

# Sustainability of Research Infrastructures

## Summary Document

### Main Recommendations

1. **Establish and maintain excellence** through the entire lifecycle of RIs by all appropriate means, by securing adequate framework conditions, and by opening the RIs up to the world.

1.1 The European Commission, National Authorities and Industrial Partners should all support by adequate means the endeavour **for excellence at RIs throughout their entire lifecycle**, which may include the pursuit of excellent in-house scientific research and the development of new technology for users.

1.2 The European Commission should, together with National Authorities, develop **guidelines for standardized, effective and robust evaluation procedures of RIs through independent international peer-review**.

1.3 The European Commission should, together with National Authorities and RIs, develop a **methodology to improve the tracking of the use of European RIs in publications and other outputs** and encourage the implementation of this system at a Pan-European level.

1.4 The European Commission, National Authorities and RIs should develop or continue to **support mechanisms for funding transnational access** (i.e. users from outside countries that fund the RIs), recognizing that openness of RIs is a driver to achieve and sustain scientific excellence.

1.5 Research Infrastructures should **keep pace with the development of science in their respective scientific fields, periodically assess their performance and relevance, and keep track of cutting-edge technology**, all in consultation with their user communities, to be able to **provide state-of-the-art instrumentation and services**.

1.6 Research Infrastructures should ensure that their **procedures to evaluate and select users' proposals and projects are based on transparent, excellence-driven processes**.

1.7 Research Infrastructures should ensure that they **attract the very best research groups**, including those that do not yet use them, through effective communication of the opportunities for excellent research that they provide.

2. **Ensure that RIs have the right people in the right place at the right time** by strengthening and harmonising national research and educational systems to make sure that all essential skills are available.

2.1 All levels should **recognise that sufficient staff equipped with specific skills are required at different stages** of the lifecycle of RIs and they should establish guidelines for qualifications and evaluation for the recruitment and training of RI managers and operators.

2.2 At all levels **staff mobility and exchange programmes for project management and capacity building should be developed** for RI personnel aided by greater harmonisation across countries of career paths, pension schemes and salaries as well as exchange and reintegration schemes between RIs, and universities and also with business and industry.

2.3 At the European level **it must be ensured that a sufficient number of suitably trained people of all types (users and staff) are made available to RIs** through training programmes via EU-networked national schemes, e.g. organised and funded through I3-like programmes.

2.4 **National Authorities should support and harmonise research and education programmes linking RIs with universities** and, where appropriate, also **business and industry at PhD, post-doc and more advanced levels** in order to provide specialised skills and training, some of which should go beyond

3. Harmonise and **integrate a vision for convergent operation of RIs and e-Infrastructures** in Europe to ensure cost-effective service provision to the user communities.

3.1 European and National Authorities should develop and implement a new culture, which **acknowledges the need of new skills to optimise future use, reuse and multiple use of data, increasingly across disciplines.**

3.2 European and National Authorities should **harmonise different existing funding models between RIs and e-Infrastructures** at all levels.

3.3 European and National Authorities shall **develop stable and robust certified repositories and registries for data preservation following the FAIR – Findable, Accessible, Interoperable, and Reusable – approach.**

3.4 European and National Authorities – including RIs – should **foster international cooperation to support the global dimension of data management and interoperability among RIs generating data, products, software and services** for science and society.

3.5 The RI should consider a **close involvement in the development of the European Open Science Cloud for Research** with a view to improve interoperability and effective access to and reuse of scientific data.

3.6 Stimulate RI to **establish transparent Data Management Policies** in accordance with the "European Charter for Access to Research Infrastructures", clarifying roles and responsibilities of data production and stewardship and increasing standardisation, interoperability of services and research replicability.

3.7 National Authorities must **assure that RIs have prepared data management plans as a basic eligibility criterion for funding right from the beginning**; requirements for such plans have been developed by e-IRG/ ESFRI and others.

4. **Fully exploit the potential of RIs as innovation hubs** by incorporating strategies for their development into national and European innovation policies.

4.1 European and National Authorities should **encourage the development of innovation ecosystems around RIs and stimulate innovation-oriented activities within RIs, including the innovation potential of data generation and service provision.** National Authorities should strongly support the implementation of **Innovation Parks in the vicinity of the RIs**, regardless of whether they are of national or of Pan-European interest.

