Collaboration at International, National and Institutional Level – Vital in Fostering Open Science

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Abstract

Open science and open research provide potential for new discoveries and solutions to global problems, thus are automatically extending beyond the boundaries of an individual research laboratory. By nature they imply and lead to collaboration among researchers. This collaboration should be established on all possible levels: institutional, national and international. The present paper looks at the situation in Finland, it shows how these collaborations are organized at the various levels. The special role played by LIBER is evidenced. The advantages of these collaborations are highlighted.

Key Words: open science; open data; collaboration; Europe; LIBER

1. Introduction

To resolve today's major social challenges, we need interdisciplinary dialogue and a new kind of openness. In the evolving digital landscape, European-national-local developments and activities are strongly linked. Even though

funding for science and research comes predominantly from national funders (for example, in Finland only 2% of research funding originates from the EU), European level policy-making and the decisions of major research funding organizations affect both national and local level policies related to Open Science, and vice versa. Depending on how interoperability and services as a whole are organised, there can be close relationships between local-European or national-European activities. In many European countries the development of national level infrastructure or service solutions are lacking and the work is done at the local level. Finland is an example of a country where the three levels are strong, and in addition Nordic collaboration is active. National level interoperability, infrastructure and services to support the development of Open Science activities in organizations at local level are developed. In this article we will show through examples the impact of international, national and institutional level collaboration.

The basic logic of science and research dictates that science, along with its methods and results, should be as open as possible. With open access, **research results and new information can be confirmed and validated independently** and without bias, and support structures are required for this validation.

In making data and research results open, we **enable and promote new businesses and innovations**, such as the creation of new services and software.

Openness is also **economical and effective**[1]**:** previously collected data and the information generated from it become globally, efficiently and equally accessible to all.

Open science creates **opportunities for a variety of stakeholders to participate** in brainstorming research topics, conducting research, evaluating results, and developing software.

Openness also improves the quality of research**:** results and data enable scientific observations to be verified or challenged, so **the global body of scientific knowledge can develop and correct itself more quickly** and without redundancy.

Openness also **promotes the faster transfer of information** for use by all. It guarantees **equal access to research data**, regardless of geography.

Providing open access to research results and data in an information network **increases the visibility** of researchers, research results, and research institutions, and **improves impact**.

Today, the road to open science can be difficult. The challenges include:
- the narrow reward culture in current academia: there is no real incentive to promote and reward openness,
- organizational support for openness: there is widespread uncertainty about how the costs of openness will be covered,
- fear that raw data will be misinterpreted, methods misused, or data published too early,
- uncertainty over the ownership of data and methods,
- lack of expertise in promoting openness.

Open Science depends on openness in the research process and working culture. Models of openness can be used to create opportunities for rich dialogue, and to preserve and increase diversity. Open Science can be successfully adopted only if those responsible for research systems[2] are motivated and trained to apply open access principles. Research systems should routinely employ open methods for managing research data. The first practical requirement is that each actor must have clearly structured, up-to-date descriptions of how to promote open science.

2. Open Science and Research Initiative in Finland

Finland started the Open Science and Research Initiative in 2014, aiming to be one of the leading countries for openness in science and research by 2017, and for Finnish society to extensively harness the opportunities that open science affords. This goal materialized in the Open Science and Research Roadmap 2014–2017 (Ministry of Education and Culture, 2014). It is a strategic-level plan for Finnish open science and research that describes the activities required to achieve the desired changes, advancements and developments. Its measures will be supplemented and updated by, for example, working groups. It will also be amended when necessary, so not all activity will be tightly bound to initial plans. Dialogue in science and research will be promoted on many levels, both nationally and internationally.

Finland can make the jump to open science and research through national cooperation, and by ensuring that the possibilities of open science will be widely utilized in Finnish society. The status of research organizations' open operational culture was evaluated in 2015 (Ministry of Education and Culture, 2015). According to this analysis, no higher education institution has yet reached the highest maturity level in openness (see Figure 1). The Universities of Helsinki and Jyväskylä have reached the second-highest level. Five institutions were placed at the third level, 14 at the fourth, and 9 at the lowest. Over half of all institutions have been actively promoting openness. When it comes to openness, universities are clearly ahead of polytechnics. The role of libraries in promoting openness in higher education institutions at the local level is a key for success.

In order to monitor progress, a similar analysis will be repeated annually during the Open Science and Research Initiative, that is, until 2017. In 2016, funding organizations will be evaluated as well.

