding mechanisms, the optimization of funding synergies, and the strategic alignment of RIs with broader European and national research agendas.

Furthermore, the report delves into the role of Smart Specialisation Strategies (S3) in aligning RIs with regional innovation strategies, underscoring the strategic importance of RIs in regional development and specialization. This alignment ensures that RIs not only contribute to scientific excellence but also to economic growth and social development within their respective regions, leveraging their potential to address regional challenges and priorities.

Lastly, we highlight the role of data and analysis in informing policy recommendations and funding strategies for RIs. The exploratory ESFRI questionnaire launched in spring 2022 provided crucial data on the diverse mix of funding sources for RIs, emphasizing the need for stable funding mechanisms. This evidence-based approach underscores the report's commitment to leveraging data and stakeholder feedback to shape effective and sustainable funding models for European Research Infrastructures.

An investment agenda by ESFRI has been accompanied by increased efforts on the sustainability of RIs. In 2017, ESFRI emphasised the need to establish adequate framework conditions for effective governance and long-term funding for RIs at every stage in their

lifecycle.[1] The topic was also addressed by the Commission Staff Working Document "Sustainable European Research Infrastructures – A call for Action"[2], which provided an in-depth exploration of key sustainability elements, paying particular attention to the sustainability of funding of research infrastructures.

The long-term sustainability of RIs has become a key agenda item for the EU, the Member States and ESFRI.[3]

Furthermore, with ESFRI White Paper[4], ESFRI committed to '*continue to support initiatives facilitating the combination of national and European funds and synergies between Horizon 2020/Horizon Europe, the Structural and Investment Funds and other European funding for RIs as an element of effective RI implementation and sustainability*'.

In October 2021 during the New ERA Slovenian Presidency Conference, various research infrastructures (RIs) and their stakeholders gathered to discuss the sustainability of RIs. In the resulting report, the participants called on ESFRI '*to analyse funding approaches across different countries in view of collecting good practice examples and stimulating improved national and European funding for RIs. Such an approach should include the mix of various funds, be it regional, national or European, in synergy. Good practices related to the usage of Cohesion policy and the Recovery and Resilience Facility are particularly welcome, as are the approaches to life cycle planning and budgeting in relation to various RIs*.'[5]

With the onset of the new Cohesion policy cycle and the Reform and Resilience Facility, the topic is also timely and highly relevant to policymakers. In fact, continuing the work of the previous presidencies of the European Council, the CZ presidency of the Council of the EU focused on the critical questions of the European strategy on research infrastructures and has put the research infrastructures and the synergies in their funding among the priorities of their presidency. The conclusions of their presidency conference Synergies 2022 emphasized that '*policy-makers are invited to continue removing barriers that prevent harvesting the full potential of synergies. Actions should aim at enabling RIs to take advantage of various EU, national and regional funding instruments throughout all their life cycle periods, possibly even through involvement of new stakeholders, and at providing stable support in line with the long-term nature of RIs, at the same time bearing in mind that the EU Cohesion Policy Funds would engage in financing of RIs only if thoroughly justified and deriving from relevant Smart Specialisation Strategies (S3).*'[6]

The Council in its Conclusions on research infrastructures adopted7 on 2/12/2022, acknowledged that the RI funding requires strategic investments through the entire RI life-cycle, including the phases of concept development, design, preparation, implementation, construction, operation, major upgrades, reorientation, decommissioning and termination,

[1] ESFRI Scripta Vol2: Long-Term Sustainability of Research Infrastructures, https://www.esfri.eu/esfri-scripta-series, 2017
[2] Sustainable European Research Infrastructures – A Call for Action, SWD (2017) 323.
[3] HLEG report Supporting the transformative Impact of Research Infrastructures on European Research 2020. https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_transformative-impact-ris-on-euro-research.pdf
[4] ESFRI White Paper 2020, https://www.esfri.eu/esfri-white-paper
[5] https://era-si.eu/news/26/conference-summary-report-and-recommendations.html
[6] Prague Declaration, https://synergies2022.eu/wp-content/uploads/2022/07/Prague-Declaration-on-Synergies_FINAL.pdf, 2022
[7] https://www.consilium.europa.eu/en/press/press-releases/2022/12/02/research-infrastructures-council-adopts-conclusions/

which spreads over decades. It encouraged Member States to form a sustainable political commitment on long-term funding of RIs, thereby facilitating a stable, reliable and predictable financial planning of RIs and their development, including through the use of EU programmes under shared management and INVITES the Commission to support them in those efforts.

Moreover, it invited Member States and the Commission through ESFRI to perform an analysis of the types of financial support to the European RIs throughout their life-cycle phases, identify good practices in synergies of various RI funding sources and, on this basis, propose appropriate RI funding models and corresponding RI funding initiatives.

In this context, an exploratory internal ESFRI questionnaire to the delegates was launched in spring 2022, and results were reported to the ESFRI forum in June 2022. The results indicated that a rich mix of funding sources is used to fund RIs, including the Recovery and Resilience Facility plans and associated funding. ESFRI roadmap and national roadmaps proved to be an important instrument for pooling resources across Europe towards the same objectives, as almost two thirds (62 %) of respondents indicated that they have published at least one call dedicated to participation in ESFRI RIs or RIs on the national roadmap in the 8-year period. However, funding instruments are often suboptimal, considering the long-term nature of RIs. Only half of respondents have reported that national nodes are funded through stable funding – either programme funding or institutional funds, which allocate dedicated resources to the nodes of the RIs. The respondents are aware of the issue and have primarily identified the need for a stable funding mechanism when asked how could sustainable funding of Research Infrastructures be achieved.

Following the exploratory survey, it was proposed to dig deeper into the topic to gain also country specific information. The delegations were asked to express their opinion on what follow-up work would need to be organised to get a more comprehensive picture of situation. Information obtained contributed to the elaboration of the objectives and scope of this report.

## Objectives and scope of our activity

Against this background, ESFRI has decided to address the issue of RI funding by establishing a drafting group in charge of analysing the topic in detail and preparing recommendations.

The ESFRI report aims to provide a response to the Council Conclusions from 02/12/2022 by:

1. Giving the recommendations on funding practices of research infrastructures based on the general overview of the: (i) major cost categories of research infrastructures including for operations and upgrade; (ii) type of funding practices and instruments in support of European research infrastructures, including through national RI roadmaps, highlighting bottlenecks and good practices. Investment schemes by Member States via international organisations based in Europe were also considered.
2. Making insights into the future needs of research infrastructures based on the analysis of the documents available for the drafting group. Major funding needs of research infrastructures at national and European levels will be considered as well as synergies among EU programmes and between European and national investments. In addition, the funding issues related to access to RIs will be covered in a complementary way with the work on Access conducted by ESFRI[8] through 2023.

The RI population considered for this analysis includes the ESFRI RIs, the ERICs (not included in the ESFRI Roadmap), European RIs established as other legal entities and not included in the ESFRI roadmap providing access and services at the European level, as well as international organisations established in Europe.

The future needs of RIs are taken into account, be that for routine operations, access provision or upgrades, while reflecting on the existing funding mechanisms, future developments and potential funding gaps.

The report provides a basis for informed policymaking at the national and European levels. It aims to contribute to:

- Improved implementation schemes based on the exchange of best practices.
- Improved synergies.
- Preparation of future investment decisions at national and European levels, thus contributing to the sustainability of the RIs.

The report provides a broad estimation of the magnitude of the **future RI funding needs** which will underpin **the need for increased European funding for RIs.** While using a very general approach, the report uses the momentum **to identify the areas which should be better financially supported at the European level** and will bring the RI funding issue to the level of the European discussion.

[8] European Strategy Forum on Research Infrastructures (ESFRI). (2024). ESFRI Report on Access to Research Infrastructures and Charter on Access to RIs. Zenodo. https://doi.org/10.5281/zenodo.10555986

# Methodology

A drafting group was established by ESFRI in December 2022[9] with the mandate in drafting a report on the funding of RIs. The drafting group developed first a concept paper on the objectives of the draft report. Two surveys were developed, one for Member state/governments (with 39 questions) and another one for RIs/Managers providing details on their RI`s funding streams and budgets. The questionnaires can be found in the annex. The objectives of the questionnaire were:

- Collecting comprehensive information on the funding sources for ESFRI RIs, including investments and operations
- Identifying the main existing gaps in RI funding
- Understanding the main bottlenecks for stable funding of RIs
- Collecting information on the funding mix for access to RIs and its adequacy
- Gathering information on medium to long-term funding needs for investments in ESFRI RIs and the planned funding sources
- Assessing the funding needs for 'greening' of ESFRI RIs within the next years

Both questionnaires were sent out on 14 February 2023 with a deadline of 20 April 2023. Two workshops introducing the questionnaires and explaining the expectations were organised on February 16th, for government representatives and for RI managers.

A follow-up workshop for RI managers was held on 23 June 2023 for close discussion and better understanding of the submitted elements. Some additional interviews for clarification were performed during June and the analysis of both questionnaire and budget tables was done during June and July. An ad hoc interim report was provided by the chair of the drafting group Elena Hoffert during the ESFRI 84th meeting in Lund on 20 – 22 June 2023. 75 RIs (ESFRI RIs, the ERICs not included in the ESFRI Roadmap, European RIs established as other legal entities and not included in the ESFRI roadmap providing access and services at the European level, as well as international organizations established in Europe) were invited to participate in the survey. For the list see Annex 1.

All ESFRI countries and HORIZON EUROPE associated countries were invited to participate in the survey, out of which 19 countries answered to the call AT, BG, CZ, DE (without financial figures), DK, ES, FR, HU, IR, IS, IT, MT, NL, NO, PO, PT, SK, SI, TK. 54 RIs answered the survey of which 38 provided in addition financial data in the budget table. In order to analyse the budget tables, RIs were grouped in single sited (9 with budget table) and distributed RIs (27 with budget table). A response rate of 72% provides sufficient data for general analysis and valid recommendations.

[9] Elena Hoffert (chair) (elena.hoffert@recherche.gouv.fr), Gelsomina Pappalardo (gelsomina.pappalardo@imaa.cnr.it), Alice Dijkstra (a.dijkstra@nwo.nl), Jana Kolar (jana.kolar@esfri.eu) until 12/2023 and then replaced by José Luis Martinez (josel.martinez@esfri.eu), Apostolia Karamali (Apostolia.KARAMALI@ec.europa.eu) until 03/2023, Dominik Sobczak (Dominik.SOBCZAK@ec.europa.eu) until 07/2023 and then replaced by Agnes Robin (Agnes.ROBIN@ec.europa.eu); Barbara Brečko (barbara.brecko@fdv.uni-lj.si) until 12/2023; Anastasios Patrikakos (apatrikakos@athenarc.gr); Ricardo Migueis (ricardo.migueis@inesctec.pt) and Markus Pasterk (markus.pasterk@unimib.it) (the latter two as experts)

# Government perspective

In this section the analysis is given on:

- How governments are funding Research Infrastructures.
- Whether national roadmaps for research infrastructures are a key dimension of stable and sustainable funding.
- What the main bottlenecks to RI funding are from the perspective of governments.

How governments are considering and taking action over urgent societal, economic and environmental risks, namely those related with energy efficiency and greening of RI development and operation.

## Funding instruments for RIs

The most often used instruments by Member States are:

(i) National project funding (19/19*)
(ii) Permanent/recurrent direct national state funding (14/19);
(iii) institutional funding from the recurrent/permanent state budget (12/19)
(iv) EU R&D funding (10/19)

*The figures in brackets represent how often this item was chosen/number of responses by country.

This is in line with the responses provided by the Research Infrastructures, in their dedicated questionnaire and emphasizes the role of project funding, which confirms that a large proportion of RI operations are covered by projects and only partially by a more stable multiannual, recurrent type of funding.

Data on use of structural/cohesion funds reported in use only by ES, BG, SI, IT, CZ, PL but not by e.g. SK, MT, PT. This is most likely due to incomplete information available at central level, which demonstrates that further work on data collection is necessary.
In fact, data provided by governments only amounts to 3,2 bn EUROS of investment in 2021 (without countries like DE, FI, SE, -hosting several RIS - among others). Furthermore, almost no detailed explanations were provided, and funding data refers mostly to central government and only rarely regional funding data was provided, which means real amounts are much higher.

## Targeted investment (per RI type and cost typology)

When asked about the use of different instruments for different RI types, most governments provided no answers, demonstrating that this is a dimension being largely ignored. From those who have answered, the main difference is between intergovernmental organizations (budget by law) and ERICs where most use annual dedicated funding schemes.

In the same way, the differentiation between capital investment and operational costs seems to follow administrative regulations. The majority of the capital investment is done by direct and state funding whereas operation costs are typically carried out by institutional or project funding. With a reported lower use of structural funds than it would seem logical in the majority of the beneficiary countries, at least for capital investment, strategic and targeted investment runs the risk to become hostage to an ad-hoc negotiation and visibility bias towards flagship projects, instead of evolving to a stable and sustainable multiannual typology.

# Funding

This section presents the data provided by the respondents regarding capital cost investment, operational costs financing, membership contributions and host country premium.

Regarding **capital costs investment**, the total amounts to 1.88 bn EURO (again for 19 countries only, although some of these countries did not provide financial data).

Investments are predominantly funded via permanent/recurrent direct national funding AND Institutional funding from recurrent/permanent state budgets AND national project funding. Almost no regional funding (only ES reported yes), no EU R&D funding (again, only ES and IS reported making use) and this data is contradictory to the data provided by the RIs themselves.
Only SI, BG, ES reported making use of structural funds, which is certainly a large underestimation, and, in the same way, governments reported almost no use of recovery and resilience facility funds (except for ES).

Regarding **financing of operational costs**, this amounts to > 1 bn EURO which is highly underestimated, as no institutional funding amounts are provided for e.g., national nodes.
Operational costs are reportedly only partially funded via permanent/recurrent direct national funding AND Institutional funding from recurrent/permanent state budgets AND national project funding.
As is the case with capital costs investment, almost no regional funding was reported (yes only ES), almost no EU R&D funding (yes only ES, IS), only SI, BG, ES, reported using structural funds and no use of recovery funds, nor other funding instruments.

**Membership contributions** are reported to be mainly funded through permanent/recurrent direct national funding AND Institutional funding from recurrent/permanent state budgets (only NO with national project funding).
There was a very minor part of governments reporting on membership of RIs, some of the amounts provided are inconsistent and not reliable. This needs extra attention! (green marked in the data file).

