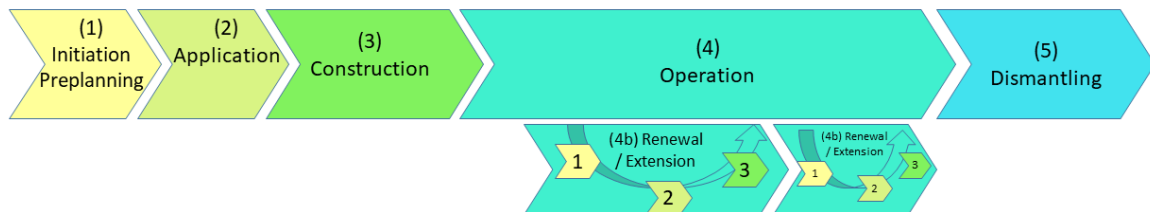


## Life-cycle management of research infrastructures at the UFZ



# Life-cycle management of research infrastructures at the UFZ

This document presents a concept for a life cycle management system for Research Infrastructures (RIs) at the UFZ that covers their entire life cycle from concept development and procurement to operation and dismantling.

## The life cycle of a research infrastructure

A distinction can be made between the following five phases in the life cycle of an RI: **1) initiation and strategic preliminary planning; 2) application; 3) construction; 4) operation; and 5) dismantling/disposal.** In addition, a phase **4b) renewal or expansion** may prove useful during the operating phase, for the realization of which the strategic planning phase and the subsequent phases are run through again.

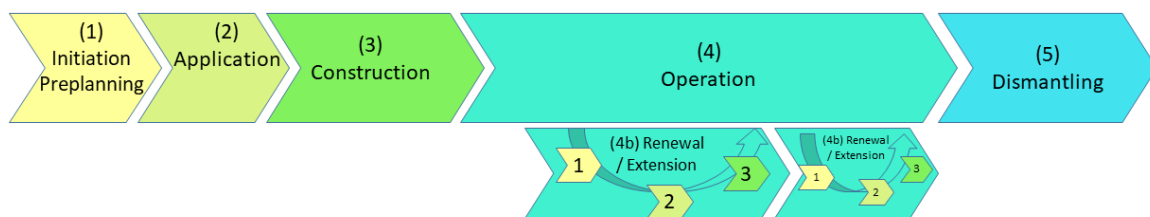


Figure 1: Life cycle phases of a research infrastructure. Renewal and/or expansion are possible during the operating phase: 1: Initiation/preliminary planning of renewal or expansion; 2: Application for renewal/expansion; 3: Construction of renewal/expansion

## Phase 1: Initiation and strategic preliminary planning

The RIs are part of UFZ's strategy and are important prerequisites for achieving its strategic research goals. At the same time, as a member of the Helmholtz Association, the UFZ's goal with RIs is to support a national and international user community through the development, construction and operation of complex research facilities and thus act as an operator and provider of world-leading research infrastructures.

As part of the implementation of the UFZ's Strategy, the RI projects already mentioned in the strategy document will be specified in the research units in the form of concept papers. Initial coordination with the Financial Controlling department (FCO) and, if necessary, with other administrative units (Scientific and Commercial Data Processing department (WKDV), Purchasing, Construction and Facility Management department (BFM)) is already taking place to prepare these papers. In addition, the research units also develop and initiate plans for new RIs as part of updating the strategy. These RI plans and concepts, which include in particular a strategic description of the content, a cost framework and implications for the research community, are regularly presented at the Research Unit Leader board (RUL Board), the monthly meeting of the Research Unit Leaders (RUL) and the Executive Management (GF). The RUL Board discusses and prioritizes these. The decision on the preparation of a full proposal for an RI lies with the Executive Management, as does the decision on the order of realization of any competing RI proposals.

## Phase 2: Application

After confirmation by the Executive Management, the RUL in charge develops the RI project towards a full application. The following aspects should be clarified and taken into account in this phase:

- Appointment of a coordinator with operational responsibility for the RI
- Analysis of the research landscape with regard to the availability of and experience with similar infrastructures as well as assessment of internal and external demand (naming of specific potential user groups with willingness to write Lols if necessary)
- Significance and contribution of the planned RI to PoF research
- Significance and contribution of the planned RI to the development of the UFZ
- Significance and contribution of the planned RI to the development of the research units
- Stakeholder involvement and transfer
- Estimation of the service life (durability of the devices, productive usability)
- Recording the negative/positive environmental impacts of procurement, construction, operation and dismantling and identifying related optimization options, taking into account the UFZ's environmental goals
- Governance concept for setting up and operating the RI (control levels, advisory bodies, user involvement)
- Personnel concept with staffing plan (coordination with the Personnel and Corporate Culture Department (PACE))
- Clarification of structural requirements (coordination with BFM)
- Clarification of IT requirements (coordination with WKDV)
- Approach to research data management (coordination with Research Data Management team)
- Cost framework by annual tranches for the development of the RI with information on the expected follow-up costs after putting the research infrastructure into operation
- Verification of the RI cost framework for plausibility, completeness and financial viability as well as analysis of the economic viability of the RI, taking into account the follow-up costs (in particular authorization fees, operating costs such as costs for maintenance and personnel in accordance with the personnel concept, data management costs and IT costs as well as costs for construction, dismantling and compensation for environmental impacts); preparation by FCO with the involvement of the administrative departments

