



**USING SCIENCE DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES**



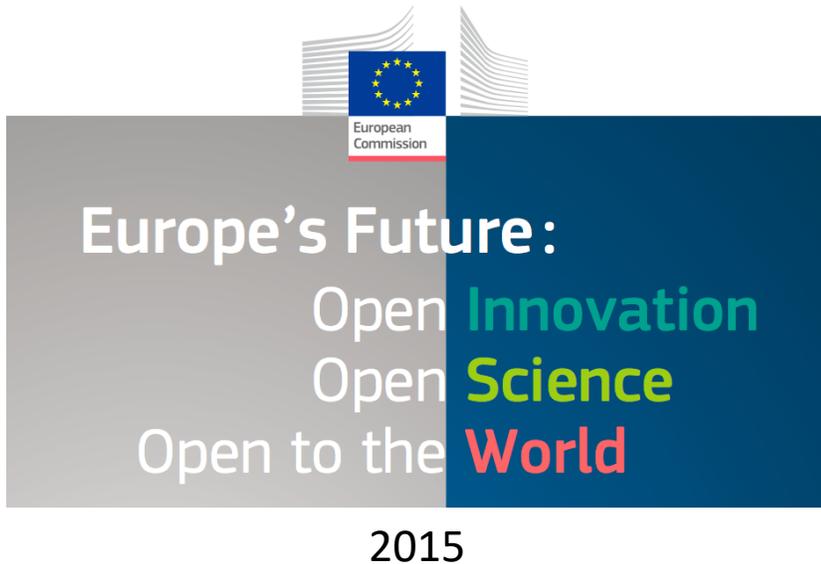
USING SCIENCE DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

Open Science Diplomacy

Dr. Katja Mayer
November 2019



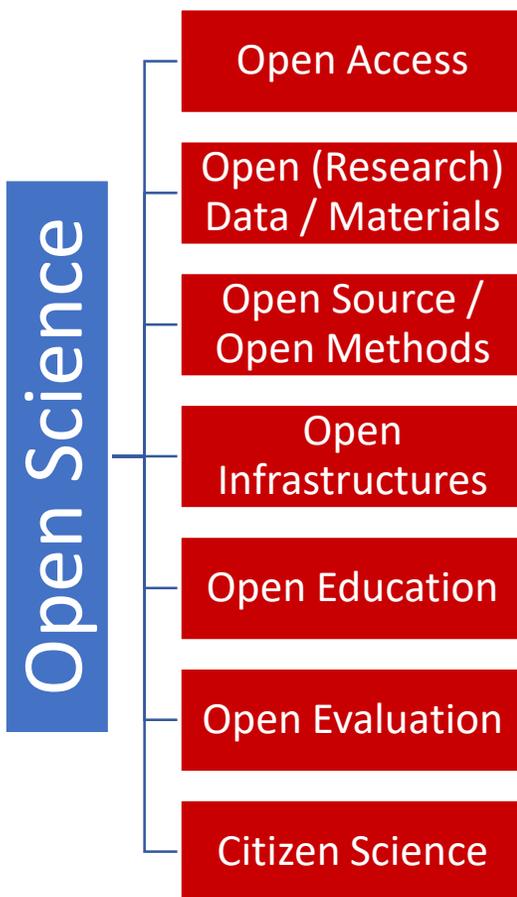
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770342.



What is Open Science?

Shifting from the standard practices of publishing research results in scientific publications towards sharing and using all available knowledge at an earlier stage in the research process





What is Open Science?

Open science is the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the research process.