Fig. 1: Overview of operational culture maturity levels of Finnish higher education institutions (from Ministry of Education and Culture, 2015).
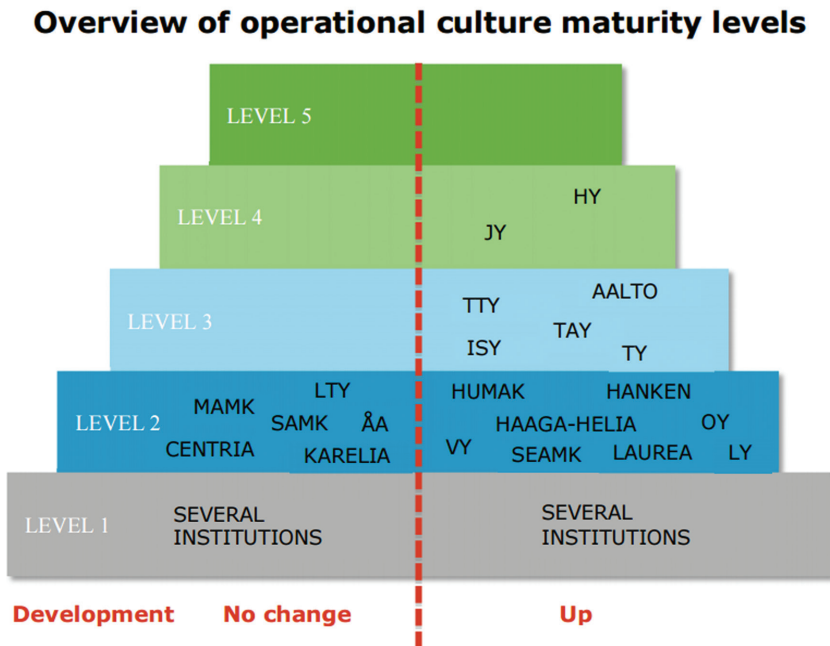
3. Research Data Management – From Policy to Practical Implementation

The amount of data is expanding at an astonishing rate: experts now point to a 4300% increase in annual data generation by 2020. As Tony Hey commented in JISC Digifest 2016 (JISC, 2016): "It is clearly not sensible to keep all the data scientists create, so how much data should you keep? I believe that you have to have the people who were involved in generating the data – the scientists – also involved in deciding which of their data should be kept." To make research data management a daily routine at research organizations, collaboration between various stakeholders is needed. There is the need for making policy, creating incentives, raising awareness, providing guidelines and tools as well as sharing best practices of research data management.

The League of European Research Universities published a roadmap (LERU, 2013) for research data management (RDM) in late 2013 in order to support LERU universities as well as other research organizations in tackling the challenges related to data. Last year the European Commission launched project LEARN (LEaders Activating Research Networks), which will raise awareness of RDM and policy issues at institutions. LEARN will also encourage organizations to produce their own data policies. There was one LEARN workshop at the LIBER Annual Conference in London in 2015 and the next one will be held in Helsinki in 2016.

Helsinki University (2015) was the first university in Finland to publish a research data policy in 2015. The work was started prior to the publication of the LERU Roadmap, which confirmed that the idea of a data policy was highly relevant. According to the policy, the University will provide researchers with an infrastructure, legal assistance, and training in questions related to research data management. Researchers, in turn, will be expected to draw up a data management plan for their research projects and to make their research data openly available, as appropriate. The libraries of the university have taken an important role in the implementation of the policy and in supporting researchers.

Helsinki University's data policy gave an impulse to the National Library of Finland to develop a policy on openness – the *Open National Library*. "The National Library of Finland is an open organization that plans its operations together with its key stakeholders. Openness builds trust. The openness of

resources and services means that customers have better access to them and they have a greater social impact."

The policy points out the importance of both organizational culture and the development of open services and infrastructures. It also provides a roadmap for the implementation of open services throughout 2016–2020.

4. Research Libraries Sharing Best Practices Among Themselves and with RDA Community

LIBER's steering committee on Scholarly Communication and Research Infrastructures has worked systematically with research libraries to support them in making the case for libraries' role in research data management. It all started with collecting 10 case studies from different European countries on RDM in 2013. The next step was to share best practices in RDM. Based on the work, a factsheet and infographic have been produced in order to support the research community. The collaborative efforts will continue.

In Finland, the Open Science and Research Initiative is developing a national DMP solution, based on an open source software solution provided by the Digital Curation Center (DCC, UK) called DMPonline. This is a collaborative project involving universities, other research organizations and the biggest funders in Finland. The Tuuli project is funded by the Ministry of Education and coordinated by Helsinki University Library. There are over 40 experts in working groups and subgroups from 22 different organizations and more organizations are joining the project.

The Research Data Alliance activity began in 2012 with the establishment of an international Steering Group by funding agencies in the US, EU and Australia.[3] Its organizational structure covers the RDA Council, RDA Secretariat, RDA Technical Advisory Board, RDA Organisational Advisory Board and RDA Steering Group. LIBER is a member of the RDA Organizational Advisory Board and, with the Confederation of Open Access Repositories (COAR), runs the Libraries for research Data Interest Group. The purpose of the group is to build capacity within the library community around research data management, ensure that libraries are aligned with other RDM service providers, and share practices as RDM library services evolve and mature.

5. LIBER Advocating for Open Science

Libraries can play a vital role in enabling Open Science because they have the power to educate students and to implement services within the research organizations. LIBER has a unique position in the field as it is dedicated to research libraries and it is a European organization representing 428 member libraries that exemplify reliability and continuity (Figure 2).

LIBER advocates policies that are important to research libraries, identified by LIBER's engagement with members and outlined in the LIBER Strategy 2013–2017 (LIBER, 2015a). LIBER tries to make sure that policy shapers, stake-holders and the media know about the issues that matter to LIBER members and to put research libraries at the heart of the EU information chain. It is also important to provide LIBER members with arguments to mobilise and to help them in their training and awareness raising.

