Specific Features for Research Infrastructure

This section provides, for different types of projects supported under the Research Infrastructures calls for proposals, further conditions and requirements that applicants should fulfil when drafting a proposal. The compliance to these provisions will be taken into account during evaluation. Information on synergies with the European Structural and Investment Funds (ESIF) and on the Responsible Research and Innovation dimension is also provided below.

The European Structural and Investment Funds will invest up to EUR 90 billion in innovation and research in the period 2014-2020, including into the development of research and innovation capacities and infrastructures. Therefore, Article 20 of the Horizon 2020 Regulation and Article 37 of the Rules for Participation encourage synergies between Horizon 2020 and other European Union funds, such as European Structural and Investment Funds.

Synergies do not mean to replace national or private funding by ESIF or to combine them for the same cost item in a project. Synergies mean to expand the scope and impact of both funds in terms of scientific excellence and place-based socio-economic development respectively. Examples could be the development and equipment of innovation infrastructures or the fostering of innovation skills through ESIF that enable the participation in a Horizon 2020 project. ESIF can also be used to expand the support and advisory services for potential Horizon 2020 participants. ESIF can also help deploying innovative solutions stemming from Horizon 2020, e.g. through public procurement in the fields of environment, transport, health and energy.

Applicants are therefore invited to identify the smart specialisation fields of their EU Member State or region¹ and explore potential for synergies with the relevant Managing Authorities in charge of the ESI Funds in their territory².

In addition, activities carried out under this Work Programme should be in respect with the Responsible Research and Innovation policy (RRI) engaging society, integrating the gender and ethical dimensions, ensuring the access to research outcomes and encouraging formal and informal science education. The alignment with the values, needs and expectations of the society will allow to identify and to deliver new solutions to the objectives of this Work Programme.

The ethical dimension of the activities undertaken should be analysed and taken into account, including relevant socioeconomic implications. This implies the respect of ethical principles and related legislation during the implementation. Whenever possible, the activities should also include in their objectives a better understanding and handling of the ethical aspects as well as the promotion of the highest ethical standards in the field and among the actors and

¹ see: http://s3platform.jrc.ec.europa.eu/eye- ris3
stakeholders. The most common issues to be considered include: personal data protection and privacy, protection of participants and researchers, ensuring informed consent, dual use and potential misuse of the research results, fair benefit sharing when developing countries are involved, environment protection etc.

A. Preparatory phase proposals

Preparatory phase proposals should cover one or more of the following activities:

- Legal work, i.e. (1) for the setting-up, construction and operation of the research infrastructure; and (2) for drafting an agreement between committed countries, in the form of a 'signature-ready' document for the setting-up and the actual implementation.

- Management and logistical work, i.e. (1) plans, in terms of construction (or major upgrade) and operation of the new research infrastructure; (2) planning (timing, resources) of staff recruitment to operate the new facility; (3) organisation of the logistic support for researchers, including informatics, etc.;

- Governance work, i.e. plans, in terms of decision-making, management structure, advisory body, IPRs, ethical issues, access rules for researchers, etc.;

- Financial work, i.e. (1) the financial arrangements for the construction, operation and decommission of the facility, using notably the complementarities between national and EU instruments (such as the European Structural and Investment Funds or the European Investment Bank); (2) studying new mechanisms, e.g. pre-commercial procurement processes, by which public authorities may develop new approaches for financing innovative solutions;

- Strategic work, i.e. (1) analysis of the socio-economic impact of the new infrastructure; (2) plan to integrate harmoniously the new entity in the European fabric of related facilities in accordance with the objective of balanced territorial development; (3) to create or consolidate centres of excellence and/or 'regional partner facilities'; (4) the identification of the best possible site(s) to set up the new facility(-ies) and its next generations;

- Technical work, i.e. (1) final prototypes for key enabling technologies and implementation plans for transfer of knowledge from prototypes to the new facility; (2) technical work to ensure that the beneficiary research communities exploit the new facility from the start with the highest efficiency, including the introduction of new processes or software.

