



OPEN SCIENCE: THE POLICY CHALLENGES

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Outline

- **Defining Open Science**
- **Rationales and impacts of Open Science**
- **The Open Science eco-system**
- **Open data**
- **Policy challenges and opportunities**



OECD report on Open Science (2015)



...and Country Notes on the OECD/WB Innovation Policy Platform

Open science country notes

The country notes present up-to-date information on the key actors in open science, and review recent policy trends in the areas of open access, research data, infrastructure, and skills at the national and international levels. These notes thus constitute a mapping of recent policy efforts to promote open science in OECD member and selected non-member countries. The information was gathered using a common template in the course of 2014, and is current as of Summer 2015.

Belgium	Finland	Japan	Portugal
Canada	France	Korea	Spain
Chile	Germany	Mexico	Turkey
China	Greece	Netherlands	United Kingdom
Estonia	India	Norway	United States
European Commission	Italy	Poland	



Defining Open science

Open science includes:

- Open access to scientific publications
 - Open and “intelligent” access to research data (and materials)
 - Open access to digital applications and source code
 - Open access for scientists, the public and commercial companies
- **re-asserting science as a global public good**

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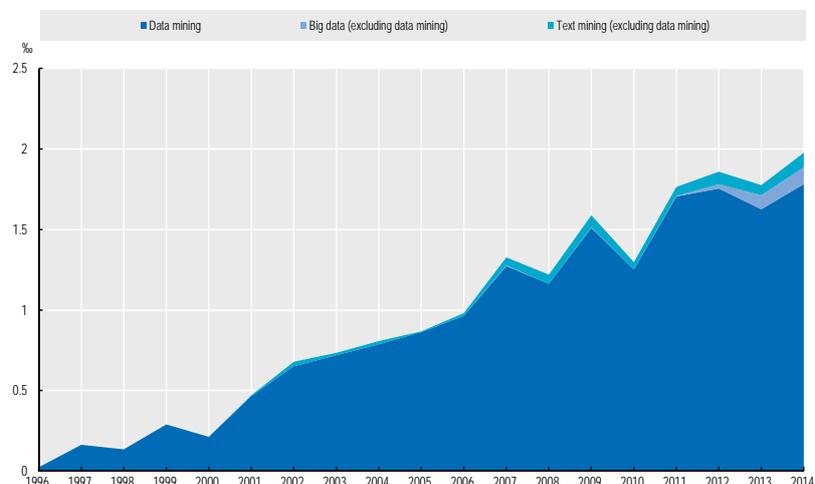


“A new scientific paradigm”

- Science is becoming increasingly data-driven

TDM-related scientific articles 1995-2014, per thousand article

Source: OECD (2014), *Measuring the Digital Economy: A New Perspective*, OECD Publishing, Paris.



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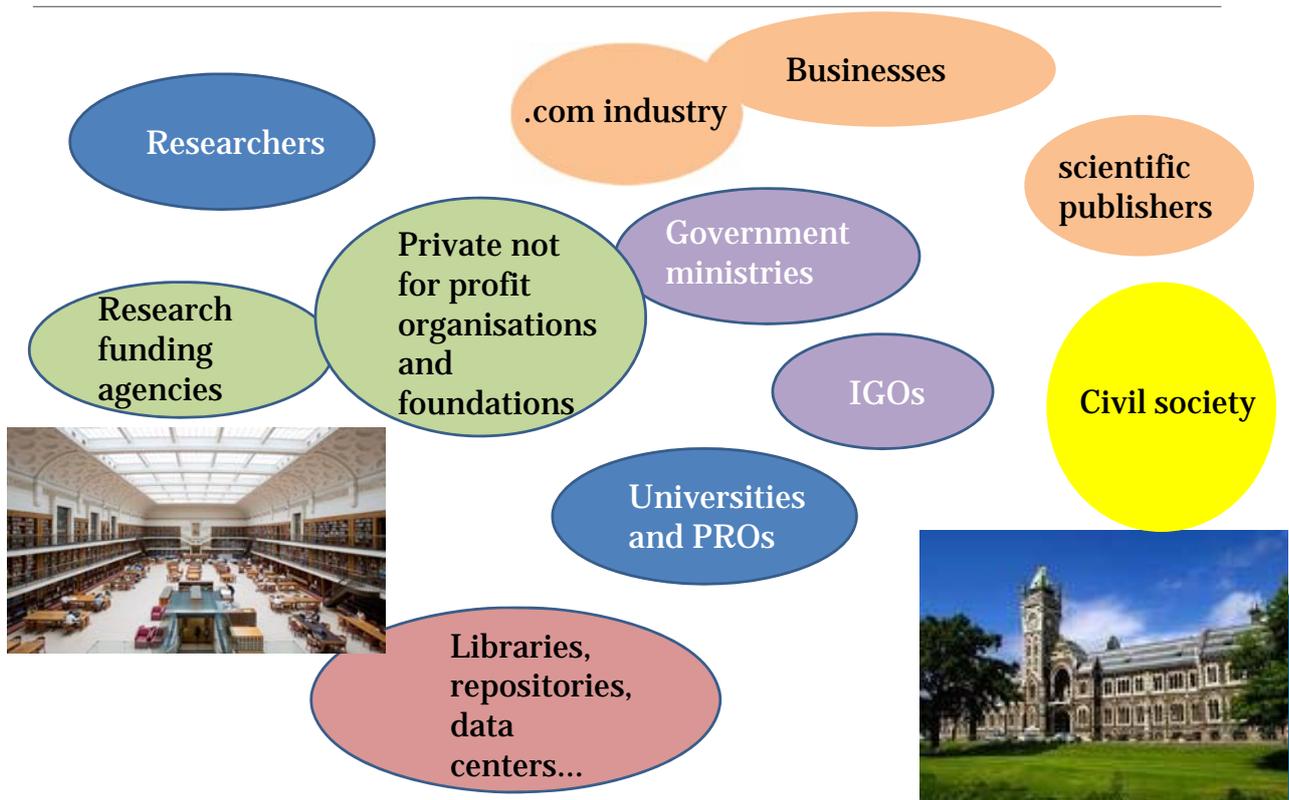
Open science: the (unrealized) potential

