Development of Open Research Policies

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Development of Open Research Policies

Pre-1993:

- Pre-digital networks.
- Little digital infrastructure.
- Data-poor.
- Data used mostly in support of journal articles.
- No institutions, except some governmental data repositories.
- But, OSS and the beginning of the digital revolution with laptops and email service.

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A comparison of some key characteristics of the print dissemination and digitally networked paradigms:

PRINT	GLOBAL DIGITAL NETWORKS
(pre) Industrial Age	post-industrial Information Age
fixed, static	transformative, interactive
rigid	flexible, extensible
physical	"virtual"
local	global
linear	non-linear, asynchronous
limited content and types	unlimited contents and multimedia
distribution difficult, slow	easy and immediate dissemination
copying cumbersome, not perfect	copying simple and identical
significant marginal distribution cost	nearzero marginal distribution cost
single user (or small group)	multiple, concurrent users
centralized production	distributed production
slow knowledge diffusion	accelerated knowledge diffusion

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1993–2002:

- Development of internet and web. Information Age begins.
- Little digital infrastructure, especially for research data.
- Scientists among first adopters of digital networks/research.
- Beginning of open journal publishing, but few open data. practices or policies—just a few discipline leads (open software exception).
- Institutions not developed and major research stakeholders—the funders, universities, publishers, data repositories/libraries, and researchers themselves—not involved.
- Big disconnect everywhere between ICT and research communities. NASA EOS example.

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2003-2012:

- Internet/web in broad use by scientists and disciplines, especially in OECD countries.
- Digital infrastructure getting more attention and development
- Research data and data science developed as a "4th paradigm"
- Differentiation by disciplines, with greater uptake by some.
- Open journal publishing goes from a few hundred to over 10,000; rise of open research data repositories.
- Development of common-use licensing.
- Many open data policies and statements being generated in countries, disciplines, institutions.
- More stakeholders involved in different sectors/regions, including governments.

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2013 – :

- Digital networks and research infrastructure much more ubiquitous; digital research tools increasingly capable.
- New forms of science/engineering entering mainstream: data science, big data, artificial intelligence, machine learning.
- Much more uptake, even by historically not data-intensive or data sharing types of research.
- Development of open data policies is more mainstream, as open access journal publishing is not controversial anymore.
- Common-use licensing in greater use, more accepted/known.
- Institutions for open research data more widespread, especially data repositories and rise of data publishing.
- Stakeholders more involved, especially governments.

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Stakeholders in the formation of open access policies:

Top-down law and policy development (public law and policy)

- Government(s) and research funding agencies
- Intergovernmental (scientific) organizations

Bottom-up law/policy development (private law) by institutions

- Universities and not-for-profit research institutes
- Industry research institutions
- Informatics organizations/institutions (libraries, data centers, archives)
- Learned societies and other NGOs (umbrella research community organizations), media

Bottom-up policy development (private law) by individuals

- Individual researchers and legal scholars
- General public

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Main players involved and policy instruments

Bottom-up researcher statements and expert analysis:

- Bermuda Principles (genomic data, 1996)
- Bethesda, Budapest, and Berlin Declarations (2002-2003)
- Salvador (2005)
- Many since

- Influential reports an articles by experts

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Main players involved and policy instruments

Bottom-up institutional policy statements and practices:

- UK Royal Society (Science As An Open Enterprise, 2012)
- Science International (Accord on Open in a Big Data World, 2015)

- 10s thousands of open source software
- > 10,500 Open Access Journals (doaj.org)
- > 4,000 OA repositories (opendoar.org)
- 887 OA repository mandates and policies (roarmap.eprints.org)
- Open university curricula (MIT OpenCourseWare, Khan University)

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Main players involved and policy instruments

Top-down policies:

- Intergovernmental organizations—World Summit on the Information Society (2005), G8 (OA Journals, 2013) Global Research Council (Open Data and Literature, 2013), UNESCO (OA , World Bank (Open Data 2013), OECD (2006 recommendations on research data from public funding, open science and institutions reports since)

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Additional works on this topic (all available freely online):

- *Bits of Power: Issues in Global Access to Scientific Data* (NAS, 1997)
- *The Role of S&T Data and Information in the Public Domain* (NAS, 2003)
- Reichman, J.H. and Paul F. Uhlir, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment,* 66 Law & Contemporary Problems 315-462 (2003)
- *UNESCO Policy Guidelines for the Development and Promotion of Governmental Public Domain Information* (2004)
- *Open Access and the Public Domain in Digital Data and Information for Science* (NAS, 2004)
- *Strategies for Open Access to and Preservation of Scientific Data in China* (NAS, 2006)
- Uhlir & Schröder, *Open Data for Global Science,* Data Science Journal, CODATA, (2007).
- Bailey-Mathae and Uhlir , eds., *The Case for International Sharing of Scientific Data: A Focus on Developing Countries* (NAS, 2011).
- Reichman, J.H., Paul F. Uhlir &Tom Dedeurwaerdere, *Governing Digitally Integrated Materials, Data, and Literature: Global IP Strategies for a Redesigned Microbial Research Commons:* (Cambridge University Press, 2016).