Open strategies in science share the following objectives

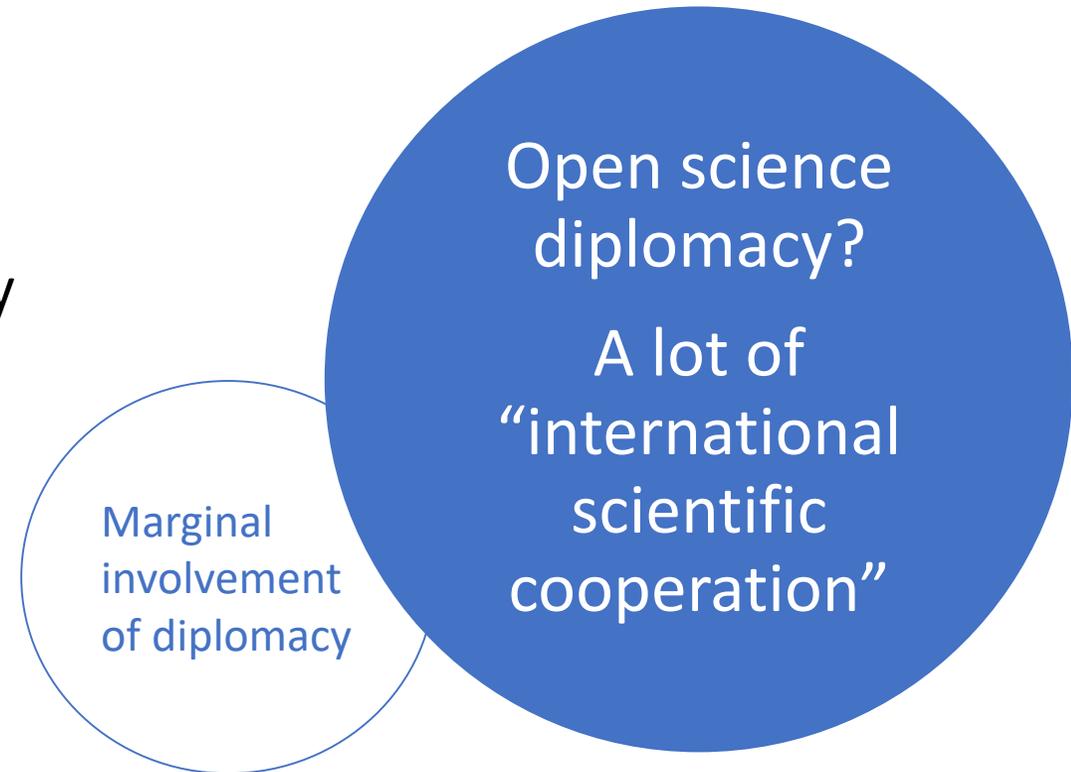
- sharing and collaboration
- transparency and reproducibility
- re-usability and new applications
- societal participation and feedback loops



Results of the Case Study 2018-2019:

The international open science community is organizing itself mainly bottom-up, only recently there is more policy involvement, such as Plan S or the European Open Science Cloud, or several national open access strategies.

Professional diplomacy is rarely involved.



Open science
diplomacy?

A lot of
“international
scientific
cooperation”

Marginal
involvement
of diplomacy



OPEN SCIENCE DIPLOMACY – Results of the Case Study

- Even though taken up increasingly by international organisations at the interface of science and global health: open science and in particular, open data are not yet on the agenda of diplomacy.
- Advocates would welcome the involvement of foreign policy experts and diplomats in negotiations of – and push for pressing issues like the harmonisation of standards and legal frameworks for the exchange of data (data diplomacy).
- Opportunities for innovation (social, ecological, economic, technological,) based on open science and data sharing are still neglected by international policy actors.



Open scholarship as strategy, but not as goal

- Goals are equity, inclusivity, a better science that leaves no one behind.
- Open Science is a key enabling strategy, to create culture change on the ground.
- Openness is not only about access and re-use; it has a great anti-discriminatory and power-challenging potential to realise a sociotechnical environment that enables a more equitable knowledge exchange.
- Openness also has the power to mobilise engagement for sustainable development and collaboration.



What is Open Science?

- Methods and tools for opening the research cycle
- Scientific / epistemic culture
- International bottom-up movement (since 30 years active, open source since 1970s) – part of open cultures
- Set of policies / set of principles

