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Maturity Matrix for   
Research Funding Organisations

TEMPLATE FROM THE SCIENCE EUROPE PRACTICAL GUIDE TO

SUSTAINABLE RESEARCH DATA

# How to use the maturity matrices?

This guidance is designed to support RPOs, RFOs, and RDIs in developing their agenda for research data to achieve sustainable data sharing and interoperable systems. It takes the form of three complementary maturity matrices to allow collaboration with other organisations.

The matrices present a framework and propose actions in six essential areas:

* Organisational engagement and commitment
* Policy environment
* Financial aspects
* Training
* Technical preparedness
* Communication and awareness raising

These areas were defined following discussions among the experts from the Science Europe’s WG DSSI, based on their experience and expertise, and extensive desk research. The areas were discussed and validated both by the WG DSSI and during a validation workshop with external experts.

## Goal-setting Depending on Strategic Priorities, Missions, Mandates and Needs

The matrices allow organisations to assess their own situation in relation to the six areas and to plan their next steps according to their organisational strategic priorities, mission, mandates, and needs. The matrices can also be used to compare actions, set collaborations, and/or seek and monitor alignment with other organisations. The interpretation and the application of the matrices may vary depending on internal organisational policies and needs, and/or on external factors ruling data management.

To assess its state of development towards sustainable research data, an organisation needs to consider its respective matrix as a whole. It should be seen as a guide for progressive development, starting with the first step for each area, ideally completing all actions proposed under one step before moving to the next one. It is, however, acknowledged that there will be cases of organisations that have reached higher progression steps without having completed all actions of the previous steps.

Organisations might find that they are more advanced in certain areas than in others. Depending on their organisational mission, strategic goals, and mandate, organisations will need to define which level they want to achieve in any given area. Not every organisation will have to reach the highest maturity level in all areas as certain actions may not be within the remit of their mission or mandate. Therefore, the potential next step needs to be defined for each area individually and in line with each organisation’s strategic goals.[[1]](#endnote-1) Some organisations may take on a driving role in a specific area, setting standards and leading policy developments, while others might have different priorities and could contribute to these efforts with expertise without having to take the lead. As the level of maturity advances, the level of collaboration with other RFOs, RPOs, RDIs, or other stakeholders will also increase.

## Definitions of progression steps in the matrices

The matrices present three progression steps for each of the six key areas:

* **Plans to develop:** The organisation has acknowledged the need to take action in a given area and is developing/has developed plans on how to proceed.
* **Development ongoing:** The organisation has done the groundwork in a given area to achieve the sustainability of research data, though more refinement is needed.
* **Developed on organisational level:** The respective area is addressed on a mature level within the organisation.

Organisations can identify which progression step they have reached in each area and which actions to undertake if they wish to progress on the journey towards sustainable research data. For many organisations, the step ‘Developed on organisational level’ will be the aspired final destination of their journey.

Organisations that have reached this step and wish to advance even further will find additional guidance under **Further advancement and alignment.** This part refers to organisational collaboration with (inter)national partners in order to align approaches and achieve a level playing field (at a national or an international level, with different disciplines).

## Definitions of the six areas in the matrices

The six areas in which each organisation should take action were defined along the following lines:

### Organisational engagement and commitment

* For all organisation types, this area refers to the organisation acknowledging the need to develop solutions for sustainable research data and being committed to seek alignment of approaches with other research stakeholders (such as RPOs, RFOs, RDIs, research communities).

### Policy environment

* For all organisation types, this refers to the organisation clarifying its objectives for data sustainability and interoperability and aiming at coherent policies for all types of organisations.
* For RFOs, this area will cover a range of issues related to RDM that reflect the way of working of the RFO, such as support for RDM infrastructure and/or training. The actual design of the organisational policy will depend on the mission of the RFO and the mandate it has in its national context.
* For RPOs, this area refers to principles and practices on RDM established by the RPO and to be followed by its researchers. The RPO will seek to provide the necessary support to its researchers.
* For RDIs, this area refers to principles and practices on RDM. These include services for researchers and take into account, where needed, disciplinary differences.

