



FAIRsFAIR
Fostering Fair Data Practices in Europe

Defining the policy environment

Key issue #1 in Assessing Capability Maturity and Engagement with FAIR-enabling Practices (ACME-FAIR)

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Defining the Policy Environment

Introduction

The existence of FAIR-aligned and harmonised data policies across various stakeholders such as funding bodies, publishers and Research Performing Organisations (RPOs) is crucial for ensuring that we can progress from a vision of the European Open Science Cloud (EOSC) to it becoming a fully functioning reality. As noted in the Turning FAIR into Reality report and action plan,¹ policies define and regulate various components of a FAIR ecosystem and the relationships between them. Indeed, policies are a cross-cutting theme in Turning FAIR into Reality (TFiR) and are reflected in many of the priority and supporting actions presented in the action plan.

Data policies that align with the FAIR Principles should include among other things clear expectations on data and metadata sharing, data management planning, and encourage the use of trusted data repositories to enable longer term curation, accessibility and reuse. However, policies on their own are not sufficient to ensure that the transition to a successfully implemented EOSC takes place. Rather, policies are just one part of a larger framework which must also ensure that:

- adequate support and guidance is available to researchers to help them with compliance
- appropriate and sustainable infrastructures are provided to support effective data sharing, curation and reuse
- effective engagement strategies are developed to ensure that emerging requirements and possible gaps can be identified in consultation with a wide range of stakeholders

This guide aims to help Research Performing Organisations to assess the data policy framework currently in place and to consider where possible improvements may be needed. To complement the guide, a FAIRsFAIR policy support checklist will be available. This aims to help RPOs to consider the content of their data policy, and how they might better align it with the FAIR Principles.

¹Directorate General for Research and Innovation (European Commission). Turning FAIR into reality. <https://doi.org/10.2777/1524> (2018).

Introducing ACME-FAIR

ACME-FAIR is a set of guides produced in the FAIRsFAIR project, whose main purpose is to help those managing and delivering relevant professional services to self-assess how they are enabling researchers, and colleagues who support them, to put the FAIR principles into practice (for short we refer to this as ‘FAIR-enabling practice’). ACME-FAIR can be used independently, or it can be used to complement Science Europe’s *Practical Guide to Sustainable Research Data*.² Both guides include ‘capability maturity’ matrices (or ‘rubrics’), for Research Performing Organisations (RPOs) e.g. universities, research institutes. While Science Europe’s guide targets their strategic-level management, **ACME-FAIR aims to support the operational levels of the organisation**. It can optionally be used to follow up an assessment based on the Science Europe maturity matrices. ACME-FAIR is also strongly informed by the recommendations of the European Commission’s Expert Group on FAIR data, *Turning FAIR into Reality*.³

Covering key practical issues

ACME-FAIR covers 7 key issues for FAIR-enabling practice themes highlighted by FAIRsFAIR, in response to recommendations from the *Turning FAIR into Reality* report, and issues covered by the Science Europe *Guide to Sustainable Research Data*. The table below shows how the FAIRsFAIR and Science Europe guides complement each other.


<ol style="list-style-type: none"> 1. Defining the policy environment 2. Developing sustainable business models 3. Professionalising roles through training, mentoring, and recognition 4. Supporting data management planning 5. Defining data interoperability frameworks 6. Selecting data, services, and repositories for FAIR 7. Ensuring trusted curation 	<ul style="list-style-type: none"> - Policy environment - Financial aspects - Training  <ul style="list-style-type: none"> Technical preparedness
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Table 1. Mapping key issues addressed in ACME-FAIR (left) to Science Europe’s guidance (right)

The ACM-FAIR guides are a series, with one guide for each of the issues in Table 1. Each includes a brief introduction, together with the explanation above, followed by a checklist describing the scope of the capabilities covered. Each guide then offers a rubric or set of tables describing maturity and community engagement dimensions of these capabilities.

Why use ACME-FAIR?