In what concerns contributions to **host country premium**, the data reported by MS is inconsistent with that of the importance attributed to this source of income by many RIs. There are many more RIs receiving host country premium than the reported by MS. 7 government representatives mentioned yes, 5 no, 6 not hosting RIs.

## Bottlenecks for RI stable funding

Member States reported as main bottlenecks for RI stable funding a set of internal (national) problems: their annual and low state budgets; increased operational costs and nonexistence of adequate instruments for investments in RIs.
This includes inexistence of a legal framework (i.e. budget line in the state budget), and lack of funding agencies capable of carrying out the work adequately.
When questioned on how to improve funding schemes, most called for the need of legislative changes and dissonance between financial administrative culture in funding schemes and agencies and the life cycle and long-term logic of RI funding.

## Good practices for stable funding:

- Multi annual planning.
- Funding outside of state budgets through agencies or RPO – Research Performing Organisations (AT, DE, SI, TR).
- Direct contracts with the ministries (IS).

## National Roadmaps (or equivalent strategic documents) and funding of RIs

National roadmaps or equivalent strategic documents are important planning tools, which should be tied to some degree of priority setting and budget commitment to allow stable funding for research infrastructures and allow the latter to provide the state-of-the-art support to research and innovation they are expected to. Nevertheless, in the majority of cases there is no link between being included in a national roadmap and guarantee of funding. Moreover, evaluation of national roadmaps is mostly ad-hoc, with some notable exceptions, in which regularity has proven results in the quality and efficiency of RI investment. The evaluation procedures also vary greatly in process, quality and international dimension.

Overall, prioritization of investments is very dependent on the political cycle and ad-hoc decisions in those cases where roadmaps are not developed, updated and evaluated regularly.

## Member States´ suggestions to the EU

The suggestions provided are:

- More funding or higher funding.
- Better synergy between EU funding instruments and facilitation of synergies with structural funds.
- Make different existing EU funding sources more comprehensive and perceivable
- Funding for national nodes.
- Increased funding of (transnational) access.
- Funding for operational costs.

All governments express EIB loans are not in use and don't intend to use them in the near future.

## Measures regarding energy efficiency, raw materials supply and environmental considerations

An ESFRI report was published on this particular topic in 2023 since the question was raised during the ESFRI work in 2022 in response to the difficulties that European RIs were facing[10].

Regarding **energy efficiency**, the majority of MS reported no specific actions targeting RIs. In some cases, some legal framework was created to provide exemptions and cost cutting, but also to impose limits on energy usage. Some countries reported extra funding to cover energy costs and there was a significant number of unanswered questions.
The same holds true for **specific measures concerning raw material supply** with a predominant answer being "don't know" or "not planning so far". Short of solutions, governments called for increased EU level investment, as well as the creation of joint platforms and joint planning to address these issues.

As for **environmental considerations / greening as a political concept for RIs**, either no answer or a clear yes (but mostly without any actions).

## Other issues

- Funding from non-public/private sources.
- Synergies between national and EU funding.
- More EU coverage for large investments.

[10] Kolar, J., Brečko, B., Campana, P., Chamberlain, M., Daillant, J., Harrison, A., Keppler, A., Lévai, P., Martins, R., Plaskan, J., Weeks, A., & Wosnitza, J. (2023). ESFRI Report on Energy and Supply Challenges of Research Infrastructures. Zenodo. https://doi.org/10.5281/zenodo.8123921

# Research Infrastructures funding

## Summary of results and analysis

The questionnaire to the RI managers consisted of 26 questions and the possibility to upload a budget file with income and expense data for a long-term period, 2021-2023.

54 RIs participated in the survey. The analysis divided the total of RIs into single-sited and distributed, but also made a division of the RIs between a) Concept phase; b) Construction; c) Operation.

The graphics below show the number and location of headquarters and distribution of nodes, among the respondents to the questionnaire and where this information was made available by the RIs. Prospective members and not fully confirmed nodes were not considered.

***Figure 1: Headquarters***

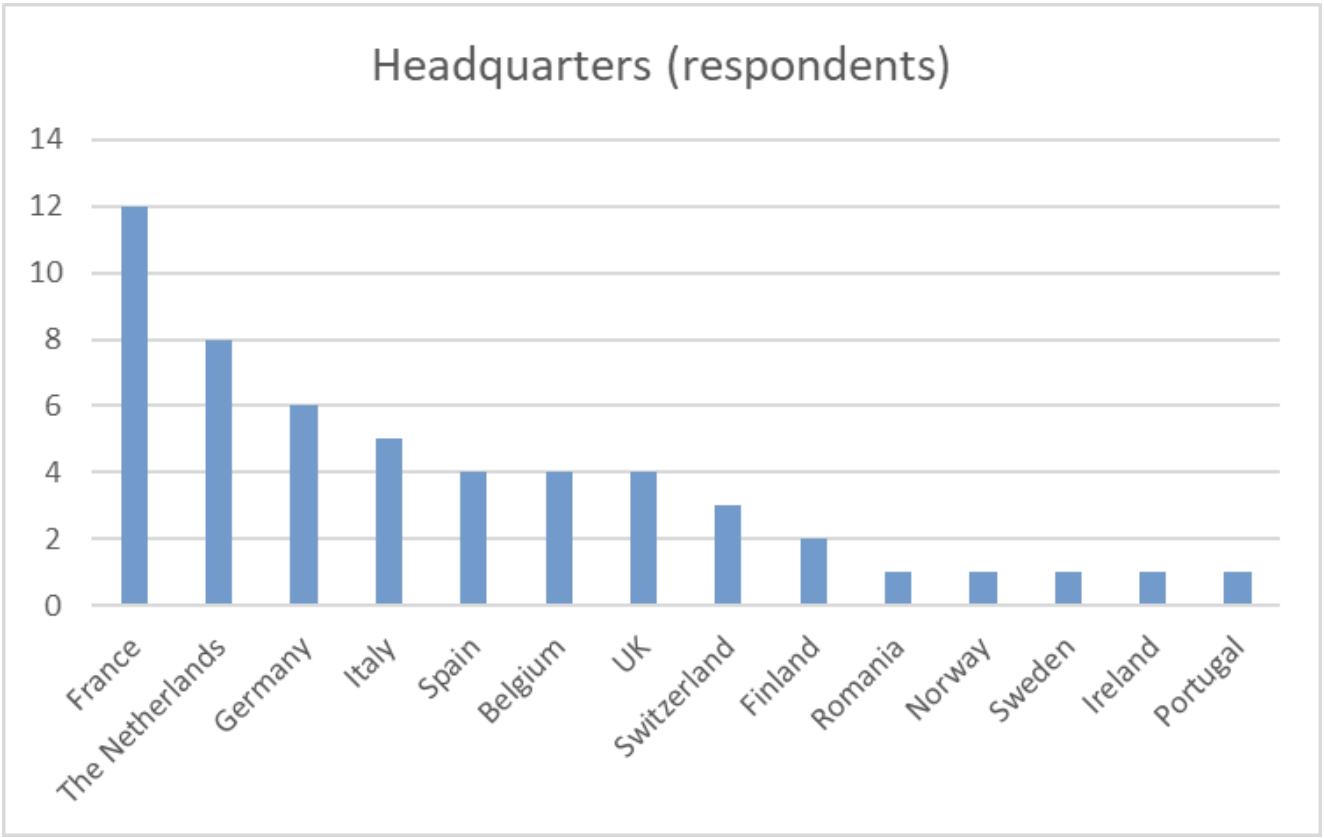


*Figure 2: Headquarters – Intensity of Concentration*

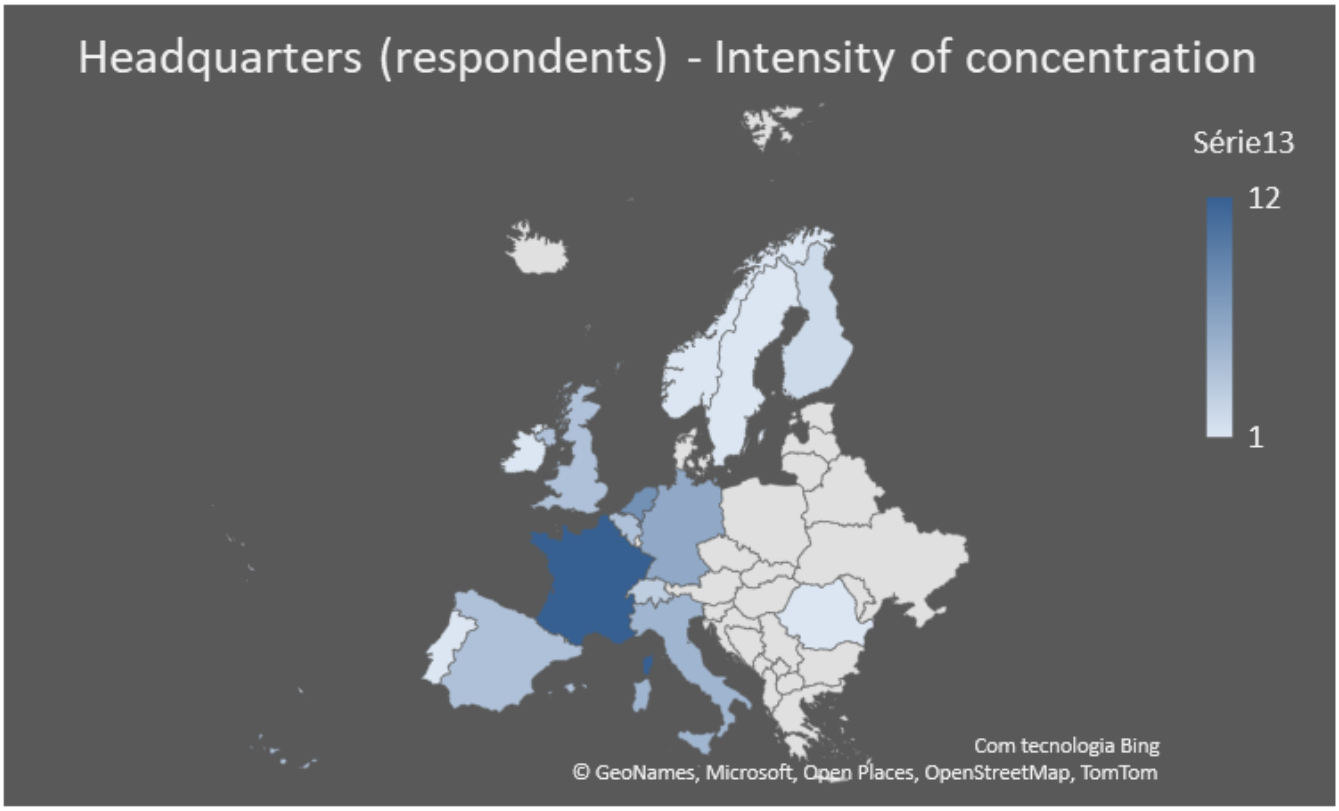



*Figure 3: Number of nodes per country*

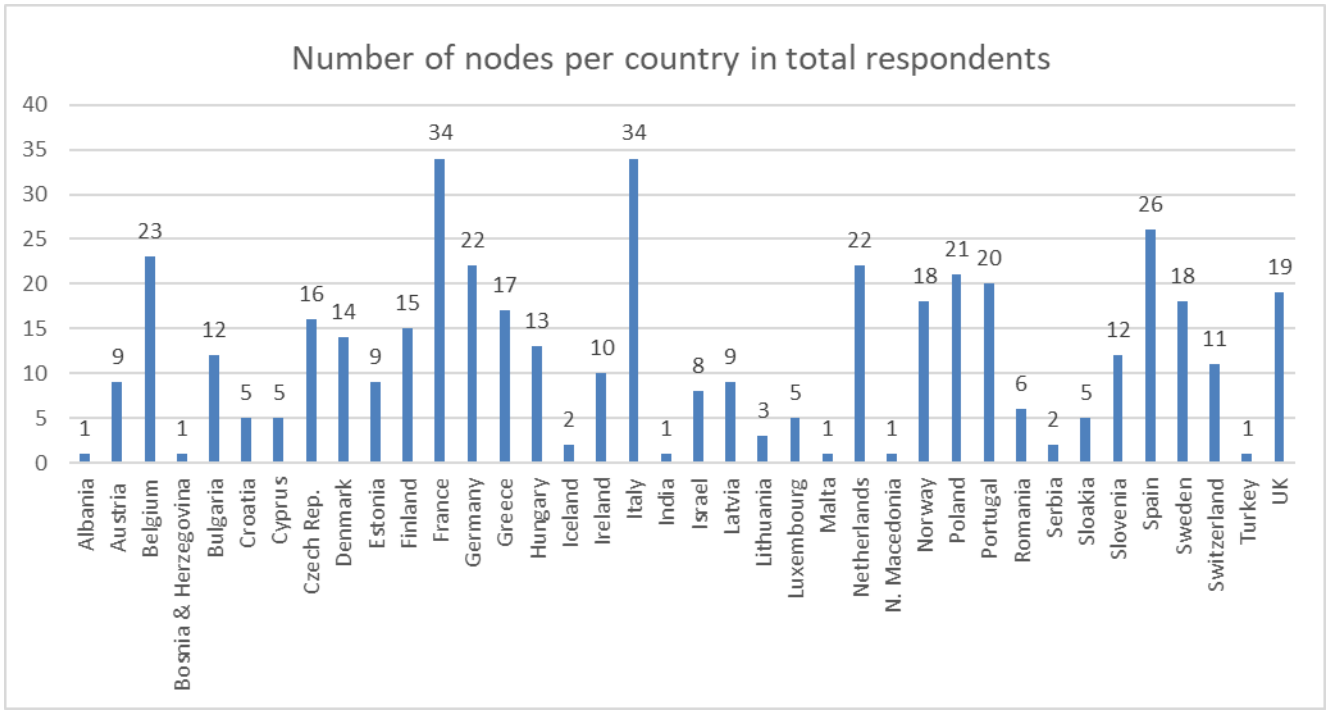
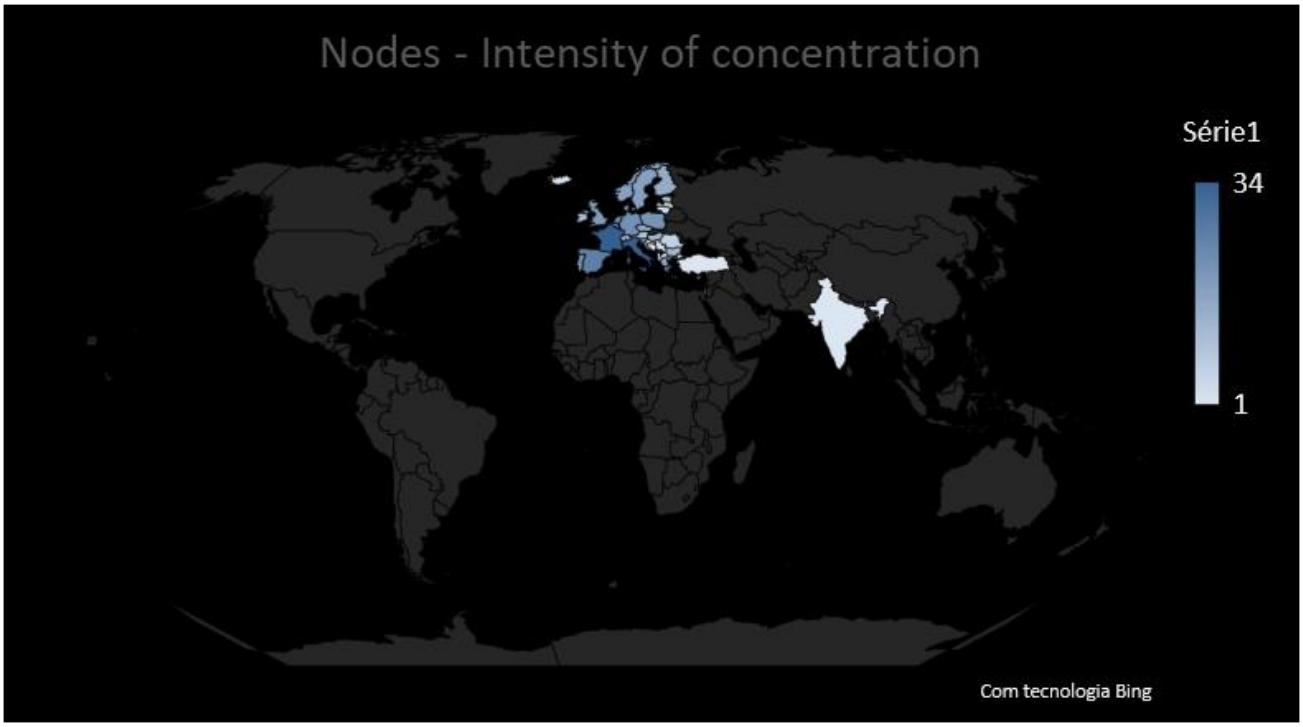