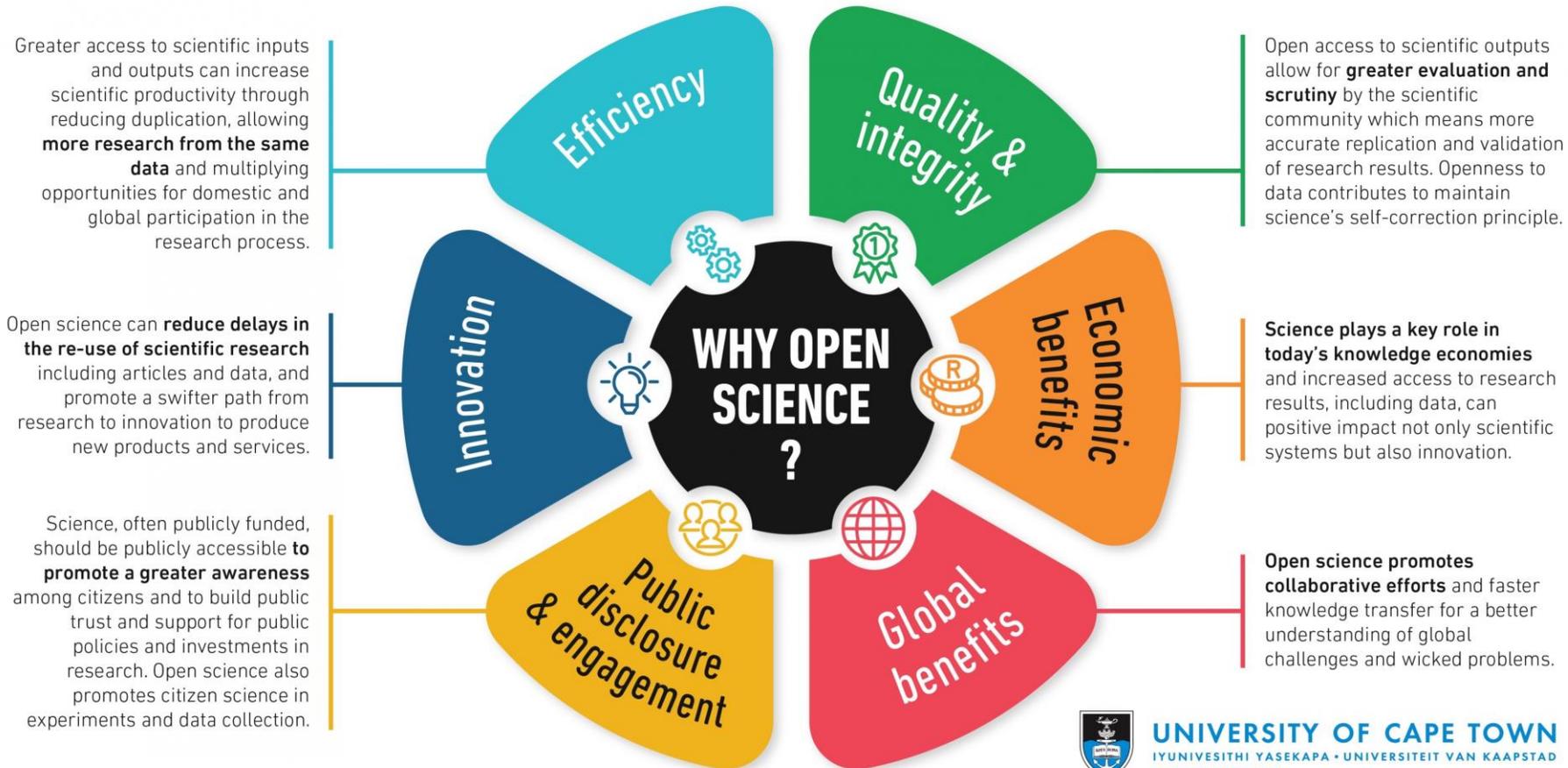




Open Science is tackling the following issues of the science system on a global scale

- Reproducibility / replication crisis
- High competition (embargos, positivity bias → unproductivity)
- Massification and high degree of specialization / fragmentation, despite globalization
- Inter- and transdisciplinarity
- Monopolised and expensive publication markets and biased indicators for evaluation
- Privatization of infrastructures and problems of knowledge ownership / knowledge access
- Knowledge transfer: neglect of importance of knowledge commons for global innovation systems and sustainability outside of specialist communities
- Brain drain

