



Federal Ministry
of Education
and Research

Guidelines for outlining proposals

for the National Roadmap for Research Infrastructures, issued
by the German Federal Ministry of Education and Research (BMBF)

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1. Overview of the roadmap process

As research infrastructures are highly relevant in terms of research policy and the national economy, a strategic plan is required for their development and establishment. The prioritisation of new research infrastructures should be a transparent, fair and open process. The German Federal Ministry of Education and Research (BMBF) plans to continue the expansion of national and international research infrastructures with German involvement in future. To this end, it has established the national roadmap process for research infrastructures.

The BMBF national roadmap process for research infrastructures serves to prepare and prioritise – in terms of research policy – future and long-term investments in national and international scientific infrastructures with German involvement. For this purpose, BMBF initially ran a pilot phase from 2011 to 2013, which received widespread support from across the German science and research community. Building on the findings from the pilot phase, the process was revised and consolidated in consultation with all parties involved. This led to the national roadmap process for research infrastructures being announced to the public in August 2015. The process is open to participation by all interested universities and non-university research institutions that are planning to develop new research infrastructures. It serves to develop the national research infrastructures roadmap, which is to be updated regularly.

Submitted research infrastructure proposals are assessed based on an external science-driven evaluation, which is carried out by the German Council of Science and Humanities (Wissenschaftsrat) (see section 4), and an economic evaluation (see section 5), which essentially

consists of an external cost estimate of the submitted proposals for research infrastructures.

Based on this assessment, and taking the social relevance and financial feasibility of the planned research infrastructures into consideration, BMBF – or another ministry if appropriate – takes the research-policy decision regarding its inclusion on the roadmap.

These guidelines for outlining proposals for the BMBF National Roadmap for Research Infrastructures set out the information required for the science-driven and economic evaluations, which the proposals need to contain, and explain the criteria by which the submitted proposals are assessed.

For the science-driven evaluation, the proposed research infrastructure projects are compared with each other and evaluated in four dimensions. These dimensions, in turn, are sub-divided into various aspects giving structure to the evaluation process. Section 4 lists detailed questions – arranged according to the dimensions and aspects – which should be considered when outlining the proposals.

Section 5 sets out the information that proposals need to contain for the economic evaluation. In order to ensure a transparent and fair assessment process, the scientists who are responsible for the proposals must all submit the required information in response to these guidelines and questions. The project management agency of BMBF will check the proposals submitted for plausibility and completeness, and request any missing information. If not all the required information can be provided in the proposals, it may happen that they are not ready for evaluation, in which case the submitted proposals cannot participate in the roadmap process.

2. Formal requirements

Research infrastructures, for the purposes of the BMBF roadmap process, are extensive and long-lasting resources such as laboratories, equipment, instruments, collections of materials and databases, or service facilities for research in all areas of science. Research infrastructures¹⁾ are of national importance in terms of science policy. They are characterised, for example, by the fact that access to them is open, and their use is regulated on the basis of scientific quality.

As part of the National Roadmap for Research Infrastructures, proposals may be submitted for new and extensive research infrastructure projects, or for substantial upgrades of existing infrastructures. Both national and international projects are considered. Substantial upgrades means measures which add real value to existing research infrastructures. These include, for example, fundamental changes to the way research infrastructures work, resulting in a significantly expanded range of possible uses and measures which can be expected to significantly increase the quality of scientific work. It shall not be considered a substantial upgrade in cases where measures are needed to secure the usability of an existing infrastructure, or if existing components are replaced to maintain the performance of an infrastructure. The planned utilisation phase of the research infrastructure must be at least 10 years following its completion.

The German share of planned development costs (essentially investment costs) should generally be at least € 50 million. If the new research infrastructure mainly focuses on the acquisition, systematic sampling, provision, maintenance and archiving of data, samples, artefacts etc., then a threshold of € 50 million (German share) likewise applies, being the sum needed for the development of the research infrastructure. The calculation of the threshold value for this “development phase” of a maximum of 10 years includes necessary costs for the progressive development of the research infrastructure. Operating costs incurred during the research infrastructure’s utilisation phase which do not contribute significantly to the further development of data or information collections cannot be included.