The ACME-FAIR aims to be useful to services providing researchers with support on FAIR implementation. Its fundamental role is to offer a framework for discussion within and between organisations. It has 3 main use cases:

1. For the service to self-assess its readiness to support FAIR, by establishing current and desired levels of communication and adoption of community practices and the organisational maturity of the support offered for these.

² Tommaso Boccali, Anne Elisabeth Sølvsnes, Mark Thorley, Stefan Winkler-Nees, & Marie Timmermann. (2021). Practical Guide to Sustainable Research Data. <https://doi.org/10.5281/zenodo.4769703>

³ European Commission, Directorate-General for Research and Innovation, (2018). *Turning FAIR into reality : final report and action plan from the European Commission expert group on FAIR data*, Publications Office. <https://data.europa.eu/doi/10.2777/54599> (p.57)

2. Provide a basis for dialogue with colleagues to set out a roadmap for improving on current support, e.g. through training and skills development to improve the communication and adoption of community practices.
3. Support sharing of consistent information between peer organisations about their current levels of maturity and community engagement around FAIR-enabling practices, e.g. with national or international coordination and facilitation.

Organisations that perform research vary a great deal, both in how they are organised internally, and the environments they operate in. No capability model can take all of these factors into account, so anyone involved in planning a roadmap for their organisation's services in this area is likely to want or need more specific guidance on the topics covered. The ACME-FAIR guides will be developed further to reference some of these. FAIRsFAIR also offers a set of examples in the form of 'Implementation Stories' that cover the same themes.⁴

Background

ACME FAIR is partly based on the Digital Curation Centre's *RISE* self-evaluation framework for research data service development⁵, and partly on the guide '*Do I-PASS for FAIR*', which was produced in the context of the Dutch Coordination Point Research Data Management.⁶

ACME FAIR uses a two-dimensional scale, comprising 0-3 maturity levels for each of the 7 issues, and 0-3 levels of communication and adoption of practice. The **maturity levels** are a simplified version of the first 3 levels of the widely adopted *CMMI* (Capability Maturity Model Integration) framework⁷.

The levels of "**community engagement**" are separated out from maturity for the following reasons:

- Community engagement is essential for all of the practice areas covered.
- While the maturity goal of optimising alignment with *organisational* standards and practice is relevant to Research Performing Organisations, for research data support it is equally important to align with *community* standards, as defined by research domains and professional communities of practice.
- Identifying areas where maturity and engagement are at differing levels may be helpful to identify pockets of good practice in one or the other, or areas to target for further action.

Capability dimensions: maturity and community engagement

The maturity and community engagement dimensions both indicate progression from no activity (level 0), through ad-hoc coverage of some practice areas (e.g. varying widely across research projects), through to more standardised approaches across the organisation. The maturity and community engagement dimensions are described in more detail as follows:

Maturity

0. **Not addressed.** The relevant professional services for research support do not coordinate any support capability for researchers in this area of focus. Some staff may help but it is not a formally recognised part of their job.

⁴ <https://fairsfair.eu/implementation-adoption-stories>

⁵ Rans, J and Whyte, A. (2017). 'Using RISE, the Research Infrastructure Self-Evaluation Framework' v.1.1 Edinburgh: Digital Curation Centre: www.dcc.ac.uk/guidance/how-guides

⁶ Taco de Bruin, Sarah Coombs, Jutta de Jong, Irene Haslinger, Henk van den Hoogen, Frans Huigen, Mijke Jetten, Jacko Koster, Margriet Miedema, Sief Öllers, Inge Slouwerhof, Ingeborg Verheul, & Jacqueline Ringersma. (2020). Do I-PASS for FAIR. A self assessment tool to measure the FAIR-ness of an organization (Version 1). Zenodo. <https://doi.org/10.5281/zenodo.4080867>

⁷ CCMI. e.g. https://en.wikipedia.org/wiki/Capability_Maturity_Model_Integration

1. **Initial.** May be incomplete and falling short of the intent of the area of focus. Aware of and addressing performance issues.
2. **Managed.** Complete coverage delivering the full intent of the area of focus, minimally in some aspects. Lacking full alignment with overall organisational standards and practice, but identifies and monitors performance objectives. Includes and builds on level 1.
3. **Defined.** Complete coverage that delivers the full intent of the area of focus and aligns with overall organisational standards and practice. Identifies and monitors performance objectives that expand alignment to the whole organisation. Includes and builds on level 2.