### Financial aspects

* For RFOs, this area relates to funding of and investment in RDM and RDIs.
* For RPOs, this area relates to access to funding for the RPO and how the funding is used to support data sharing and interoperability.
* For RDIs, this area refers to the development and implementation of business models for sustainable funding streams.

### Training

* For all organisation types: the common understanding of RDM, data sharing, and interoperability is considered a shared responsibility among all organisations. Training comprises both RDM training for researchers and for organisational staff.
* For RFOs, this area relates to the organisation’s contributions to building and maintaining skills and competencies for researchers, the organisations it supports, and their own staff involved in RDM.
* For RPOs, this area relates to training and competency enhancement for both researchers and RDM support staff.
* For RDIs, this area relates to training and competency enhancement of RDI staff, to support researchers in the RDM efforts, as well as training for the users of RDIs.

### Technical preparedness

* For RFOs, this area relates to investments in the development and implementation of technology to support RDM.
* For RPOs, this area relates to contributions to infrastructures, data hubs, interfaces, and information management issues that ensure interoperability.
* For RDIs, this area relates to professional technical support for data management, including metadata, storage, usage/accessibility, and APIs.

### Communication and awareness raising

* For RFOs, this area relates to stakeholder engagement and community development, especially with other RFOs, RPOs, and scientific communities.
* For RPOs, this area relates to both researcher engagement as well as engaging with the broader stakeholder community (such as scientific communities, other RPOs) to seek alignment of approaches.
* For RDIs, this area relates to engagement with researchers as users as well as with the researchers’ funding organisations and home institutions.