Operating costs to take into consideration here include e.g. energy, material, rental and personnel costs that are incurred in the acquisition, systematic sampling, provision, maintenance and archiving of information or collections. In this case, the use of the infrastructure and its continuation in a way that is adequate for research purposes must be guaranteed for at least 10 more years following the development phase. For research infrastructures in the fields of humanities and social sciences or educational research, a threshold of € 20 million (German share) applies; the calculation conditions mentioned above in the case of collections, archives etc. apply analogously here.

The format of the submitted proposals should be as follows: A4 size, font Arial 11 pt, line spacing 1.5 lines, with 3 cm margins. A German version comprising not more than 25 pages for the scientific part (section 4) and not more than 15 pages for the economic part (section 5), an English version, and electronic versions of the documents are to be submitted. Please submit a respective German and English hard copy with original signature, as well as copies in each case. The German-language version is the binding proposal. The sender confirms with their signature that the German and English-language documents and copies of the same are identical in content. Please create the electronic versions as PDF files without password protection and without restricted permissions for reading, copying and printing.

The following structure including all sub-items should be adopted for the proposals. If no information can be provided for individual items, this should be documented.

Please formulate the proposal in a language that can also be understood by specialists in other areas of science. Please especially avoid the use of abbreviations and acronyms that are only established in particular scientific communities, and, if needed, please explain any unclear or ambiguous terms. If you wish to include references to relevant documents and bibliographical sources, you may also insert a hyperlink.

¹⁾ Research infrastructures for the purposes of this text are always new and extensive research infrastructure (large scale research infrastructures) projects or substantial upgrades of existing infrastructures.

3. Basic information

For a short and concise presentation of your research infrastructure, and for a clear presentation of all relevant institutions and contact persons, a number of formal details and basic pieces of information are required. These serve to provide the reviewers with all necessary information “at a glance”.

3.1 Formal details/title page

“Title”	<in German>
Acronym	<in German>
“Title”	<in English>
Acronym	<in English>
Leading responsible institution:	(Name)
Scientist in charge:	(Title First name Last name)
Contact person:	(Title First name Last name)
Address: Phone: Fax:	
E-mail:	
Website:	
Place, date	
Name, signature	
Additional leading responsible institution(s), if applicable:	(Name(s))
Scientist in charge:	(Title First name Last name)
Address: Phone: Fax:	
E-mail:	
Website:	
Place, date	
Name, signature	

3.2 Short summary

Please describe, in a generally understandable form, the planned new or developed research infrastructure. Briefly describe its significance for the fields of science and technology concerned at national, European and global level. Please also explain the societal and social importance of the research infrastructure (max. 2 pages).

3.3 Basic data on the research infrastructure

Provide a summary in table form of all other cooperating responsible institutions and in each case list the scientists in charge and the contact persons on site.

Please describe briefly the basic organisational and legal form of the research infrastructure, and include a diagram. State here whether it is a centralised or decentralised research infrastructure, where it is to be constructed, and whether the composition of the responsible organisation is national, international or European (e.g. ERIC) (max. 1 page).

3.4 Overview of annexes

Both the science-driven evaluation and the economic evaluation examine the various concepts and states of planning from their respective perspectives. To avoid repetition, information that is required for both evaluation processes should be added to the concept in the form of annexes. For example, this could be plans, diagrams, charts, self-declarations or concept papers. Details of the aspects that should be commented on in the annexes can be found in sections 4 and 5. The following annexes should be submitted with the proposals:

Annex 1	“Development costs” (for details see section 5.1.1)
Annex 2	“Financing structure” (for details see sections 4.3.4 and 5.1.2)
Annex 3	“Costs of the utilisation and closure phases” (for details see section 5.1.3)
Annex 4	“Economic risk assessment” (for details see section 5.1.4)
Annex 5	“Project plans” (for details see sections 4.3.2 and 5.2.1)
Annex 6	“Management concepts” (for details see sections 4.3.3 and 5.2.2)
Annex 7	“Governance” (for details see sections 4.3.2 and 5.2.3)
Annex 8	“Implementation phase risk analysis” (for details see sections 4.3.1 and 5.2.4)
Annex 9	“Target group analysis” (for details see sections 4.2.1 and 5.3.1)
Annex 10	“Access management” (for details see sections 4.2.2 and 5.3.2)
Annex 11	“Business plan” (for details see section 5.3.3)
Annex 12	“Data utilisation and data management concept” (for details see sections 4.2.3 and 5.3.4)
Annex 13	“Competing and complementary research infrastructures” (for details see section 4.1.3)
Annex 14	“Code of conduct” (for details see section 4.2.4)

