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Maturity Matrix for   
Research Performing 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

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| --- | --- | --- | --- | --- |
| Maturity Level  Areas | Progression Steps | | | Further Advancement and Alignment |
| Plans to Develop | Development Ongoing | Developed on  Organisational Level |
| Organisational Engagement and Commitment | * RPO is engaged with RDM, at least to the level of statements of intent on the importance of research data and RDM. * RPO determines the scope of its activities and is in contact with its stakeholders to acquire high-level recommendations/guidelines and possibly looking to others for guidance and best practices. | * RPO is actively engaged with RDM issues and has defined long-term handling of research data and related outputs as a priority. * RPO commits to addressing RDM issues, through the development of a comprehensive strategy, to include policy, funding, technical infrastructure and training. | * RPO is effectively engaged with RDM issues and has a strategy for RDM in place. * RPO has active support in place, including financial support, support for policy implementation, technical support (for examples via the availability of data stewards), training and where appropriate the provision of long-term data infrastructure. * RPO has established a stable communication channel with technical providers (at least one between RDIs or EU/country wide services). * RPO is in dialogue and collaboration with related RFOs, RPOs, and RDIs at (inter)national level to advance on practical RDM issues. | * RPO enhances engagement on RDM at (inter)national level; the policies are fully aligned with RFOs, RDIs, scientific communities, and government policies. * RPO has connections with technical providers (be they RDIs, country-wide services) that include a long-term commitment and are shared with similar RPOs. |
| Policy Environment | * RPO identifies areas for RDM policy development, establishes respective processes and consults with other stakeholders (RFOs, RDIs, government) | * RPO has an initial RDM policy in place. * RPO has a policy review/revision date established, recognising that policy will need revision and refinement as organisational maturity increases. * RPO consults with stakeholders on policy implementation and monitoring. * RPO has established a basic support for researchers, in co-ordination with RFOs, to meet funder and legal requirements. * RPO considers RDM requirements for future assessment processes of internal projects. * RPO negotiates with selected RDIs to handle the research outputs (if outsourcing has been decided); otherwise, an internal process of procurement and deployment is planned. | * RPO has well-developed, comprehensive policies within a supporting environment (data processing procedures throughout and after finalisation of the research process, compliance monitoring, including as part of the research funding peer-review process at project approval) * RPO offers selected RDIs (in-house, nationwide, EU-wide) to researchers to handle the research outputs; MoUs or similar are available with these RDIs. In case an in-house solution is selected, it is declared operational and usable. * RPO provides clear instructions for support to research and technical staff. * RPO has a complementary community development process established as part of policy development, including the provision of RDM training and infrastructure.[[2]](#endnote-2) | * RPO’s RDM policies and guidelines for the utilisation of selected RDIs (if outsourced) are fully aligned with other national RPOs and with stakeholders (RFOs, RDIs, scientific communities, Government). * RPO ensures alignment of its policies with evolving legal framework around research data and European Data Strategy. * RPO has set up a co-ordination process with peer organisations. * RPO has set up effective long-term management agreements between RDIs and RFOs. * RPO collaborates with disciplines to seek broader alignment. |
| Financial Aspects | * RPO acknowledges that it has a role in ensuring RDM activities/infrastructure are supported financially. * RPO discusses with RFOs, government and RDIs (as service providers) to allocate appropriate levels of funding, including exploring potential new sources. * RPO has initiated discussions with research communities on consequences for project evaluation modalities, including discussions on the eligibility of research costs. | * RPO has defined an initial budget allocation for RDM and areas for spend. * RPO has allocated funding, internally and with other entities (RFOs, government, RDIs). This might be a short-term interim response, awaiting a consolidated longer-term plan. | * RPO has an enhanced, longer-term investment plan to support research communities with implementing RDM strategies. This includes the recognition that RPO needs to provide training and first-level RDM infrastructure beyond the life of any specific project or programme. * RPO needs to include potentially modified evaluation modalities for projects including incentives for researchers’ career paths. * RPO has a process to monitor efforts and investments, and assesses and solves gaps. * RPO provides a specific support service for researchers, via data stewards and librarians, available to help research groups in all project phases. | * RPO foresees budgets to meet RDM policies and plans for most research groups. * RPO foresees budget also for project evaluation (at approval, throughout the research project, and after finalisation of the project) and for the impact of researchers’ career paths. * RPO secures additional funding with RFOs/government or carves it out of the standard budget. * RPO has a support service that is sustainable in the long term. |
