Research and Innovation in transformation: the transition to **Open Science**

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NARMA vårkonferanse 2018 – Open Science
6-7 March 2018, Lillestrøm, Norway

What is the European Commission?

A policy maker

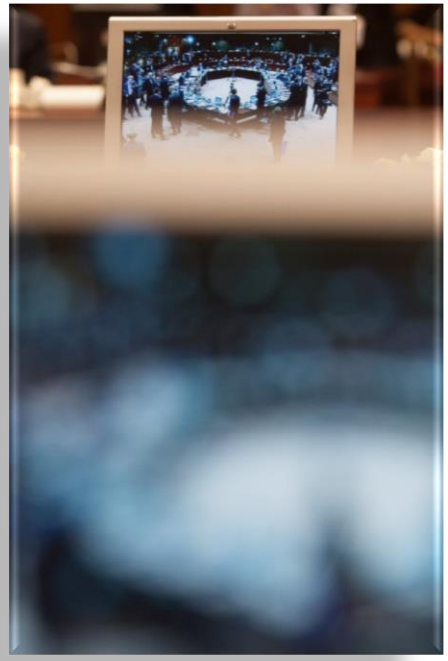
- It proposes EU legislation
- It legislates with other Community institutions (European Parliament, Council...)
- It invites Member States to act

A funding agency

- It sets its own rules for EC-funded scientific research and innovation

A capacity builder

- It funds projects that support EC/EU policy



How does the EC work?

A large organisation

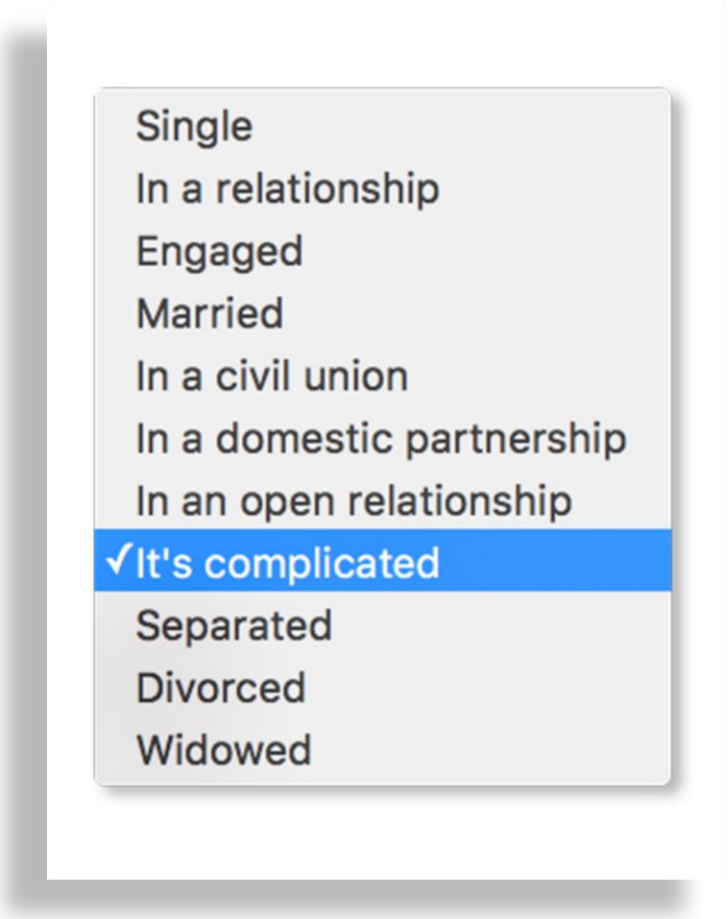
- 32,000 people

With other Institutions

- Council (Member States), EP, Committees, Agencies etc.

And "Stakeholders"

- "The Bubble"
- International partners etc.



Open Science: where to start?

With open access = the practice of providing on-line access to scientific information that is free of charge to the user and that is re-usable

No single definition but some well-accepted, authoritative ones e.g. the Budapest Declaration (2002) and the Berlin Declaration (2003).