4. Science-driven evaluation

The science-driven evaluation of research infrastructure projects takes place in two successive steps: a qualitative individual evaluation of each project, and a comparative overall evaluation. Both evaluations comprise four dimensions of evaluation: scientific potential, use, feasibility and relevance to Germany as a location of science and research. These four dimensions are sub-divided into various aspects. In the research infrastructure proposals, each of these aspects should be briefly commented on from a scientific perspective. Please provide additional information such as figures, plans, diagrams, charts, self-declarations and concept papers in each case as annexes to your proposal (see also section 3.4, Overview of annexes).

4.1 Scientific potential

The “scientific potential” dimension of evaluation refers to the importance of the project in opening up new fields of research or developing existing fields. It also takes competing and complementary research infrastructures into account.

In the text, please describe the scientific potential of the research infrastructure project, based on aspects 4.1.1 to 4.1.3. The questions serve to explain the respective aspects, and are merely for guidance. Accordingly, statements concerning each aspect may be combined.

4.1.1 Scientific prospects

- How does the research field appear in the national and international context, and how does the project fit into it? What is the strategic importance of the research infrastructure for the research field?
- What key research questions are to be addressed?
- What scientific or technological innovations are expected from the research infrastructure or from the upgrade?
- What alternative ways of answering the research questions have been considered?
- What consequences are to be expected, if the research infrastructure or upgrade could not be realised?
- To what extent do the relevant scientific communities support the investigation of research

questions with recourse to the planned research infrastructure?

- What impact does the planned research infrastructure have on collaborations within the subject and beyond the subject?

4.1.2 Potential modes of operation during life-time

- What potential applications or modes of operation are planned generally and during the life-time (e.g. multi-purpose platform), especially with regard to the research question?
- What preparatory considerations have taken place for making its use more flexible and/or for adaptation to changed research questions, with the goal of making optimal use of the research infrastructure during its life-cycle? What plans exist for the research infrastructure’s closure phase and in the event that the expected innovations do not materialise?

4.1.3 Competing and complementary research infrastructures

- How does the project fit into the field of existing and other planned research infrastructures (uniqueness, competition, complementarity, synergies, etc.)? In what relationship do they stand to the planned infrastructure? Please list the complementary and competing research infrastructures as annex 13 “Competing and complementary research infrastructures”, and include the following information: name of the research infrastructure, brief description, website, life-time, location(s) and countries involved. Here you should differentiate between predecessors, current and planned research infrastructures as well as those being phased out and those that have been terminated¹.

4.2 Utilisation

The “utilisation” dimension of evaluation relates to the size and origin of user groups, the regulation of access to the research infrastructure, data management and quality assurance.

In the text, please briefly describe the utilisation of the research infrastructure project from a scientific perspective, based on aspects 4.2.1 to 4.2.4. Please provide further information in annexes 9 “Target group analysis”, 10 “Access management”, 12 “Data utilisation and data

¹ An example of this list is available on the Council’s website: http://www.wissenschaftsrat.de/arbeitsbereiche-arbeitsprogramm/forschungsinfrastrukturen/dokumente_und_links.html. It can also be requested via e-mail from the Council’s head office (forschungsinfrastrukturen@wissenschaftsrat.de).

management concept” and 14 “Code of conduct”. The questions serve to explain the respective aspects, and are merely for guidance. Accordingly, statements concerning each aspect may be combined.

4.2.1 Expected user groups

- How big is the expected user group (in absolute terms and as a proportion of the relevant scientific community or communities)? How large is the expected proportion of international users, and how large is that of businesses and other users (cf. 5.3.1)?
- What level of capacity utilisation is expected? What is this estimate based on? Quantifying details are desirable here concerning the expected extent of use in the way usual in your scientific community, as well as comparison figures for existing facilities (national/European/international) (cf. 5.3.1).
- What is the disciplinary and institutional origin of the expected users (specifying the relative proportions in relation to the overall user base)?
- What impact will the new research infrastructure have on the use of existing research infrastructures?