*Figure 4: Nodes – Intensity of Concentration*




Regarding the distribution of the RIs in the lifecycle phase, it worth noting that:

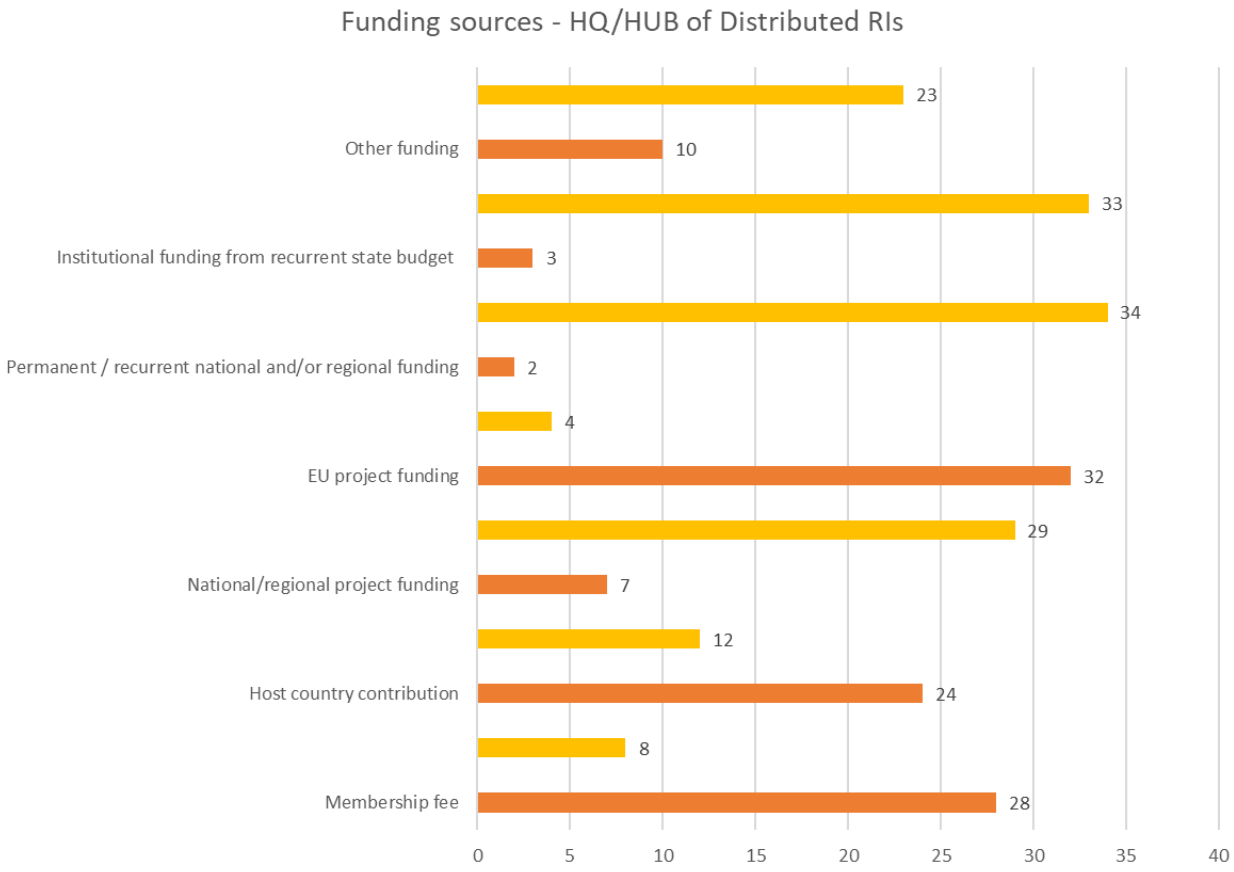
- Among the 20 respondent landmarks, 17 are in operation and only 3 are still in implementation phase.
- The majority of the other respondent RIs are under construction (11), concept (2), in operation (1) and 1 did not specify.
- Among the 51 total number of respondents, 14 are single-sited RIs and 37 are distributed RIs.

## Rationale for funding at national and European levels, including synergies

### Sources of income for HQs of distributed RIs

- The membership fee has a crucial role in paying the expenses of the administrative hubs of most distributed RIs.
- Host country contribution is also an important component of the income stream, which can be found already in many RIs even when in early implementation phases.
- These central management structures very rarely benefit from national or regional project-type of funding.
- It was also reported that almost all of the distributed RI Central Hubs do not have permanent or recurrent national nor regional funding.
- The Hubs are also very reliant on EU project funding with 32 of the distributed RIs reporting this as an important source of funding for central activities.

***Figure 5: Funding Sources***




(Yes: Orange / No: Yellow)

- *RI central management Hubs play a crucial role in leveraging the EU added value of distributed RIs.*
- *The current logic of funding for these structures is based entirely on membership fees and host country contributions. This is reflected ,by accountability of the Hub activities to the participating/funding members of the RI.*
- *Sustainability of HQs and their capacity to provide EU-added value rests, in large measure, in multiannual contributions from governments and members and is complemented by participation in EU projects.*
- *Increased targeted funding (specific purpose funding associated to a key service or explicitly aligned with a strategic goal) amounts and the potential of innovative instruments to fund implementation of measures providing EU-added value, against clear KPIs, could be explored with a view to adding sustainability, stability and quality of implementation.*
- *Monitoring and identifying the key needs of RI Hubs and how these relate to current and future design of funding systems requires a standardized methodology of accounting at Hub level. It would also require more regular accompaniment from ESFRI.*

## Sources of income for RI nodes

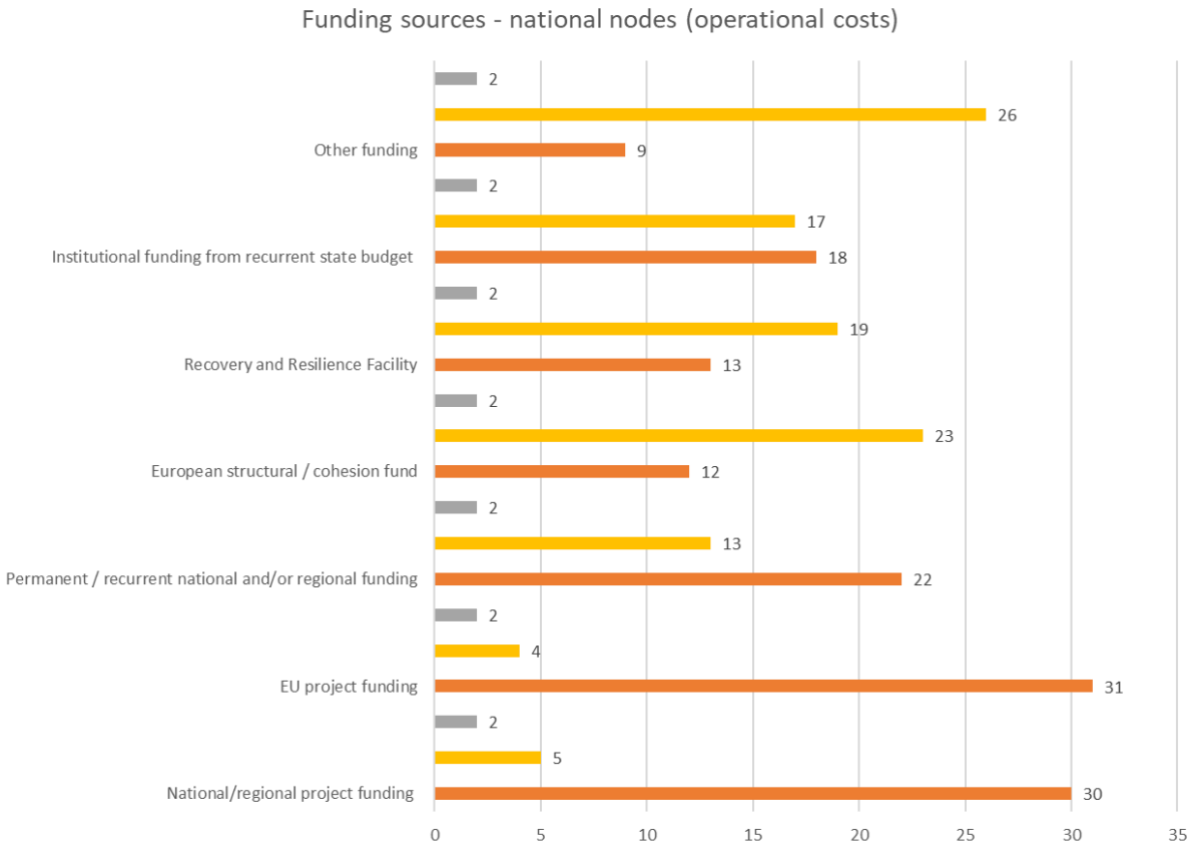
In what concerns operational costs, the majority of RIs relies primarily on a fairly diversified mix of funding sources (multiple choices were possible):

- EU project funding. (31)
- National and regional project funding (30)
- Permanent/recurrent national and/or regional funding (22)
- Institutional funding from recurrent state budget (18)

Followed by:

- Recovery and Resilience Facility (13)
- European Structural / Cohesion Funds (12)
- Other funding (9)

*Figure 6: Funding sources - national nodes (operational costs)*

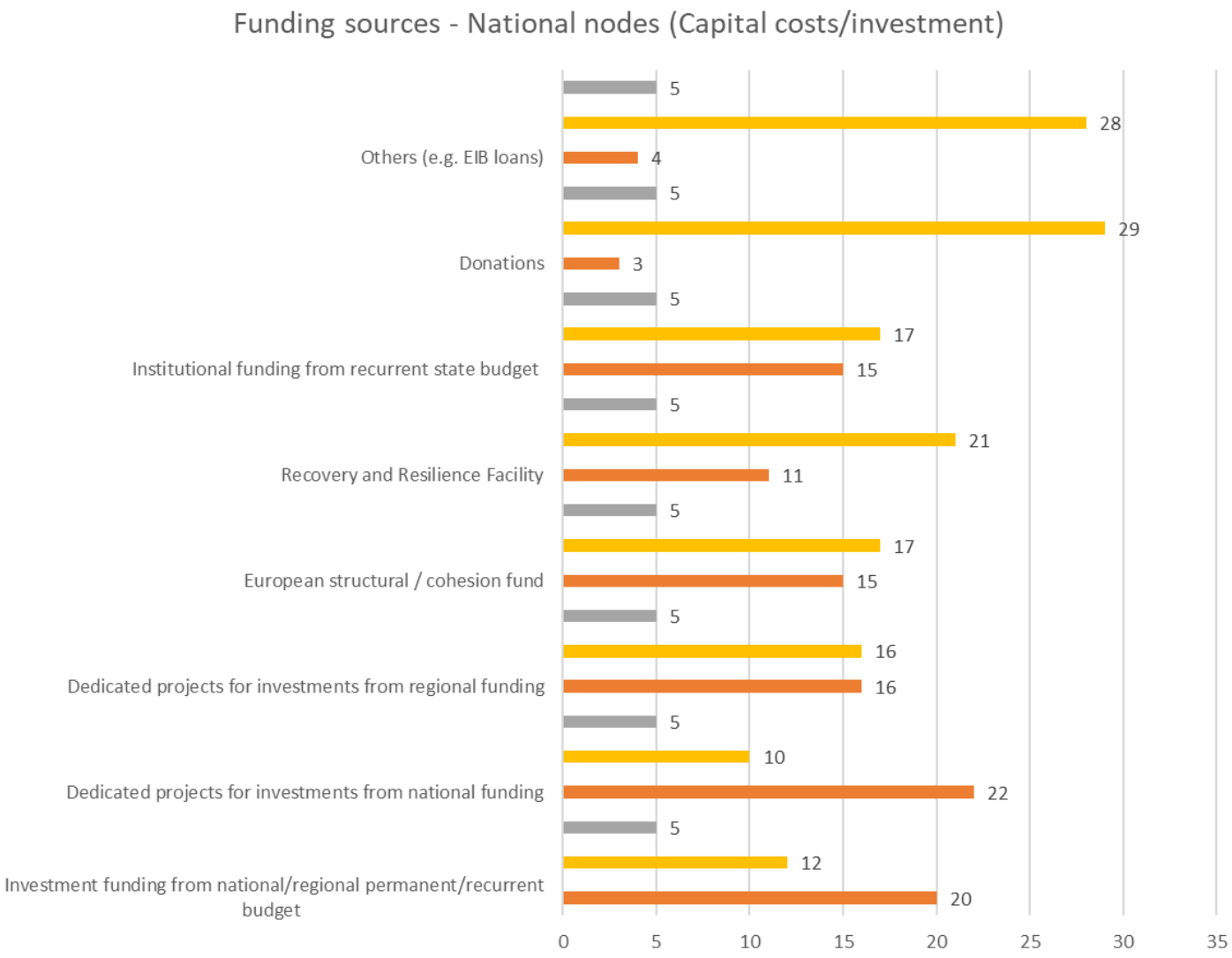



(Yes: Orange / No: Yellow)

Capital costs and investment are reliant on a diversified set of funding sources with most of the funding coming from investments at national and regional level, either through dedicated projects for RI investment or from recurrent (multi-annual) national or regional budgets.