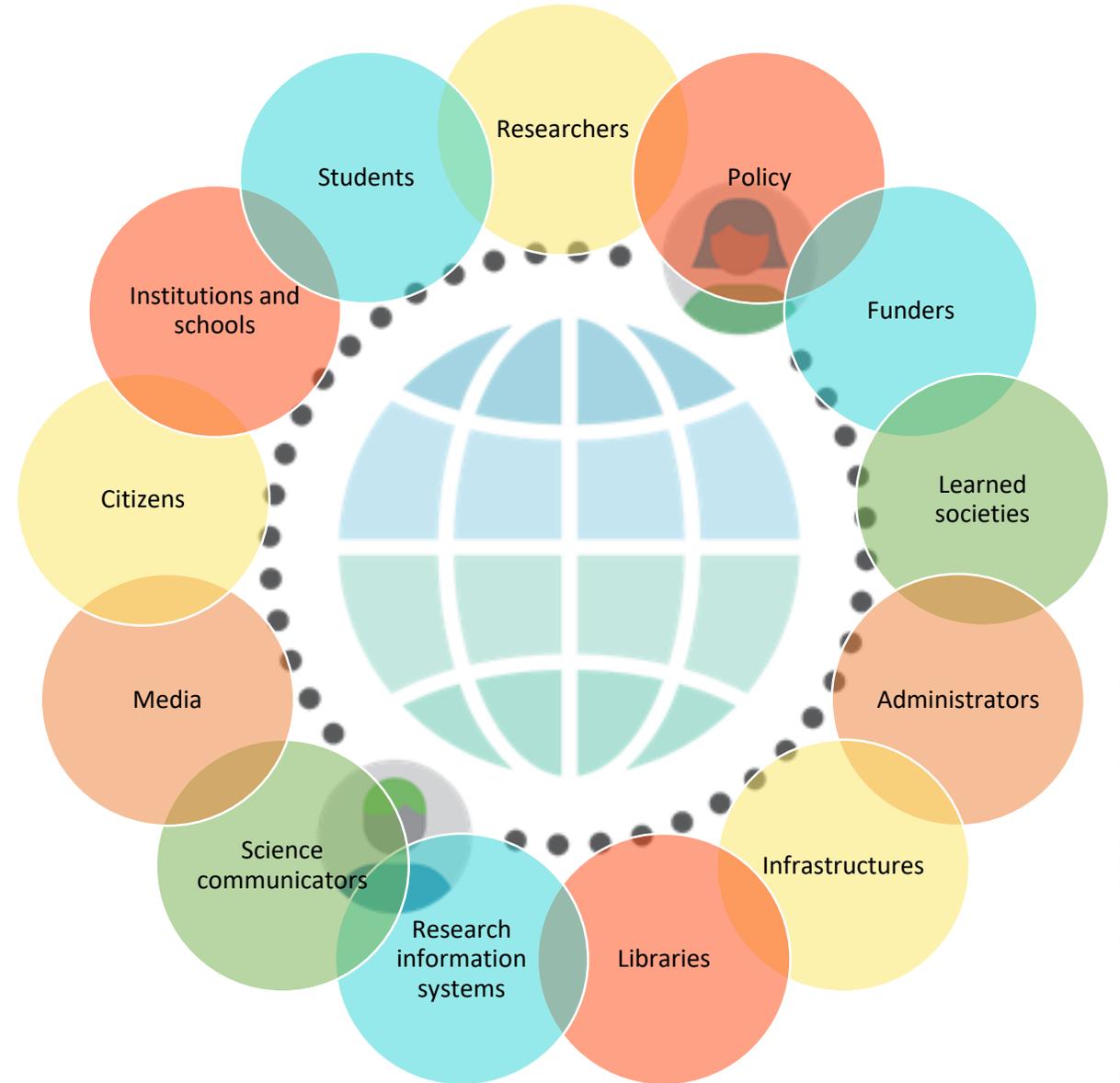






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OPEN SCIENCE TRANSITION STAKEHOLDERS



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OPEN ACCESS

- OA is a broad international **movement** advocating **unlimited access to results of publicly funded research**.
- OA means free and open online access to research information, such as publications and data. When anyone can read, download, copy, distribute, print, search for and search within the information, or use for education or another way within the legal agreements, the publication is called 'open access', as there are no financial, legal or technical barriers.
- OA is a **new business model** for academic publishing that makes research information available **to readers at no cost**. It contrasts with the subscription model, in which readers have access to scholarly information, usually via a library, by paying a subscription.
- OA increases the visibility, uptake and (re)use of research results.





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KNOWLEDGE MARKETS - PRICE OF ACCESS

The amount paid in Europe for accessing scholarly publications is impressive: more than **one billion euros per year** for all types of resources (journals, e-books and publication databases), and more than **720 million euros for periodicals alone.**

The second EUA Big Deals Survey Report contains inputs from 31 negotiating consortia, providing unique and important figures from Europe. It informs the debate within the scientific community, as well as among laboratory heads, rectors and policy makers.



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Opening the markets of scholarly knowledge

A transition to Open Access requires

- A big change in scientific culture
- Robust and sustainable open infrastructures
- Incentives and rewards
- New diversified and inclusive evaluation systems
- Elaborated monitoring systems and access to national and international research information
- Legal frameworks to support text and data mining and reuse of publicly funded knowledge
- Backing by policy makers and funders on global scale

<https://paywallthemovie.com/>



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- **Research+dissemination: mainly government-funded + int. cooperation**

- **Scholarly publishing not outsourced to commercial publishers**

- **Scholarly-led OA publishing with no APC/BPC**

20 countries
 Population: 626.721.000
 Language.: Spanish/Portuguese
Map source: Wikipedia
 Scientific output (main countries):
 Brazil, México, Argentina,
 Colombia, Chile

Learning from Open Science Champions

from individual journals to regional portals for transition to Open Access



Scientific Electronic Library Online

- Started 1997
- Today **1.249 journals** (Iberoamerican countries)
- 573.525 articles
- Bibliometric indicators
- Scielo Citation Index WoS



- Started 2003
- Today **1137 journals** (Iberoamerican countries)
- 481.962 full-text articles
- Indicators of scientific output (institutions, countries, subjects)

Improved **quality, visibility, open access and impact** of scholarly journals
 Development of **Open Access indicators**
 Collaborative **research on Open Access** outreach and impact in Latin America

Regional journals harvester: **Portal de Portales Latindex www.latindex.ppl.unam.mx/**



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Plan S is an initiative for open access publishing that was launched in September 2018 by a consortium of major national research agencies and funders from twelve European countries and with support of international funders, such as the Gates Foundation and Wellcome Trust.