B. Individual support to ESFRI projects and other world class research infrastructures

Individual support to ESFRI projects and other world class research infrastructures should cover one or more of the activities listed below. If combined support with the European Structural and Investment Funds (ESIF) is foreseen for such infrastructure, the proposal
should specify which activities will not be funded by Horizon 2020, but by ESIF (and by which Operational Programme of ESIF).

- organisation of the logistic support for researchers, definition of access policies for researchers and management of IPRs and ethical issues;

- integration of the new entity in the European landscape of related facilities, and in the local context;

- promotion of long-term sustainability, including e.g. the involvement of funders, enlargement of the membership, the preparation of business plans beyond the end of the grant, clear assessment of the costs for serving a user and for dealing with and making available the produced data;

- development of regional partner facilities (RPF) aiming at a more balanced development of the European Research Area. The supported activities should help the RPF to meet the same standards required for pan-European Research Infrastructures, in particular regarding the quality of services, management and open access policy;

- limited pilots of access provision to research communities following the rules specified for integrating activities, in order to test reliability and increase user trust;

- outreach;

- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;

- mapping of infrastructures, users, investments, etc, in the specific field for supporting policy developments;

- activities to increase the potential for innovation, including social innovation, of the related infrastructure, such as networking with industries (including SMEs), facilitating their involvement as partners of the research infrastructures for technological developments, developing customised services for industry and SMEs, dissemination of research outcome and technology transfer.

C. Integrating Activities

An Integrating Activity shall cover three types of activities: Networking activities, Trans-national and/or virtual access activities, and Joint Research activities.

(i) Networking activities. To foster a culture of co-operation between the participants in the project, the scientific communities benefiting from the research infrastructures, industries and other stakeholders, and to help developing a more efficient and attractive European Research Area. Networking activities could include (non-exhaustive list):

- joint management of access provision and pooling of distributed resources;
dissemination and/or exploitation of project results and knowledge, contribution to socio-economic impacts, promotion of innovation;

reinforcing partnership with industry: outreach and dissemination activities, transfer of knowledge, activities to foster the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies;

strengthening of virtual research communities;

definition of common standards, protocols and interoperability; benchmarking;

development and maintenance of common databases for the purpose of networking and management of the users and infrastructures;

activities to improve the efficiency of the research infrastructures' management and of their service provision;

spreading of good practices, exchange of personnel and training of staff, consultancy;

outreach and training courses to new users, with specific attention to increase participation of women to science;

activities to attract young people to science careers;

foresight studies for new instrumentation, methods, concepts and/or technologies;

promotion of clustering and coordinated actions amongst related projects;

coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;

promotion of long-term sustainability, including the involvement of funders and the preparation of a business plan beyond the end of the project;

definition of data management plans to organise the efficient curation, preservation and provision of access to data collected or produced under the project;

relations with publishers for supporting data and sample deposition services;

mapping of infrastructures, users, investments, etc, in the specific field for supporting policy developments.

(ii) **Trans-national and/or virtual access** activities.

**Trans-national access activities**

To provide 'free of charge' trans-national access to researchers or research teams including from industry to one or more infrastructures among those operated by participants. These

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3 As defined in the Article 16 of the Model Grant Agreement
access activities should be implemented in a coordinated way such as to improve the overall services available to the research community. Access may be made available to external users, either in person ('hands-on') or through the provision of remote scientific services, such as the provision of reference materials or samples, the performance of sample analysis or sample deposition.

The research infrastructures shall publicise widely the access offered under the grant agreement to ensure that researchers who might wish to have access to the infrastructure are made aware of the possibilities open to them. The research infrastructures shall promote equal opportunities in advertising the access and take into account the gender issues when defining the support provided to visitors. They shall maintain appropriate documentation to support and justify the amount of access reported. This documentation shall include records of the names, nationalities, and home institutions of the users within the research teams, as well as the nature and quantity of access provided to them. To this extent a unit of access to the infrastructure shall be identified and precisely defined in the Grant Agreement.

