Stakeholder - specific recommendations

Funders

Funding bodies are key stakeholders in the open access ecosystem: they develop and mandate policies that affect how data is managed, accessed, disseminated and preserved and how funds are allocated in the various phases foreseen in the process of making research data open. Research funders include the European Union (EU) and national governments, individual public funders that distribute competitive funding, non-profit institutions and private funders. This variability in the types of research funders, depending –among others– on their public or private nature, the size and effect of funding they mobilize for research and the country circumstances impacts on the measures and strategies they adopt.

The drive for open access to research data, especially those produced as a result of public funding, is justified by reference to the public interest, yet funder policies for open access to research data remain limited, especially when compared to those for peer-reviewed publications. At the EU level, the most prominent funder is the European Commission (EC), representing an important source of competitive funding for some member states. Thus, the EC can have a catalyst role in the formulation of open access policies for publications and research data among member states. Setting the example as a major European public funder, the EC has elaborated a comprehensive framework to support open access to scientific information, including research data. In 2012 it passed the "Recommendation on access to, preservation of and dissemination of scientific information" and formulated a pilot action on open access to research data in the context of Horizon 2020, the main EC funding program for research for the period 2014-2020. The Recommendation calls on member states to develop comprehensive and aligned policies and strategies that will ensure open access to publications and research data from publicly funded research. The Open Data Pilot is implemented in seven areas for 2014 and 2015 and requires open access to research data generated by the projects.

At member state level, UK research funders, the Research Councils UK and the Wellcome Trust, are global pace-setters in policy development for research data and in comprehensively developing relevant supporting services. In the rest of Europe, a great number of funding bodies have yet to develop policies on open access to research data or have no immediate intention of doing so, while most governmental policies and strategies concentrate in the field of governmental rather than research data. Beyond the EU, the White House issued a Directive in 2013, whereby all federal funding agencies with a $100 million/year funding for extramural research or development should require open access in their policies, both for research publications and research data.

The most significant and effective funder policies set open access to research data as the default requirement for the funded research with provision for possible exceptions for legal and ethical reasons. They require deposit of research data supporting publications and other important research data in certified repositories. They require researchers to describe these and other provisions (e.g. evaluation of their data; long term preservation provisions) in mandatory Data Management Plans (DMPs), which are submitted with the grant proposals and evaluated. The costs for data management are usually eligible for projects. To secure the reusability of research data and the ability to identify and measure policy compliance, funders have introduced technical specifications in their policies (e.g. digital object identifiers (DOI), specific metadata standards etc.) as well as provisions on appropriate licensing. Most importantly, efficient policies include clear descriptions of responsibilities/ expectations for the main stakeholders involved: funders, researchers (either under their capacity of grant applicants or grant holders), research institutions, data centers and repositories, and publishers. With regard to monitoring some funders include provisions on the monitoring of their policies.

Current practices demonstrate that there is no one-size-fits-all solution: different countries have different approaches towards developing such strategies and policies, dependent upon local conditions. In developing related policies, research funders are encouraged to study the policies and practices of other countries and have a solid knowledge of important issues in their own country such as (but not limited to) the available infrastructures and support services, the diversity of scientific and scholarly practices.

Recommendations

1. **Develop explicit policies for open access to research data with clear roles and responsibilities**

   Funder policies should set open access as the default for research data. Explicit policies with clear description of roles and responsibilities for each stakeholder (i.e. funders, grantees, repositories/data centres that curate the research data) are key in fostering change through their impact on research cultures.

2. **Adopt a comprehensive approach in funding the implementation of open access to and preservation of research data**

   Appropriate financing and comprehensive planning is necessary for the following: collaborative and scalable infrastructures and services for access to and long-term preservation of research data; innovative actions that boost data-reuse in the research and innovation sector; development of skills among researchers and information specialists, both formal (curriculum development) and informal (training activities). In achieving this comprehensive approach, they are encouraged to mobilize complementary funding instruments.

3. **Reinforce the significance of the Data Management Plan (DMP) to embed and promote data management as a distinct activity within the research process**

   Funders are encouraged to acknowledge the DMP as a distinct activity within the project and appoint data management experts to review and monitor their implementation. DMPs should be accompanied by the allocation of appropriate resources for the delivery of such plans and for monitoring researchers' compliance.

4. **Raise awareness and promote open research data in view of leading an open science paradigm**

   Funders should engage in activities such as the promotion of good practices by specific researchers and research groups and/or establishing prizes for good practices in sharing research data, in view of leading

cultural change towards the open science paradigm.

5. **Foster collaboration with relevant stakeholders and networks**

    Funders should take the lead in bringing together researchers, research institutions policy makers, data mangers, publishers, in view of developing aligned policies and sustainable strategies and infrastructures for open access to research data.

Research Institutions

Research institutions refer to universities and higher education organizations engaged in primary or secondary research and to publicly and privately funded research institutes/centres. Research institutions hold a focal role in transitioning to open access practices, as the primary loci where researchers carry out and publish their work. In recent years, research institutions around the world have been promoting the uptake of open access practices, as shown in the steadily increasing number of relevant policies. Nonetheless, the main focus thus far has been on open access to publications rather than research data and a comparatively small number of institutions has developed policies for research data management. Motivation to develop policies derives from institutions' need to safeguard their intellectual, financial, human and material investment, as well as the increasing pressure from research funders who require that research data produced with their funding is properly managed and openly accessible. In some cases, the motivation for developing a sound institutional data strategy derives from researchers, who acknowledge the significance of research data and the need for better management.

The most consistent progress in research data management is observed in the UK, the USA and Australia. Rapid developments both in the UK and the USA are mostly the result of funder mandates: Research Councils UK and the National Science Foundation and the National Institutes of Health in the USA. In Australia, while the policy of the main funding agency is not mandatory for research data, universities have made significant progress in addressing research data management under the influence of the Australian Code for Responsible Conduct of Research, requiring an institutional data management policy.