



Interreg



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ResInfra@DR

Recommendations for RI Managers



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RECOMMENDATIONS FOR RI MANAGERS

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1 INTRODUCTION

The ResInfra@DR project has aimed at upgrading the knowledge of policy-makers and policy delivery organisations involved in the funding of research infrastructures (RIs), and RI managers. Thus, it has facilitated a dialogue process for RI stakeholders in the Danube macro-region; organised training workshops for RI policy-makers, managers and reviewers; compiled a registry of competent reviewers for RI evaluations; and arranged pilot peer learning activities to help existing RIs improve their operations and planned RIs to fine tune their investment plan and business model. For a more detailed account of these activities and their results, please consult: <http://www.interreg-danube.eu/approved-projects/resinfra-dr>

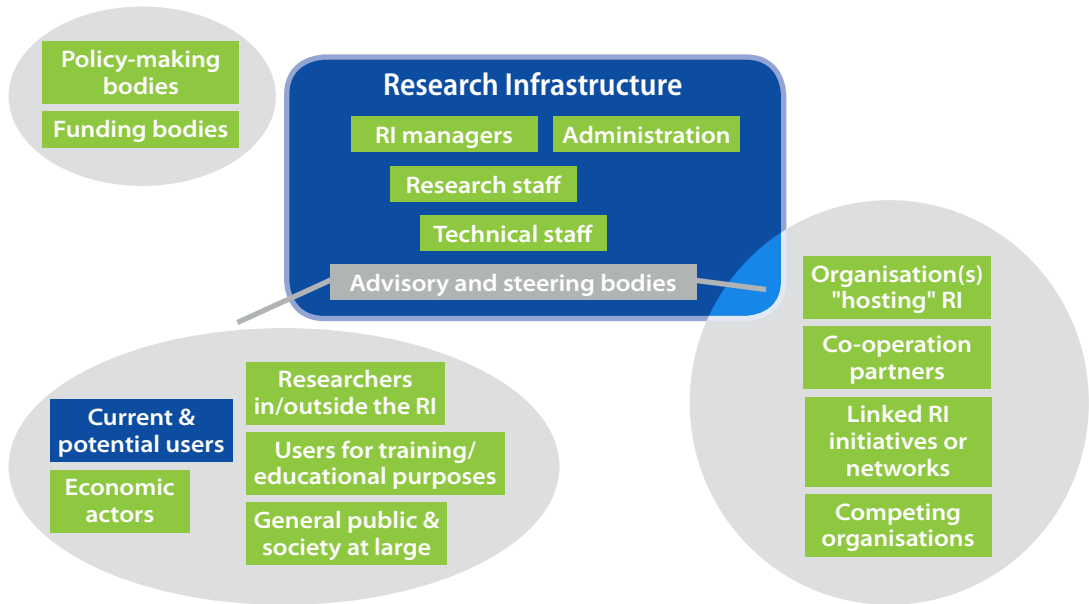
The project has produced three guidance documents for RI policymakers, managers and reviewers on ex ante evaluation, monitoring and assessment of the socio-economic impact of RIs, thus covering the life cycle of RIs. It furthermore provides two sets of recommendations (1) addressing the research infrastructure management; (2) addressing the specific policy makers also engaged in the steering and funding of RIs.

This specific set of recommendations was prepared by the ResInfra@DR project partners and cumulates findings from four dialogue workshops and a concluding consultation meeting held in 2017 and 2018. It takes views from research infrastructure (RI) managers; relevant science, technology and innovation (STI) policy makers and relevant funding agencies. A first draft was presented at a dedicated workshop in Budapest and the received comments were incorporated, we are grateful for the opinions and contributed content.

The recommendations reflect the increased attention for the topic research infrastructures on the STI policy agenda of the Danube macro-region and provides practical recommendations for advancing and improving with RI management. The document builds also on other recommendations released by the European Strategic Forum for Research Infrastructure (ESFRI) as it focus strongly on the Danube macro-regional situation and respects the broad variety in terms of current funding, steering and governance, the operation capacities.

This set of recommendations address research infrastructure managers involved in the daily management, the practical user interaction and service, as well as in setting the development strategy of a given RI. The level of analysis, as in the case of the other three ResInfra@DR guidance documents, is an individual RI. In addition it also addresses the hosts of RIs by focusing on practical issues, including governance and ownership, stakeholder management, or the monitoring of operations. These subjects reflect the diversity of (1) how RIs are established, (2) how they fulfil their scientific mission, and (3) how they repeatedly reformulate their approach; (4) how to achieve and maintain financial sustainability.