Fig. 2: LIBER's network includes 402 participants in 41 countries (figures as of end-2015). The map above shows the distribution of members across various European countries. The bulk of LIBER participants are based in Europe.
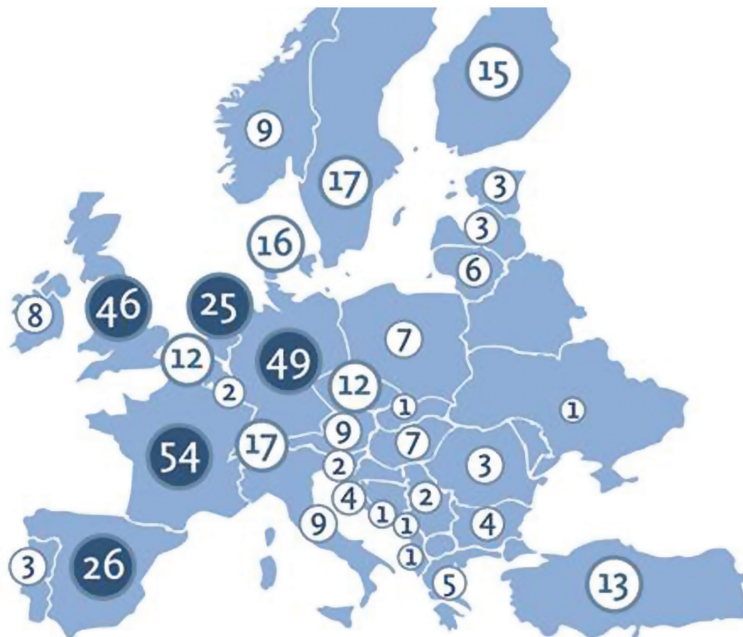
Via events, newsletters, social media and its website, LIBER continually works to advance the causes that matter to LIBER libraries. It publishes position statements, papers and factsheets on key issues. Conferences, seminars, meetings and workshops are the means to meet with politicians, decision makers and librarians to spread information and knowledge.

In recent years there has been a marked increase in European Commission activities that have an impact on research libraries. LIBER has regular contacts with the EC to ensure that the priorities of research libraries remain high on the agenda. A fundamental part of this work is keeping members informed of activities at the EC and those of LIBER and ensuring that matters that are important to libraries are promoted, making the most of the opportunities offered at EU and international level and feeding back information.

A good example of LIBER´s advocacy work is the launch of the Hague Declaration (LIBER, 2015b), which aims to improve Knowledge Creation in the Digital Age, in May 2015. At the moment 230 institutions and 520 individuals have signed the declaration.

6. Coordinated Open Science Training in Finland

The Open Science and Research Initiative (ATT) organizes open science training at the national level in Finland. The aim of the training is to support the academic community in complying with open access and to introduce services supporting open science and research. Its training initiative provides a series of seminars and workshops for sharing information and approaches regarding openness in science.

All the events are provided in collaboration with academic organizations, networks and researchers representing various academic disciplines who share their activities, such as policies, best practices and experiences, in the field of open science. The target group of the training is faculty of academic organizations, researchers and students. We aim to train ambassadors who will act as trainers in their own organizations and to find researchers who have utilized open science to act as role models for other researchers. Another focus is to help higher education institutes to include openness in their curriculum.

There is also collaboration with LIBER related to research data management training.

The training initiative also provides a web portal for sharing training materials produced for the training events and derived from other sources to support self-learning and development of training at organizational level. The web portal includes plenty of material provided by international organizations, networks and societies regarding open science policy and practices. These resources are essential for the fast and cost-effective development of open science. We are also planning to build an online course for doctoral schools in collaboration with universities. The feedback on the training has been very positive. The participants have expressed many wishes for future events and studies have named a number of emerging challenges for open science.

7. Conclusion

Open Science benefits from collaboration across nations, disciplines and roles. All stakeholders are invited to engage in extensive cooperation to implement the open way of doing research. The responsibilities and roles complement each other. Research libraries have a role in enabling open science to support increased transparency, better quality research, a higher level of citizen engagement, and accelerating the pace of scientific discovery through the facilitation of data-driven innovation. Libraries are key players in enabling open science. They can help build 'commons' ensuring the long-term availability of research results, foster new forms of publishing, enable new methods of knowledge discovery, and open up metadata. As well as the development of supporting infrastructure and services, libraries are key in supporting advocacy and metrics open science, and building partnerships. Open Science has a great potential for new discoveries and solutions to global problems.

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Notes

[1] According to a study conducted for the European Commission, open data projects are expected to generate 140 billion euros per annum (Vickery, 2011). The economic impact of open research data is not so straightforward. A recent study estimated that investments in availability services would generate an income 2–10 times as great as the amount invested (Beagrie & Houghton, 2014).

[2] A more detailed description of the research system can be read here: http://www.research.fi/en/tutkimusymp%C3%A4rist%C3%B6t.

[3] https://rd-alliance.org/about.html.