ACADEMY OF FINLAND

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National criteria for research infrastructures

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1 General evaluation criteria for research infrastructures

There are a set of general criteria for research infrastructures. A research infrastructure must:

- provide potential for world-class research and scientific breakthroughs
- be of broad national interest and enhance the international impact
- have a long-term plan for scientific goals, maintenance, financing and utilisation
- be used by several research groups/users for high-quality research
- be open and easily accessible for all researchers
- have a plan for access to and preservation of collected data and/or materials in spirit of open science and data policy.
- be extensive enough so that individual groups cannot manage them on their own
- introduce new cutting-edge technology (if relevant).

A research infrastructure can be national or international and single-sited, distributed or virtual.

The development of research infrastructures involves several phases, from ideas, concept development, and planning to construction and operation, to occasionally upgrading, and eventually to phasing out. These phases have different financing needs. To assure that long-term research infrastructure needs are met, different types of support and financing are necessary. From a research infrastructure perspective, relevant types of funding include:

- planning grants for design studies and planning of construction or collaboration
- grants for investing in equipment or databases, used to construct national or international research infrastructures or a single research infrastructure that is nationally accessible
- grants for operational costs of maintaining the operation in the long term
- grants for phasing-out the research infrastructure (when relevant)

A well-designed funding plan is important for the long-term design of a research infrastructure. The construction phase, mainly for centralised research infrastructures involving facilities and instrumentation, requires major, limited-time investment costs. The cost balance between construction and operation may be the opposite for distributed research infrastructures, where the greatest expense is seldom the investment cost, but rather the cost of ongoing work in standardisation, harmonisation and quality assurance of procedures and data.

Usually, research infrastructures must be upgraded to maintain their competitive strength, necessitating financing of new investments. Eventually, most research infrastructures will be phased out, which is associated with substantial costs of disassembling technical equipment and phasing out staff, etc. Hence, a phase-out plan should also be established prior to a decision to build a research infrastructure.

2 Specific evaluation criteria for research infrastructures

The research infrastructure projects evaluated maybe at different stages in terms of their life cycle. Some are in the planning phase while others might already be completely operational. For those research infrastructures that are in the planning phase, the evaluation is mainly based on anticipated future impacts rather than actual results. For existing research infrastructures the actual results will be evaluated.

The criteria used should be fair and equal, reflecting the international state of the art within the field in question. Major upgrades of existing research infrastructures or their reorientation require an evaluation of all criteria, the general and specific ones on pages 3 and 4-6, respectively.

The evaluation of the research infrastructures is carried out in a process comprising five different dimensions. Each research infrastructure is evaluated individually in each separate dimension as well as in comparison to the other infrastructures in all other areas of science. The dimensions are:

1. Scientific quality and potential
2. Open access and utilisation
3. Relevance to the strategies of host institutions
4. National and international relevance
5. Feasibility and Sustainability

2.1 Scientific quality and potential

The leading principle of evaluation is enabling scientific excellence through the research infrastructures.

Specifically, the following issues must be addressed:

1. The research infrastructure is of scientific significance, enables frontier research, is timely and provides added value at the national and international level
2. The research infrastructure is continuously used by excellent researchers and research groups
3. Existing research infrastructures shall provide an account of their activities, showing utilisation rate and impact, for example, in the form of publications and data methods
4. The research infrastructure participates in the training of researchers and students or is utilised for these purposes

2.2 Open access and utilisation, Finnish and international users

Research infrastructures have developed in many different ways. The use of research infrastructures has partly grown organically over time and partly been tailored to the specific research needs. In many cases, new research infrastructures attract excellent user groups from other disciplines as well as researchers from abroad.

1. There should be transnational open access to the research infrastructure. Access may require approval of a research plan and reasonable user fees as a compensation for the maintenance, user support and other services.
2. The research infrastructure should have a data policy that supports the Open Science concept in which research methods, data and outcomes are all thoroughly documented and publicly accessible in an open manner. Therefore, the research infrastructure must have a data management plan that consists of information on data acquisition, computation, storage, and ownership of the data.
3. The research infrastructure must have clear and well-functioning leadership and administrative structures, adequate personnel for the maintenance, services and user support of the research infrastructure.
4. The research infrastructure should monitor its utilisation rate.
5. The research infrastructure should demonstrate its contribution to the training, e.g. provision of courses, professional guidance and science education.

2.3 Strategic relevance of the research infrastructure for Finland

Building and operating a research infrastructure requires a long-term commitment from the research infrastructure itself and the host as well as other contributing institutions. Therefore, the strategies and priorities of the host institution(s) will also be included in the evaluation.

2.4 National and global relevance

This dimension of evaluation relates to the added value the research infrastructure provides for the national and/ global research community, and how it contributes to the visibility, global attractiveness and future development of Finnish research environment.

1. Strategic significance of the research infrastructure for Finland
2. Added value of research infrastructure:
    - for society, at large
    - for innovation activities, business and economy
    - through global cooperation (e.g mutual mobility) of Finnish research community

2.5 Feasibility and Sustainability

The feasibility and sustainability of the project is assessed on the basis of the technical, institutional (e.g. form of ownership, terms of use or membership) and personnel requirements during the whole life cycle of the research infrastructure.

The expenses consist of planning, investment, operational and decommissioning costs during the whole life cycle of the research infrastructure.

Planning costs

Investment costs

- Construction/Building (incl. manpower)
- Acquisition of real estate
- Special technical equipment
- Supply/construction of devices and equipment

Operating costs

- Personnel costs (e.g. operation, maintenance, user support)
- Material costs (incl. membership fees or other payment of contributions to organisations)
- Costs of running the premises (rent, electricity)
- Other noteworthy investments (replacement purchases) required to keep the research infrastructure and equipment on an adequate level, reflecting the state-of-the-art

Decommissioning costs

- Costs of closing down the business and conservation of the resources developed

Ensuring sustainable funding during the whole life cycle of research infrastructure is essential not only for research infrastructure itself but also to the user community at large. In the financial plan investment and operational costs should be made explicit as well as the associated sources of those funds. Flexible business models are essential to keep research infrastructure sustainable in the long run.

For each research infrastructure call organised by the Academy of Finland, more detailed instructions for the costs covered are given.