Plan S requires that, from 2021, scientific publications that result from research funded by public grants must be published in compliant open access journals or platforms.



cOAlition S
Making full
and immediate
Open Access
a reality

A DECLARATION OF COMMITMENT
BY PUBLIC RESEARCH FUNDERS



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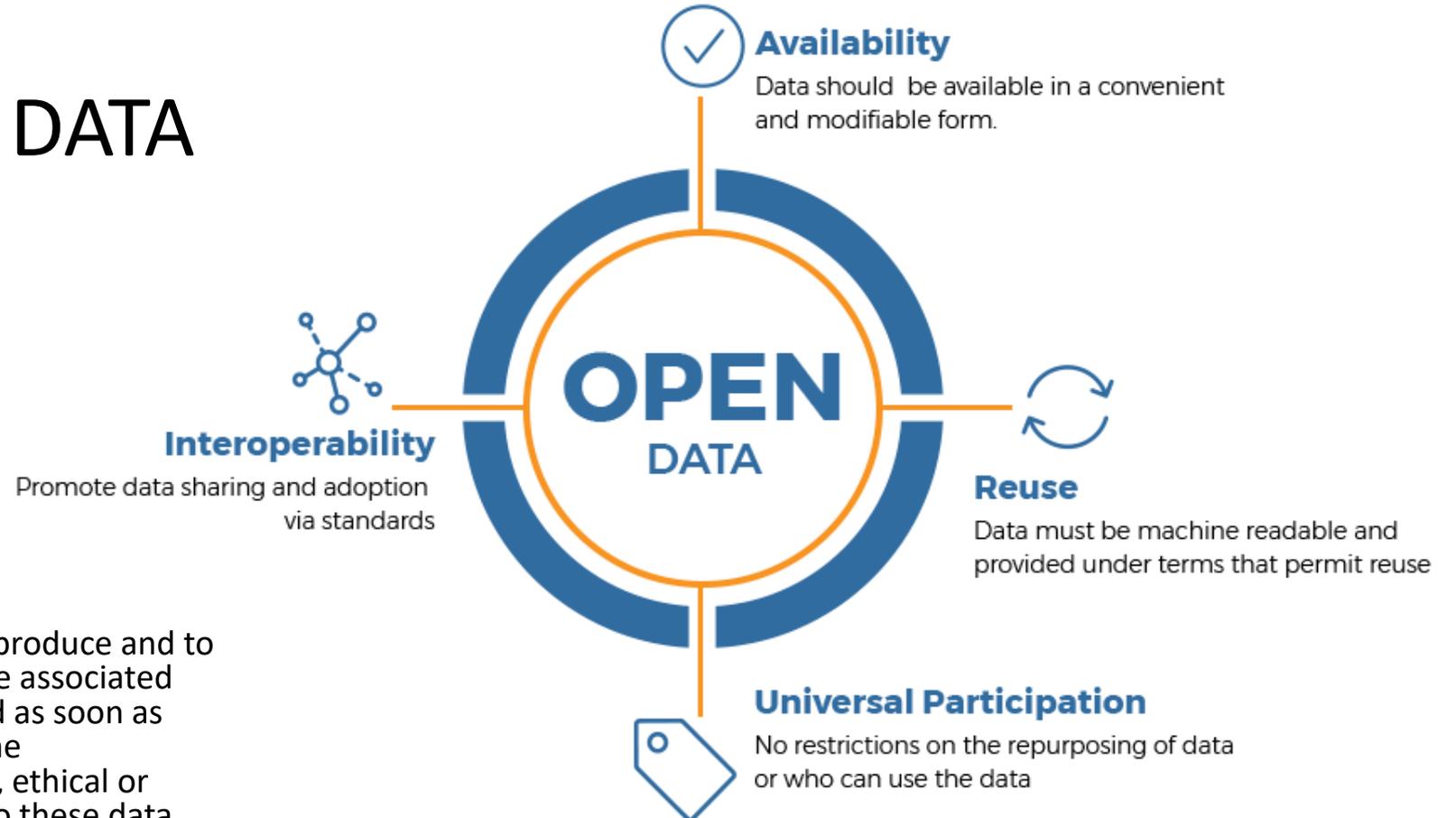
<https://www.coalition-s.org/>

OPEN RESEARCH DATA

is data that can be

- freely accessed,
- reused,
- remixed and
- redistributed

Research data are all data necessary to reproduce and to verify the results of research, including the associated metadata. These data should be published as soon as possible, but at the latest together with the corresponding research publication. Legal, ethical or other reasons, that prevent open access to these data should be explained.