Only 11 RIs reported funding from the respective Recovery and Resilience Facility plans in their country and only a minority (4) reported having demanded loans from the European Investment Bank.

***Figure 7: Funding sources - National nodes (Capital costs/investment)***




(Yes: Orange / No: Yellow)

- ***Operation costs are mainly covered at project level****, with an emphasis for the weight carried out by EU project funding on node operation. Another crucial source of funding for operational costs are national and regional projects. On the one hand this is an indicator of complementarity and potentially also of multilevel R&I agenda alignment. On the other hand, RIs need for stable funding across a long-time frame is not ensured in all cases which raises questions on long-term sustainability.*

- ***ESFRI and EC effort to continue to promote planning and funding at national and regional level through roadmaps is crucial***.
- *The balance of funding for capital costs is diversified and presents a healthy reliance on dedicated projects at national and regional levels and multiannual funding schemes.*
- ***Only 15 of the respondents reported having used structural funds for capital costs, which by their nature are dedicated to structural transformation and upgrade of the technology basis of a territory***, *with a significant component of European NUTS[11] regions using their smart specialization strategies as investment priority frameworks.* ***Further work on this needs to be done to leverage further investment in research infrastructures and in the role of the latter as crucial components of successful innovation ecosystems***, *in a collaborative form with other regional national and international R&I actors, that help the EU achieve resilient and autonomous technological sovereignty in key areas of the present and the future.*

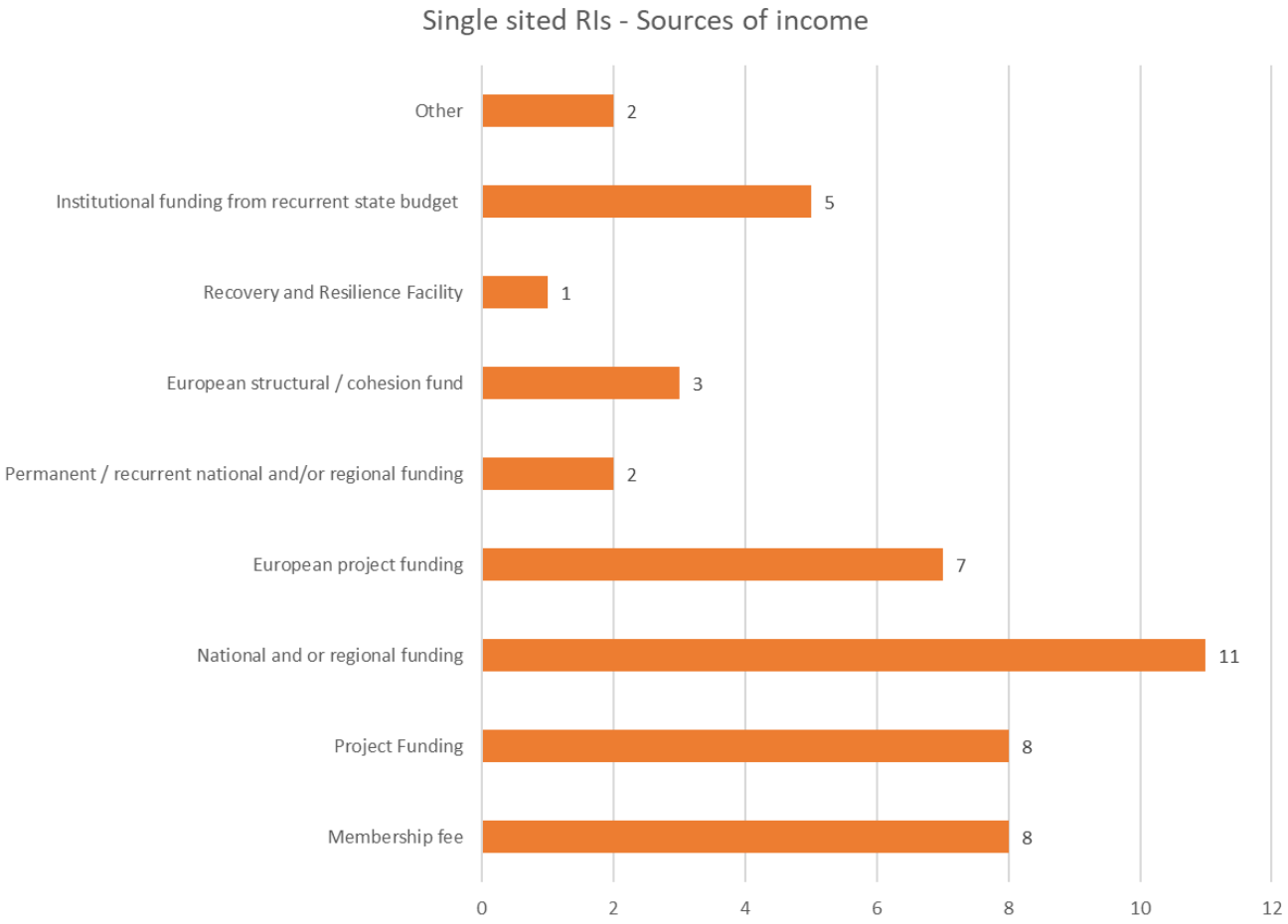
## Sources of income and investment – Single sited RIs

Responses regarding sources of income for single-sited RIs have demonstrated that there is a balance that relies mainly on national and regional funding, which seems clear. Nevertheless, project-based funding, if one adds the results from European project funding (7) + National project funding (8), indicates that for the majority of the respondents there is still a substantial amount of their budget for operation being covered by specific projects.

Membership fees also play an important role and, worryingly, funding from recurrent state budget is rare (5) and only 1 single-sited RI reported benefiting from the Recovery and Resilience Facility.

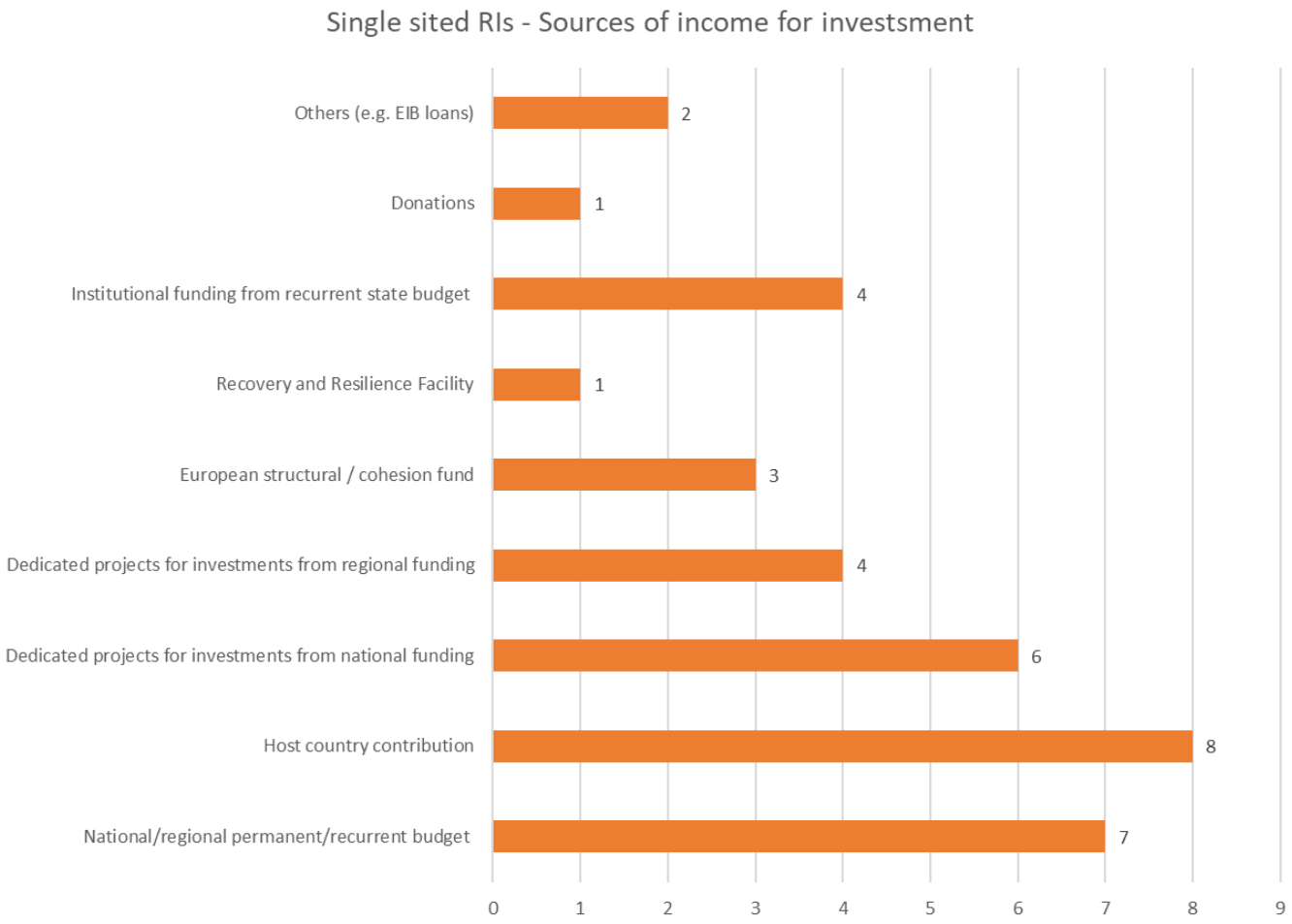
[11] NUTS – Nomenclature of Territorial Unites for Statistics

*Figure 8: Single-sited RIs - Sources of Income*




In the case of single-sited RIs, the fact that the data collected indicates that the majority of capital investment comes from host country contributions and/or national regional recurrent budget emerges as a logical pattern. However, the landscape is diverse and there are cases of large single-sited RIs where we know this is not the case, such as ESS-Lund, CERN, ESRF, ILL, among others.

*Figure 9: Single-sited RIs - Sources of income for investment*



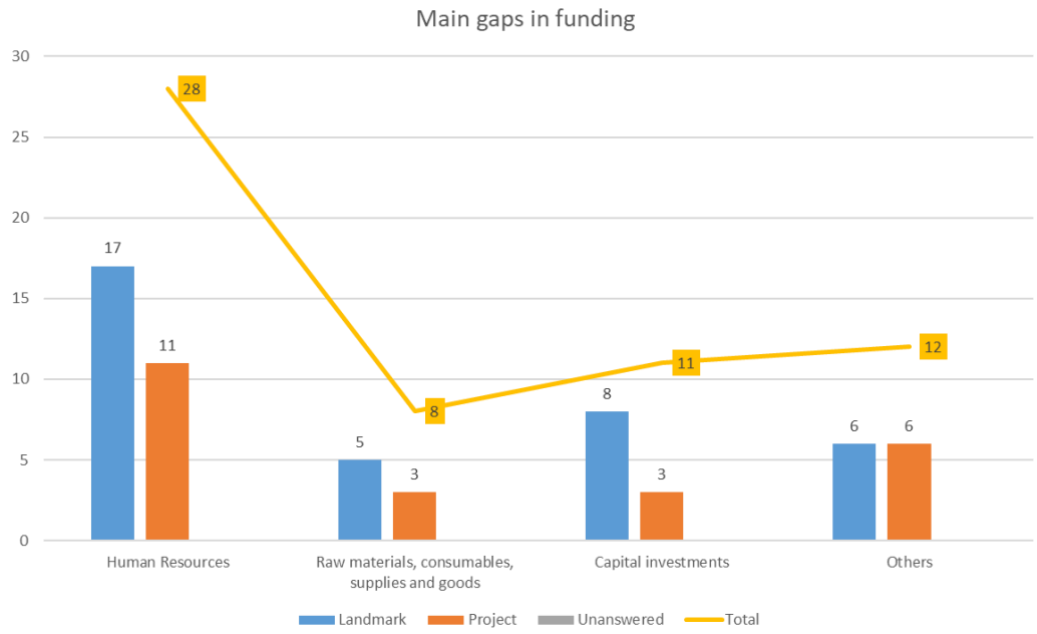

- ***The lack of investment from structural funds and inclusion in Recovery and Resilience Facility*** *plans is a worrying signal of the alignment with local and national investment priorities, but may also be related to a set of other issues, such as research community connectedness with policy and decision makers, the urgency with which the RRF was asked to be developed, the location of the infrastructure or its current needs and maturity of implementation. In any case, further work by ESFRI will be needed to get relevant information on how to support and solve concrete issues and challenges across the diverse reality of the RI world.*

## Main gaps in funding

Regarding main gaps in funding for all RIs the answers were as follows:

- Human resources: 28
- Others: 12
- Capital investments: 11
- Raw materials, supplies and goods: 8

*Figure 10: Main gaps in funding*




- *When asked about **main gaps in funding**, the overwhelming majority of respondents pointed to the **challenge of attraction and retention of human resources**.*
- *This is **in line with the RIs also overwhelming dependence on non-stable (mainly project-based) funding**.*
- *This is also related with the well-known lack of specialized human resources across the EU and the **lack of competitiveness in salaries** in the academic/research sector vis-à-vis the private sector.*
- *From an ecosystems-based approach, this points at the need for **much more focus on the inter-institutional interface dimension of the RIs and RI managing institutions and the need to increase its capacity to work in close collaboration with other key stakeholders**.*