The structure of the full proposal is based on the Helmholtz Association's template for RI proposals. The Executive Management decides on the submission of the completed full proposal. The Executive Management presents the planned RI to the Management Board and the research field platform. In addition, an assessment of the Scientific Technical Council (WTR) on the establishment of the RI is obtained.

The Scientific Advisory Board (SAB) accompanies the process of preparing the full RI application. On the basis of the full proposal, SAB members provide a scientific classification and evaluation of the planned RI. This can be done either through a written statement by the SAB or by involving external expertise (external expert opinion). In this context, the SAB should be given the opportunity to have the planned RI presented and discussed by the responsible RUL and, if necessary, other scientists. On this basis, the SAB makes a recommendation to the Supervisory Board regarding the implementation of the RI.

Based on the recommendation of the SAB and/or the external expert opinion, the Supervisory Board decides whether to approve the RI applied for. If approved, the RI is presented to the funding authorities in the coordination meeting and included in the UFZ's economic planning. This sub-step focuses in particular on the financial planning of the investment and the long-term financing of operation and dismantling. Since an RI is a very knowledge-intensive investment, often resulting in an infrastructure that is unique and unparalleled worldwide, precise financial planning is very difficult, as there are many uncertainties regarding the technical implementation of such investments. Careful and continuous risk assessment is therefore of great importance.

The process steps for a large-scale investment of more than 2.5 MEUR and less than 15 MEUR in phases 1 and 2, including a timeline up to its approval, are shown in the following table.

**Table 1: Typical process flow for planning research infrastructures (> 2.5 MEUR, < 15 MEUR) at the UFZ (UFZ-internal):**

<b>Nr.</b>	<b>Process step (responsibilities)</b>	<b>Time prior to planned start of operation (year X)</b>
<b>1</b>	Development of RI outlines in the research units based on the UFZ Strategy 2025+ and submission to the RUL Board (RUL)	Continuously, year X-3 at the latest
<b>2</b>	Specification of the RI and development of sketches in the research units and prioritization of the RI sketches on the RUL Board (RUs/RUL Board)	End of year X-3
<b>3</b>	Decision on the preparation of a full proposal (Executive Management)	Beginning of year X-2
<b>4</b>	Discussion of the further developed draft in the SAB (RUL/applicant)	Spring of year X-2
<b>5</b>	Information of the Supervisory Board on RI planning, coordination of the review process (Executive Management / ZENCO))	Spring of year X-2
<b>6</b>	Presentation of the RI in Management Board / research field platform (Executive Management / topic speaker)	Spring / summer of year X-2, before Supervisory Board decision, no chronological sequence with steps 4-9
<b>7</b>	Preparation of full proposals for RI projects selected in step 3, taking into account the feedback in steps 4-6 (RUL/applicant)	Spring / summer of year X-2, before SAB recommendation, should already be started in parallel with steps 4-6
<b>8</b>	Recommendation by WTR (Executive Management/RUL)	Summer / fall of year X-2, before Supervisory Board decision, no chronological sequence with step 9
<b>9</b>	Recommendation by SAB, if necessary on the basis of external expert opinions as agreed in step 5 (Executive Management/RUL/applicant)	Summer / fall of year X-2, before Supervisory Board decision
<b>10</b>	Supervisory Board resolution (Executive Management)	Fall of year X-2
<b>11</b>	Coordination with the funding authorities as part of the coordination meeting and inclusion in the business plan (Administrative Director/FCO)	Spring of year X-1
<b>12</b>	Approval of the RI in the UFZ's grant notification	End of year X-1 / beginning of year X

In the case of RIs with an investment volume > 15 MEUR (so-called "strategic RI"), the Supervisory Board only decides on the participation of the UFZ in the RI application. The internal UFZ approval is then followed by a committee procedure at Helmholtz Association level lasting approximately one year.

### Phase 3: Construction

As the construction phase often follows directly after the approval and the equipment to be procured needs to be updated due to developments in the meantime, good cooperation between all those

involved from science and administration is required in order to carry out the procurements promptly and implement the necessary construction measures quickly. If additional staff are to be recruited, the positions must be advertised in good time in collaboration with the PACE department. Through close cooperation between the coordinator and other responsible scientists with the BFM department, the structural requirements for the new RI must be created and the procurement processes for the new RI equipment must be handled in cooperation with the Purchasing department.

