

**EIROforum input on the preparation of the next
EU Framework Programme (FP10)**

April 2024

Executive Summary

European research infrastructures (ERIs) are at the core of the European Research Area (ERA), having a pivotal role in propelling Europe towards a knowledge and innovation-based society. They are a proven success in enabling new frontier science – attracting increasing interest from communities outside the EU – and have been continuously strengthening innovation by translating and valorising discovery to the benefit of industry, technology-driven organisations and platforms, and society. In fact, ERIs drive scientific excellence and innovation through technology development by providing state-of-the-art equipment and facilities to a wide and diverse user community, empowering researchers to push the frontiers of knowledge, and enabling integration of research communities across disciplines from all countries in Europe. ERIs play a crucial role in maintaining Europe at the cutting edge, often promoting it to a worldwide leadership position, in many R&D areas, by providing state-of-the-art experimentation possibilities and by contributing to the development and retention of talent in Europe. ERIs also work closely with European industry, be it as users of their facilities, providers of new equipment and instrumentation, or as co-developers of novel technologies for future upgrades or new research infrastructures. Moreover, ERIs serve as focal points for interdisciplinary cross-border collaboration, creating and facilitating a network of researchers, academic institutions, and industries across Europe and beyond. ERIs also contribute significantly to the training and development of the next generation of researchers, engineers, and technicians, who will constitute the future European workforce and ensure European competitiveness in the long term. Research infrastructures provide numerous benefits to the European society and economy, either directly, through addressing societal challenges or industrial needs, or indirectly through training and education, as well as through knowledge and technology transfer activities that go well beyond fundamental research.

In the context of continuing expansion of the research infrastructure landscape in Europe, the EIROforum organisations express their concern about the reduction in funding for the Research Infrastructures Programme of Horizon Europe with respect to Horizon 2020. They emphasize the need to rectify this situation in the strategic planning for the next Framework Programme and call for a consequent substantial budget increase for a transversal research infrastructure programme in FP10 emphasising the aspects favouring the strengthening of technology-driven innovation. Large-scale Data Infrastructures could profit from funding programmes that allow the expansion of data storage and compute resources to stay innovative and competitive in the global landscape, and to be able to attract new talents to Europe, while offering the same quality of data and services, in line with the principles of open science.



EIROforum proposes reinforcing the future Research Infrastructure Programme in FP10 by:

- full integration as a transversal programme to deliver the full potential and impact across all pillars and clusters of the new programme;
- strengthening of valuable policy instruments for both incipient and consolidated research infrastructures and their communities;
- providing continuous support for the further development and operation of the European Open Science Cloud (EOSC);
- introducing actions that enable the efficient uptake and upscale of AI methods by ERIs;
- providing wide, flexible, and continuous transnational access to infrastructures for curiosity-driven projects, in parallel with enabling calls that focus on specific fields or thematic priorities.
- reinforcing the actions that have a focus on innovation and collaboration with European industry for technology transfer/co-development;
- introducing new instruments (programme-based funding) for long-term support to the implementation of research infrastructures roadmaps and strategic technology developments at ERIs;
- introducing dedicated instruments for continuous training of young researchers and innovators at ERIs.

The European Research Area and European Research Infrastructures

The European Research Area (ERA) stands as a collective vision of European nations to foster collaboration, innovation, and excellence in research. At the heart of this ambitious initiative are European research infrastructures (ERIs), which play a **pivotal role in enabling excellent fundamental research and addressing societal challenges**, thus shaping the scientific landscape and propelling Europe towards a knowledge and innovation-based society¹. One of their primary contributions is their ability to **enable scientific excellence and innovation**. By conducting discovery-driven research, and providing state-of-the-art services, equipment, and facilities, ERIs empower researchers to push the boundaries of knowledge and address complex scientific questions. Their role is crucial in addressing interconnected global challenges such as climate change and public health crises² through comprehensive and interdisciplinary research, provision of vital data, thus amplifying the impact of European science on a global scale³. The collaborative nature of these infrastructures facilitates the convergence of ideas and methodologies from various scientific domains.

¹https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/european-research-infrastructures_en

² It is reminded that crucial vaccination to overcome the COVID-19 pandemic came from ground-breaking EU funded research on new RNA-based technologies which amply benefitted from ERI.

³[EIROforum position paper "Research Infrastructures: Value and Impact for European Science, Industry and Society"; May 2020](#)



Moreover, ERIs often provide unique resources and facilities that individual countries may not be able to construct and maintain independently. Whether it be accelerators and detectors, advanced imaging technologies, cutting-edge analytical facilities, and specialised life-science databases, **ERIs ensure that European researchers have access to the tools required for world-class research.** This collective approach establishes Europe as a global leader in scientific discovery and technological innovation and enhances the quality and mobility of research and researchers.