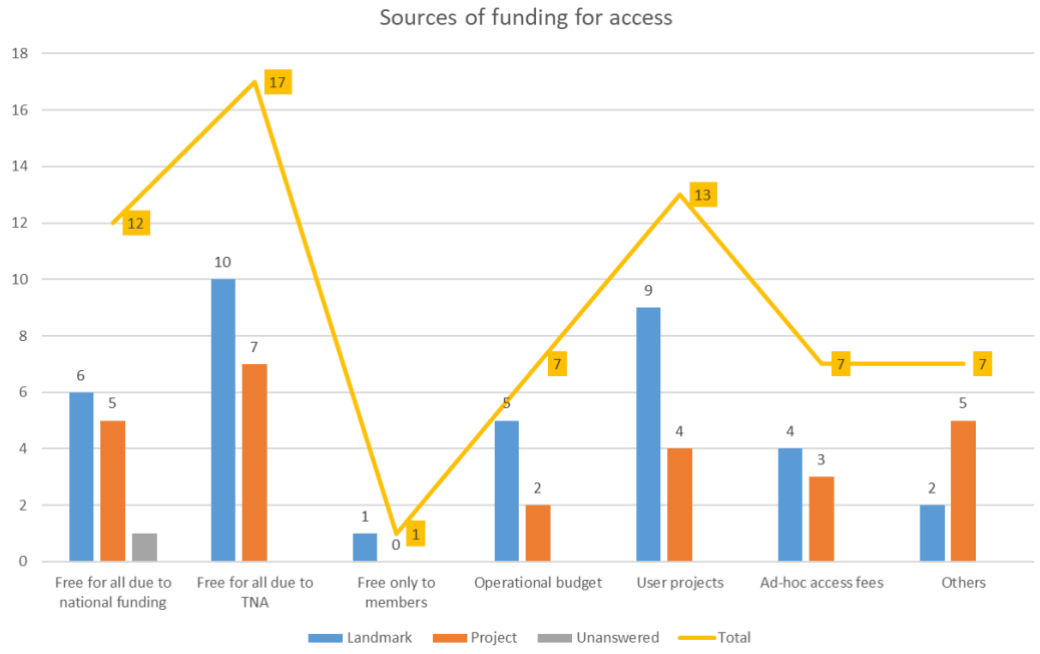
## Funding for access to RIs

Central to the mission of all Research Infrastructures is the ability to provide high-quality access both to internal and external users and, in this way, contribute to the depth and connectedness of the European Research Area.

Distributed RIs funding sources to provide access are as follows:

- Free for all due to TNA – Trans-National Access (based on EU project funding): 17
- User projects: 13
- Free for all due to national funding: 12
- Operational budget: 7
- Ad-hoc access: 7
- Others: 7

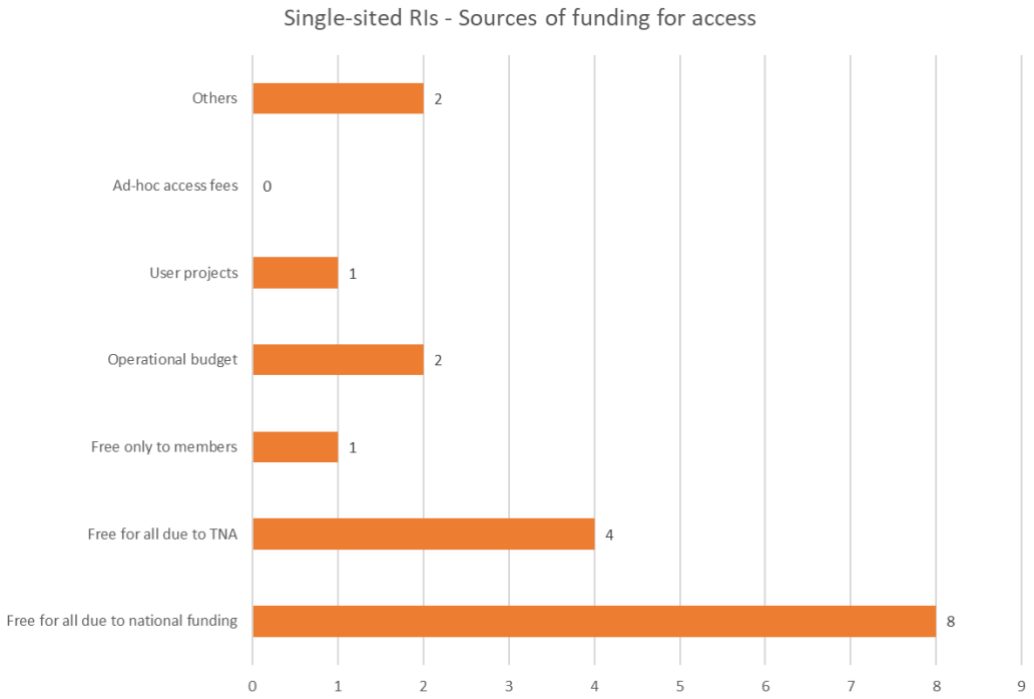
*Figure 11: Sources of funding for access*




Single-sited RIs demonstrate a much higher reliance than distributed RIs on national funding for provision of access (8), complemented mainly by transnational access EU funded projects (4).

Still in what concerns access, it is also worth noting that landmark distributed RIs reported a much higher share of user projects-based funding than single-sited RIs.

*Figure 12: Single-sited RIs - Sources of funding for access*




As it was indicated in the beginning of this report, the drafting group on RI funding also took into consideration the results of the ESFRI analysis on Access[12], which was conducted in 2023. **Financial** challenges, especially operational costs, infrastructure maintenance, and personnel costs, are viewed as **important barriers to broadening access**. The importance of EU funding for TNA and more generally, ensuring consistent, diverse, and adequate funding sources is essential. At the same time, reliance on project-based funding and the ending of specific funding streams pose sustainability threats to RIs. While user fees can be one avenue, they have their limitations and might deter broad access. Comments reflect that efforts should be directed towards identifying diversified funding streams, advocating for long-term support, and exploring innovative financial models to ensure both the sustainability and broadened accessibility of RIs.

Other challenges identified include the limitation for broader access due to limited human resources (example of more beam time), the significance of mutual benefits from RI access, challenges with policy alignment, and the need for greater visibility and streamlined ethical approval procedures across Europe.

Also in the Access report of ESFRI it is indicated that RIs were asked to select as many as needed categories of main users among listed options (researchers, PhD Students, public authorities, public services, private sector). As expected, all respondents confirmed **researchers** as their main users and almost all included PhD students as well. 57% of RIs also selected **private sector** (this rate goes up to +80% by Health and Food – H&F and Environment - ENV RIs), 31% selected **public services** (this rate goes up to +60% by Social Sciences and

[12] European Strategy Forum on Research Infrastructures (ESFRI). (2024). ESFRI Report on Access to Research Infrastructures and Charter on Access to RIs. Zenodo. https://doi.org/10.5281/zenodo.10555986

Humanities - SSH RIs) and 22% selected public authorities (this rate goes up to 60% by ENV RIs).

There is also a marked willingness for opening up to **new research communities** (~60% of respondents), and to **industry users** (+50 % of respondents). However, there are specific trends for some domains: targeting private sector goes up to 80% of respondents for ENV and H&F; and targeting users from public services is signalled by +60% of ENV and SSH RIs (only ~20% all domains together).

- *The **current role of EU funding** in fulfilling the mission of **increasing cooperation, complementarity and transnational access** becomes clear.*
- *Almost all RIs, in all phases of implementation, indicated that **this type of funding is crucial and needs to be dramatically increased**.*
- ***EU support** should provide more continuity to transnational access and appropriate budget to ensure that the best researchers in Europe can access the best RIs.*
- *Funding is a crucial source of RI sustainability. It is very positive to note that **as maturity of implementation increases, the source of funding from user projects also increases**.*
- ***National funding plays an important role and should be reinforced alongside EU funding** to provide access and create a dynamic collaboration between different teams, institutes and increase multidisciplinary capacity to address common societal challenges.*
- *A reflection should be conducted on the fact that RIs provide a large part of their services to public missions. EU funding could be used to support the **public missions of research infrastructures, which go beyond the access provisions.***

## Future funding insights

Regarding the main funding needs and plans for the next 10 years these are the cross-roads of upgrading, keeping up with structural operational costs and extension of activity either for increased relevance through geographical coverage or/and to better respond to major scientific, societal and policy priorities and challenges.

A related aspect directly and indirectly alluded to by many of the RIs has been the effort required for an effective coordination of EU-level distributed activity, in the case of distributed RIs, which call for a widespread need for an integrated, coherent and much larger in volume capital investment too. This is profoundly related to the EU-added value provided by the capacity to build joint research and innovation agendas, which is something the majority of RIs is far from being able to achieve in a structured manner.

The landscape of European Research Infrastructures is at a transformative point, marked by rapid technological advancements, evolving governance dynamics, and pressing societal challenges while facing constrained budgets. The ESFRI Landscape Analysis 2024 decoupled from the update of ESFRI roadmap, is a strategic document

which offers a comprehensive analysis of this dynamic environment, encapsulating current states, services, impact, future trends, challenges, and opportunities in all scientific fields. The reflections on future funding needs of RIs should be articulated with these analytical and strategic considerations of ESFRI.

## Energy efficiency and environmental considerations

When questioned about the intention to implement specific measures for energy efficiency and environmental considerations within the next 2 to 4 years, there is a divided answer with 20 of the respondents answering that yes, it is concretely planned and 15 answering that this type of measures are not specifically planned.

More mature, Landmark projects are more focused on this type of activities than projects at an earlier implementation phase.

Some of the RIs considered this to be an inherent part of their mission and organic growth and operation, given their role and mission.

Summing up, these specific needs related to the twin transitions on research infrastructures, including both the environmental and digital aspects, were reflected in the documents with different degree of implication from RIs. The environmental impact of the research infrastructures and the critical situation connected to the energy crisis and electricity costs impact RI future projections, their funding and sustainability perspectives, and the uncertainty in available funding can explain the disparity in the approaches of the European RIs to these questions. These challenges are common to all European RIs, and thus should be treated in a common approach, sharing good practices and using funding mechanisms, which can facilitate these transitions. A common dedicated European funding source could be a suitable instrument to catalyse the national efforts and to give impulse to national actions.

- *The **majority of the energy efficiency and environmental considerations investment plans are related to capital investments** and some the RIs explicitly mentioned these are difficult or simply **"cannot be covered with the current mix of funding resources"**.*
- *The majority of the **most recent energy efficiency and greening projects** have been **covered by the Recovery and Resilience Plan** of the respective country, shedding light on the awareness of the RIs to this urgent matter and **need to further increase availability of funding instruments aligned and focused with this goal**.*
- *Another **challenge commonly mentioned was the reduction of the carbon-footprint of the RIs operations**: a) through cost-effective rethinking of the operation with minor capital investment (i.e. reduction of in-person meetings, etc.) and b) through the need to rethink and redesign activities that are inherently carbon-heavy (like aviation travel of instruments and materials) or through the need for further incremental R&I to modernize and effectively adapt or even change the underlying technology used.*
- *Once again, the **funding sources referenced to cover the needed capital (but also operational) investments are not clear nor guaranteed** in the majority of the cases with many references to the **need to explore a synergistic approach to the funding mix**, ranging first and foremost from regional and national funding sources, to EU level funding instruments.*

## Results from quantitative data (budget files)

38 RIs submitted budget tables. For easier use, results are shown separating single sited from distributed RIs.

From the 9 single sited RIs [CERN, CTAO, ET, IFMIF, ILL, IRAM, J-IVE, EU Spallation S, EuXFEL]

***Figure 13: Single-sited RIs - budget data***

| Total single sited RIs | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All the amounts are in M€ | | | | | | | | | | | | | |
| single sited RI Income | | | planned for the current year | planned for the 4 coming years | | | | planned for the next 6 coming years | | | | | |
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
| Membership fees | | | | | | | | | | | | | |
| *cash* | € 1.422,83 | € 1.430,88 | € 1.481,90 | € 1.468,64 | € 1.473,25 | € 1.478,34 | € 1.479,19 | € 1.484,29 | € 1.506,35 | € 1.513,25 | € 1.520,15 | € 1.527,55 | € 304,67 |
| *in-kind* | € 0,10 | € 0,53 | € 1,34 | € 56,55 | € 65,18 | € 96,55 | € 118,70 | € 106,07 | € 43,64 | € 41,82 | € 29,33 | € 25,28 | € 14,18 |
| Host country contributions | | | | | | | | | | | | | |
| *cash* | € 20,90 | € 21,32 | € 21,62 | € 20,84 | € 21,25 | € 21,66 | € 22,09 | € 22,07 | € 22,07 | € 22,07 | € 22,07 | € 22,07 | € 22,07 |
| *in-kind* | € 0,52 | € 0,59 | € 1,38 | € 13,09 | € 20,83 | € 54,31 | € 75,97 | € 62,14 | € 48,82 | € 47,00 | € 34,51 | € 30,46 | € 19,36 |
| National/regional project funding | € 0,91 | € 0,71 | € 2,72 | € 2,73 | € 2,75 | € 0,76 | € 0,78 | € 0,54 | € 0,55 | € 0,57 | € 0,59 | € 0,60 | € 0,62 |
| European project funding | € 9,96 | € 14,51 | € 11,27 | € 12,55 | € 11,75 | € 9,56 | € 9,55 | € 9,25 | € 9,29 | € 9,33 | € 9,37 | € 9,41 | € 1,45 |
| Permanent / recurrent national and/or regional funding | € 13,18 | € 13,51 | € 14,57 | € 15,09 | € 15,39 | € 15,70 | € 16,01 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 |
| *cash* | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 |
| *in-kind* | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 |
| Other funding | € 186,22 | € 198,99 | € 184,39 | € 143,81 | € 121,33 | € 117,91 | € 81,30 | € 78,38 | € 78,83 | € 80,16 | € 79,88 | € 79,89 | € 3,19 |
| TOTAL RESOURCES | € 1.654,62 | € 1.681,04 | € 1.719,19 | € 1.733,30 | € 1.731,72 | € 1.794,79 | € 1.803,58 | € 1.762,74 | € 1.709,57 | € 1.714,20 | € 1.695,90 | € 1.695,28 | € 365,55 |
| Expenses | | | | | | | | | | | | | |
| Personnel costs | € 870,32 | € 885,44 | € 895,40 | € 883,19 | € 881,82 | € 897,62 | € 908,07 | € 886,73 | € 865,59 | € 866,33 | € 860,41 | € 861,24 | € 169,91 |
| Other operational costs (excl personnel) | € 353,63 | € 363,43 | € 496,61 | € 489,26 | € 471,27 | € 480,70 | € 476,34 | € 522,49 | € 635,14 | € 628,51 | € 642,04 | € 634,47 | € 141,78 |
| *access costs* | € 0,00 | € 0,00 | € 0,08 | € 0,26 | € 1,64 | € 4,98 | € 7,15 | € 5,83 | € 4,36 | € 4,18 | € 2,93 | € 2,53 | € 1,42 |
| Capital investments | € 327,25 | € 351,66 | € 454,76 | € 566,68 | € 536,12 | € 535,91 | € 535,93 | € 584,85 | € 520,19 | € 488,64 | € 470,30 | € 464,43 | € 301,18 |
| TOTAL expenses | € 1.551,19 | € 1.600,52 | € 1.846,78 | € 1.939,13 | € 1.889,21 | € 1.914,23 | € 1.920,34 | € 1.994,06 | € 2.020,92 | € 1.983,43 | € 1.972,75 | € 1.960,13 | € 612,86 |
| Balance | € 103,43 | € 80,52 | -€ 127,59 | -€ 205,82 | -€ 157,49 | -€ 119,43 | -€ 116,75 | -€ 231,32 | -€ 311,35 | -€ 269,27 | -€ 276,85 | -€ 264,85 | -€ 247,31 |
| Reserve | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 |

- all provided data until year 2027; 4 RIs provided only partial financial figures beyond 2027 or no one until year 2033;
- a total income of > 1,71 bn EUR and total expenses of > 1,84 bn EUR in 2023 is recorded with > 18 bn EUR needed for the years to come (limitation, only partial data beyond 2027)
- Membership fees were in cash only /in-kind only/ mix / or no was the distribution 5 / 1 / 1 / 1
- host country contribution (Premium) was in cash only /in-kind only/ mix / or no the distribution was 2 / 2 / 1 / 4
- Capital investment planned could be found in all 9 RIs.