In particular, the governance structure must be implemented at an early stage in order to ensure communication with the administrative departments that are particularly important for the set-up phase - WKDV, Purchasing and BFM - and to enable an efficient set-up phase. In this phase, the RUL, in consultation with the coordinator, arranges for the establishment of at least the following three bodies: i) a steering group under the leadership of the RUL or the coordinator with responsibility for operation and control as well as reporting; ii) a supporting and advisory external advisory board; iii) a stakeholder support group and/or regular stakeholder workshops. These serve to ensure the character as a platform and are intended to directly or indirectly take into account the interests of all potential users and other stakeholders (e.g. funding authorities, politicians, UFZ Environmental Committee). In this way, it is ensured in particular that the RI is realized in accordance with the Helmholtz mission. As a result, the interactions outlined in Figure 2 arise.

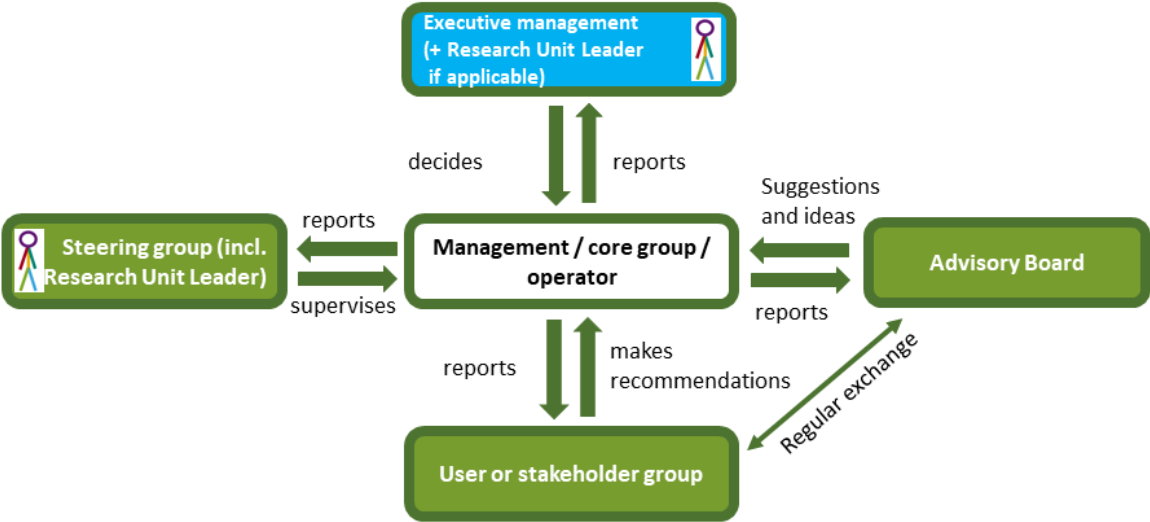


Figure 2: Interactions of the RI committees

Due to the great uncertainty in the set-up phase regarding the technical implementation and the associated costs, a comprehensive financial controlling is carried out in this phase. The coordinator draws up a detailed procurement plan by annual tranches for the entire duration of the investment measure. The financial framework for this procurement plan corresponds to the annual tranches according to the business plan (**target**). Once the measure has been approved, a cost center is set up in the SAP system for this purpose and is allocated budget funds in accordance with the annual tranches in the business plan. It is not possible for the system to exceed the budget. Budget responsibility lies with the management of the UFZ organizational unit, which is in charge of coordinating the investment measure. The procurement plan, supported by the service descriptions, is handed over to the purchasing department and implemented in compliance with procurement regulations and the UFZ's decision-making and signature regulations. Financial controlling of scientific investment measures is the responsibility of the FCO department. The BFM department is responsible

for controlling the construction measures as part of an RI. The Executive Management is informed on a quarterly basis about the financial processing of RIs > 2.5 MEUR. The relevant reports are submitted to the Supervisory Board at each Supervisory Board meeting. During the set-up phase, the RI coordinator can obtain daily updates on the current financial status of the RI via the SAP system (current budget, thereof committed, thereof available). Furthermore, a project group (coordinator person, responsible persons from the areas of purchasing, asset accounting, financial controlling) is established at the beginning of the RI set-up phase, which meets quarterly and evaluates the current implementation status of the procurement plan (**commitments and actuals**). **Target/actual deviations** are analyzed and appropriate countermeasures are initiated if necessary.