FIGURE 1: OVERVIEW ON STAKEHOLDERS OF RESEARCH INFRASTRUCTURES



Source: ResInfra@DR 2019

Approach and background of the recommendations

Throughout the last decade, investment in research infrastructures has gained increasing importance for research organisations, and it attains an ever more structured, strategic approach. On the national level, the awareness on the relevance of an internationally attractive national science base is growing. RIs operate typically research-driven, and mission-oriented also the demand by private-sector influences the operation.

The hosting or umbrella structures of Research Infrastructures have developed practices that respond to new policy developments. Equally, the managing teams of successful RIs have continuously upgraded their competences to meet the challenges of this renewed policy framework. Considering another viewpoint, researchers actively contribute to assessment panels for the evaluation of funding proposals. Thus researchers do not only “consume” funding with their endeavours but they also contribute to evidence-based decisions.

In an ideal world, we would find RIs proactively steering their developments, establishing and maintaining highly advanced internal processes. Special attention would be put on achieving long-term sustainability and systematic upgrading, a variety of professionalised management and services offers would be supported by staff that continuously develops through trainings etc. In the Danube Macro region, only a handful of RIs have the potential to follow this idealized path.

The real picture in many countries of the Danube macro region comprises a fast-changing funding landscape. Generally, small funds for RIs are often distributed as part of institutional funding or in the framework of grants that do not provide a medium or long-term perspective. At the same time, universities are experimenting with better integration of research in their activities and often RIs are established to contribute on that scale. Another feature of the picture is small laboratories that look for users beyond the hosting organisation aiming at additional income.

With this set of recommendations, ResInfra@DR provides an overview of important processes which should be discussed already at the start of the development of research infrastructures. Still, the content will help to rethink already existing RIs to identify further steps to develop.

For the purpose of the recommendation the following **definition of RIs** will be used:

Research infrastructures (RIs) are facilities, resources and services used by the research community to conduct top-level research in any scientific or technological field. The variety of RIs is huge, and because they serve different research communities with complex research needs and objectives, each RI has its specific characteristics.

Research infrastructures need to be understood broadly, including all those elements, which are indispensable for conducting scientific research and disseminate results, that is, equipment, biobanks and other banks of various materials, databanks, information systems, as well as human resources operating RIs.

Research infrastructures include:¹

- Major equipment or sets of instruments used for research purposes;
- Knowledge resources such as collections, archives, structured information or systems related to data management, used in scientific research;
- Enabling information and communication technology-based infrastructure or 'e-infrastructure' such as grid, computing, and software communications;
- Any other entity of a unique nature that is used to achieve excellence in research.

According to the level of maturity (lifecycle), research infrastructures can be classified as:

- Proposal for establishment of research infrastructure
- RIs in the design and construction phase
- RIs in operation
- RIs in the process of decommissioning

According to their geographical scope/ relevance, RIs are:

- regional
- national
- macro-regional
- pan-European

1 Griniece E., A. Reid, J. Angelis (2015): Guide to Evaluating and Monitoring Socio-Economic Impact of Investment in Research Infrastructures, Tallinn: Technopolis Group, https://www.researchgate.net/publication/275037404_Evaluating_and_Monitoring_the_Socio-Economic_Impact_of_Investment_in_Research_Infrastructures

TABLE 1: TYPOLOGY OF RESEARCH INFRASTRUCTURES ACCORDING TO THEIR STRUCTURE/DISTRIBUTION

Type of research infrastructure	Description	Examples
Single-site facility	Unified body of equipment at one physical location	High-performance laser system; clean room; coastal observatory; Centre of Competence. E.g. Multi-purpose Hybrid Research Reactor for High-tech Applications (MYRRHA); European Solar Telescope (EST)
Distributed facility	Network of distributed instrumentation or collections, archives and scientific libraries	European Light Infrastructure (ELI); Council of European Social Science Data Archives; Central European Research Infrastructure Consortium (CERIC ERIC); International Centre for Advanced Studies on River-Sea Systems (DANUBIUS RI); European Plate Observing System (EPOS)
Mobile facility	Mobile vehicles specially designed for scientific research	Research vessels, satellite and aircraft observation facilities
Virtual facility (e-infrastructures)	ICT-based system for scientific research, including high-capacity communication networks and computing facilities	European Grid Computing Infrastructure; Digital Research Infrastructure for the Arts and Humanities (DARIAH); Partnership for Advanced Computing in Europe (PRACE)