For the 27 distributed RIs

- HQ data until 2033 are provided only by 12 RIs (AnaEE; EATRIS; EMSO; E-RHIS; GUIDE; IAGOS; ICOS, MARINERG-I; METROFOOD; OPENSCREEN; OPERAS; SLICES);
- Other only until 2030 (IBISBA), 2028 (EURO-BIOIMAGING but no detailed expenses; ELIXIR), 2027 (ARGO; CLARIN; EBRAINS; EHRI; EPOS; ERINHA; ILT; INSTRUCT; MIRRI), 2026 (GGP, SOLARIS), and ECRIN only for 2023
- total income for 2023 will be 66 Mio EUR with 70 Mio EUR expenses and 463 Mio needs for the next 10 years.

### *Figure 14: Distributed RIs - Budget data*

| SUM page | | | | | | | | | | | | | 1000000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All the amounts are in M€ | | | | | | | | | | | | | |
| HQ Income | | | planned for the current year | planned for the 4 coming years | | | | planned for the next 6 coming years | | | | | |
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
| Membership fees | | | | | | | | | | | | | |
| *cash* | € 17,67 | € 18,64 | € 20,04 | € 23,39 | € 26,81 | € 28,83 | € 32,47 | € 25,66 | € 12,44 | € 13,90 | € 13,34 | € 13,39 | € 13,46 |
| *in-kind* | € 0,52 | € 0,54 | € 0,73 | € 0,96 | € 0,96 | € 0,96 | € 1,06 | € 0,39 | € 0,15 | € 0,15 | € 0,15 | € 0,15 | € 0,15 |
| Host country contribution | | | | | | | | | | | | | |
| *cash* | € 7,71 | € 7,18 | € 8,67 | € 8,91 | € 9,88 | € 9,99 | € 9,76 | € 8,10 | € 8,22 | € 9,53 | € 9,55 | € 9,56 | € 9,60 |
| *in-kind* | € 5,43 | € 5,23 | € 6,87 | € 7,71 | € 7,96 | € 8,17 | € 7,89 | € 2,90 | € 2,93 | € 2,94 | € 2,96 | € 2,98 | € 2,51 |
| National/regional project funding | € 0,14 | € 0,36 | € 0,45 | € 0,00 | € 0,00 | € 0,00 | € 2,00 | € 4,00 | € 4,00 | € 2,00 | € 2,00 | € 0,00 | € 0,00 |
| European project funding | € 13,22 | € 18,56 | € 27,81 | € 21,21 | € 17,26 | € 15,63 | € 16,71 | € 12,61 | € 9,07 | € 6,00 | € 6,19 | € 4,49 | € 4,69 |
| Permanent / recurrent national and/or regional funding | € 0,00 | € 0,08 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 |
| *cash* | € 0,13 | € 0,13 | € 0,13 | € 0,13 | € 0,13 | € 0,13 | € 0,13 | € 0,13 | € 0,27 | € 0,27 | € 0,27 | € 0,27 | € 0,27 |
| *in-kind* | € 0,04 | € 0,03 | € 0,05 | € 0,10 | € 0,05 | € 0,05 | € 0,25 | € 0,20 | € 0,20 | € 0,20 | € 0,20 | € 0,20 | € 0,20 |
| Other funding | € 1,70 | € 1,13 | € 1,88 | € 1,39 | € 1,28 | € 1,27 | € 1,52 | € 0,74 | € 0,90 | € 0,89 | € 0,91 | € 0,92 | € 0,94 |
| TOTAL RESOURCES | € 46,55 | € 51,87 | € 66,65 | € 63,80 | € 64,32 | € 65,04 | € 71,79 | € 54,74 | € 38,18 | € 35,90 | € 35,58 | € 31,96 | € 31,82 |
| | | | | | | | | | | | | | |
| HQ Expenses | | | | | | | | | | | | | |
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
| Personnel costs | € 21,51 | € 23,79 | € 32,15 | € 26,32 | € 27,23 | € 28,20 | € 29,75 | € 22,71 | € 20,24 | € 21,94 | € 21,79 | € 22,05 | € 22,33 |
| Other operational costs (excl personnel) | € 19,05 | € 19,89 | € 35,32 | € 23,04 | € 23,85 | € 24,28 | € 25,12 | € 21,36 | € 8,70 | € 9,19 | € 9,12 | € 9,32 | € 9,29 |
| *access costs* | € 0,86 | € 0,47 | € 0,74 | € 1,47 | € 1,81 | € 1,76 | € 1,40 | € 0,30 | € 0,05 | € 0,05 | € 0,00 | € 0,00 | € 0,00 |
| Capital investments | € 0,41 | € 0,34 | € 2,69 | € 1,77 | € 1,45 | € 2,21 | € 6,92 | € 11,29 | € 11,16 | € 6,21 | € 6,21 | € 2,21 | € 1,76 |
| TOTAL expenses | € 41,83 | € 44,49 | € 70,90 | € 52,61 | € 54,34 | € 56,46 | € 63,19 | € 55,65 | € 40,15 | € 37,40 | € 37,13 | € 33,58 | € 33,39 |
| | | | | | | | | | | | | | |
| Balance | € 4,72 | € 7,38 | -€ 4,25 | € 11,19 | € 9,98 | € 8,58 | € 8,60 | -€ 0,92 | -€ 1,97 | -€ 1,50 | -€ 1,55 | -€ 1,62 | -€ 1,57 |
| Reserve | € 11,73 | € 11,09 | € 4,90 | -€ 3,05 | -€ 5,56 | -€ 8,09 | -€ 10,73 | -€ 15,19 | € 0,22 | € 0,25 | € 0,28 | € 0,31 | € 0,41 |

Much less information was provided for the National Nodes:

16 RIs provided national node data (11 do not have National Node data!) with very few having data beyond 2027 (ARGO (y21-27), EURO-BIOIMAGING (only income / no expenses), CLARIN (only income / no expenses and y21-24 only), EBRAINS (y21-27), EHRI (y21-27), E-HRIS (full), GUIDE (full), IAGOS (full), ISBISBA (y21-23), ICOS (full), ILT (only income / no expenses), INSTRUCT (full y21-27), MARINERG-I (full), METROFOOD (full), MIRRI (full), OPERAS (full), SLICES (full).

### *Figure 15: Distributed RIs - National nodes budget data*

| National Nodes Income (Total) | | | planned for the current year | planned for the 4 coming years | | | | planned for the next 6 coming years | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
| National / regional project funding | € 43,44 | € 54,27 | € 46,42 | € 53,21 | € 75,86 | € 61,26 | € 149,42 | € 63,83 | € 84,14 | € 63,60 | € 66,36 | € 18,98 | € 39,76 |
| European porject funding | € 32,64 | € 32,34 | € 35,20 | € 24,87 | € 20,47 | € 17,26 | € 20,56 | € 11,84 | € 9,52 | € 9,31 | € 9,45 | € 4,61 | € 4,77 |
| Permanent / recurrent national and/or regional funding | € 131,72 | € 142,84 | € 143,91 | € 145,18 | € 267,81 | € 278,81 | € 280,81 | € 28,05 | € 29,05 | € 32,05 | € 34,05 | € 34,05 | € 34,05 |
| *cash* | € 4,01 | € 5,12 | € 5,36 | € 7,92 | € 9,26 | € 9,42 | € 9,12 | € 8,68 | € 8,68 | € 8,69 | € 8,70 | € 8,71 | € 8,72 |
| *in-kind* | € 12,59 | € 11,84 | € 13,06 | € 18,34 | € 20,87 | € 20,76 | € 21,35 | € 11,79 | € 12,03 | € 12,07 | € 12,11 | € 12,14 | € 12,19 |
| European structural/cohesion Fund | € 26,84 | € 29,97 | € 2,03 | € 33,67 | € 5,36 | € 9,16 | € 6,24 | € 1,38 | € 1,45 | € 1,72 | € 1,59 | € 1,67 | € 1,76 |
| Recovery and Resilience Facility | € 1,70 | € 5,86 | € 33,32 | € 30,00 | € 7,53 | € 2,58 | € 2,57 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 | € 0,00 |
| Other funding | € 136,51 | € 131,50 | € 137,91 | € 92,15 | € 95,52 | € 95,59 | € 100,56 | € 88,25 | € 7,44 | € 5,72 | € 6,11 | € 3,77 | € 6,41 |
| TOTAL RESOURCES | € 389,45 | € 413,74 | € 417,20 | € 405,34 | € 502,67 | € 494,84 | € 590,63 | € 213,82 | € 152,31 | € 133,16 | € 138,38 | € 83,94 | € 107,66 |
| | | | | | | | | | | | | | |
| Expenses | | | | | | | | | | | | | |
| Personnel costs | € 124,34 | € 129,04 | € 133,05 | € 137,56 | € 206,91 | € 218,06 | € 247,82 | € 63,21 | € 75,20 | € 65,49 | € 68,32 | € 52,35 | € 65,22 |
| Other operational costs (excl personnel) | € 59,57 | € 70,19 | € 81,32 | € 74,53 | € 138,55 | € 139,73 | € 146,40 | € 19,15 | € 24,65 | € 23,70 | € 25,10 | € 22,33 | € 24,75 |
| *access costs* | € 1,12 | € 1,16 | € 2,44 | € 1,73 | € 1,47 | € 1,48 | € 1,61 | € 0,56 | € 0,59 | € 0,61 | € 0,63 | € 0,65 | € 0,67 |
| Capital investments | € 82,60 | € 89,76 | € 66,06 | € 96,50 | € 96,15 | € 75,55 | € 131,77 | € 49,42 | € 53,49 | € 46,50 | € 47,35 | € 8,67 | € 16,73 |
| TOTAL expenses | € 266,51 | € 289,00 | € 280,43 | € 308,58 | € 441,61 | € 433,35 | € 525,99 | € 131,78 | € 153,34 | € 135,70 | € 140,78 | € 83,35 | € 106,69 |
| | | | | | | | | | | | | | |
| Balance | € 122,94 | € 124,75 | € 136,76 | € 96,76 | € 61,07 | € 61,50 | € 64,65 | € 82,04 | -€ 1,03 | -€ 2,53 | -€ 2,40 | € 0,59 | € 0,97 |
| Reserve | € 117,53 | € 117,53 | € 117,52 | € 84,71 | € 83,96 | € 83,56 | € 84,48 | € 82,83 | -€ 0,44 | -€ 0,56 | -€ 0,67 | -€ 0,78 | -€ 0,89 |

Because of lack of provided national node data total spending and investment needs can´t be calculated.

## Cost categories per major RI domains

When looking into the major cost categories, there are substantial differences between distributed and single sited RIs and to a lesser extent also between different scientific domains.

The budget tables reflect, in large measure, the findings retrieved by the qualitative component of the questionnaire to RIs. In distributed RIs, the most obvious finding is that most if not all central hubs (secretariat/central management/HQs) predominately personnel costs is the major cost factor. Still some RIs' operational costs can be equal or higher than their personnel costs. Access costs are (in those cases identified) a very minor cost category. Capital investment costs do not exist in many distributed RIs HQs.

Different to the central hub is the cost category distribution within the National Nodes much closer to that of single sited RIs. In scientific areas which mainly uses brain power again personnel costs is the largest category. In contrast, RIs with relying on heavy equipment operational costs is more important. Capital investment category therefore is also a dominant cost category. Due to few and partially filled data, interpretation of the financial data within National Nodes is less reliable than that of central hubs. Access costs (again in those few cases identified) are relatively little.

Within the world of single sited RIs almost all exist within the broader academic discipline of physical sciences incl. astronomy. Capital investment plus operational costs equals personnel cost category. Interestingly none of the 9 participating RIs within this survey was able to identify / or allowed to share their access costs (which in some RIs might equal the total of all costs).