- ‘Big data’ and ICTs open up **new scientific opportunities**
- Enable **collaboration** across disciplines
- Increase **efficiency, transparency** and **reproducibility**
- Address **global challenges** more effectively
- Increase **knowledge spill-overs** for science, innovation and society
- Promote **citizen engagement** in science

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The open science ecosystem: a complex picture





OA journals and Knowledge spill-overs

Within Science

- Access to science journals is an obstacle for researchers in many countries and institutions
- Some evidence of an open access publication citation advantage

For firms

- UK SMEs cannot easily access scientific articles (Ware, 2009)
- 48% of Danish SMEs consider research outcomes very important for their business activities and more than 2/3 reported difficulties in accessing research material (Houghton, Swan and Brown 2011)

For the public

- 25% of the daily unique users for Pub Med Central are from universities, 17% from companies, 40% are individual citizens (UNESCO 2012)



Open science needs to be more fully understood

- Open science a relatively new phenomenon (at least for policy makers) with multiple stakeholders
- Different behaviours in different fields – what are realistic limits to openness?
- Scientists tends to like open science in surveys (what about in reality?)
- Many estimates of the economic impact of data sharing but mostly on open government data
- The real socio-economic and scientific impact of open access to research data less well established



Open Data is the real challenge

- Ownership & IPRs issues around data, e.g. much 'Big Data' is owned by commercial companies.
- Huge diversity of datasets and v. limited interoperability.
- Ensuring data integrity – traceability and quality
- Timing: when is a dataset complete and ready to be released?
- Confidentiality and security issues
- Ethical issues, re personal data access and use
- Lack of incentives in the academic community
- Expanding infrastructure requirements
- Training and skills for data management and analysis
- Sustainable funding and business models

➤ **Need technical solutions + policy action**

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Lowering the barriers to data sharing

- Need to build **trust** at multiple levels
 - Lessen the **burden**, re. user friendly infrastructure, data services & skills
 - Motivation/**credit** and reward
 - **Governance** and brokering for access to sensitive data
- **A major cultural shift for many parts of the science community**

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Science Ministerial, Daejeon, Oct, 2015

1. Open Science needs leadership and political will
2. Build shared understanding of basic concepts
3. Recognise and stress benefits for society, e.g. education
4. Develop roadmaps for open access to publications
5. Open and FAIRR (findable, accessible, interoperable, reusable and recognition) data is the main challenge
6. No one size fits all, re. disciplinary data
7. Build workforce and skills for data analytics
8. Need exchange of good practices and policies, e.g. on data management plans
9. Invite OECD to help with policy agenda develop Principles and Guidelines



The next steps

- Mandate from Ministers for OECD to further explore the policy implications of “digitalisation of science”
- Ongoing GSF work on ethics of the use of new forms of data for social sciences
- New GSF/CODATA project on Business Models for Data Repositories
- New GSF/WDS project on International co-ordination of Cyber-infrastructure
- Develop new indicators to monitor Open Science behaviours and impact
- Explore the need to update or revise the 2007 OECD Principles on access to data from public funding
- ? A global policy forum for Open Science

➤ **Different actors need to work together**





Thank You