Community engagement: practice awareness, adoption, and collaboration

This dimension identifies the level of engagement the organisation (or the relevant services it offers) has with the communities it serves, about maintaining and updating data stewardship practices and identifying new areas for the development of policy and implementation standards. It includes actively communicating and promoting existing and emerging approaches to the immediately impacted communities and the wider data infrastructure landscape.

0. **Not addressed.** The relevant professional services for research support do not coordinate any support capability for researchers in this area of focus. Some staff may help but it is not a formally recognised part of their job.
1. **Awareness:** the service monitors data stewardship practice in the community or communities it serves, and makes local practitioners aware of it.
2. **Adoption:** the service or its host organisation also supports practitioners to embed community practice locally.
3. **Collaboration:** the service also engages with the design, development, and review of community practice. Consults and collaborates widely, potentially also taking a community coordination and leadership role.

Please give us your feedback

The Digital Curation Centre (DCC) maintains ACME-FAIR. Feedback on this guide was gathered in the FAIRsFAIR project, and changes have been made to reflect that. DCC very much welcomes your thoughts on how to improve it further, especially suggestions of guidance to reference on each of its themes. Please give your feedback using this [short questionnaire](#). It asks how far you agree with 4 simple statements, and invites you to add any comments you wish. Please note that it collects no personal information.

ACME Checklist: Developing the policy environment

The ACME-FAIR checklist identifies six main capability areas under this theme. Five capability areas are assessed on the *maturity* scale, measuring integration of the capability with organisation-level standards and practices. Another two capability areas are assessed on the *community engagement* scale, measuring adoption of broader community standards and practices.

The Science Europe *Practical Guide to Sustainable Research Data* includes a capability maturity matrix that complements ACME-FAIR at a high level. The relevant capabilities it describes include:

- Policy environment: articulating the principles and practices on RDM established by the RPO and to be followed by its researchers, together with the necessary support to its researchers.
- Organisational engagement and commitment: acknowledging the need to develop solutions for sustainable research data and being committed to seek alignment of approaches with other research stakeholders (such as other RPOs, funders, infrastructures, research communities).

The scales used in the Science Europe guide are broadly consistent with ACME-FAIR. It may be helpful to use it prior to using ACME-FAIR, but this is not necessary to use ACME-FAIR effectively.

As a first step, consider the capabilities in the checklist below that are relevant to your organisation. This may help you narrow down your goals in using ACME-FAIR, which might include assessing only those capabilities already under development, only those under consideration, or both.

Which capabilities is your organisation developing or considering doing in future?

Maturity	Current	Considering
1) Aligning data policy with principles for FAIR and Open Science?	<input type="checkbox"/>	<input type="checkbox"/>
2) Defining strategy for sustaining FAIR and open research data?	<input type="checkbox"/>	<input type="checkbox"/>
3) Defining roles and responsibilities for FAIR data?	<input type="checkbox"/>	<input type="checkbox"/>
4) Defining a service roadmap for FAIR implementation?	<input type="checkbox"/>	<input type="checkbox"/>
5) Making the data policy document machine-actionable?	<input type="checkbox"/>	<input type="checkbox"/>
Engagement		
6) Communicating policy and raising awareness of FAIR?	<input type="checkbox"/>	<input type="checkbox"/>
7) Engaging with users and stakeholders in service development	<input type="checkbox"/>	<input type="checkbox"/>

These capabilities might be developed by a single unit within a Research Performing Organisation, for example by a Library or Research Office. More likely, several areas of the organisation's governance will also be involved, e.g. Research Committee, Research Ethics Committee, Intellectual Property and Commercialisation Unit, and any Research Data Management service.

The next step in using ACME-FAIR is to discuss with the relevant colleagues what can realistically be achieved to meet needs of researchers, other stakeholders such as funders, and the organisation. To inform that, you may find the scope notes below helpful. They describe each capability for this theme covered in the framework.