The selection of researchers or research teams shall be carried out through an independent peer-review evaluation of their research projects. The research team, or its majority, must work in countries other than the country(ies) where the infrastructure is located (when the infrastructure is composed of several research facilities, operated by different legal entities, this condition shall apply to each facility) except in the case of a distributed set of resources or facilities offering remote access to the same services or when access is provided by an International organisation, the Joint Research Centre (JRC), an ERIC or similar legal entities. User teams where all or the majority of users works in third countries can be supported as far as the cumulative access provided to them is below 20% of the total amount of units of access provided under the grant. In exceptional and well justified cases a higher percentage of access to third-country user teams can be foreseen in the Grant Agreement. Only research teams, including industrial users, which are entitled to disseminate the knowledge they have generated under the project are eligible to benefit from research services to the infrastructure under the grant agreement. Exception to this condition is foreseen when users work for SMEs. The duration of stay at a research infrastructure shall normally be limited to three months, unless otherwise provided for in the Grant Agreement.

EU financial support to trans-national access will cover the access costs\(^4\) incurred by the access provider for the provision of access to the selected researchers as well as the travel and subsistence incurred to support the visits to the infrastructure of these researchers.

The access costs charged to the grant will never include capital investments while they may cover the running costs of the infrastructure as well as the cost for the logistical, technological

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\(^4\) Access costs can be supported through the reimbursement of the eligible costs specifically incurred for providing access to the research teams selected for support under the project, or on the basis of unit costs calculated according to the methodology indicated in the Commission Decision C(2013)8199. In the latter case the access costs will be calculated multiplying the unit cost by the quantity of access provided under the grant. The cost of the unit of access to the infrastructure, the unit cost, shall then be indicated in the proposal. A combination of the two methods mentioned above will also be possible.
and scientific support to users’ access, including costs for ad-hoc training needed by users to use the infrastructure and for preparatory and closing activities that may be necessary to carry out users’ work on the infrastructure.

**Virtual access activities**

To provide virtual access to resources needed for research through communication networks without selecting or even identifying the researchers to whom access to resources is provided. Examples of virtual access activities are databases available via Internet, or data deposition services. Only virtual services widely used by the community of European researchers will be supported, therefore the services offered under a project shall be periodically assessed by an external board. In addition statistics on the access provided shall be given to the Commission. Virtual access activities will be supported through the reimbursement of the operating costs incurred by the infrastructure or installation for providing virtual access to resources over the duration of the project. EU financial support will never include capital investments while it may cover all the technological and scientific support needed by researchers to effectively use the service. Only eligible costs that can be clearly attributed to the provision of access can be reimbursed.

(iii) **Joint Research activities.** These activities should be innovative and explore new fundamental technologies or techniques underpinning the efficient and joint use of the participating research infrastructures. They should involve, whenever appropriate, industries and SMEs to promote innovation and knowledge sharing through co-creation of needed technical solutions. In order to improve, in quality and/or quantity, the services provided by the infrastructures, the joint research activities could address (non-exhaustive list):

- higher performance methodologies and protocols, higher performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software;
- integration of installations and infrastructures into virtual facilities;
- innovative solutions for data or sample collection, management, curation annotation, and deposition;
- innovative software solutions for making new user communities benefit from computing services.

**D. Guidance on submission of proposals to e-infrastructures topics**

The following conditions shall be met by proposals for research e-infrastructures:

Proposals should consider existing operational services to the greatest extent possible (such as authorisation and authentication systems, service registry, etc.) to use or extend them with new applications and functionalities. Furthermore, all services developed by projects should be made discoverable on-line, e.g. by including them in searchable catalogues or registries of (digital) research services with the metadata for describing and accessing the service.
All software developed under e-infrastructures should be open source with appropriate licenses, unless it can be well justified that it should be otherwise.

All proposals are requested to suggest clear metrics (key performance indicators) for monitoring their results and impact.

A detailed list of activities, structured as networking activities, service activities and Joint Research activities may be supported in proposals in the e-infrastructure part of the work programme.

While proposals in theme 1 "Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities" shall put their main focus on service activities and networking activities, proposals in theme 2 "Prototyping innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large" can combine any of the three activity types as appropriate to an effective work plan.

