Standards, Repositories and Policies:
Facilitating Discovery, Adoption and Use

Executive summary of the RDA-adopted recommendations of the joint RDA/Force11 FAIRsharing WG.

Data sharing is essential to both the discovery and evolution of scientific practice, and the demand for rapid results and underlying data reporting is critical to the advancement of science. Expediting data sharing, however, should not happen at the expense of reusability. It is paramount that all research digital assets are FAIR, to enable reproducible research and underpin scholarly publishing. To this end, it is critical that community-developed standards[1] for the identification and reporting of data and metadata, and the repositories, databases and knowledgebases that implement these standards, are easily discoverable for adoption and recommendation in data policies, and use by the community.

1. Focus and Description

The recommendations laid out here provide guidance to **users** and **producers** of standards and repositories, describing how they can best *select* and *describe* these resources, and provide advice to funders and publishers on how they can best *recommend* these resources in their data policies. These guidelines are extracted and derived from the RDA-adopted output of the joint RDA/Force11 FAIRsharing WG.

Inform and educate

A curated service of interlinked standards, repositories and data policies **in all disciplines**, the FAIRsharing registry plays a fundamental role in providing accurate information on these resources, facilitating the wider adoption of these FAIR enabling resources. When a standard is mature and standard-compliant repositories are available, these resources need to be promoted to the relevant stakeholder community, who in turn need to recommend their implementation (e.g., in data policies of scholarly publishers, funders and other policy makers, also training material by libraries and supporting organizations) or use them (e.g. to define a data management plan) to facilitate a high-quality research cycle. Through providing metadata on these resources, FAIRsharing informs and educates users as to which standard to use and to which repository they should search or deposit their data. **FAIRsharing is already adopted and recommended** by a growing numbers of funding agencies, standards organizations, librarians, infrastructure providers and scholarly publishers, from academia, industry and governmental bodies, and actively works with a growing international user base and collaborators.

FAIRer resources for FAIRer data

With community contribution, FAIRsharing collects the necessary metadata to ensure that standards, repositories and data policies are: findable (e.g., by providing persistent and unique identifiers, functionalities to register, claim, maintain, inter-link, search and discover them),

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[1] Organized in four categories. (1) Minimum reporting guidelines or checklists outline the necessary and sufficient information vital for contextualizing and understanding a digital object. (2) Terminology artifacts or 'semantics', ranging from dictionaries to ontologies, provide definitions and unambiguous identification for concepts and objects. (3) Models and formats define the structure and relationship of information for a conceptual model and include transmission formats to facilitate the exchange of data between different systems. (4) Identifier schema are formal systems for resources and other digital objects that allow their unique and unambiguous identification.

accessible (e.g., by identifying their level of openness and/or licence type), encouraged to be interoperable (e.g., through highlighting which repositories implement the same standards to structure and exchange data), and reusable (e.g., knowing the coverage of a standard and its level of endorsement by a number of repositories will encourage its use or extension into neighbouring domains, rather than reinvention). More features and functionalities of the FAIRsharing registry are summarized in the extended version of the [RDA-adopted output](#) and the [FAIRsharing educational page](#).

2. Guidelines for stakeholders

Here we describe how several stakeholders can reduce the knowledge gap around these resources.

- ***Researchers in academia, industry and government*** can use FAIRsharing as a lookup resource to identify and cite the standards, databases or repositories that exist within this expanding area. For example, when creating a data management plan for a grant proposal or funded project, or when submitting a manuscript to a journal, researchers can identify which of the recommended repositories and standards they use in order to provide their data in an open and FAIR manner.

- ***Developers and curators of standards, databases and repositories*** can use FAIRsharing to explore what resources exist to enhance the discoverability and exposure of their own resource. This resource might then receive credit outside of its immediate community and ultimately promote adoption. The more adopted a resource is, the greater its visibility. For example, if your standard is implemented by a repository, these two records will be interlinked; thus, if someone is interested in that repository they will see that your standard is used by that resource.

- ***Journal publishers or organizations with data policies*** can use FAIRsharing to maintain an interrelated list of citable standards and databases, grouping those that their policy recommends to users or their community. As FAIRsharing continues to map the landscape, journals/publishers can also revise their selections over time, enabling the recommendation of additional resources with more confidence. All journals that do not have such data statements should develop them to ensure all data relating to an article or project are as FAIR as possible.

- ***Research data facilitators, librarians and trainers*** and organizations involved in supporting research data can use FAIRsharing to provide a foundation on which to create or enrich educational lectures, training and teaching material, and to plug it into data management planning tools.

- ***Learned societies, unions and associations*** should raise awareness around standards, databases, repositories and data policies, in particular on their availability, scope and value for FAIR and reproducible research.

- ***Funders and data policy makers*** can use FAIRsharing to help select the appropriate resources to recommend in their data policy and highlight those resources that awardees should consider when writing their data management plan.