# Research Performing Organisations (RPOs)

Maturity matrix for sustainable research data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Maturity Level  Areas | Progression Steps | | | Further Advancement and Alignment |
| Plans to Develop | Development Ongoing | Developed on  Organisational Level |
| Organisational Engagement and Commitment | * RFO takes first steps towards considering RDM issues and defining where it needs to act. * RFO determines the scope of its activities, including looking to others for guidance and best practices. | * RFO sees effective RDM as part of its strategic objectives and develops a comprehensive strategy[[2]](#endnote-2) to include policy, funding, technical infrastructure and training as appropriate. * RFO ensures that RDM objectives are developed within the context of related organisations. | * RFO has an RDM strategy. * RFO actively engages in RDM issues, including financial support for policy implementation, training, and, where appropriate, the provision of infrastructure for long-term data preservation. * RFO is in dialogue and collaboration with related RFOs, RPOs, and RDIs at (inter)national level to advance practical RDM issues. | * RFO seeks alignment on RDM policies and practices amongst RFOs, RPOs, and RDIs at (inter)national level. * RFO engages in dialogue and collaboration at (inter)national level for policy, training, provision of RDI and so on. * RFO helps to provide a level playing field at the (inter)national level. |
| Policy Environment | * RFO outlines areas of policy and process for policy development that likely need to be addressed. * RFO identifies relevant stakeholders within and outside the RFO in the policy development process. * RFO reviews policies from related organisations to ensure consistency (where appropriate and possible). | * RFO has an initial RDM policy in place, including guidelines on when and how data should be made available and findable. * RFO has established a policy review/revision date, recognising that the policy will need revision and refinement as organisational maturity increases. * RFO consults with stakeholders on policy implementation and monitoring. * RFO has established dialogue with RPOs and RDIs that collaborate with the RFO to ensure they are developing policies and procedures that reflect the requirements of the RFO. | * RFO has a well-developed comprehensive RDM policy and supporting environment, including in research funding peer-review processes. * RFO engages with a community of stakeholders for policy implementation, for example, through developing a process to monitor the ‘FAIRness’ of research data. * RFO has a complementary community development process established as part of policy development, including the provision of RDM training and infrastructure.[[3]](#endnote-3) * RFO works towards alignment of policies at an (inter)national level through engaging with related organisations. * RFO initiates monitoring exercises to measure policy impact. | * RFO has aligned its policy with those from international organisations (such as Science Europe, RDA & OECD), with other (inter)national RFOs, with a national policy framework for Research Data Management (RDM). * RFO policy is aligned with evolving legal framework around research data and European Data Strategy. * RFO policy is developed in collaboration with RPOs and research communities and in alignment with community norms.[[4]](#endnote-4) * RFO is part of an international RFO network for continuous exchange on further policy development/ alignment. * ‘FAIRness’ of research data is part of the criteria for research funding evaluations. * RFO has monitoring in place to measure policy impact, leading to iterative development of policies. * RFO policy includes enhanced guidelines to ensure sustainability.[[5]](#endnote-5) |
| Financial Aspects | * RFO acknowledges that it has a role in ensuring that RDM activities, including services, are supported financially[[6]](#endnote-6) and discusses with RPOs and RDIs what this should entail. * RFO acknowledges that RDM is a shared endeavour and that combining resources may lead to economies of scale. * RFO makes some funding available but funding is not integrated into a comprehensive RDM strategy. | * RFO has defined an initial budget allocation for RDM and areas that should be financed. This might be a short-term, interim response awaiting effective longer-term plans. * RFO funds RDM primarily on a project-by-project basis, without an overall investment strategy. * Funding might be used to incentivise RDM activities within research projects. * RFO actively explores opportunities for co-operation with other stakeholders to realise efficiencies and economies of scale. * RFO foresees funding to support training and development of basic and domain-specific RDM skills and awareness raising for all researchers. | * RFO acknowledges RDM as a fundable element of the research process. * RFO has an enhanced, longer-term investment plan to support its RDM strategy, including the recognition that the RFO must provide funding for the development of training and for RDM infrastructure operations activities beyond the life of a given project or programme. * RFO expects that supported RPOs and RDIs strive to gain best value for money through joint programmes, common systems and so on, and collaborates with other RFOs to achieve this. | * RFO is part of an agreement on an (inter)national investment strategy for RDM to ensure a level playing field between RFOs, RPOs, RDIs, and research communities. * RFO provides clear indications on long-term funding periods and allocation of funds. * RFO provides funding programmes for training development and activities to sustain the operation of RDM infrastructure. * RFO enables/supports publicly funded RDIs to develop sustainable business models, including clarification of the role of the private sector, shared services, and opportunities for commercial use of data. |