4.2 National Authorities, RIs, Research Performing Organisations and Business & Industry should **facilitate procedures for RIs to become partners in the development and commercialization of innovations** and of putting innovations at the service of the broader public born there and encourage RIs to **facilitate early involvement of Business & Industry and Public Services in the supply of high-tech components** and increase the awareness of RI staff of these matters.

4.3 National Authorities should work with RIs, Business & Industry, Public Services and Research Performing Organisations to **develop and co-fund exchange programmes** for staff and PhD students to raise mutual awareness by the RIs, Research Performing Organisations, Public Services and Business & Industry of their needs, opportunities, operations and culture.

4.4 **RIs should encourage and support Public Services and Business & Industry to engage with and exploit them more fully** by identifying their needs and by tailoring user policies and practices to meet these needs.

4.5 Research Infrastructures and Research Performing Organisations should **establish structures and culture in which (open) innovation is most likely to thrive**, including: recruitment of an officer to implement innovation policies with dedicated resources, supported by an advisory body composed of representatives of appropriate industries or commercial activity; raising the awareness and incentivising of staff to engage in innovation activities.

4.6 **Clarify Industry Access Rules, mainly concerning IPR** regimes and procedures for accessing RI.

4.7 Support **large scale initiatives and pilots involving RI**, academy and industry through a co-innovation process. Stakeholders should also identify **possible tax incentives for (private) investment** as well as wider awareness/promotion or RI services. **Public-private partnership vouchers** to support cluster activities in RI should also be considered.

4.8 Stimulate **join innovative procurement mechanisms**, precommercial procurement and the link with Public Procurement mechanisms, pre-commercial procurement and the link with Public Procurement of Innovative Solutions.

4.9 **Develop strategic roadmaps in key technologies** required for the construction and upgrades of RI in close relation with EIT, KICs and KETs.

4.10 **Foster the use of RI for pre-normative research**. Large scale RI and testbeds can play a key role for the design and validation of innovative products and technologies, thus bridging the gap between research and innovation, and commercialisation. In this sense, pre-normative research carried out at RI leads to the production of data and guidelines that feed into the standards making process, enabling industry for the market uptake of their innovations.

4.11 Enhance the **role of intermediaries** and develop specific mechanisms to stimulate the commercial application of RI services and tools. Several stakeholders, such as ERF, Science Europe and ESFRI advocated for "mediation" to facilitate tailored industry users support and the need to have brokerage functions to facilitate knowledge and technology transfer for the translation into industrial and commercial environment. The **reinforcement of the ILOs** seems essential to stimulate the RI and industry interaction.

4.12 **Encourage private funding for development of new services and technologies**.

5. Set up effective means of **determining the economic and wider social value of RIs**, and incorporate these benefits into science policy-society dialogues.

5.1 The European Commission should together with National Authorities support the **development of a model with key performance indicators to evaluate the socio-economic value of RIs**, support its adoption across Europe, and use the findings to promote and encourage the use of RIs for the greater good. This model should aim to provide comparisons between different types of RIs while recognising the great diversity in scientific domain and character, the wide range of benefits they bestow on society, and different national environments.

5.2 National Authorities and funding bodies should be explicit about the role that socio-economic benefits play in their strategy and funding decisions so that RI operators are aware of its significance and take appropriate action when developing strategy and operating models to enhance it in the future. Periodic monitoring of **societal impact should be a part of the regular assessment of the RIs**.

5.3 National Authorities should **adapt the model** developed at a European level **to their particular national needs, implement it in their national evaluation processes of the socio-economic value of RIs**, and feed this back to provide comparisons across Europe. This value should be promoted to the broader society by all means.

5.4 Research Infrastructures should **dedicate sufficient resources both to evaluate their value to the economy and society at large and to communicate this to targeted audiences**, from the general public to policy makers as part of local, national and European science policy- society dialogues to gain acceptance and support at all levels.

5.5 **Broaden stakeholders' engagement by developing criteria and narratives to define environmental, social, cultural and political impact and invite RI to communicate better their added value**.

5.6 **Reinforce the integration of RI in the regional scientific, economic and social ecosystem by assessing the contribution of RI to national and/or regional research and innovation strategies for smart specialisation (RIS3)**.

