EXCELLENT SCIENCE - Research Infrastructures

Specific objective

The specific objective is to endow Europe with world-class research infrastructures which are accessible to all researchers in Europe and beyond and which fully exploit their potential for scientific advance and innovation. Research infrastructures are key determinants of Europe's competitiveness across the full breadth of scientific domains and essential to science-based innovation. In many fields research is impossible without access to supercomputers, analytical facilities, radiation sources for new materials, clean rooms and advanced metrology for nanotechnologies, specially equipped labs for biological and medical research, databases for genomics and social sciences, observatories and sensors for the Earth sciences and the environment, high-speed broadband networks for transferring data, etc. Research infrastructures are necessary to carry out the research needed to address major societal challenges. They propel collaboration across borders and disciplines and create a seamless and open European space for online research. They promote mobility of people and ideas, bring together the best scientists from across Europe and the world and enhance scientific education. They challenge researchers and innovative companies to develop state of the art technology. In this way, they strengthen Europe's high-tech innovative industry. They drive excellence within the European research and innovation communities and can be outstanding showcases of science for society at large.
Europe must establish, on the basis of commonly agreed criteria, an adequate, stable base for building, maintaining and operating research infrastructures if its research is to remain world-class. This requires substantial and effective cooperation between Union, national and regional funders for which strong links with the cohesion policy will be pursued to ensure synergies and a coherent approach. This specific objective addresses a core commitment of the flagship initiative 'Innovation Union', which highlights the crucial role played by world-class research infrastructures in making ground-breaking research and innovation possible. The initiative stresses the need to pool resources across Europe, and in some cases globally, in order to build and operate research infrastructures. Equally, the flagship initiative 'Digital Agenda for Europe' emphasises the need to reinforce Europe's e-infrastructures and the importance of developing innovation clusters to build Europe's innovative advantage.

Rationale and Union added value

State-of-the-art research infrastructures are becoming increasingly complex and costly, often requiring integration of different equipment, services and data sources and extensive transnational collaboration. No single country has enough resources to support all the research infrastructures it needs. The European approach to research infrastructures has made remarkable progress in recent years with continuously developing and implementing the European Strategy Forum on Research Infrastructures (ESFRI) roadmap for infrastructures, integrating and opening national research facilities and developing e-infrastructures underpinning an open digital ERA. The networks of research infrastructures across Europe strengthen its human resource base by providing world-class training for a new generation of researchers and engineers and promoting interdisciplinary collaboration. Synergies with Marie Skłodowska-Curie actions will be encouraged.

Further development and wider use of research infrastructures at European level will make a significant contribution to development of the ERA. While the role of Member States remains central in developing and financing research infrastructures, the Union plays an important part in supporting infrastructure at European level such as encouraging co-ordination of European research infrastructures, by fostering the emergence of new and integrated facilities, opening up and supporting broad access to national and European infrastructures, and making sure that regional, national, European and international policies are consistent and effective. It is necessary to avoid duplication and fragmentation of efforts, to foster coordinated and effective use of the facilities and, where appropriate, to pool resources so that Europe can also acquire and operate research infrastructures at world-class level.

ICT has transformed science by enabling remote collaboration, massive data processing, in silico experimentation and access to distant resources. Research therefore becomes increasingly transnational and interdisciplinary, requiring the use of ICT infrastructures that are as supranational as science itself. The efficiencies of scale and scope achieved by a European approach to
construction, use and management of research infrastructures, including e-infrastructures, will make a significant contribution to boosting Europe's research and innovation potential and make the Union more competitive at international level.

**Broad lines of the activities**

The activities shall aim at developing the European research infrastructures for 2020 and beyond, fostering their innovation potential and human resources and reinforcing European research infrastructure policy.

**(a) Developing the European research infrastructures for 2020 and beyond**

The aim shall be to facilitate and support actions linked to: (1) the preparation, implementation and operation of the ESFRI and other world-class research infrastructures, including the development of regional partner facilities, when a strong added value for Union intervention exists; (2) the integration of and transnational access to national and regional research infrastructures of European interest, so that European scientists can use them, irrespective of their location, to conduct top-level research; (3) the development, deployment and operation of e-infrastructures to ensure world-leading capability in networking, computing and scientific data.

**(b) Fostering the innovation potential of research infrastructures and their human resources**

The aims shall be to encourage research infrastructures to act as early adopters or developers of cutting-edge technology, to promote R&D partnerships with industry, to facilitate industrial use of research infrastructures and to stimulate the creation of innovation clusters. This activity shall also support training and/or exchanges of staff managing and operating research infrastructures.

**(c) Reinforcing European research infrastructure policy and international cooperation**

The aim shall be to support partnerships between relevant policymakers and funding bodies, mapping and monitoring tools for decision-making and also international cooperation activities. European research infrastructures may be supported in their international relations activities.

The objectives set out under activity lines (b) and (c) shall be pursued by dedicated actions, as well as within the actions developed under activity line (a), when appropriate.
Context

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