| Training  *Note: An RFO will probably not provide training for researchers, however, it will expect RPOs to ensure the researchers they support are effectively trained. In many cases an RFO will provide internal training for their staff.* | * RFO acknowledges the importance of RDM training. * RFO consults with stakeholders (such as RPOs and RDIs) on likely training requirements. * RFO identifies existing training available. | * RFO clarifies responsibilities for RFO, RPOs, and RDIs with the other organisations and develops training plans for RDM to cross-link to RPO curricula and training undertaken within RPOs and RDIs. * RFO supports training development on basic and domain-specific RDM skills and awareness raising for all researchers. | * RFO supports the community to develop expected RDM competency levels (in conjunction with RPOs and RDIs). This should include developing a common understanding of the benefits of FAIR data, and compliance with legal requirements (for example in relation to data protection). * RFO expects training in effective RDM skills as a core element of support provided to researchers. It clarifies responsibilities for training with other organisations and supports the provision of specific advanced training. | * RFO supports the development and implementation of (inter)national RDM competency levels and training curriculum. * RFO collaborates with RFOs and RPOs on (inter)national level to define responsibilities for training and sources of related funding. |
| Technical Preparedness | * RFO acknowledges that it has a role in supporting the technical environment for RDM, such as collaborating with other stakeholders (RPOs, RDIs, scientific communities) to identify appropriate standards, and through funding the use of RDIs. * RFO establishes an internal awareness on management level regarding the allocation of appropriate resources. * RFO considers the value of joint working shared services between RFOs, RPOs, and RDIs. | * RFO supports work with RPOs, RDIs, and research communities to identify appropriate metadata standards and required infrastructure and services. * RFO has awareness building measures in place and aims to ensure that disciplinary differences with respect to RDM are recognised in an effective and efficient technical implementation. * RFO develops mechanisms to support joint working, development of shared services, and so on, to help deliver economies of scale. | * RFO acknowledges that RDM is an international shared endeavour, best achieved through federation of services, joint working, and joint facilities (such as EOSC). * RFO has an RDM technical plan in place to ensure FAIR data. The plan includes the provision of RDM infrastructure and the promotion of interoperability as strategic choices. * RFO agrees with all stakeholders on the limits of responsibility of the RFO, including specific allocation of funds and definition of responsibilities. * RFO has established communication and co-operation channels with other stakeholders on a national level. * Collaboration, shared services, and so on become the default. A default funding model should enhance existing provisions rather than developing new ones, unless there is a very clear business case for this. | * RFO has established exchanges with other research stakeholders on international level on technology issues. * RFO is part of a joined up (inter)national RDM technical approach across all RFOs to ensure RDM infrastructures reflect wider best practice for sustainability. * RFO aims to provide a level playing field and equal access to RDM infrastructure in collaboration with other organisations, so that access to infrastructure is no longer a barrier to doing effective RDM. * RFO has strategic planning in place to match RDM requirements and IT infrastructure. * RFO develops innovative business models involving private sector participation. |
| Communication and Awareness Raising | * RFO develops its agenda for research data, in collaboration with other stakeholders (such as government, RPOs). * RFO plans and initiates a process to engage all stakeholders in the dialogue on the importance of RDM issues. * RFO develops public statements of intent around the importance of research data and RDM. | * RFO has established communication pathways to engage RPOs, RDIs and researchers supported by the RFO on the agenda for research data. * RFO has developed communication materials to show how it addresses the issue strategically and to underline that RDM is a shared endeavour by all stakeholders. * RFO has identified and highlighted best practices/projects from its funding activities and provides information about associated costs. * RFO collaborates with other related organisations to help develop and advance the agenda for research data. * RFO acknowledges that RDM is part of research processes and should not be seen as anything out of the ordinary. | * RFO provides well-developed communication materials and pathways, stressing the importance of RDM, the roles of each key stakeholder, and the commitment of the RFO towards RDM (the agenda for research data). * RFO clearly communicates the support RFOs offer for RDM capacity building and specialist careers development. * RFO actively engages with the community to make RDM a shared endeavour across the RFO’s research community. * RFO has established effective RDM as part of research processes and does not see it as something out of the ordinary. * RFO uses the agenda for research data to communicate objectives to own researchers and staff and beyond. | * RFO co-ordinates with other RFOs, RPOs, and RDIs (inter)nationally to develop a common agenda for research data. |

1. The strategic goals can refer to the timing of taking future actions as well as the decision of which progression step an organisation wants to reach. [↑](#endnote-ref-1)
2. The RDM strategy is a core element that cuts across many of the thematic areas. It brings together separate thematic activities into a more organised whole and should not be developed in  
   isolation. [↑](#endnote-ref-2)
3. Implementation of policy must go hand-in-hand with establishment of necessary skills and infrastructure. [↑](#endnote-ref-3)
4. Aim is to provide a level playing field and consistent policy environment for all researchers regardless of funder or discipline. [↑](#endnote-ref-4)
5. Including issues of interoperability and re-usability of data, necessary for making informed judgements of what data are likely to have a long-term value, and identification of roles and responsibilities. [↑](#endnote-ref-5)
6. For example, RFO provides RDM funding in project budget and/or includes funding in its data sharing policies. [↑](#endnote-ref-6)