Source: Griniece E., A. Reid, J. Angelis (2015): Guide to Evaluating and Monitoring Socio-Economic Impact of Investment in Research Infrastructures, p. 5

The following challenges are addressed by the set of recommendations:

CHALLENGE ADDRESSED	Focus of recommendations
Management	Proactive management and operation and possible tools in support
Financial sustainability	Mission, strategy and ownership or RI, stakeholder management,
Human resources	Specific HR needs during establishment and operation, service orientation during operation, training needs
Adequate evidence of results	Key performance indicators, sources of evidence and monitoring
Access to RIs	Core aspects of access to RI
Exchange of practice	Possible exchange and learning options

2 THE MANAGEMENT CHALLENGE

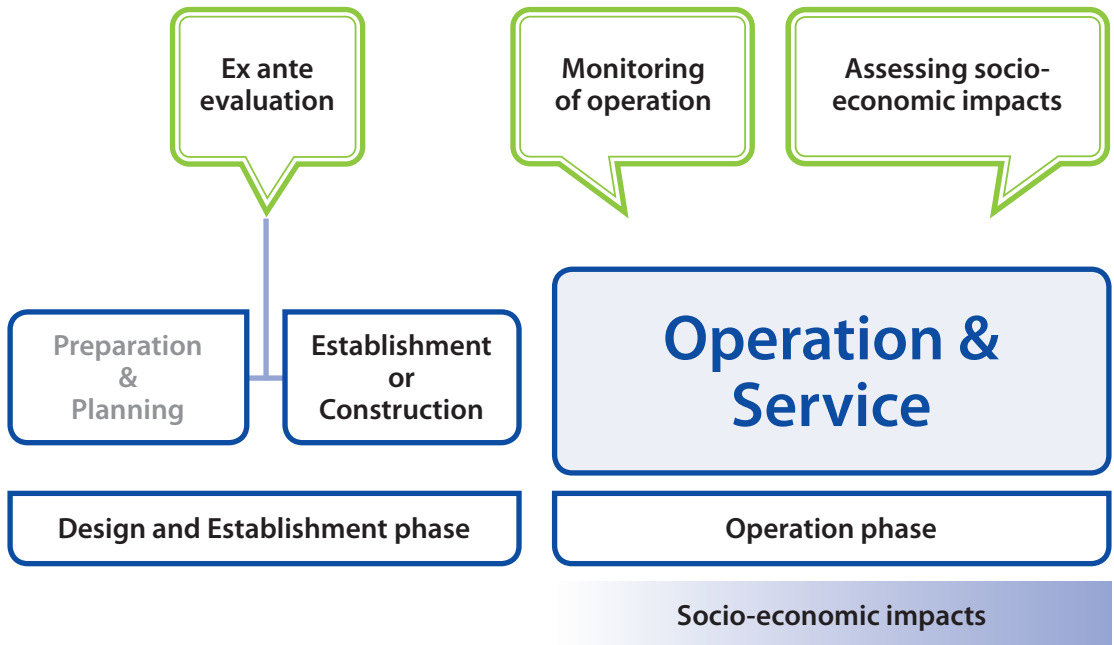
Developing effective management procedures

Taking on the challenge of access and service provision to researchers requires a specific management of the facility; such a credible framework considers IPR regulations, a defined (open) access policy and options for the ownership and the sharing of results. Keeping track of the operation by use of specific monitoring procedures requests a careful planning and proactive approach, also the visibility of the RI is important. All of these challenges can be met only by adequate and management structures and professionalized processes. This highly interrelates with the financial management and business planning – the open access to an RI comes with options for the cost coverage.