# Annexes

## Annex 1 - List of RIs invited to participate

| Name | Fullname |
|---|---|
| EBRAINS | European Brain ReseArch INfrastructureS |
| SLICES | Scientific Large-scale Infrastructure for Computing/ Communication Experimental Studies |
| SoBigData++ | European Integrated Infrastructure for Social Mining and Big Data Analytics |
| IFMIF-DONES | International Fusion Materials Irradiation Facility - DEMO Oriented Neutron Source |
| MARINERG-i | Marine Renewable Energy Research Infrastructure |
| DANUBIUS-RI | International Centre for Advanced Studies on River-Sea Systems |
| DiSSCo | Distributed System of Scientific Collections |
| eLTER RI | Integrated European Long-Term Ecosystem, critical zone and socio-ecological system Research Infrastructure |
| EIRENE RI | Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe |
| EMPHASIS | European Infrastructure for Multi-scale Plant Phenomics and Simulation |
| EU-IBISBA | European Industrial Biotechnology Innovation and Synthetic Biology Accelerator |
| METROFOOD-RI | Infrastructure for promoting Metrology in Food and Nutrition |
| EST | European Solar Telescope |
| ET | Einstein Telescope |
| EuPRAXIA | European Plasma Research Accelerator with Excellence in Applications |
| KM3NeT 2.0 | KM3 Neutrino Telescope 2.0 |
| E-RIHS | European Research Infrastructure for Heritage Science |
| EHRI | European Holocaust Research Infrastructure |
| GGP | The Generations and Gender Programme |
| GUIDE | Growing Up in Digital Europe: Euro Cohort |
| OPERAS | OPen scholarly communication in the European Research Area for Social Sciences and Humanities |
| RESILIENCE | REligious Studies Infrastructure: tooLs, Innovation, Experts, conNections and Centres in Europe |
| PRACE | Partnership for Advanced Computing in Europe |
| ECCSEL ERIC | European Carbon Dioxide Capture and Storage Laboratory Infrastructure |
| EU-SOLARIS | European Solar Research Infrastructure for Concentrated Solar Power |
| JHR | Jules Horowitz Reactor |
| ACTRIS | Aerosol, Clouds and Trace Gases Research Infrastructure |
| EISCAT_3D | Next generation European Incoherent Scatter radar system |
| EMSO ERIC | European Multidisciplinary Seafloor and water-column Observatory |

| | |
|---|---|
| EPOS ERIC | European Plate Observing System |
| EURO-ARGO ERIC | European contribution to the international Argo Programme |
| IAGOS | In-service Aircraft for a Global Observing System |
| ICOS ERIC | Integrated Carbon Observation System |
| LifeWatchERIC | e-Infrastructure for Biodiversity and Ecosystem Research |
| AnaEE | Analysis and Experimentation on Ecosystems |
| BBMRI ERIC | Biobanking and Bio Molecular Resources Research Infrastructure |
| EATRIS ERIC | European Advanced Translational Research Infrastructure in Medicine |
| ECRIN ERIC | European Clinical Research Infrastructure Network |
| ELIXIR | A distributed infrastructure for life-science data |
| EMBRC ERIC | European Marine Biological Resource Centre |
| ERINHA | European Research Infrastructure on Highly Pathogenic Agents |
| EU-OPENSCREEN ERIC | European Infrastructure of Open Screening Platforms for Chemical Biology |
| Euro-BioImaging ERIC | European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences |
| INFRAFRONTIER | European Research Infrastructure for the generation, phenotyping, archiving and distribution of mouse disease models |
| INSTRUCT ERIC | Integrated Structural Biology Infrastructure |
| MIRRI | Microbial Resource Research Infrastructure |
| CTA | Cherenkov Telescope Array |
| ELI ERIC | Extreme Light Infrastructure |
| ELT | Extremely Large Telescope |
| EMFL | European Magnetic Field Laboratory |
| ESRF EBS | European Synchrotron Radiation Facility Extremely Brilliant Source |
| European Spallation Source ERIC | European Spallation Source |
| EuropeanXFEL | European X-Ray Free-Electron Laser Facility |
| FAIR | Facility for Antiproton and Ion Research |
| HL-LHC | High-Luminosity Large Hadron Collider |
| ILL | Institut Max von Laue – Paul Langevin |
| SKAO | Square Kilometre Array Observatory |
| SPIRAL2 | Systeme de Production díl ons Radioactifs en Ligne de 2e generation |
| CESSDA ERIC | Consortium of European Social Science Data Archives |
| CLARIN ERIC | Common Language Resources and Technology Infrastructure |

| | |
|---|---|
| DARIAH ERIC | Digital Research Infrastructure for the Arts and Humanities |
| ESS ERIC | European Social Survey |
| SHARE ERIC | Survey of Health, Ageing and Retirement in Europe |
| CERIC | Central European Research Infrastructure Consortium |
| JIVE | Joint Institute for the use of Very Long Baseline Interferometry |
| EGO-VIRGO | European Gravitational Observatory |
| IRAM | Institut de radioastronomie millimétrique |
| LOFAR | Low Frequency Array |
| CONCORDIA | Research station in Antarctica |
| ECORD | The European Consortium for Ocean Research Drilling |
| CERN | European Organization for Nuclear Research |
| ESO | European Southern Observatory |
| EMBL | European Molecular Biology Laboratory |
| ECMWF | European Centre for Medium-Range Weather Forecasts |
| ESRF | The European Synchrotron Radiation Facility |

## Annex 2: List of RIs participating

| Name | Fullname |
|---|---|
| EBRAINS | European Brain ReseArch INfrastructureS |
| SLICES | Scientific Large-scale Infrastructure for Computing/ Communication Experimental Studies |
| IFMIF-DONES | International Fusion Materials Irradiation Facility - DEMO Oriented Neutron Source |
| MARINERG-i | Marine Renewable Energy Research Infrastructure |
| DANUBIUS-RI | International Centre for Advanced Studies on River-Sea Systems |
| eLTER RI | Integrated European Long-Term Ecosystem, critical zone and socio-ecological system Research Infrastructure |
| EMPHASIS | European Infrastructure for Multi-scale Plant Phenomics and Simulation |
| EU-IBISBA | European Industrial Biotechnology Innovation and Synthetic Biology Accelerator |
| METROFOOD-RI | Infrastructure for promoting Metrology in Food and Nutrition |
| ET | Einstein Telescope |
| E-RIHS | European Research Infrastructure for Heritage Science |
| EHRI | European Holocaust Research Infrastructure |
| GUIDE | Growing Up in Digital Europe: Euro Cohort |
| OPERAS | OPen scholarly communication in the European Research Area for Social Sciences and Humanities |
| RESILIENCE | REligious Studies Infrastructure: tooLs, Innovation, Experts, conNections and Centres in Europe |
| ECCSEL ERIC | European Carbon Dioxide Capture and Storage Laboratory Infrastructure |
| EU-SOLARIS | European Solar Research Infrastructure for Concentrated Solar Power |
| JHR | Jules Horowitz Reactor |
| ACTRIS | Aerosol, Clouds and Trace Gases Research Infrastructure |
| EPOS ERIC | European Plate Observing System |
| EURO-ARGO ERIC | European contribution to the international Argo Programme |
| IAGOS | In-service Aircraft for a Global Observing System |
| LifeWatch ERIC | e-Infrastructure for Biodiversity and Ecosystem Research |
| AnaEE | Analysis and Experimentation on Ecosystems |
| EATRIS ERIC | European Advanced Translational Research Infrastructure in Medicine |
| ECRIN ERIC | European Clinical Research Infrastructure Network |
| ELIXIR | A distributed infrastructure for life-science data |
| EMBRC ERIC | European Marine Biological Resource Centre |
| ERINHA | European Research Infrastructure on Highly Pathogenic Agents |

| | |
|---|---|
| EU-OPENSCREEN ERIC | European Infrastructure of Open Screening Platforms for Chemical Biology |
| Euro-BioImaging ERIC | European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences |
| INSTRUCT ERIC | Integrated Structural Biology Infrastructure |
| MIRRI | Microbial Resource Research Infrastructure |
| CTA | Cherenkov Telescope Array |
| European Spallation Source ERIC | European Spallation Source |
| European XFEL | European X-Ray Free-Electron Laser Facility |
| FAIR | Facility for Antiproton and Ion Research |
| HL-LHC | High-Luminosity Large Hadron Collider |
| ILL | Institut Max von Laue Paul Langevin |
| SPIRAL2 | Système de Production d'Ions Radioactifs en Ligne de 2e génération |
| CLARIN ERIC | Common Language Resources and Technology Infrastructure |
| ESS ERIC | European Social Survey |
| JIVE | Joint Institute for the use of Very Long Baseline Interferometry |
| IRAM | Institut de radioastronomie millimétrique |
| LOFAR | Low Frequency Array |
| CERN | European Organization for Nuclear Research |
| ESO | European Southern Observatory |
| Synchrotron SOLEIL | Synchrotron SOLEIL |
| DiSSCo | Distributed System of Scientific Collections |

## Annex 3: List of countries participating

Bulgaria
Croatia
Czechia
Denmark
France
Germany
Hungary
Iceland
Ireland
Italy
Malta
The Netherlands
Norway
Poland
Portugal
Slovak Republic
Slovenia
Spain
Turkey

# Annex 4: Questionnaires to Member States and to RI managers

## Questionnaire for MS

Dear colleagues,

Since 2016 ESFRI has introduced in its Roadmaps the Landscape Analysis which provides an overview of the European RI ecosystem by identifying the main RIs operating transnational access in Europe, in all fields of research, and major new or ongoing projects, as well as an outlook to the global landscape of relevance.

The onset of the renewed European Research Area brought new ambition also to Landscape Analysis. Decoupled from the next Roadmap process and completed by the end of 2023, it should provide the framework for the next ESFRI roadmap, contribute to the EOSC Strategic Research and Innovation Agenda, promote the development of new research infrastructure services, including, when needed, infrastructure clustering for pan-European thematic or interdisciplinary services and foster RIs' contribution to the implementation of European Missions.

To prepare such an ambitious report, ESFRI has decided to involve directly the RIs and main stakeholders which could provide the relevant information for this report. To this aim, you are kindly asked to fill in the questionnaire below, where information about the current status, trends and future developments, as well as impact, is collected.

Please complete the questionnaire below until 7th of April and always provide detailed answers and links to illustrate those answers, if possible.

Contact: RI-funding@esfri.eu

Every question contains space for comments; thus if you would like to specify some information in your answer, do not hesitate to use this space.

**Q1 - Country**

Albania
Armenia
Austria
Belgium
Bosnia and Herzegovina
Bulgaria
Czech Republic
Croatia
Cyprus
Denmark
Estonia
Faroe Islands
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Latvia
Liechtenstein
Lithuania
Luxembourg
Malta
Moldova
Montenegro
Netherlands
North Macedonia
Norway
Poland
Portugal
Romania
Serbia
Slovak Republic
Slovenia
Spain
Sweden
Turkey
Ukraine
Other:

**Q2 - Contact person for this questionnaire:**

Name _____

Surname _____

**email - Email:**

(e.g. john@gmail.com)

_____

**Q3 - Through which instruments are RIs (list of RIs) financed in your country and which are the amounts of these funding contributions, with reference to the year 2021 (If the information/figures for the reference year are not available, please refer to the most recent numbers and precise the year of reference in your case.).**

| | Financed through the instrument | | | |
|---|---|---|---|---|
| | yes | no | Amount (EUR) | Reference year (YYYY) |
| Permanent/recurrent direct national state funding | ◌ | ◌ | | |
| Institutional funding from the recurrent/permanent state budget | ◌ | ◌ | | |
| National project funding | ◌ | ◌ | | |
| Regional project funding besides structural cohesion funds | ◌ | ◌ | | |
| EU R&D Funding (especially Framework programmes) | ◌ | ◌ | | |
| Structural/cohesion funds | ◌ | ◌ | | |

| | | | |
|---|---|---|---|
| EU Recovery and Resilience Facility | ◌ | ◌ | |
| Other ( e.g. EIB loans (please explain): | ◌ | ◌ | |
| Other: | ◌ | ◌ | |
| Other: | ◌ | ◌ | |

**Q7 - If you have any comment you can add it here.**

_____

**Q8 - In case you use different instruments for different categories of RIs (e.g. Intergovernmental organization, ERICs etc.), please explain:**

_____

**Q9 - Can you specify, if you have different Instruments of funding for Investments and operational costs of RIs?**

_____

**Q10 - Investments are financed via:**

| | yes | no | Amount (EUR) |
|---|---|---|---|
| Permanent/recurrent direct national state funding | ◌ | ◌ | |
| Institutional funding from the recurrent/permanent state budget | ◌ | ◌ | |
| National project funding | ◌ | ◌ | |
| Regional project funding besides structural cohesion funds | ◌ | ◌ | |
| EU R&D Funding (especially Framework programmes) | ◌ | ◌ | |
| Structural/cohesion funds | ◌ | ◌ | |
| EU Recovery and Resilience Facility | ◌ | ◌ | |
| Other ( e.g. EIB loans (please explain): | ◌ | ◌ | |

**Q13 - Operational costs are financed via:**

| | yes | no | Amount (EUR) |
|---|---|---|---|
| Permanent/recurrent direct national state funding | ◌ | ◌ | |
| Institutional funding from the recurrent/permanent state budget | ◌ | ◌ | |
| National project funding | ◌ | ◌ | |
| Regional project funding besides structural cohesion funds | ◌ | ◌ | |
| EU R&D Funding (especially Framework programmes) | ◌ | ◌ | |
| Structural/cohesion funds | ◌ | ◌ | |
| EU Recovery and Resilience Facility | ◌ | ◌ | |
| Other ( e.g. EIB loans (please explain): | ◌ | ◌ | |

**Q16 - Country membership contributions to RIs are paid through:**

| | yes | no | Amount (EUR) |
|---|---|---|---|
| Permanent/recurrent direct national state funding | ◌ | ◌ | |
| Institutional funding from the recurrent/permanent state budget | ◌ | ◌ | |
| National project funding | ◌ | ◌ | |
| Regional project funding besides structural cohesion funds | ◌ | ◌ | |
| EU R&D Funding (especially Framework programmes) | ◌ | ◌ | |

| | | | |
|---|---|---|---|
| Structural/cohesion funds | ◌ | ◌ | |
| EU Recovery and Resilience Facility | ◌ | ◌ | |
| Other ( e.g. EIB loans ): | ◌ | ◌ | |

**Q19 - In the case where your country (an organisation of your country) hosts RIs, is a host country contribution/premium paid?**

◌ Yes

◌ No

◌ Other (e.g. approach varies depending on the type of organisation of the RI).