4.2.2 Access management and service

- What utilisation strategy or what utilisation concept has been developed? In what form have users been or will users be involved in subsequent development over the entire life-time (participation)?
- How is the qualified access to the planned research infrastructure organised (access criteria, access procedures, user fees, training and advice services for users, etc.)? Please provide the terms of use in annex 10 “Access management” (cf. 5.3.2).

4.2.3 Data concept

- What concept for data collection, provision (also for external parties), processing, storage and security has been developed, also with regard to the expected volume of data? On what standards is the concept based? Please describe the concept. Please also explain how the general sustainable utilisation or commercial use of the acquired data is made possible for scientists in Germany and other countries. Data protection issues – especially in connection with personal data – also need to be considered for research infrastructures in the social sciences and humanities or life sciences. Please provide a concrete data utilisation and data management concept as annex 12 “Data utilisation and data management concept” (cf. 5.3.4).
- What open data strategies are pursued (legal and ethical implications, security standards)?

4.2.4 Process integrity

- What quality assurance measures are envisaged?
- What guidelines exist with regard to ethical standards and standards in dealing with research data (particularly with regard to documentation and ensuring the reproducibility of data and data curation) and publications? If available, please provide the code of conduct as annex 14 “Code of conduct”.

4.3 Feasibility

The “feasibility” dimension of evaluation primarily comprises the technical requirements, but also the institutional and personnel requirements of the responsible institution(s), which need to be fulfilled for the implementation of the research infrastructure, as well as the associated risks

In the text, please briefly describe the feasibility of the research infrastructure project from a scientific perspective, based on aspects 4.3.1 to 4.3.4. Please provide additional information as annexes 5 “Project plans”, 6 “Management concepts”, 7 “Governance” and 8 “Implementation phase risk analysis”. The questions serve to explain the respective aspects, and are merely for guidance. Accordingly, statements concerning each aspect may be combined.

4.3.1 Technical requirements and risks

- Are new technological developments necessary for the implementation of the research infrastructure? What risks are associated with this? Please give a detailed account of the potential scientific, technological and institutional risks and uncertainties in annex 8 “Implementation phase risk analysis” (cf. 5.2.4).
- What technical alternatives – also with regard to cost-benefit aspects – have been considered? Please give reasons for the preferred option.
- What risks and consequences need to be considered from an ethical and/or legal and/or environmental point of view?

4.3.2 Institutional requirements

- How is the project embedded in the strategy of the responsible institution(s) (and the collaborating institutions)?
- What are the underlying ideas about project management in the planning and implementation phases? Please describe these from a scientific perspective. Additional information such as existing plans should be provided in annex 5 “Project plans” (cf. 5.2.1).
- What governance concept has been developed for the operation of the research infrastructure? What about its ownership (e.g. legal character)? What scientific supervisory and advisory bodies are envisaged? Please describe the concept from a scientific perspective. Please provide additional information in annex 7 “Governance” (cf. 5.2.3).

4.3.3 Personnel requirements

- What scientific, scientific-technical, technical and management competencies are required in the responsible organisation(s) for the development,

implementation and operation of the research infrastructure? Please describe these from a scientific perspective. Please provide additional information such as existing concepts in annex 6 “Management concepts” (cf. 5.2.2).

- To what extent does/do the responsible organisation(s) have personnel available, and can these personnel be used for the development and operation of the research infrastructure? If not, how can these personnel be recruited?
- What personnel development concepts exist for the various personnel groups and for young academics?

4.3.4 State of realisation

- At what stage of realisation is the project?
- What binding expressions of interest or commitments from other responsible institutions or financing sources currently exist? Please provide these in annex 2 “Financing structure” (cf. 5.1.2).

4.4 Relevance to Germany as a location of science and research

The evaluation dimension “importance for research and science in Germany” includes the relevance of the research infrastructure project to the interests of Germany as well as its impact on the visibility and attractiveness of German science.

In the text, please describe the significance of the research infrastructure project for Germany as a location of science and research, based on aspects 4.4.1 to 4.4.3. The respective questions serve to explain the aspects, and are merely for guidance. Accordingly, statements concerning each aspect may be combined.