| Training | * RPO acknowledges the importance of RDM training and consults communities on training requirements and RDIs on training needs. | * RPO provides a basic training environment for researchers and support staff, usually via internal expertise in the RPO. * RPO has initiated evaluating the possibility of engaging data stewards and preparing an internal consultancy service. | * RPO has defined expected RDM core competency levels for the research community and established them throughout the organisation. * RPO considers continuous/regular training in effective RDM skills (internal or served via larger communities such as RFOs or science communities) a core element of support for researchers and a recurrent activity in the long-term planning. * RPO has internal or outsourced experts (such as data stewards, digital curation experts, librarians, and archivists) available for consultancy in all phases of the research process and beyond to advise on RDM planning, data curation and storage. * RPO’s training opportunities include legal aspects to ensure compliance with legal requirements. | * RPO has a complete training and support system with sufficient staff, with specific support personnel offered to research groups (data stewards, librarians, and so on). * RPO’s training activities cover legal aspects, (inter)national standards for technical aspects, RDM policies, life-cycle data management and digital preservation. |
| Technical Preparedness | * RPO acknowledges that it has a role in technical support for RDM, for example, on metadata standards or provision of RDI, and collaborates with other stakeholders (RFOs, RDIs, scientific communities) to identify appropriate standards. * RPO investigates possible RDIs to be used as technical solution to handle research data, including links between own infrastructure and network with other RDIs. | * RPO works with its research communities to identify appropriate metadata standards and required infrastructure (internally/externally/networking) addressing the respective disciplinary needs. * RPO conducts tests with selected RDIs to handle the research outputs, including permanent feedback with its own researchers. * RPO decides whether to outsource the technical aspect or keep it in-house. | * RPO has an RDM technical plan to ensure FAIR data. It includes metadata standards and provision of RDM infrastructure in collaboration with technical service providers. Responsibilities within the organisation (clear governance structure) and budget allocation are crucial elements of the plan. | * RPO considers FAIR handling of research data the norm. * RPO is part of a joined-up RDM technical approach across all RPOs in the same field/country. * RPO ensures, in case an RPO-owned infrastructure is chosen, that it provides adequate support staff, is fully operational and/or ensures seamless data flow to national/international infrastructure providing long-term handling of research data. * RPO is part of an agreed and established governance of research data networks. |
| Communication and Awareness Raising | * RPO develops its agenda for research data, in collaboration with the stakeholders (such as RFOs, government). * RPO sets up a communication process to engage own researchers on the value of FAIR research data and RDM. | * RPO has established communication pathways to engage research groups it supports; aspects like awards and better career opportunities are clarified. * RPO provides information showing its commitment and supporting role for researchers. | * RPO provides well-developed communication materials and pathways, stressing the importance of RDM, the roles of each key stakeholder, and the commitment of the RPO towards RDM. * RPO’s active community engagement leads to RDM becoming a shared and recognised value across the RPO’s research communities. * RPO clearly communicates the objective of FAIRness in its strategy. | * RPO has entered a co-ordination process with other RPOs (nationally and internationally) to develop a common agenda for research data. This needs to be aligned with RFOs’ policies and with RDIs’ technical offerings. * RPO has established RDM as part of the everyday activity of research. Effective RDM becomes the ‘new normal’. |

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. Implementation of policy must go hand-in-hand with establishment of necessary skills and infrastructure. [↑](#endnote-ref-2)