**Q20 - Country membership contributions to RIs are paid through:**

| | yes | no | Amount (EUR) |
|---|---|---|---|
| Permanent/recurrent direct national state funding | ◌ | ◌ | |
| Institutional funding from the recurrent/permanent state budget | ◌ | ◌ | |
| National project funding | ◌ | ◌ | |
| Regional project funding besides structural cohesion funds | ◌ | ◌ | |
| EU R&D Funding (especially Framework programmes) | ◌ | ◌ | |
| Structural/cohesion funds | ◌ | ◌ | |
| EU Recovery and Resilience Facility | ◌ | ◌ | |
| Other ( e.g. EIB loans ) | ◌ | ◌ | |

**Q23 - What are the main bottlenecks for stable funding of RIs in your country?**

_____

**Q24 - Are there any national or regional measures (instruments, other initiatives) foreseen or in development to improve stability of funding of RIs?**

_____

**Q25 - Can you describe a good practice of (stable) funding for RIs in your country (e.g. multiannual commitment to funding, synergies between european and national or regional level funding, among others you may wish to describe)?**

_____

**Q26 - How does your country/region evaluate funding needs of RIs?**

_____

**Q27 - How do you prioritize investments into RIs?**

_____

**Q28 - Do you have a funding concept associated to your National RI Roadmap? Please describe the different funding sources used.**

_____

**Q29 - In the absence of a National RI Roadmap, please describe your RI funding prioritisation and funding strategies.**

_____

**Q30 - Do you have suggestions for the improvement of funding instruments for RIs at European level? Do you see the areas where the EU funding can be particularly helpful?**

_____

**Q31 - Has your country used EIB loans as a source of funding for RIs? Do you consider such an instrument for financing future RI investments? Are there any legal obstacles in your country to use EIB loans for investments in RIs?**

_____

**Q32 - Concerning the current challenges linked to Energy costs, what are the solutions that your government is able to propose in order to support the RIs? Maybe a solution can be found at the European level?**

_____

**Q33 - Certain RIs are facing difficulties with the supply of raw materials for their operations. What are the mitigation measures that your government can take? Otherwise, can you suggest any mitigation measure at the European level?**

_____

**Q34 - Does your government consider the "greening" of research infrastructures in its strategic reflection? In which way is your government planning to support this European priority and which funding instruments could be used for such investments in RIs? Do you think that particular funding instruments should be set up at the European level to foster the progress of RIs towards this priority?**

_____

**Q35 - Does your government consider other issues in RIs funding which were not covered by this questionnaire?**

_____

## SURVEY RI Managers

Dear colleagues,

Since 2016 ESFRI has introduced in its Roadmaps the Landscape Analysis which provides an overview of the European RI ecosystem by identifying the main RIs operating transnational access in Europe, in all fields of research, and major new or ongoing projects, as well as an outlook to the global landscape of relevance.

The onset of the renewed European Research Area brought new ambition also to Landscape Analysis. Decoupled from the next Roadmap process and completed by the end of 2023, it should provide the framework for the next ESFRI roadmap, contribute to the EOSC Strategic Research and Innovation Agenda, promote the development of new research infrastructure services, including, when needed, infrastructure clustering for pan-European thematic or interdisciplinary services and foster RIs' contribution to the implementation of European Missions.

To prepare such an ambitious report, ESFRI has decided to involve directly the RIs and main stakeholders which could provide the relevant information for this report. To this aim, you are kindly asked to fill in the questionnaire below, where information about the current status, trends and future developments, as well as impact, is collected.

Please complete the questionnaire until 7th of April and always provide detailed answers and links to illustrate those answers, if possible.

Contact: RI-funding@esfri.eu

**Q1 - Title: full name of the RI**

_____

**Q2 - Short description and goals of the RI (max 300 words).**

_____

**Q3 - Key person for this questionnaire:**

Name _____ Surname _____

**email - Please provide your email, so we can contact you for further clarifications.**

(e.g. john@gmail.com)

_____

**Q4 - Website of the RI.**

(e.g. http://www.google.com)

_____

**Q5 - Key descriptive data**

_____

**Q6 - Which is the legal status of RI?**

_____

**Q7 - Establishment of the legal status (date)**

**Q8 - Lead country (HQ/secretariat):**

_____

**Q9 - Member countries (nodes):**

_____

**Q10 - ESFRI status (if applicable):**

◌ Project

◌ Landmark

◌ Not applicable

**Q11 - Which phase of the RI lifecycle are you in:**

◌ Concept

◌ Construction

◌ Operation

**Q12 - What kind of RI are you?**

◌ Single sited

◌ Distributed

**Q13 - Current funding status**

_____(

## IF DISTRIBUTED RI

**Q14 - How is constituted your mix of sources of income for HQ (the hub) (refer to the last 3 years):**

Multiple answers are possible

☐ Membership fee

☐ Host country contribution

☐ National/regional project funding

- ☐ European project funding
- ☐ Permanent / recurrent national and/or regional funding
- ☐ Institutional funding from recurrent state budget
- ☐ Other:

IF (1) Q12 = [2]

**Q15 - Comment if needed:**

_____

(1) Q12 = [2]

**Q16 - How is constituted your mix of sources of income for national nodes (operational costs) (refer to the last 3 years):**

Multiple answers are possible

- ☐ National/regional project funding
- ☐ European project funding
- ☐ Permanent / recurrent national and/or regional funding
- ☐ European structural / cohesion fund
- ☐ Recovery and Resilience Facility
- ☐ Institutional funding from recurrent state budget
- ☐ Other:

IF (1) Q12 = [2]

**Q17 - Comment if needed:**

_____

(1) Q12 = [2]

**Q18 - How is constituted your mix of sources of income for national nodes (capital costs/investment) (refer to the last 3 years):**

Multiple answers are possible

- ☐ Investment funding from national/regional permanent/recurrent budget
- ☐ Dedicated projects for investments from national funding
- ☐ Dedicated projects for investments from regional funding
- ☐ European structural / cohesion fund
- ☐ Recovery and Resilience Facility
- ☐ Institutional funding from recurrent state budget
- ☐ Donations
- ☐ Others (e.g. EIB loans):

IF (1) Q12 = [2]

**Q19 - Comment if needed:**

_____

(1) Q12 = [2]

**Q20 - What is the funding system for upgrade/technological developments in order to keep the proper level of the provided services?**

_____

IF (1) Q12 = [2]

**Q21 - What are the main identifiable gaps in funding? What costs are not covered or lack considerable support? Please provide details choosing the options below.**

Multiple answers are possible

- ☐ Human resources
- ☐ Raw materials, consumables, supplies and goods
- ☐ Capital investments
- ☐ Others (please specify

IF (1) Q12 = [2]

**Q22 - Please explain your answer:**

_____

(1) Q12 = [2]

**Q23 - How do you provide access to your RI?**

Multiple answers are possible

☐ The infrastructure offers different types of access: physical, remote, virtual

☐ The infrastructure offers only particular type of access: please precise which one (a multiple choice: physical, remote, virtual)

☐ Physical/ remote access is possible only for the RI members, on the excellence selection

☐ RI members have privileged time for physical / remote access, on the excellence selection

☐ Physical / remote access is free and possible to all users (academic and industrial) on the basis of scientific excellence selection

☐ Physical / remote access is free and on the basis of scientific excellence selection only for the academic users

☐ Physical / remote access is on a fee basis for the industrial users but the submitted requests are still evaluated by the selection committee

☐ Physical/ remote access is possible to all the users without scientific excellence selection if the user brings its funding for access

☐ Virtual access is possible for all the users without any limitation

☐ Virtual access is possible under certain conditions (precise the conditions)

☐ Other:

IF (1) Q12 = [2]

**Q50 - Comment if needed:**

_____

(1) Q12 = [2]

**Q24 - How do you fund excellence-based access to your RI?**

Multiple answers are possible

☐ Access is free for all users (industrial and academic) and is part of my operational budget thanks to the national funding of the facility / nodes

☐ Access is free for all users (industrial and academic) and is funded by the TNA funding instruments from EU projects

☐ Access is free only to the members of the RI

☐ Access program funded by my operational budget covers parts of the access costs for all users (travel and accommodation costs are not included)

☐ Access is funded through different projects obtained by the user

☐ Access fees on an ad-hoc basis (academic and industrial users enjoy different fee schemes)

☐ Other:

IF (1) Q12 = [2]

**Q51 - Comment if needed:**

_____

(1) Q12 = [2]

**Q25 - Is the current access funding mix sufficient to support access demand?**

◯ Yes

◯ No

IF (2) Q25 = [2]

**Q26 - Please provide details on funding gaps and needs on access.**

_____

## IF SINGLE SITED RI

**Q27 - How is your mix of sources of income constituted (refer to the last 3 years):**

Multiple answers are possible

☐ Membership fees

☐ Project funding

☐ National and or regional funding

☐ European project funding

☐ Permanent / recurrent national and/or regional funding

☐ European structural / cohesion fund

☐ Recovery and Resilience Facility

☐ Institutional funding from recurrent state budget

☐ Other:

IF (3) Q12 = [1]

**Q28 - Comment if needed:**

_____

(3) Q12 = [1]

**Q29 - How is your mix of sources of income for investment constituted (refer to the last 3 years):**

Multiple answers are possible

☐ Investment funding from national/regional permanent/recurrent budget

☐ Host country contribution

☐ Dedicated projects for investments from national funding

☐ Dedicated projects for investments from regional funding

☐ European structural / cohesion fund

☐ Recovery and Resilience Facility

☐ Institutional funding from recurrent state budget

☐ Donations

☐ Others (e.g. EIB loans):

IF (3) Q12 = [1]

**Q30 - Comment if needed:**

_____

(3) Q12 = [1]

**Q31 - What is the funding system for upgrade/technological developments in order to keep the proper level of the provided services?**

_____

IF (3) Q12 = [1]

**Q32 - What are the main identifiable gaps in funding? What typologies are not covered or lack considerable support? Please provide details and justify your answer.**

_____

(3) Q12 = [1]

**Q33 - How do you provide access to your RI?**

Multiple answers are possible

☐ The infrastructure offers different types of access: physical, remote, virtual

☐ The infrastructure offers only particular type of access: please precise which one (a multiple choice: physical, remote, virtual)

☐ Physical/ remote access is possible only for the RI members, on the excellence selection

☐ RI members have privileged time for physical / remote access, on the excellence selection

☐ Physical / remote access is free and possible to all users (academic and industrial) on the basis of scientific excellence selection

☐ Physical / remote access is free and on the basis of scientific excellence selection only for the academic users

☐ Physical / remote access is on a fee basis for the industrial users but the submitted requests are still evaluated by the selection committee

☐ Physical/ remote access is possible to all the users without scientific excellence selection if the user brings its funding for access

☐ Virtual access is possible for all the users without any limitation

☐ Virtual access is possible under certain conditions (precise the conditions)

☐ Other:

IF (3) Q12 = [1]

**Q34 - Comment if needed:**

_____

(3) Q12 = [1]

**Q35 - How do you fund excellence-based access to your RI?**

Multiple answers are possible

☐ Access is free for all users (industrial and academic) and is part of my operational budget thanks to the national funding of the nodes

☐ Access is free for all users (industrial and academic) and is funded by the TNA funding instruments from EU projects

☐ Access is free only to the members of the RIs

☐ Access program funded by my operational budget covers parts of the access costs for all users (travel and accommodation costs are not included)

☐ Access is funded through different projects obtained by the user

☐ Access fees on an ad-hoc basis (academic and industrial users enjoy different fee schemes)

☐ Other:

IF (3) Q12 = [1]

**Q36 - Comment if needed.**

_____

IF (3) Q12 = [1]

**Q37 - Is the current access funding mix sufficient to support access demand?**

◌ Yes

◌ No

IF (4) Q37 = [2]

**Q38 - Please provide details on funding gaps and needs on access.**

_____

## Annex 5: Slides & Recordings from workshops

- ESFRI RI Funding online workshops for Ris and for Member States, 16 February 2023. Recordings and presentations are available at:

  https://imisathena-my.sharepoint.com/:f:/g/personal/info_esfri_eu/EnIN4FNiiCpNsY7GxRN6HMQBfiJhKp_dfQ5gpt-daNhLlQ?e=DG9lh3

- ESFRI RI Funding Follow-up online workshop, 23 June 2023. Recordings and presentations are available at:

  https://imisathena-my.sharepoint.com/:f:/g/personal/info_esfri_eu/ErOJGEzcQptHjurv3nGf1lgBMMSRKcSPl736ptTMzzHLSA?e=0LhnW2

# Annex 6: Definitions

## CAPITAL INVESTMENT

General definition:

Capital investment is the acquisition of physical assets by an organisation to maintain operations and achieve its long-term goals and objectives. Real estate, manufacturing plants, and machinery are among the assets purchased as capital investments. Within RIs the term refers to the acquisition of permanent fixed assets such as real property, plant, or equipment. Capital assets are reported as non-current assets, and most are depreciated.

Examples:

The most obvious examples within RIs are large or long-lasting scientific equipment, but also construction or land/space acquisition. Also, high computing facilities, storage farms, and similar facilities would fall under this category. Such assets are for use longer than 1 year

## OPERATING COSTS

General definition:

Operating costs are associated with the maintenance and operation of an organization on a day-to-day basis. Operating costs include direct costs of materials and other operating expenses—often called selling, general, and administrative —which include rent, payroll, and other overhead costs (e.g. purchased services, maintenance expenses). Operating costs exclude non-operating expenses related to financing, such as interest, investments, or foreign currency translation.

Examples:

Within RIs, operating costs are all costs running the infrastructure and could also include the costs for research and development to produce research data and tools. Data production in the preparatory phase of virtual and or data-based RIs could also be identified within this block. It includes in European funding categories the costs for personnel, travel, other costs to perform the research, and all the overheads like rent, electricity, maintenance of the equipment and the facility, but not the acquisition of capital investment (equipment, land, or space) as defined above.

## ACCESS COSTS

General definition:

Access costs here are defined as the costs related to provide access to researchers in all the formats available incurred by the RI (to exclude costs incurred by the access requestor) . Access costs are mainly a part of operating costs.

Access to RIs is fully described in the ESFRI report on access to RI. In summary there is a large diversity of type of access (physical, remote, virtual), nature of service offered (access to equipment, to data, to collection etc.), often depending on the scientific domain and the nature of the RI (single site or distributed).

Examples:

For physical access, access costs could include housing expenses for the researcher, costs related to training of such researcher, R&D costs to do the requested research, consumables, costs for the evaluation of access requests, etc. For remote access, costs could be again training of the service

seeker as well as costs related to setting up remote access. The production of data and tools could fall under operating costs in preparation for future requests or under access costs in cases where the research data and tools are developed for a specific project (tailored) as part of service delivery. Some RIs might be able to categorize all their operating costs as access costs, but for others, it might be only a specific part.

* These definitions are proposals for discussion and use in ESFRI documents/questionnaires. They were drafted based on general definitions from basic economics text books like "Complete Economics for Cambridge IGCSE® and O Level, Oxford University Press, 2018, D.Moynihan & B.Titley" "Financial Planning & Analysis and Performance Management, Wiley Finance, 2018, J.Alexander", web sites like https://www.investopedia.com/terms, https://www.sciencedirect.com and https://www.nasdaq.com adapted for RIs from Markus Pasterk and revised by Enrico Guarini.