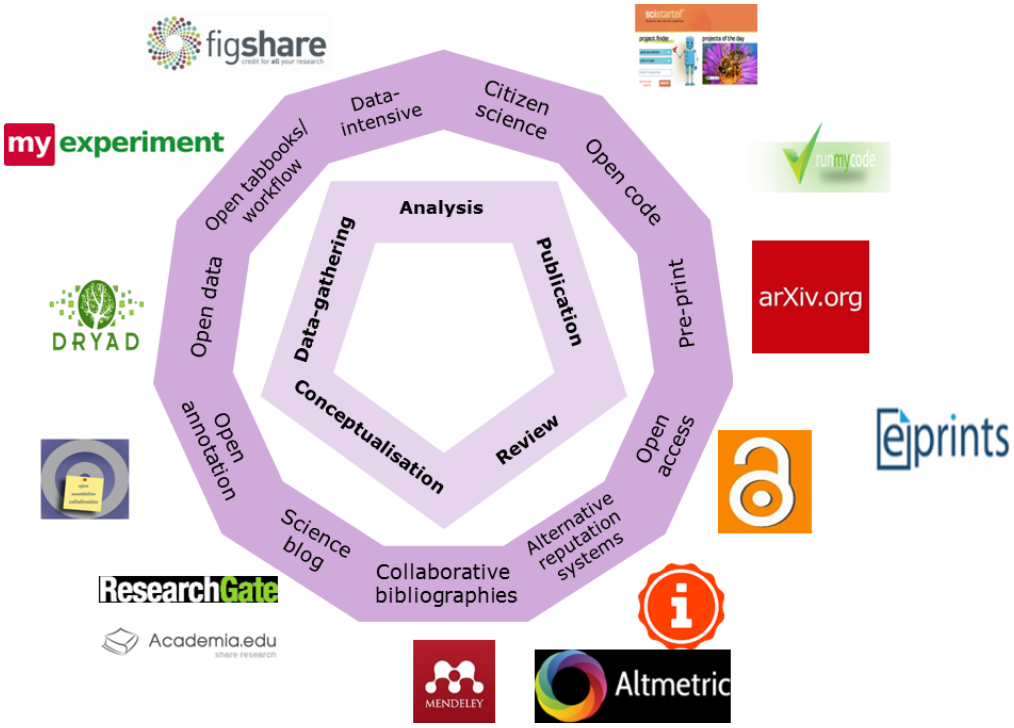
- These definitions describe 'access' in the context of open access as including not only basic elements such as the right to read, download and print, but also the right to copy, distribute, search, link, crawl, and mine

Open access to research outputs: publications, data, software and other outputs

For publications:

- Open access publishing, i.e. publishing in an open access mode/venue (Gold OA)
- Making accessible through repositories (Green OA)

Open Science: what transformation are we talking about?



The nature of science *(modus operandi)* is changing from a closed system to an <u>open and sharing</u> one

- It affects virtually all components of doing science and research
- It shifts in particular the focus from "publishing as fast as possible" to "sharing knowledge as early as possible"

Illustration: Ron Dekker, CESSDA

How is the R&I ecosystem affected?

101 Innovations in Scholarly Communication


Jeroen Bosman @jeroenbosman
Utrecht University Library

The Changing Research Workflow


Bianca Kramer @MsPhelps
Utrecht University Library

innoscholcomm.silk.co

Science is in transition. This poster gives an impression of the exploratory phase of a project aiming to chart innovation in scholarly information and communication flows from evolutionary and network perspectives.

We intend to address the questions of what drives innovation and how these innovations change research workflows and may contribute to more **open, efficient** and **good** science.

101 Innovative tools and sites in 6 research workflow phases (< 2000 - 2015)

January 2015

Most important developments in 6 research workflow phases

	Discovery	Analysis	Writing	Publication	Outreach	Assessment
Trends	social discovery tools	datadriven & crowdsourced science	collaborative online writing	Open Access & data publication	scholarly social media	article level (alt)metrics
Expectations	growing importance of data discovery	more online analysis tools	more integration with publication & assessment tools	more use of "publish first, judge later"	use of altmetrics for monitoring outreach	more open and post-publication peer review
Uncertainties	support for full-text search and text mining	willingness to share in analysis phase	acceptance of collaborative online writing	effect of journal/publisher status	requirements of funders & institutions	who pays for costly qualitative assessment?
Opportunities	discovery based on aggregated OA full text	open labnotes	semantic tagging while writing/citing	reader-side paper formatting	using repositories for institutional visibility	using author-, publication- and affiliation IDs
Challenges	real semantic search (concepts & relations)	reproducibility	safety/privacy of online writing	globalization of publishing/access standards	making outreach a two-way discussion	quality of measuring tools
Most important long-term development	multidisciplinary + citation-enhanced databases	collaboration + data-driven	online writing platforms	Open Access	more & better connected researcher profiles	importance of societal relevance + non-publication contributions
Potentially most disruptive development	semantic/concept search + contextual/social recommendations	open science	collaborative writing + integration with publishing	circumventing traditional publishers	public access to research findings, also for agenda setting	moving away from simple quantitative indicators

Typical workflow examples

Source: https://101innovations.wordpress.com/press/

How to describe Open Science?