(1) Developing a **proactive RI management** includes:

- RI management takes care of effective **stakeholder management**. Internal and external stakeholders contribute to governance and steering processes; some are anchors for regional cooperation. Stakeholders include different user groups, the organisation hosting an RI and all organisations collaborating and partnering. A stakeholder-specific approach, leading to trustful interaction, e.g. by means of regular meetings is needed.
- RI management can be arranged according to the development stage. The management structure should be life-cycle specific and respond to the specific challenges of each phase. This should be also reflected in the available staff capacities, which might be different for the concept development, the design or the implementation phase.
- Intellectual property rights – IPR: For the **post-use of results of the RI**, we recommend developing regulations to enable open access to RIs. Specific IPR mechanisms for the use of results and relevant procedures must be transparent.
- A proactive management has an overview on the operative capacities and the staff abilities. Given the high costs of some new equipment a careful look on the own capacities might allow in-house building of equipment. We recommend exploring this option as an alternative solution for upgrading. In-house building of instrumentation should be rewarded adequately.
- RIs can explore the service needs of “untypical” users and across the Danube region or identify new services that can be jointly developed with other RIs
- A termination/decommissioning phase does not have to occur if the RI proves sustainable but should be planned as an eventuality from the outset in an exit strategy. If termination occurs, it may provide experiences to be built upon in the concept development of new RIs in the future. RI management should thus reflect on the latter stages of their RI’s life cycle.

Life cycle of RIs, the relevance of ex ante evaluation, monitoring and socio-impact assessment at different stages of the life cycle



Source: ResInfra@DR, 2019

(2) Steering the own development in a dynamically developing research field is a challenge. We recommend evaluating the achievements, the service and general progress of an RI on a regular base. This task can be commissioned to external experts or expert groups and will help to steer the development of an RI. We recommend the following steps:

- The RI management can use individually set **targets** (key performance indicators- KPIs) to set the direction of operations already at the time of establishment. Targets can be developed in a dialogue jointly with the (potential) users, the funders and the own staff
- **Monitoring** is a priority for the management from the start of an RI. In particular, monitoring should be seen by the management as a tool to guide operative decisions, to play back results to steering bodies. ResInfra@DR has prepared a specific monitoring guideline which can be consulted and followed.
- **Preparedness** for evaluations is important, also to convince funders about effective grant management. An effective monitoring system is a backbone for future audits and evaluations. Thus, RI management must organise the process of collecting and storing the necessary data.

3 THE FINANCING CHALLENGE

Managing RIs in a financially sustainable way

The clear mission and the strategy of a research infrastructure are core components for setting the direction of research, for organising stakeholder interaction especially with regards to the service offered to the users and the funding schemes involved. The long-term commitment should be clearly present and part of the mission and strategy of an RI.

In our view, core challenges are (1) organising adequately the ownership of RIs and its steering and governance; (2) long term perspectives and the management of financial support.

Already during the establishment of an RI the mission must be stated clearly and can take on different expectations of important stakeholders. A broad consensual ownership can safeguard funding commitment for the development. The following aspects are highlighted:

- Developing and maintaining a strong internal vision to commit support by the staff involved a
- Responsible stakeholder management reach out to internal stakeholders, funders and users (or potential users) and is a prerequisite for long-term commitments of funding. Mapping internal and external stakeholders in the beginning can serve as a valuable exercise.
- We recommend taking credit of concepts and approaches developed by other RIs to establish a well-fitting governance structure comprising steering bodies which shall be able to steer and advise the development.
- Expectations on different roles of an RI can differ, typically higher education tasks and training components need to receive adequate attention, and we recommend repeatedly discussing the anticipated benefits and expectations of all stakeholders involved.

Long-term financial sustainability

- In some cases, funding for the establishment of RIs is available, while the mid- and long term perspective for funding is hardly known. Therefore we recommend that concepts of RIs look on funding resources over the lifetime of the RI in an early stage. A financial sustainability plan explores all funding sources along the life cycle of an RI
- During its operation, RI management should ensure timely applications for funding. The systematic collection of information about funding sources (or calls) is an inevitable task. This includes the operation, maintenance and renewal of existing RIs, and the decommissioning phase if relevant.
- Planning upgrades is an important core task and implies that the “landscape” of state-of-the-art RIs in the field must be permanently screened. A good option is to join field-specific networks and to collect systematically information about i.e. new installations of similar RIs to readjust the own services if necessary.

4 THE HUMAN RESOURCE CHALLENGE – PLACING HUMAN RESOURCES AT THE HEART OF RIS

A core component of management concerns the **human resource planning and development**. We suggest the following approaches:

- Service orientation: RI management should ensure the availability of technical staff that welcomes new users and instructs to instrumentation and facilities, but also supports for an enjoyable living environment for researchers coming from abroad, probably need permits for stay or specific invitations to acquire the necessary visa.
- Training of users: The RI management should organise and offer trainings for new users according to their knowledge and experience. Further, safety trainings, or specific trainings of the specific regulations e.g. for the use of databases might be part of trainings.
- RI management should explicitly address the new generation of researchers which can be in their further career the power users of facilities. Specific user arrangements can provide opportunities for early stage researchers. Beside careful (and transparent) selection of access, the specific human resources for support and advise of this user group should be systematically developed
- RI management should address own and invite external excellent researchers to contribute to specific trainings or exchange sessions to enable the access to active research teams and networks in research field(s). Investing in networking with other researchers and facilities sets the basis for joint research, cooperation and projects for the future.
- RI manager/management can regularly inquire information about the service quality of the RI in all aspects. This will help to receive feedback and finally establish or change service offers for users.