(i) Networking activities (NA): foster a culture of co-operation between the participants in the project (service providers, users and other relevant stakeholders) and with complementary and other related projects. Through NA, scientific communities and e-infrastructure operators are empowered to benefit from e-infrastructure services, industrial partnerships and cooperation with relevant stakeholders. NAs help developing a more efficient and attractive European Research Area.

Networking activities could include (non-exhaustive list):

- joint management of service provision and pooling of distributed resources;
- dissemination and/or exploitation of project results and knowledge, contribution to socio-economic impacts, promotion of innovation;
- reinforcing partnership with industry: outreach and dissemination activities, transfer of knowledge, activities to foster the use of e-infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies;
- strengthening of virtual research communities;
- definition of common standards, protocols and interoperability; benchmarking;
- development and maintenance of common databases for the purpose of networking and management of the users and e-infrastructures;
- activities to improve the efficiency of the e-infrastructures' management and of their service provision;
- spreading of good practices, consultancy and training courses to new users;
- exchange of personnel and training of staff;
• foresight studies for new instrumentation, methods, concepts and/or technologies;
• promotion of clustering and coordinated actions amongst related projects;
• coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
• promotion of long term sustainability, including the involvement of funders and the preparation of a business plan beyond the end of the project;
• definition of data management plans to organise the efficient curation, preservation and provision of access to data collected or produced under the project;
• relations with publishers for supporting data deposition services;
• mapping of e-infrastructures, users, investments, etc, in the specific field for supporting policy developments.

(ii) Service activities (SA): are at the core of the e-infrastructure development and operation. They provide e-infrastructure related services based on at least TRL 8 systems and technologies to the scientific community. Proposals addressing theme 1 "Integration and consolidation of e-infrastructure platforms supporting European policies and research and education communities" need to comply with the conditions set out in the model grant agreement on trans-national\(^5\) and/or virtual access activities and must provide an adequate description of the services provided in the form of a catalogue of services.

Activities may include (non-exhaustive list):

• procurement and upgrading communication infrastructure, network operation and end-to-end services;
• computer infrastructure support, operation and management; integration, test and certification; services deployed on top of generic communication and computing infrastructures to build and serve virtual communities in the various scientific domains;
• deployment, quality assurance and support of middleware component repositories;
• data and resources management (including secure shared access, global scheduling, user and application support services) to foster the effective use of distributed supercomputing facilities; federated and interoperable services to facilitate the deployment and wide use of digital repositories of scientific information;

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\(^5\) Trans-national access costs can be supported through the reimbursement of the eligible costs specifically incurred for providing access to the research teams selected for support under the project, or on the basis of unit costs calculated according to the methodology indicated in the Commission Decision C(2013)8199. In the latter case the access costs will be calculated multiplying the unit cost by the quantity of access provided under the grant. The cost of the unit of access to the infrastructure, the unit cost, shall then be indicated in the proposal. A combination of the two methods mentioned above will also be possible.
vertical integration of the different services in support of specific virtual research communities, including virtual laboratories for simulation and specific workspaces.

(iii) **Joint Research Activities (JRA):** are innovative activities to explore new fundamental technologies or techniques, which have already reached at least TRL 6 and have the potential to underpin the efficient and joint use, co-design and provision of e-infrastructure services. JRA activities shall aim to develop platforms and services based on at least TRL 8 systems and technologies. They should involve, whenever appropriate, industries and SMEs to promote innovation. In order to improve, in quality and/or quantity, the services provided by the e-infrastructures, the joint research activities could address (non-exhaustive list):

- higher performance methodologies and protocols, higher performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software;

- integration of installations and infrastructures into virtual facilities;

- innovative solutions for data collection, management, curation and annotation;

- innovative solutions for communication network (increasing performance, improving management, exploiting new transmissions and digital technologies, deploying higher degrees of security and trust) and introduction of new end-to-end services (including dynamic allocation of resources and innovative accounting management);

- novel computer architecture frameworks and policies, innovative computer technologies, or new middleware solutions driving the emergence of high level interoperable services;

- advanced Service Level Agreements and innovative licensing schemes, fostering the adoption of e-infrastructures and the use of other types of research infrastructures by industry;

- innovative software solutions for making new user communities benefit from computing services.