ERIs enable innovation as they need to continuously develop advanced instruments and a variety of cutting-edge technologies to address new scientific challenges and enable better services to their user communities. The development of novel instrumentation and new technologies at ERIs is done in close collaboration with industry, and leads to both incremental and breakthrough innovation. Knowledge and technology transfer from ERIs to industry via collaborative R&D activities, procurement of high-tech equipment and services, and the creation of spin-off companies is of significant benefit for, and the technological sovereignty of, European industry. ERIs address Europe's sustainability challenge by enabling the discovery of new materials and techniques addressing circular economy, and also by demonstrating how high-energy consuming infrastructures can be operated in a more sustainable and effective way, and environmentally friendly manner. In this way, ERIs have become **key drivers for continuous technology developments and carbon footprint reduction strategies** that can feed the innovation cycle beyond their respective scientific areas.

To maintain their leading position in the global landscape, ERIs must continuously adapt their instrumentation in response to the rapid evolution of new technologies. This includes expanding capacity and adopting automation to accommodate a broader range of users and communities engaged in dealing with pressing global challenges. Infrastructure upgrades often require synergistically combining internal innovations, to offer researchers and stakeholders expanded experimental opportunities and the adoption of **cutting-edge technologies** adapted to their growing needs, such as novel optical elements, and high-speed data storage solutions. ERIs also develop new services, such as user-friendly interfaces, machine learning tools, and automated procedures, that make experiments accessible to non-experts, enabling ERIs to serve new communities.

Additionally, ERIs serve as focal points for international collaboration. They are often the cornerstone of **science diplomacy** and serve as a forum where people across borders and cultures meet in the peaceful pursuit of science. The synergies generated by these collaborations amplify the impact of European research and innovation on the global stage, promote the sharing of knowledge, and beside contributing to the resolution of global challenges, also help to build a peaceful dialogue between nations. The challenges facing society today, from climate change to public health crises and artificial intelligence (AI) development and proper use, are complex and interconnected. ERIs play a crucial role in addressing those by **providing the tools and resources needed for comprehensive, interdisciplinary research** and understanding of these complex matters. One recent and outstanding example has been the key role that research infrastructures have played in



the fight against the COVID-19 pandemic⁴. It demonstrated how agile and sustained infrastructures can very quickly organise and make available new resources, deploying FAIR data for understanding the cause of the disease and for developing vaccines.

ERIs contribute significantly to the **training and development of the next generation of researchers**, science managers, engineers, and technicians, extending beyond the realm of academia. These infrastructures provide unique learning environments where early career scientists and technical staff can gain hands-on experience with cutting-edge technologies and methodologies⁵, complementary to the formal training offered by European universities. The collaborative and international nature of ERIs exposes them to diverse perspectives and approaches, enriching their transversal skill sets and strengthening their career perspectives for both academia and industry. Furthermore, **ERIs support outreach and public engagement activities**, collaborating with educational institutions to promote science education, trust and interest in science. By fostering a strong connection between research infrastructures and education, ERIs expand Europe's talent pool, capable of tackling the societal challenges of the future.

ERIs, as custodians and sources of data, are **training tomorrow's data science workforce**. Some of the high-value datasets have global impact either as reference data or for training AI models, which have a huge impact on how science is conducted in specific areas⁶.

Over the past two decades, the European research infrastructure landscape has been strengthened, consolidated, and expanded to adequately address Europe's research and technology needs, notably thanks to the ESFRI roadmaps and related national and EU funding. At present, there are more than 60 ESFRI projects and landmarks, and hundreds of European national research infrastructures with international users, with a total level of investments of several tens of billions of euros.

Numerous case studies and reports have been produced in order to give evidence of and quantify the **socio-economic impact of research infrastructures**. Perhaps the most notable example in this regard is the World Wide Web, invented at CERN back in 1989. What began by a seemingly small technical breakthrough some 35 years ago, later gave rise to the Internet economy with annual turnover of trillions of euros. Many other examples related to health, energy, environment, imaging, computing, consumer goods, and materials for circular economy are available in a report prepared by Science Business⁷.

⁴ [Research Infrastructures mobilisation in response to COVID-19: lessons learned](#) (OECD, 2021).

⁵ [European Commission staff working document on "Long-term Sustainability of Research Infrastructures"](#)

⁶ e.g. AlphaFold2, <https://alphafold.com>

⁷ [Big Science: what is it worth?](#), Science Business, 2015

FP10 and European Research Infrastructures

The natural entry point for ERIs with respect to European funding for collaborative R&D&I is the Work Programme for Research Infrastructures under Horizon Europe. Under the previous Framework Programme, Horizon 2020, the allocated budget for research infrastructures reached €2.49 billion, a figure that was diminished to €2.41 billion in Horizon Europe⁸. Moreover, Research Infrastructures was the only programme element of Horizon Europe that did not receive an increase from the previous programme, despite the total budget rise from €80 billion to €96 billion. This apparent stagnation, in other words effective reduction, poses a clear obstacle to the growth and societal benefits that ERIs contribute to European society, as detailed in the preceding section.