Finally, during the set-up phase, the details for scientific controlling of the RI during the operating phase are defined in coordination with the Executive Management in order to be able to record and evaluate the scientific achievements in connection with RIs separately. All services are earmarked accordingly: publications when reported to the library, third-party funded projects and patents when applied for or approved. The format for annual reporting to the Executive Management is also defined.

At least one year before the start of the operating phase, a utilization concept for an RI must be developed under the direction of the coordinator and agreed with the RUL and the Executive Management, which should include the following points:

- Specification of the governance concept from the full application for the RI
- Description of the concept for attracting external and internal users
- Financing concept for the operating phase, including budget requirements for operation and maintenance as well as a concept for the counter-financing of operating costs by internal and external users
- Allocation concept for regulating the allocation of RI usage times - including a differentiation of user groups (e.g. the applying research unit, other research units, UFZ-external scientists at public institutions, private sector users), a catalog of fees and a catalog of criteria for prioritizing the allocation of usage times
- Publication regulations in accordance with the DFG Guidelines for Safeguarding Good Scientific Practice, the Environmental Information Act and where applicable other relevant legal regulations
- Preparation of a reporting concept with determination of indicators for the operating phase and the procedure for their collection, in particular for the components i) scientific results; ii) financial controlling (plan-actual comparison of costs); iii) environmental impact
- Updated information on dismantling: list of criteria for determining the timing of dismantling, specification of dismantling costs if significant changes to the full application are foreseeable

To prepare for the operating phase, the utilization concept must be implemented to a large extent as directed by the responsible RUL and the Executive Management. The responsible RUL must be informed regularly, at least twice a year, about the status of the set-up phase. The Executive Management, for their part, reports on the RI set-up status in the meetings of the Scientific Advisory and Supervisory Boards.

## Phase 4: Operation

The completion of the set-up phase or the start of the operating phase is usually associated with an inauguration or kick-off event at which the participants and stakeholders are informed about the start of the new research infrastructure and its potential uses.

Continuous reporting and controlling are carried out in order to determine the economic efficiency and environmental compatibility in accordance with previously defined criteria and to provide a basis for decision-making with regard to further operation and possible modernization and expansion projects. This also includes examining the criteria for possible dismantling.

Annual internal UFZ reporting by the operators to the Executive Management and the RUL includes the following information:

- Scientific achievements (third-party funded projects and commissions, publications, conferences, workshops, patents)
- Information on stakeholder involvement and the public relations work carried out for this purpose
- Defined environmental impact
- Information on operating costs (incl. costs for personnel, consumables, maintenance, servicing, licenses, IT, research data management, compensation for environmental impact)
- Income (fee income, refinancing)
- Utilization of the RI
- Outlook for the coming operating year

The Executive Management reserves the right to carry out an internal or external evaluation by scientific experts, e.g. persons from the SAB, for supplementary information on the performance status of an RI in the operating phase. In addition, an annual controlling report is submitted by FCO to the Executive Management and RUL on the follow-up costs of the RI.

If it is determined during monitoring and reporting that the scientific performance of the RI is declining or that a shutdown of the RI should be considered with regard to further dismantling criteria, this is first discussed within the research unit with the managers (RU Board). The RU Board then makes a recommendation to the RUL Board and Executive Management regarding continued operation, expansion or dismantling.

## Phase 4b: Renewal/expansion

If the RU Board and the responsible RUL recommend a renewal or expansion of the RI, this must be discussed by the responsible RUL with the RUL Board and the Executive Management and a decision must be made by the Executive Management on the basis of a modernization concept. Prior to this decision, an evaluation can be carried out, e.g. involving experts from the SAB, in order to scientifically assess the RI's performance to date and the modernization concept submitted. If, on this basis, the Executive Management makes a positive decision to renew/expand the RI, a new application phase follows (phase 2).



## Phase 5: Dismantling

Should the RU Board and the responsible RUL recommend the dismantling or change of use of the RI, the decision is made by the Executive Management, if necessary with the advice of the RUL Board and the SAB. Alternatively, dismantling can be initiated by the Executive Management - for example on the basis of an evaluation or for strategic reasons. The preliminary cost planning was carried out in the application and during the operating phase. Before dismantling begins, a dismantling coordination group is formed, consisting of the coordinator and responsible persons from the BFM and FCO departments. This group first updates the dismantling plan, including the costs and environmental impact. The dismantling process takes into account the environmental guidelines and environmental goals of the UFZ. The Environmental Committee is given the opportunity to comment on the updated dismantling plan and the Executive Management decides on its implementation. Dismantling is carried out under the leadership of the dismantling coordination group, regularly reported to the Executive Management and the conclusion is brought to the attention of the Supervisory Board. A short final report, which must be submitted no later than six months after the dismantling has been completed, presents the key scientific findings from the construction and operating phases and a final cost calculation. Associated publications appearing after this date are recorded with reference to the RI by notification to the library.