4.4.1 Visibility

- In what way does the project help to promote strengths or correct weaknesses in the German research landscape?
- In what respect does the project contribute to the European and international visibility of research in Germany?
- If this is a European or international project: what role does Germany play in it?

4.4.2 Attractiveness

- To what extent does the planned research infrastructure promote the attractiveness of Germany as a location of science and research in the medium and long term within the European and international context, also with regard to young academics?
- What role does the infrastructure play in the education of young academics and especially in supporting them?

4.4.3 Transfer and impact

- What arrangements have been made for knowledge and technology transfer in a broad sense (including a transfer to the public)?
- What are the expected social and economic impacts of the research infrastructure? What possibilities are envisaged for recording and documenting effective transfer and the achievement of impact?

5. Economic evaluation

As part of the economic evaluation of the submitted proposals, the costs of the research infrastructure are at first estimated individually by several independent experts – without knowing the actual specific cost estimate – based on the cost structure (see section 5.1.1). In a subsequent cost estimation meeting, the respective estimated values are discussed by the expert group, and then a joint cost estimate is produced by consensus. The economic evaluation also includes checking the soundness and suitability of the implementation and realisation concepts – including planning statuses and management concepts – as well as the utilisation concepts, in respect of their economic and organisational feasibility.

The costs to be estimated in the cost estimation meeting comprise the portions of the research infrastructure, or the work packages of the project, for which German financial resources are required. Clearly definable work packages and portions of costs that are funded by other institutions are checked for plausibility in the cost estimation meeting. If this is a research infrastructure that is to be financed by multiple institutions via a real common pot, so that it is not possible to clearly separate the German share, then the whole research infrastructure will need to be appraised for the purpose of the cost estimation meeting.

In the text, please provide a brief outline description of the economic perspective for all of the following points. Please provide additional information such as figures, plans, diagrams, charts, self-declarations and concept papers in each case as annexes to your proposal.

5.1 Financing concept

The financing concept is the basis for the economic evaluation of your research infrastructure proposal. It is therefore necessary to present here in detail all the information that is relevant to its development and construction. The information required for the cost estimation meeting is specified in section 5.1.1; this information is particularly important for the economic evaluation. The information in sections 5.1.2 to 5.1.4 serve to estimate potential monetary and planning risks of the research infrastructure concepts, and also flows into the economic evaluation.

5.1.1 Costs of the development phase

As the external experts' cost estimates for the research infrastructure's development phase should be as unbi-

ased as possible, the cost types and items for the concepts should first of all be described in the text, without citing specific figures. In table form, please state the specific development costs for the research infrastructure that are to be financed via the German share, listing the individual costs and quantity structures, in annex 1 "Development costs", and include this with your proposal. Please also set out the development costs in yearly tranches based on the schedule, showing the required financial resources.

Explanation

The external cost estimate for the development phase is based on a comprehensible cost structure – with substantiated content, and which is as detailed as possible – for the German share of the planned research infrastructure, which you should explain in the text. This should list all foreseeable cost items, and specify them via the quantity structures, that are necessary for the development and implementation of the research infrastructure. Depending on the planned type of research infrastructure, these could be, for example:

- Purchase of land
- Construction costs
- Material costs
- Special technical equipment
- Procurement/construction of apparatus and equipment
- Costs for approvals/inspections (e.g. relating to radiation protection)

If fundamental research and development (R&D) work is still needed for the development of the research infrastructure, this should also be listed. The R&D work should be presented comprehensibly and its content substantiated. Costs for R&D activities that are incurred in connection with the use of the research infrastructure cannot be included.

If it is necessary for setting up the research infrastructure – e.g. in the case of international or nationally distributed research infrastructures – to set up an administrative office or management organisation, reasons for this should be given and the type of costs specified (personnel costs, rent, equipment, location etc.).

Key indirect costs should also be estimated and listed. These could be, for example, overhead costs or costs

for international research infrastructures that arise because of the international nature of the research infrastructure, and take the form of e.g. contribution payments to the operating company.

If the new research infrastructure is mainly focused on the acquisition, maintenance and archiving of data, samples, artefacts etc., then – for a phase of maximum 10 years – all research infrastructure costs that are necessary for setting up the research infrastructure should be listed here. These could also include, for example, costs arising for the acquisition, systematic sampling, provision, maintenance and archiving of information, data or suchlike. These costs should be presented comprehensibly and specified. Operating costs incurred in connection with the use of the research infrastructure which do not contribute substantially to the development of the information, sample or data collections should be presented under section 5.1.3 (see diagram).

