OPEN SCIENCE: THE POLICY CHALLENGES

Dominique Guellec
(with Giulia Ajmone-Marsan & Carthage Smith)

Science and Technology Policy Division, DSTI
OECD

BETTER POLICIES FOR BETTER LIVES

Defining Open science

Open science reflects changes in the science machine in relation with digitalisation. OS has three pillars:

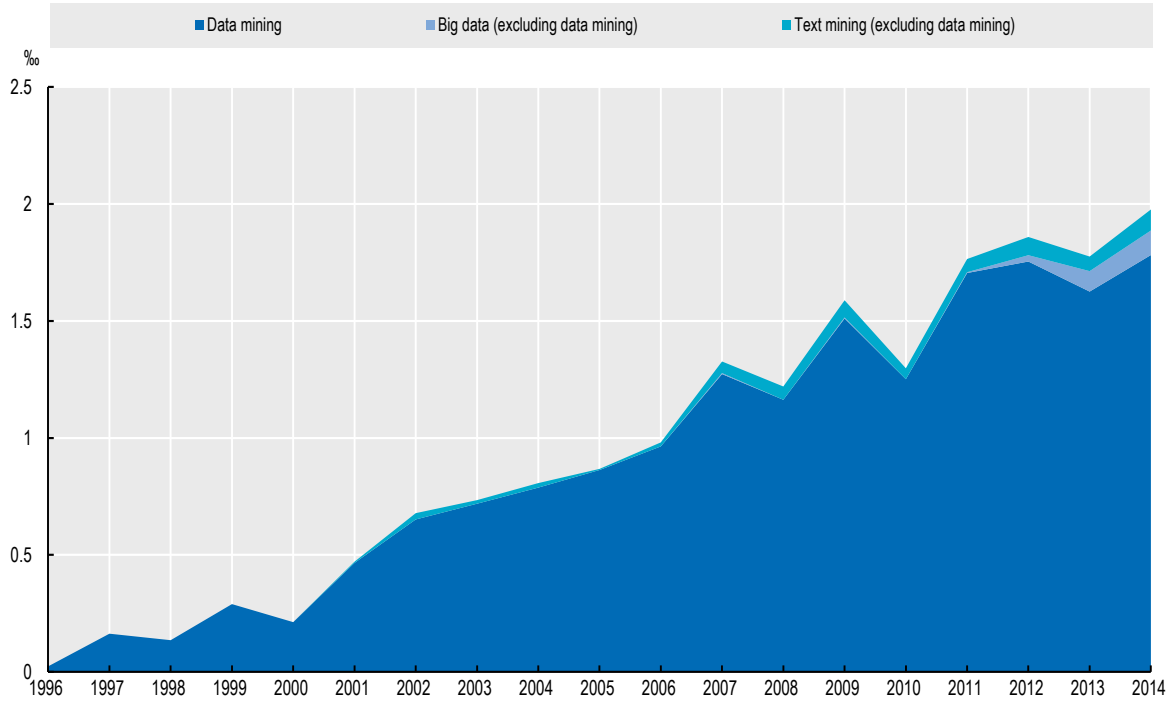
- Open access to scientific publications
- Open and “intelligent” access to research data (incl. materials, source code etc.)
- Communication & collaboration: among scientists, with industry, with the public

A new scientific paradigm

Science is becoming increasingly data-driven

TDM (Text & Data Mining)-related scientific articles
1995-2014, per thousand article

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



Open Science: New Opportunities

- '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 and innovation for the economy and society
- Promote citizen engagement in science

The Actors of the Open Science Ecosystem

Researchers

.com industry

Businesses

scientific publishers

Private not for profit organisations and foundations

Government ministries

Research funding agencies

IGOs

Citizens - Civil society

Universities and PROs

Libraries, repositories, data centers...

The First Pillar: Access to Publications

Within Science

- Access to science journals is faced with obstacles 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 Data is a Challenge

- **Ownership & IPRs** issues around data, e.g. much 'Big Data' is owned by businesses.
- **Incentives** for scientists (openness vs. competition)
- Huge diversity of datasets and v. limited **interoperability**.
- Ensuring **data integrity** – traceability and quality
- **Confidentiality** and security issues
- **Ethical** issues, re personal data access and use
- Expanding **infrastructure** requirements
- Training and **skills** for data management and analysis
- Sustainable **funding** and business models

➢ Need technical solutions + policy action

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

OECD 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, re-useable 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 Third Pillar: Engaging with Industry and Society

Digital tools offer new ways for scientists & policy makers to engage with other actors:

- With businesses: Open innovation (cementing ecosystems)
- Citizen science (non professionals contributing to scientific research)
- Engaging with the public to discuss the scientific agenda (societal challenges etc.)

Towards Science Platforms

Huge benefits to be expected from the interconnection of all components of the science activity: publications, scientific data, scientific tools, researchers data, funding agencies data (e.g. research projects) etc.

Issues:

⇒Interoperability

⇒Technical standards

⇒Access, funding & control

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	

For more information

www. innovationpolicyplatform.org

Thank You