

Digital chances, digital challenges – the ESF efforts to improve the sharing of scientific knowledge in the post- Gutenberg era.

by Alexis-Michel Mugabushaka

The rapid advances in electronic data processing have brought sweeping changes to almost all aspects of daily life, which would have been hardly possible to foresee just a few decades ago. Arguably, in no other field has Information and Telecommunication Technology (ICT) so profoundly altered the daily business as the area which saw its birth and development: science and research. ICT has revolutionised knowledge production and dissemination and it is difficult to predict where the next horizons lie.

The impact of ICT on scientific research will necessarily be seen differently by researchers, librarians, publishers, science policy makers and research organisations, as each community will have its own perspective on how far reaching the changes are, how beneficial or risky the innovations can be and in which way related challenges can be addressed. From the perspective of research organisations, the digital revolution presents an array of opportunities to take advantage of but also a number of challenges to address.

In this article we present three initiatives of the European Science Foundation (ESF) with

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its Member Organisations and other partners to take advantages of the digital opportunities for improving knowledge sharing and for devising sound strategies to deal with the digital challenges. The initiatives presented here deal with various topics including open access to scientific publications, long term preservation of records and access to research data.

The European Science Foundation

The European Science Foundation (ESF) is a platform of 75 research organisations in 30 European countries. Its members are major research funding agencies, research performing organisations and learned societies who created ESF in 1975 to foster collaboration between researchers and between research organisations in Europe. ESF produces authoritative strategies and visions in all research fields, develops and manages funding schemes on behalf of its Member Organisations (MOs) and organises consultative processes to allow its MOs to develop common or compatible policies and procedures when dealing with issues of common concerns.

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1. Access to ‘conventional publications’

ICT offers unprecedented opportunities for disseminating research results. Major publications have switched to electronic publications and publishers have digitalised back issues of their journals making it possible to offer access to a worldwide readership at a fraction of the costs of reprinting. Scientists have profited from this development because it has decreased the time spent searching for publications and waiting for the delivery of reprints.

However, the potential benefits of reducing publication costs have not yet been fully exploited. Indeed, there is evidence that the soaring prices of journals have led major libraries to cancel journal publications, at a time when digitalisation paradoxically offers possibilities to lower the costs associated with the production and dissemination of research journals. The open access movement calls for new means to take advantage of ICT to ensure access to publications.

There are two complementary approaches for realising this goal:

- (1) **Open Access self-archiving – also called the “green road”** – which calls for authors to provide access to their own papers published elsewhere by making them freely available in accessible repositories.
- (2) **Open Access journal publishing – also called the “golden road”**. In this approach, journals provide free access to their articles.

One of the earlier initiatives in the “green road” was taken by the Open Archives Initiative which develops and promotes interoperability standards to enhance the use of institutional repositories to disseminate scientific publications. In 2001 the “Open Archives Initiative Protocol for Metadata Harvesting” was

published and became the de-facto standard for interoperability of open repositories.

To encourage the use of institutional repositories for scientific publications in Europe, ESF supported a series of workshops which were organised at CERN (Conseil Européen pour la Recherche Nucléaire). The first workshop of the series took place in March 2001 and was jointly organised by the Ligues des Bibliothèques Europeennes de Recherche (League of European Research Libraries), in partnership with CERN, SPARC (Scholarly Publishing and Academic Resources Coalition), the Joint Information Systems Committee (JISC) and the Open Society Institute (OSI).

The workshop “Open Archives Initiative and Peer Review Journals in Europe” discussed innovative ways of combining open access repositories and rigorous peer review to achieve the double goal of easy access to high quality publications¹. This workshop gave an additional momentum to the then emerging open access movement and fuelled the debates on accessibility of research results coming from publicly funded research efforts. In the following December, a meeting of the Open Society Institute in Budapest issued its now famous Open Access Initiative which set down the principles and strategies, around which today’s open access ideas are based upon.

While the “green road” remains an important element in promoting open access, recent efforts of European research organisations focus increasingly on mechanisms to promote open access to research results published in ‘conventional journals’ (“golden road”). Most research-funding organisations and research-performing organisations encourage scientists they fund or employ to publish in open access journals. Another line of action has been to provide publication funding to allow the researchers to publish in journals, which then make their articles freely accessible (so called hybrid journals which offer free access to se-

lected articles when the authors or their institutions pay an agreed upon fee).

The current practice of research organisations negotiating separate deals with publishers is being criticised as it fails to solve the problem of open access and places smaller research-funding organisations in weaker positions. It has been suggested that a concerted approach among research organisations is needed to develop a coherent strategy and jointly negotiate with publishers². The on-going discussions between major European research organisations will define the role the ESF can play in coordinating the positions of its Member Organisations.