5.1.2 Description of the financing structure

The financing structure should show the total financing of the research infrastructure. In the text,

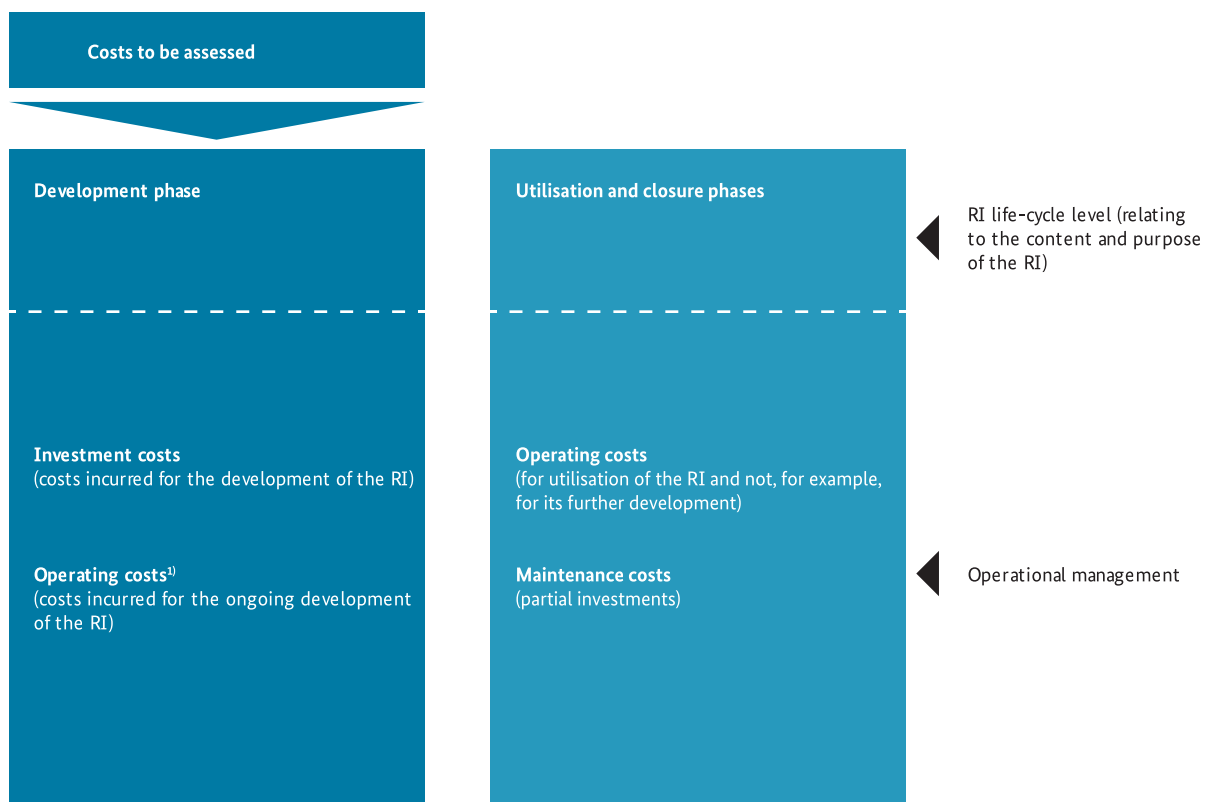
please briefly explain and give reasons for the type of financing structure (own resources, third-party resources, public resources etc.). In annex 2 “Financing structure”, please present, in summary and table form, in yearly tranches, the planned overall financing structure for the development phase of the research infrastructure, and specify the German share.

Explanation

Present the planned own contribution to financing the research infrastructure and include a substantiated self-declaration concerning the level of own financing. Show the anticipated external financing by national and international partners (institutions, organisations, countries etc.) and include any corresponding binding statements (cf. 4.3.4).

Within the German share, you should also list the necessary financial resources that are to be provided by third parties. If the scope of this financing cannot be clearly determined, please specify a minimum and a maximum value.

