

# EXECUTIVE BRIEFING

## *Managing Knowledge Assets for Research and Innovation in the 21st Century*

### The problem

Research data is the new currency of the digital age. From sonnets to statistics, and genes to geodata, the amount of material being created and stored is growing exponentially. However, the LERU Roadmap for Research Data<sup>1</sup> identifies a serious gap in the level of preparation amongst research performing organisations. This gulf is prominent in areas such as policy development, awareness of current issues, skills development, training, costs, community building, governance, disciplinary/legal/terminological and geographical differences.

### The solution

This **LEARN Executive Briefing** will help decision and policy makers identify sound solutions. In addition, stakeholders can follow the LEARN Toolkit of Best Practice Case Studies, all of which will help organisations to grapple with the data deluge. LEARN also provides a self-assessment survey<sup>2</sup>.

### Research Data Policy

Every research performing organisation should have a research data policy, which lays down a framework for how research data is curated and managed. Research funders should also have a research data policy, stipulating the obligations that a researcher is expected to meet as a condition of the funding received. LEARN has created a model Research Data Management policy for research performing organisations, along with guidance for the implementation of this policy.

The model LEARN policy can be both adapted and adopted by individual research performing organisations, by regional, national and/or international consortia.

### FAIR Data

Best practice indicates that research data should be FAIR<sup>3</sup>:

- **F**indable – **A**ccessible – **I**nteroperable – **R**eusable

To be findable, the data should be adequately described, using standard taxonomies and ontologies where possible. To be accessible, research data should ideally be open data, available for sharing and reuse. Not all research data can be open, but best practice indicates that such data should be “as open as possible, as closed as necessary”<sup>4</sup>.

Research data should also be interoperable, capable of being processed by machines using vocabularies which follow FAIR principles. To be reusable, metadata describing the data should meet domain-relevant community standards.

1 [http://www.leru.org/files/publications/AP14\\_LERU\\_Roadmap\\_for\\_Research\\_data\\_final.pdf](http://www.leru.org/files/publications/AP14_LERU_Roadmap_for_Research_data_final.pdf)

2 All available at <http://learn-rdm.eu>; last accessed 16/12/16

3 <https://www.force11.org/group/fairgroup/fairprinciples>; last accessed 12/12/16

4 [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hi-oa-data-mgt\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf), p. 4

## Research Data Management Stewardship

It is important that researchers plan the collection, curation, description and dissemination of their research data at the start of their research. This information is best captured in a Research Data Management plan, which provides a framework for research data stewardship<sup>5</sup>.

### Infrastructure

To curate their research data, researchers and research performing organisations need access to the requisite digital eco-systems. These may be maintained locally; or they may be commercial services, subject domain offerings or regional/national/international platforms. Different subject communities and individual countries will want to provide such facilities in different ways. Commonly, the platform(s) will need to offer the following services:

- Storage, for researchers who are actively collecting data;
- A publication platform, where research data and related software can be made available for sharing and re-use;
- Archive facilities, to allow research data to be curated for the long term, often in response to the requirements of research funders;
- A discovery service, which will allow researchers and citizens to search for research data deposits both locally and across the Internet.

The European Commission is promoting the European Open Science Cloud<sup>6</sup>. The EOSC is a metaphor to help convey both seamlessness and the idea of a commons based on scientific data. The EOSC will be a federated environment for the sharing and re-use of scientific data, based on existing and emerging elements in the Member States, with lightweight international guidance and governance and a large degree of freedom regarding practical implementation.

### Training

The prevalence of research data requires all researchers, new and established, to equip themselves with the skills and tools to be confident in a data-driven environment. The lead needs to be taken by research performing organisations and, in many cases, by their institutional libraries.

### Funding

Research data management comes with costs. There is no one method for assessing these costs, but a number of costing models exist to help, for example the 4C Project<sup>7</sup>.

### Conclusion

Research data can drive innovation and stimulate new discoveries, to the great benefit of Society. All stakeholders in the research workflow have a role to play. This Executive Briefing highlights what researchers and research performing organisations need to do to rise to this exciting challenge.

<sup>5</sup> For further information, see <http://www.dcc.ac.uk/resources/data-management-plans>; last accessed 12/12/16

<sup>6</sup> See <http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud>; last accessed 12/12/16

<sup>7</sup> For further information, see <http://www.4cproject.eu/summary-of-cost-models>; last accessed 12/12/16