2. Long term preservation of data

The digital revolution has enabled the analysis of current research data, together with their easy storage and retrieval from rapidly growing data collections. However, the digitalisation of research data also makes them vulnerable to loss. Storage devices physically deteriorate and they quickly become obsolete as the data formats change or new technologies emerge.

While at the national level, a number of initiatives and programmes exist to deal with data curation and long term preservation, a conference organised in 2004 by the National Library of the Netherlands during the EU Dutch presidency, strongly urged key stakeholders to join efforts at the European level to tackle these challenges and to agree on a technical, legal and economic framework to ensure the long term preservation of data. ESF together with other European Organisations actively participated in a Task Force convened to draft a strategic vision to achieve this aim. The Task Force recommended the establishment of an "Alliance for Permanent Access to the Digital Records of Science". The preparatory work is coming to an end and the

Alliance, which will be formally launched in November 2007, will establish a wide consensus on framework for long term preservation and access to science records in Europe. It will work closely with the European Commission, national governments and a gradually growing number of research organisations and communities on common challenges for permanent access.

The founding members include the National Library of the Netherlands (KB), British Library (BL), the International Association of Scientific, Technical, Medical and Scholarly publishers (STM), the Joint Information Systems Committee (JISC), le groupe Pérennisation des Informations Numériques (PIN), the Digital Preservation Coalition (DPC), Network of Expertise in Long-Term Storage of Digital Resources (NESTOR), Science and Technology Facilities Council (STFC), the National Archives of Sweden and the European Science Foundation (ESF).

3. Sharing Raw Data

Scientific inquiries and discoveries depend very much on efforts and achievements made by other researchers from other regions or previous generations. In this context, open and free information has been and continues to be the cornerstone on which scientific progress rests. The digitalisation of research data make it easier for researchers working on related topics to exchange data and to engage in collaborative efforts based on common datasets or shared analytical capacities. The exchange and accessibility to raw data helps prevent unnecessary data collection thus ensuring the efficient use of resources. It also allows for the reanalysis of previous results or the studying of phenomena which go beyond the scope of the initial goal.

It is against this background that international efforts are being undertaken to facilitate easy access to digital research data.

- the OECD has developed a set of principles and guidelines for access to research data and issued recommendations to its member states³.
- The Committee on Data for Science and Technology (CODATA) together with the International Council for Science (ICSU) launched the “Global Information Commons for Science Initiative”, whose aims include the facilitation of the reuse of publicly-funded research data and its sharing among researchers⁴.

Two elements are critical for bringing the principles and guidelines for access to research data to fruition: sustainable data infrastructures and sound policies regulating deposit, availability and long term access to the research data.

The European Science Foundation (ESF) with the Deutsche Forschungsgemeinschaft (DFG) have initiated a consultation process among key research funding agencies in Europe to discuss their policies and practices of access to research data.

The first step in this process is a workshop which will take place in the framework of the 5th Berlin Open Access conference in September 2007. It will enable research funding agencies to become acquainted with the practices and policies of open access in their partner organisations and it is expected that the workshop will help identify areas in which research funding agencies could and should fruitfully collaborate to facilitate access to research data.

Concluding remarks

ICT has brought sweeping and profound

changes to the ways science and research is performed and communicated, which are tantamount to a digital revolution. Its impact can arguably be compared to the beginning of the Gutenberg era. Research organisations, be they research-funding agencies or research-performing organisations, have helped shape these changes and have benefited from them while at the same time, acknowledging the challenges inherently associated with this digital revolution.

The European Science Foundation supported early efforts to raise awareness on the benefit of open access and establish a consensus on how to take full advantage of ICT advances to improve access to research publications. As an umbrella organisation of major European research-funding agencies and research-performing organisations, ESF provides a platform to develop sound policies to address the challenges of long term preservation and sharing of data. As new technologies emerge, new issues and priorities shift, ESF will continue to be instrumental in helping shape coherent research policies by taking new digital chances and facing new digital challenges.

The views expressed are those of the author and do not necessarily reflect the views of the ESF

Notes

¹ The results were published as an ESF Policy Briefing. “Open Access: Restoring scientific communication to its rightful owners” (ESF Policy Briefing Nr. 21, april 2003).

² Cf. Dieter Imboden, Publishers divide and rule on open access, Research Research, March 29, 2007

³ <http://www.oecd.org/dataoecd/9/61/38500813.pdf>

⁴ <http://www.codata.org/>