The EIROforum organizations stress the importance of revising the approach to this matter in the strategic blueprint for FP10. It is crucial to highlight that basic research progresses via two separate avenues. Firstly, on an individual or small group scale, facilitated by funding streams like those from the European Research Council (ERC) and the Marie Skłodowska-Curie program. Secondly, when backed by resources tailored to tackle intricate scientific challenges within expansive, interdisciplinary scientific networks, promoting essential collaborative research and innovation endeavours. The policy instruments provided under the Research Infrastructures Work Programme play a pivotal role in facilitating such endeavours. The stagnation of funding for ERIs represents a major hurdle in maximizing Europe's investment returns in the realm of extensive scientific undertakings. Hence, it is imperative to address and rectify this situation to ensure sustained progress and innovation within the European Research Area by providing an adequate **budget envelope for research infrastructures in FP10**.

In addition, the cross-disciplinary nature of ERIs could be better recognised in FP10 by embedding Research Infrastructures as a transversal and well-integrated work programme serving all other key components of the framework programme from fundamental research to research output valorisation and translation, and training, and not operating separately from the rest of the research and innovation ecosystem.

The EIROforum organisations express the keen interest of their user communities in the **continuation, within the RI Work Programme, of policy instruments that have proven to be valuable and necessary** for both emerging and established research communities. This concerns notably the design studies, preparatory and implementation phase of ESFRI and other world-class infrastructures, including major upgrades, actions for support to joint development of scientific instrumentation, transnational user access to ERIs, and collaborative networks and clusters of research infrastructures, aiming at integration and federation of their scientific communities. Additionally, EIROforum advocates for **strengthening the presence of instruments in the RI Work Programme with a focus on innovation** and fostering collaboration with industry, especially with

⁸ European Commission, Directorate-General for Research and Innovation, Horizon Europe, budget – Horizon Europe - the most ambitious EU research & innovation programme ever, Publications Office of the European Union, 2021, <https://data.europa.eu/doi/10.2777/202859>; [Horizon 2020, structure and budget](https://data.europa.eu/doi/10.2777/202859).

fast innovators like SMEs and start-ups. The rationale behind this is that the existing ecosystems of ERIs and European industrial players, be they RI users or technology providers, ensure the rapid translation of cutting-edge research and its associated technologies into industrial products, contributing to the overall prosperity of the European society and also to the European technology independence and security.

Furthermore, the EIROforum organisations propose the **introduction of new instruments** within the Research Infrastructures Work Programme that capture the essence of **long-term frontier research and innovation** inherent to large scientific collaborations. These new policy instruments should be both roadmap-based and programme-based, and provide long-term funding with periodic reviews to span periods of five to ten years, with the objective to be particularly suitable for the implementation of technology roadmaps of large RI communities.

The ERIs are major sources of scientific data as well as data stewards for all aspects of data management and data science. The role of data in training breakthrough AI algorithms has been clearly identified as one of the main game changers in society in general. AI algorithms require computing resources, well curated data, and well-trained domain experts in order to succeed. The ERIs are a major source of all of these.

Funding for ERIs should support the full lifecycle of infrastructures: research infrastructures would benefit from funding for upgrades and continuous technology development to keep offering the competitive level of services to academic and industrial users across Europe. This is particularly relevant for Data Infrastructures that archive, curate, maintain, and update vast datasets, which eventually would be the basis of successful AI-approaches for Europe.

The EOSC has started to bring different data providers and experts together but has a long way to go yet. The ERIs will play an **essential role in order for the EOSC to succeed** by creating data spaces of high value data. FP10 should continue to support the participation of ERIs in the EOSC through funding and policies that enable increased scientific output through data re-use and creating inter-ERI synergies around data.

Finally, as emphasized in the preceding section, FP10 should reinforce the role of ERIs, in collaboration with industrial stakeholders and academia, in hands-on education for the future European workforce. Funding instruments should be incorporated to enable the **continuous training and education of interdisciplinary cohorts of future leaders** in the realm of new research disciplines, breakthrough technologies and their applications, both within and beyond the purely scientific domain of the hosting research infrastructures. This would be a unique opportunity for young scientists, engineers, and innovators, which is not offered by other EU Programmes.

Recommendation

In order to support the world-class excellence of European science, to enable European RIs to stay at the forefront of their science and technology fields, and to provide direct and indirect benefits for European academia, industry, and society, **the Research Infrastructure programme in FP10 should be funded at an adequate level**. This figure should be commensurate with the overall budget envelope of the new Framework Programme, and in line with the budget evolution for other programmes supporting fundamental research, notably the ERC and the Marie Skłodowska-Curie actions. FP10 should support the role of ERIs for innovation, notably with ERI integration in the implementation of technological platforms and initiatives.

The EIROforum organisations put their expertise at the disposal of the ERAC Committee and Task Force, as well other relevant stakeholders, for any follow-up consultation that might be needed or requested.