European Commission Expert Group,
Turning FAIR into Reality (2018)

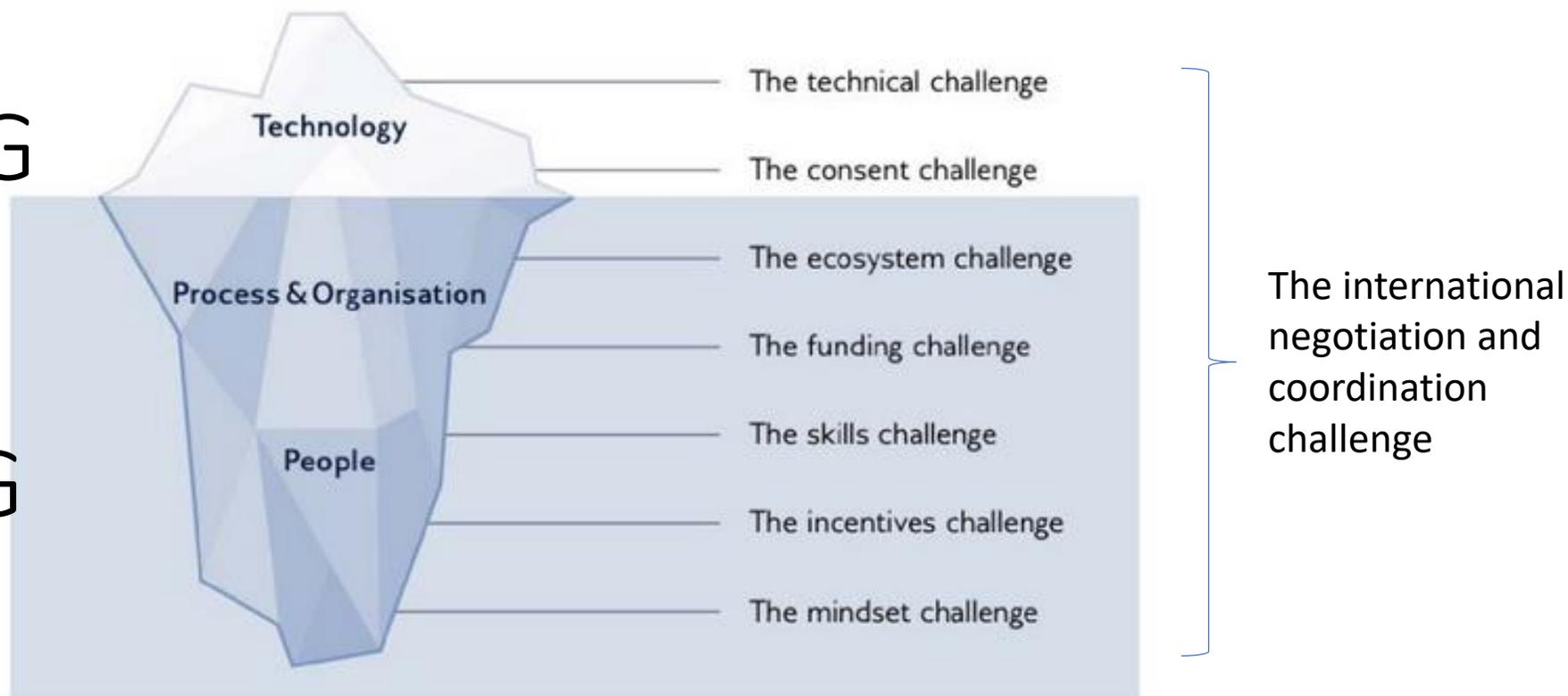
FAIR DATA

- **F**indable: have sufficiently rich metadata and a unique and persistent identifier, to enable discovery.
- **A**ccessible: retrievable by humans and machines through a standard protocol; authentication and authorisation where necessary. Allows programmatic access for analysis.
- **I**nteroperable: metadata use a ‘formal, accessible, shared, and broadly applicable language for knowledge representation’. The descriptions of variables etc follow a shared specification and are commensurable.
- **R**eusable: metadata provide rich and accurate information; clear usage license; detailed provenance. Both humans and their analytical tools know what can be done with the data (license) and can assess its provenance.



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OPENING DATA FOR SHARING



Source: Deetjen U., E.T. Meyer and R. Schroeder (2015), *Big Data for Advancing Dementia Research*, OECD Publishing, Paris, forthcoming.



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OPEN DATA – GLOBAL INITIATIVES

- Bits of Power: Issues in Global Access to Scientific Data 1997
- The three Bs (Budapest, Berlin and Bethesda) and Open Access, 2002-2003
- OECD Principles and Guidelines on Access to Research Data, 2004, 2007
- UK Funder Data Policies, from 2001, but accelerates from 2009
- NSF Data Management Plan Requirements, 2010
- Royal Society Report ‘Science as an Open Enterprise’, 2012
- OSTP Memo ‘Increasing Access to the Results of Federally Funded Scientific Research’, Feb 2013
- G8 Science Ministers Statement, June 2013
- G8 Open Data Charter and Technical Appendix, June 2013
- EC H2020 Open Data Policy Pilot, 2014; Adoption of FAIR Data Principles, 2017
- Science International Accord on Open Data in a Big Data World, Dec 2015
- China State Council Law on Management of Research Data, March 2018
- Open, Public, Electronic and Necessary (OPEN) Government Data Act USA 2019
- EU Directive on Open Data and Public Sector Information 2019
- UN Conference Towards Global Open Science: Core Enabler of the UN 2030 Agenda 2019