Research infrastructure costs to be assessed



¹⁾ e.g. energy, material, rental or personnel costs that are incurred in the acquisition, systematic sampling, provision, maintenance and archiving of data or information collections

5.1.3 Costs of the utilisation and closure phases

For the presentation of costs for the utilisation and closure phases (operating costs, costs for closure and dismantling if applicable), the overall level of detail can be lower than in the presentation of costs for the development phase. The costs for the utilisation and closure phases are not estimated by the external experts. It is mainly a question of the plausibility and consistency of the concept as a whole; moreover these costs are even more difficult to predict owing to the longer time-span. In the cost estimation meeting, the experts check and assess the plausibility of the operating costs. In the text, please briefly explain and give reasons for the anticipated costs of the utilisation and closure phases, and include an annex 3 “Costs of the utilisation and closure phases”. Please also include binding statements in respect of taking on or covering the facility’s operating costs in the utilisation phase and the costs for the closure phase.

Explanation

All costs that are incurred on a sustained basis after the construction of the research infrastructure should be considered in the utilisation and closure phases. These particularly include material and personnel costs, as well as repair and maintenance costs. The regular purchase of replacement equipment and systems at the ends of their respective useful lives is also included in the operating costs. Please also take into account necessary and considerable additional investments or replacement purchases that are required to keep the research infrastructure scientifically up-to-date.

Required regular fees or membership subscriptions should also be considered. Please also state the portion that is to be financed from public resources, if applicable. Additional possible follow-up costs should be quantified.

Please present a concept for financing the research infrastructure during the utilisation phase and explain the planned financing sources. You should take expected revenues into account here, too. These could be realised e.g. via usage fees for the research infrastructure paid by science and business users. Please explain any additional planned sources of income.

The necessary costs and expenses for subsequent usage or the closure, dismantling and disposal of facilities need to be considered. Since the dismantling of facilities only be-

comes necessary after a lengthy period of time, planning and cost estimates are generally only possible to a limited extent. Nevertheless, the concept should contain all available information and present them in a comparable way, as with the costs of the development phase.

5.1.4 Economic risk assessment

Owing to the complexity and long-term nature of such projects, a cost-based risk analysis is essential for obtaining the most realistic estimate possible of the development costs for a research infrastructure. Therefore, in the text, please specify and explain all foreseeable and significant risks and uncertainties that could result in changes in the individual and overall costs, and quantify the monetary consequences in table form in annex 4 “Economic risk assessment”.

Explanation

Possible cost items for the development phase that could change over the course of a number of years include, for example, material costs for metals, special metals, rare earths etc. Prices for energy sources and electricity can also fluctuate greatly. Failures of specific systems or technical equipment may result in relevant additional costs. If it is anticipated that there is a significant degree of probability that these will occur in the planned research infrastructure (e.g. based on experiences from similar projects), the monetary consequences should be estimated. Likewise, cost increases may result from foreseeable changes in the legal framework (environmental regulations, radiation protection etc.). If applicable, please estimate these costs also.

If additional R&D work is planned and necessary for the implementation of the planned research infrastructure, please describe the economic risks that a negative outcome could entail.

Additional operating costs about which particular uncertainties exist regarding the future price trend should be listed. Here too, the costs of foreseeable failures should be quantified.

Please explain your risk minimisation measures, i.e. what strategies are pursued to reduce risks and uncertainties, and minimise the resulting cost increases.

5.2 Implementation and realisation concept

The implementation and realisation concept is used to evaluate the “level of maturity” of the research infrastructure, i.e. how realistic it is that the presented proposal can be implemented promptly. If any of the concepts mentioned below are not yet available, please state when and how these will be produced.

5.2.1 Project plans

In the text, please briefly describe the state of planning of the research infrastructure and include the existing plans as annex 5 “Project plans” (cf. 4.3.2). The project plans essentially comprise the following plans:

- The project structure plan, which sub-divides your research infrastructure project into plannable and manageable elements, and forms the basis for the scheduling and sequencing, and the resource and cost planning
- Project organisation plan showing responsibilities and hierarchies
- Timelines, work plans and resource plans for all necessary phases for the implementation of the research infrastructure up to the beginning of the utilisation phase (e.g. planning phase, design studies, construction concepts)
- Timelines and work plans for the utilisation and closure phases

5.2.2 Management concepts

The envisaged management concepts for all necessary phases in the life of the research infrastructure should be submitted. In the text, please briefly describe the planned management concepts, and include the existing concepts as annex 6 “Management concepts” (cf. 4.3.3).