Scope

We define capabilities as follows below, and then describe levels of maturity and engagement.

Aligning data policy with principles for FAIR and Open Science

- Clarifying the policy scope, and the importance of managing data according to FAIR principles,

- Articulating the need for sustainable access and long-term preservation of research data, to keep data FAIR and ensure research integrity.
- Assessing research outputs and Open Research practices with emphasis on rewarding good practice and identifying areas for improvement, with recommendations covering measures to enable FAIR.

Defining strategy for sustaining FAIR and open research data

- Compliance with policies of the organisation, external funders and other stakeholders
- Setting organisational goals and relating these to key stakeholder priorities
- Identifying benefits sought from FAIR and open data assets, and reviewing these through research assessment

Defining roles and responsibilities for FAIR data

- Articulating staff roles and responsibilities for compliance with legal and regulatory obligations and external funders requirements e.g. for Data Management Plans.
- Clarifying the organisation's expectations of researchers and of the providers of services to support them in implementing FAIR principles.
- Reviewing the roles and responsibilities, to align with career progression and reward, and the external environment for these.

Defining a service roadmap for FAIR implementation

- Reviewing gaps in the provision of services to enable implementation of FAIR and open principles
- Defining measurable objectives for these services
- Reviewing and improving how services are integrated with core business processes and management structures

Making the data policy document machine-actionable

- Providing the policy online with clear indicators of its currency
- Giving the policy an identifier and structured markup to support machine-readability
- Registering the policy in relevant community catalogues of FAIR-enabling resources

Communicating policy and raising awareness of FAIR

- Promotion to all relevant researchers, support staff, students and external stakeholders.
- Establishing channels for ongoing consultation
- Using such channels for routine communication and review of policy and strategy objectives

Engaging with users and stakeholders in service development

- Gathering requirements of service users and stakeholders to fulfil the policy, including their needs for compliance with external funder, government or other stakeholder requirements.
- Analysing gaps in provision and piloting tools and services to fulfil the policy, through the service offerings available externally e.g. from Research Data Infrastructures.
- Enabling researchers and data service providers to take a community coordination and leadership role, and applying the resulting insights to drive forward policy.

ACME Rubric: Defining the policy environment

Defining the Policy Environment	Maturity			Maturity level (0-3)
	1) Initial	2) Managed	3) Defined	
	<p>1) Initial May be incomplete and falling short of the intent of the area of focus. Aware of and addressing performance issues</p>	<p>2) Managed Delivering the full intent of the area of focus, though minimally in some aspects. Lacking full alignment with overall organisational standards and practice, but identifies and monitors performance objectives. Includes and builds on level 1.</p>	<p>3) Defined Complete coverage that delivers the full intent of the area of focus and aligns with overall organisational standards and practice. Identifies and monitors performance objectives that expand alignment to the whole organisation. Includes and builds on level 2.</p>	
<p>Aligning data policy with principles for FAIR and Open Science</p>	<p>Our research data policy makes clear the range of outputs that are covered and which are not in scope, and defines what is meant by research data. It recognises the importance of some aspects of managing data according to FAIR principles, but may not explicitly address these principles or those of Open Research.</p>	<p>Our policy articulates the need for sustainable access and long-term preservation of research data, to keep data FAIR and ensure research integrity. Referring to FAIR and Open Research principles, the policy identifies a timeline for implementing these</p>	<p>Our organisation's policy articulates the need to assess research outputs and Open Research practices according to relevant indicators. Emphasis is placed on rewarding good practice and identifying areas for improvement. Tools are provided for assessing outputs against relevant indicators for FAIRness. Recommendations cover metadata, identifiers for people and data, repositories, intellectual property, licensing and data citation.</p>	
<p>Defining strategy for sustaining FAIR and open research data</p>	<p>Our research data strategy is focused on compliance with the organisational and/ or national policies and regulations relevant to the jurisdiction environment, addressing FAIR and Open Research requirements of external stakeholders.</p>	<p>Our research data strategy includes our organisation's goals for FAIR and Open Research, and relates these to key stakeholder priorities, including those for research assessment and data protection.</p>	<p>Our organisation's research data strategy on FAIR and Open research is embedded in overall organisational priorities. It identifies benefits sought from FAIR and open data assets; these are subject to review and are linked to research assessment.</p>	