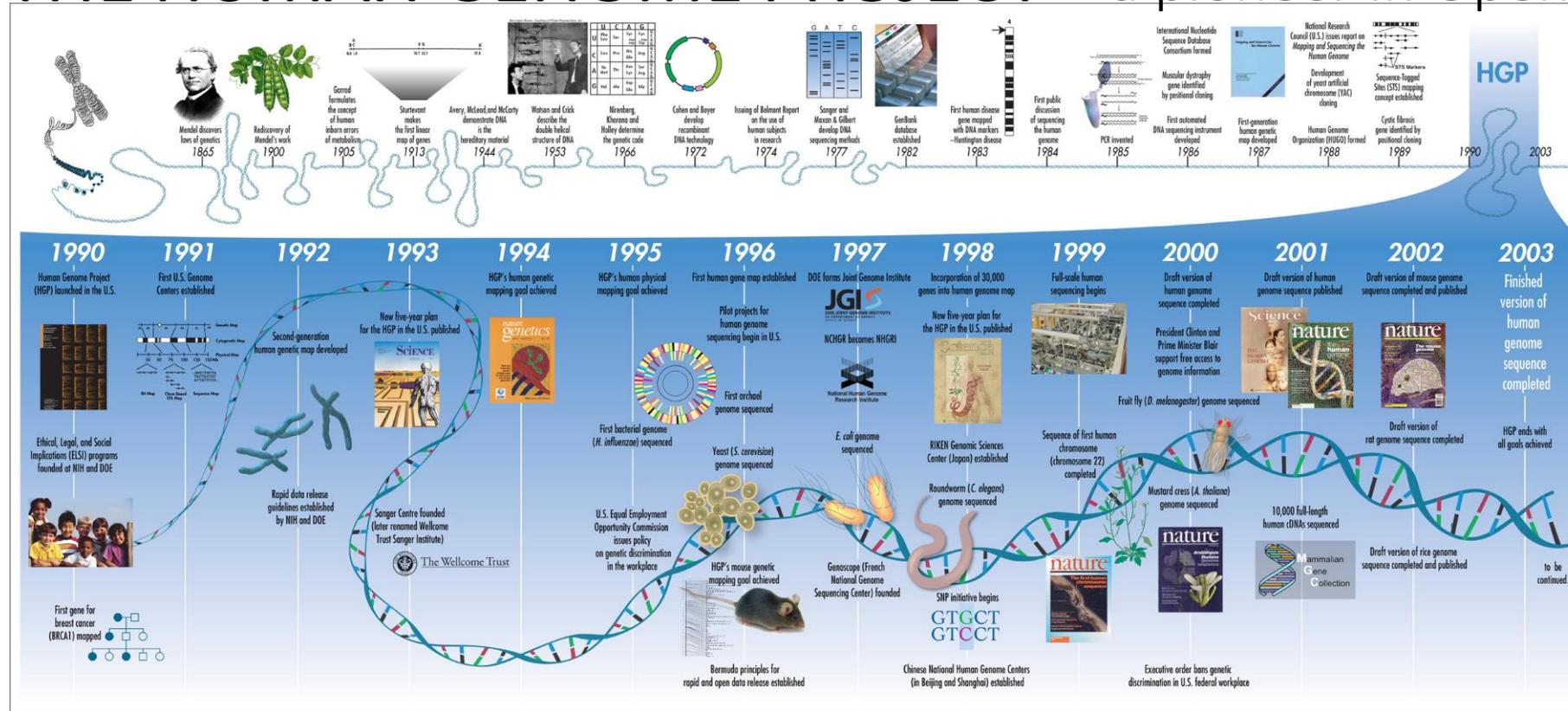


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THE HUMAN GENOME PROJECT – a pioneer in Open Science



The Human Genome Project Timeline contains major milestones in genomics from 1865 to 2003.

More: www.genome.gov/11007569.