6. Establish adequate framework conditions **for effective governance and sustainable long-term funding for RIs at every stage in their lifecycle**, together with effective management.

6.1 At the European level continue to **launch initiatives which improve the management of RIs through the exchange of best practices and lessons learnt, and contribute to strategic planning, evaluation, and training.**

6.2 European and National Authorities should **contribute to the development of a feasible business model that exploits innovation potential, support for costs for Open Access and incorporate these into the national governance models.** Increase transparency in cost calculation and include access to RIs, as an eligible cost in a research grant.

6.3 European Commission together with National Authorities should **explore improving the ERIC regulation so that its potential may be more fully exploited.** Provide EU support to newly established ERICs on new services development, interoperability and international outreach; as well as to their operation where there is a clear added-value for EU policymaking. Facilitate the use of the ERIC instrument, by further clarifying the extent to which incentives for investments such as VAT exemption for in-kind contribution can be used by the Member States;

6.4 National Authorities should **consider governance models which provide the right balance between long-term funding commitments (including operation costs and strategic developments) and regular evaluation of the RI performance.**

6.5 Research Infrastructures must **develop**, right from the start of the planning phase and prior to the roadmapping exercise, **a comprehensive business plan covering all stages of their lifecycle including upgrading and decommissioning. Improve RI's bankability** by supporting the development of an RI business Model. The development of a credible business plan during the preparatory phase of an RI is recognised as imperative to improve the bankability of RI.

6.6 **A minimum target budget should be established for infrastructural investment.**

6.7 **Synchronisation of national roadmaps and their alignment with the European RI roadmap should be encouraged.**

6.8 **Improve RI costs coverage.** Improving the coverage of RI costs implies a higher visibility for their services to the research communities. Turning operational RI costs eligible in research grants, at a national and European level. For instance, in the form of a fixed percentage that would be added to the user costs allowing for the RI to undertake maintenance could be beneficial for the sustainability.

6.9 Develop a stronger **monitoring, support of the Pan-European RI and the development of an international benchmark** RI landscaping before taking decisions on development/upgrading/termination of an RI.

6.10 **Better inform the upgrading and decommissioning decision-making process;** The need to introduce international evaluation and accounting standards as support to decision makers, allowing choices/planning between different options (renewal versus decommissioning) is important. The establishment of common guidelines on decommissioning, including provisions for channelling expertise acquired data and research results, knowhow from RI users and operators towards other RI's is also important.

6.11 **Improve the synergies with ESI Funds**, to implement national RI roadmaps and to support transnational access schemes between RI. Encourage the use of other financial instruments like the InnovFin instruments under Horizon 2020 and the European Funds for Strategic Investments (EFSI).

7. Foster broader **coordination at National and European levels** when designing processes for planning and supporting national and pan European RIs and so enhance their strategic value.

7.1 European and National Authorities should **aim for stronger convergence of a broader range of research related policies at EU and national level – innovation, employment, social security, pension schemes and mobility rules** etc. – and in particular, reinforce coordination between Member States on all aspects of the RI lifecycle.

7.2 National Authorities are invited to **harmonise and synchronise the development of investment strategy for their RIs** to the greatest possible extent with a pan-European vision by taking advantage of the landscape analysis and roadmapping procedures developed by ESFRI and other players at the global level.

7.3 European, National Authorities and RIs shall **further develop platforms for communication and promotion for RIs** of potential meta-regional, European, and global relevance which are mature enough for engagement strategies.

7.4 Research Infrastructures should **take full advantage of RI self-organisation and coordination at the EU level, which allows efficient sharing of best practices among them and includes also mutual learning exercises.**

7.5 Research Infrastructures should **ensure that they have effective means of communicating and engaging with all their stakeholders throughout their lifecycle** and in particular new RIs should do this right from the start of their design phase.

7.6 **Enhance the role of international fora in Research Infrastructure development.**

7.7 **Encourage national and regional funding programmes to support cross border access to RI.**

7.8 **Increase the visibility of RI services and broaden user communities by developing a European catalogue of RI services.**

7.9 **Encourage the systematic analysis of the international landscape in the national and EU RI roadmapping process so as to identify potential gaps and complementarities.**

## **Bibliography**

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