Both the management concepts which are to apply until the research infrastructure is constructed, and the management concepts that come into effect during the utilisation phase, should be described. Altogether, the management concepts essentially cover the organisation of management and business administration, and take into account e.g. human resource management and reporting.

5.2.3 Governance

An extensive governance system that is adequate to the task must be in place for the planned research infrastructure. In the text, please briefly describe the economic aspects of the planned governance system, and include further information about its planned nature and structure as annex 7 “Governance” (cf. 4.3.2).

This should include a description of the fundamental system of enterprise management and governance. The nature and manner of operation of the envisaged governance bodies, such as scientific advisory boards, supervisory boards, the composition of the board of directors and of management are essential elements of governance, especially for international or decentralised research infrastructures. In the case of a decentralised research infrastructure (distributed between multiple locations or institutions), it is a further requirement that the added value of having a functionally integrated research infrastructure with common standards (in respect of data or methods), which can therefore be evaluated as a unit, must be given. The governance of a research infrastructure is a determining factor in its effectiveness, and therefore has a significant influence on its success. The type of ownership, its location and the associated location decisions, and rules determining the tasks and decision-making powers, are fundamental design elements of a governance concept.

5.2.4 Implementation phase risk analysis

In the implementation and realisation concepts, the potential risks and uncertainties should be described that are associated with the individual implementation steps. Please provide an extensive description of the type of risks that might occur in annex 8 “Implementation phase risk analysis” and briefly describe the economic impacts in the text (cf. 4.3.1).

These risks include, for example, possible delays in work schedules, missing milestones, partners dropping out, or also technical and scientific risks that could arise particularly if preparatory R&D work is needed. Please also describe the impacts of the risks and uncertainties in respect of time schedules and the impacts on the scientific benefit of the research infrastructure, and specify the planned counter-measures.

5.3 Utilisation concept

The submitted research infrastructure concepts should contain meaningful information about the intended use of the research infrastructure. The utilisation concept should serve to assess the viability of the research infrastructure and present information about the organisation and financing of its use over its entire life-time. If any of the concepts mentioned below are not yet available, please state when and how these will be produced.

5.3.1 Target group analysis

To estimate the viability of the planned research infrastructure, an analysis of its target groups should be carried out to illustrate the potential demand for the planned scientific service. Possible scenarios which could result in a reduction in the anticipated demand should be described. In the text, please briefly describe the bases of your target group analysis, and provide further information in annex 9 “Target group analysis” (cf. 4.2.1).

5.3.2 Access management and service

In the text, please briefly describe the access management concept for the research infrastructure, with particular consideration of economic aspects. This comprises both internal and external use

(beyond the responsible institution). Please provide additional information, process and organisational descriptions for the planned use, and the envisaged access arrangements as annex 10 “Access management” (cf. 4.2.2). The utilisation concept should ensure equal and open access to the entire research community. The projected usage ratio of external users should be estimated.

5.3.3 Business plan

A business plan in rough outline should be provided as part of the utilisation concept. This should take up the results of the target group analysis and demonstrate that the research infrastructure concept can be profitable. Please list the specific commercially exploitable services of the research infrastructure in annex 11 “Business plan”. Name possible competitors and present the basic financial planning with capital requirements and income statements.

5.3.4 Data utilisation and data management concept

For most research infrastructures, data management is a major challenge with regard to implementation and execution. Annex 12 “Data utilisation and data management concept” (cf. 4.2.3) is therefore also examined and taken into account as part of the economic evaluation.

6. Further information

The BMBF launched the national roadmap process for research infrastructures on 28 August 2015. For more information about the process, visit: <http://www.bmbf.de/de/22519.php>.

For basic and more detailed information about the national roadmap process for research infrastructures and a description of the prioritisation procedure, please see the “National roadmap process for research infrastructures” brochure, which is available to download from the above BMBF website.

DLR Project Management Agency is available to answer questions and provide further information about the national roadmap process for research infrastructures.

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