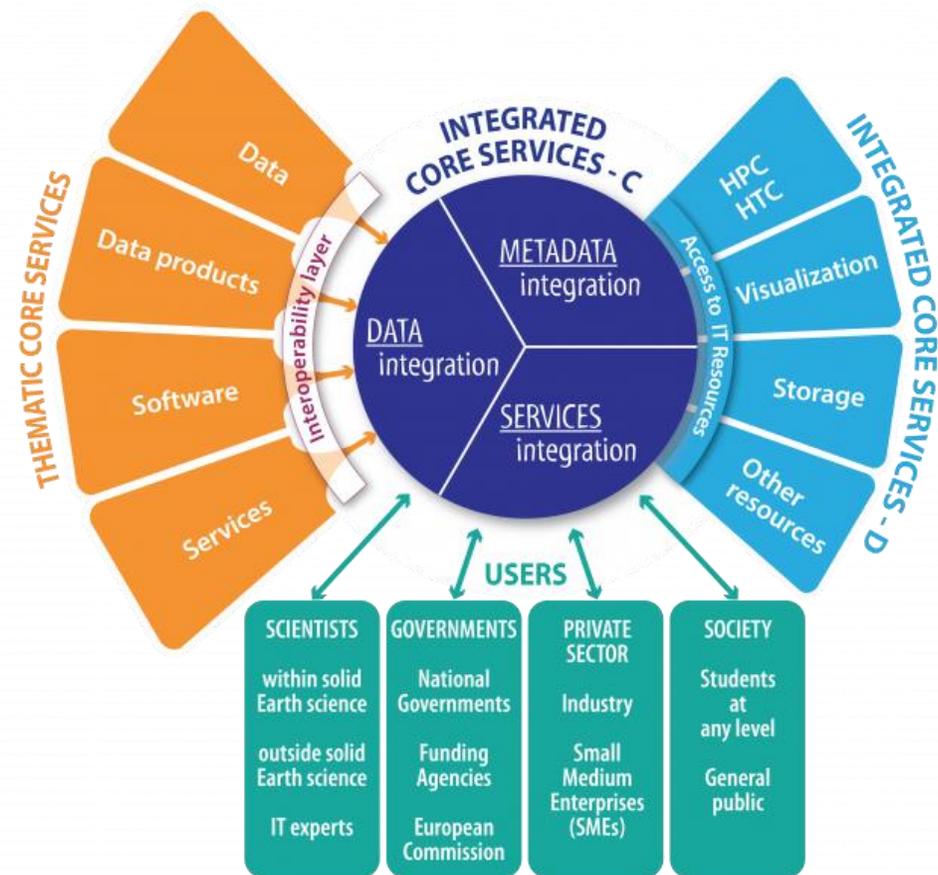
Credit: Darryl Leja, NHGRI.



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EUROPEAN OPEN SCIENCE CLOUD

The European Open Science Cloud (EOSC) is a European Commission initiative aiming at developing an infrastructure providing its users with services promoting open science practices. The EOSC officially launched in November 2018, starting to provide access to services via their EOSC Portal.



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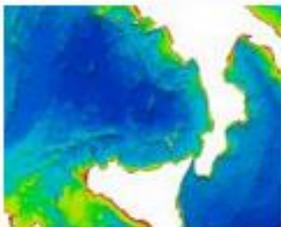
The European Marine Observation and Data network



- Data from the marine environment are valuable assets. **Rapid access to reliable and accurate information** is vital in addressing threats to the marine environment, in the **development of policies and legislation** to protect vulnerable areas of our coasts and oceans, in **understanding trends and in forecasting future changes**. Likewise, better quality and more easily accessible marine data is a prerequisite for further **sustainable economic development**, so-called 'blue growth'.
- The European Marine Observation and Data Network (EMODnet) is a network of more than 150 organisations supported by the **EU's integrated maritime policy**. These organisations work together to observe the sea, process the data according to international standards and **make that information freely available as interoperable data layers and data products**.
- This "collect once and use many times" philosophy benefits all marine data users, including **policy makers, scientists, private industry** and the **public**. It has been estimated that such an integrated marine data policy will save at least one billion Euros per year, as well as opening up new opportunities for innovation and growth.

EMODnet provides access to European marine data across seven discipline-based themes:

• Bathymetry



• Geology



• Seabed habitats



• Chemistry



• Biology



• Physics



• Human activities





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Conclusions from the case study

European Open Science priorities are seen internationally rather positively, commitments and partnerships are increasing, but the implementation is still cautious.

- Open Science is rarely on the diplomatic agenda, and science diplomacy is only marginally used for international orchestration and coordination, even though advocates would welcome the involvement of foreign policy actors.
- Pressing issues, like the harmonization of standards and legal frameworks for the exchange of data ('data diplomacy'), as well as new opportunities for innovation have not yet been discussed in the light of diplomatic action for Open Science.
- The rare instances of involvement of diplomatic institutions has mostly been triggered by local advocates and is often not sustainable.



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Conclusions 2

Future science diplomacy efforts with and for Open Science should therefore include planning and harmonization of the following actions:

1. Understanding and mediating the benefits (and challenges) of Openness
2. Bringing together and managing multi-level, multi-national, multi-format stakeholder negotiations



Actions for Future Open Science Diplomacy

- Points of contact and designated communication channels will better facilitate international Open Science negotiations and improve the level of preparedness in times of crises.
- Elaborated evidence and accessible information on challenges and benefits of Open Science will foster robust local and international cooperation.
- Open and transparent research information systems and scientific code of conduct are the basis for any elaborated evidence based policy with global impact.





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