Defining the Policy Environment	1) Initial May be incomplete and falling short of the intent of the area of focus. Aware of and addressing performance issues	2) Managed Delivering the full intent of the area of focus, though minimally in some aspects. Lacking full alignment with overall organisational standards and practice, but identifies and monitors performance objectives. Includes and builds on level 1.	3) Defined Complete coverage that delivers the full intent of the area of focus and aligns with overall organisational standards and practice. Identifies and monitors performance objectives that expand alignment to the whole organisation. Includes and builds on level 2.	Maturity level (0-3)
Defining roles and responsibilities for FAIR data	Our research data policy articulates roles and responsibilities for researchers, other staff and students to comply with legal and regulatory obligations and external funders' RDM policy expectations, including for Data Management Plans.	Our policy clearly states what is expected of researchers when it comes to making data FAIR, sharing it, and citing it. It also provides clarity on legitimate exceptions to data sharing. Policy also defines roles and responsibilities for specific service roles to support FAIR and Open Research.	Our organisation regularly reviews roles and responsibilities, and aligns them with career progression and reward processes, and with relevant other organisational policies e.g. Responsible Research and Innovation (RRI)	
Defining a service roadmap for FAIR implementation	Internally and externally provided services are reviewed to identify those that enable implementation of FAIR and open principles, and ensure long-term access to research objects. Provision may be local or externally sourced e.g. from EOSC and is sufficient to comply with Funder, Government and legal requirements.	Services to implement FAIR and Open Research practices and ensure long-term access to data are defined with measurable objectives. These aim to meet research needs across the whole project lifecycle, and are informed by organisational policy and strategy.	Local or external services to implement FAIR and Open Research practices are integrated into the core business processes and management structures of the organisation, and are subject to review and continual improvement.	
Making the data policy document machine-actionable	Our policy is accessible online with a version number, a period of validity, and indication of planned review dates.	Our policy is described consistently using a structured data markup schema to support both human and machine readability. Policy has a persistent identifier (PID).	Our organisation's policy is registered in the metadata records of registries such as FAIRsharing.org.	

	Community engagement: Practice awareness, adoption and collaboration			
Defining the Policy Environment	1) Awareness: the organisation monitors community practice and makes local practitioners aware of it.	2) Adoption: the organisation also supports practitioners to embed community practice locally. Includes and builds on level 1.	3) Collaboration: the organisation also engages with the design, development, and review of community practice. Consults and collaborates widely, potentially also taking a community coordination and leadership role. Includes and builds on level 2.	Engagement level (0-3)
Communicating policy and raising awareness of FAIR	Policy areas are identified and processes initiated to address these in consultation with RFOs and government. Principles of FAIR and Open Research, including the need to sustain long-term access to research data, are promoted to all relevant researchers, support staff, students and external stakeholders.	We have established channels for ongoing consultation with relevant researchers, support staff, students, and stakeholders on applying FAIR and Open Research principles (e.g. through information campaigns, training, events). Our research data policy is contextualised to the organisation's strategy, research environment and community needs.	Processes are in place to routinely communicate the organisation's research data policy and strategic objectives, which seek to lead and respond to research and community goals articulated by researchers, support staff, students, and stakeholders.	
Engaging with users and stakeholders in service development	We gather requirements for enabling support of FAIR and Open Research, and for long-term access to research data. We assess the current provision of relevant tools and services to researchers, and their ability to use them to meet the needs of their domain and of RFO, government and stakeholders.	We analyse service performance requirements and gaps in capacity to fulfil them. Requirements addressing the whole project lifecycle, including long-term access, are met through piloting of in-house tools and services, and through negotiation with external providers and Research Data Infrastructures.	Our organisation enables researchers and data service providers to take a community coordination and leadership role. It applies the resulting insights to drive new areas for policy development, to help implement standards for FAIR and Open Research.	