5 BUILDING A STOCK OF EVIDENCE TO TRACE SUCCESS

We recommend collecting timely information on (1) the results and scientific achievements and outputs, (2) the results created by taking up the new knowledge and (3) the impact occurring. Keeping in mind the correlation to RI activities, it is important to understand which results can be directly or indirectly attributed to specific RI activities and which impacts for society can be attributed to a specific RI. Once an achievement can be traced back to a specific RI, this insight might open new funding opportunities or cooperation options.

- The **monitoring of operation** accompanies all RI activities and the RI management plays the key role. ResInfra@DR has developed a specific monitoring guideline which can support to set up a realistic and easy-to-use monitoring approach.
- The RI management staff should be aware of core principles of monitoring and impact assessment, its limits and the role of external experts for impact assessments. Engaging researchers and users but also other stakeholders in the process of tracing the results of the work conducted at the RI can reveal new insights.
- Following the mission of an RI, expected impact pathways of RIs can be explored in advance with a broad range of stakeholders and be used to keep track of achievements. As impacts (positive and negative) can appear beyond expected pathways a broader viewpoint is necessary.

6 THE OPEN ACCESS CHALLENGE – KEEPING RIS OPEN TO DIFFERENT USERS

A holistic approach for the service provided and the user access is necessary to enable the best possible use of the RI but also to meet funding requirements. RIs planning to open their research facilities to a broader range of researchers are challenged with new processes.

- Explicit access rules include the rules for use and technicalities, the service that can be expected during use. Clear access rules comprise IPR rules and ownership of results. The expected costs of services can be published in a catalogue.
- The selection of users is an important management task. In many cases scientific assessments regulate the access. In order to widen the user spectrum a balance of different users is necessary. Typical users are (i) excellent researchers or teams where access can be regulated by evaluation procedures both from the host of an RI and beyond, (ii) access for training purpose with university education; (iii) diploma students and young researchers, university staff, (iv) commercial users partly anchored in the regional economy, (v) the wider public. It is possible to set targets (i.e. beam time) for different user groups and access can be steered by selection boards or similar bodies.
- We recommend explicitly the opening up of an RI for international/transnational use. It is beneficial for the RI to attract excellent researchers and receive access to relevant networks of researchers e.g. through participation in the CERIC ERIC calls. [\(link\)](#)
- RI management and operation has to comply with the legal framework for access. For example, business operations must follow in most countries the state aid rules what limits economic use to 20% of operation (or beam time). It is necessary to become familiar with the rules and establish the necessary monitoring of operation.
- We recommend to actively exchanging with other RIs to learn about new cost models for open access, but also how to observe and steer.
- The specific options for OpenAIRe and the European Science can be explored

7 EXCHANGING EXPERIENCES – LEARNING FROM OTHER PRACTICES

To enable informed decisions during operation, it is necessary to gain permanent information about main EU trends as the ESFRI roadmap, projects and landmarks, the Horizon 2020 funding and the relevant funded projects, the involvement options in networked RIs i.e. as CERIC ERIC. It is an important task to follow the discussions and to screen **available information sources** about RI framework conditions, the operation practice and to understand which training or exchange options are currently in place that might deepen the knowledge of the active RI staff. Danube Region organisations with similar plans in a situation of scarce funding and fields for mutual exchange and learning can be identified.

- We recommend formalising the exchange and mutual learning i.e. by identifying exchange options for sharing knowledge with other countries' research organisations focusing on RI management, the staff development etc. The Joint action plan developed by ResInfra@DR ([link](#)) gives further suggestions how this can be organised.
- RIs can share their experience on what works and what does not work across the Danube region. Learning from challenges and failures is just as important as learning from success stories!

REFERENCES AND SUGGESTED FURTHER RESOURCES

InRoad

RI tools

ACCELERATE

RiTrain

RI paths

OECD

ESFRI

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