There are many definitions but maybe Open Science is:

- A system of practices that moves towards a more open, collaborative, data-intensive and networked way of doing research and sharing research results, enabled by developments in ICT and related infrastructures and the increasing proliferation of data.

Or Open Science is:

- ***Just science done right!***

Stickers: Melanie Himming, ImmingImpact

How did we end up here?

Many interpretations and theories on why the way we do science is changing:

Digitization

- Data availability & production (exponential growth)
- Technology

Discovery of a new transparency

- Accountability, responsiveness and reproducibility

Opportunity and to better connect with the society at large

- Including involvement of citizens, the 'digital natives'

Why is Open Science so important?

It's good for science: efficiency, verifiability, transparency, inter-disciplinarity

It's good for the economy: access to and re-use of scientific information by industry, innovation

It's good for society: broader, faster, transparent & equal access for citizens, increased societal impact of science and research

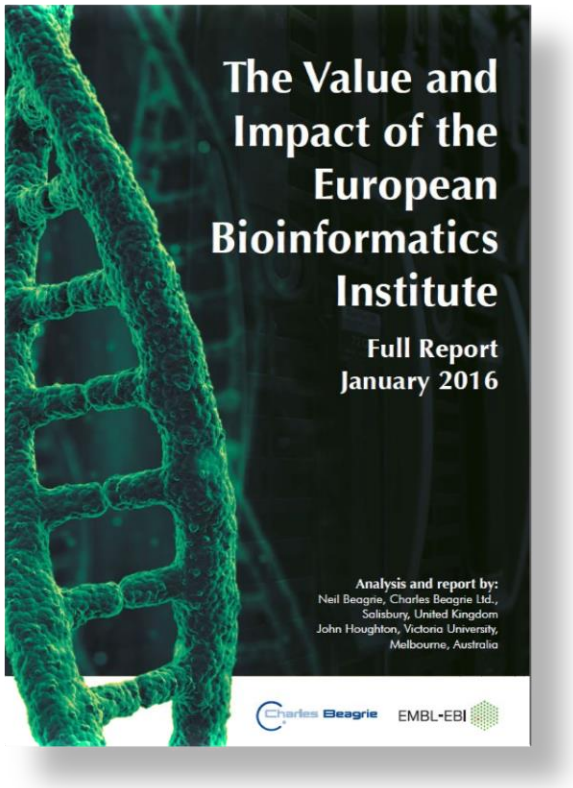
Open Science is irreversible and is not happening in isolation

One example of the gains arising from open research data

1.3 Billion EUR per year

- Benefits identified by the European Bioinformatics Institute to users and their funders just by making scientific information freely available to the global life science community

This is equivalent to more than 20 times the direct operational cost of the Institute



Source: Charles Beagrie Ltd. For EMBL-EBI

What has the EC been doing so far?

- 2007 • EC Communication on Scientific Information
- 2008 • FP7 OA Pilot
- 2012 • Recommendation on scientific information & ERA Communication
- 2014 • Horizon 2020 OA and ORD policies
- 2015 • Digital Single Market (DSM) strategy
- 2016 • Council Conclusions on open science (Member States)
- 2016 • European Cloud Initiative Communication (ECI)
- 2018 • Revision of the 2012 Recommendation in conjunction with PSI Directive
- 2018- • Preparing Open Science for FP9

European Commission

Open science is for everyone

"We do what we preach"

The easy one: publications

Mandatory open access to peer-reviewed publications through repositories at the same time as publication.

- Acceptable embargo: 6M and up to 12M for SSH
- Open access publishing encouraged and APCs eligible costs
- Gradual emphasis on monitoring and on 'sanctions'
- Current success rate: about 68% (depending on the method of calculation)

The less easy one: research data

By default participation in the ORD extended pilot

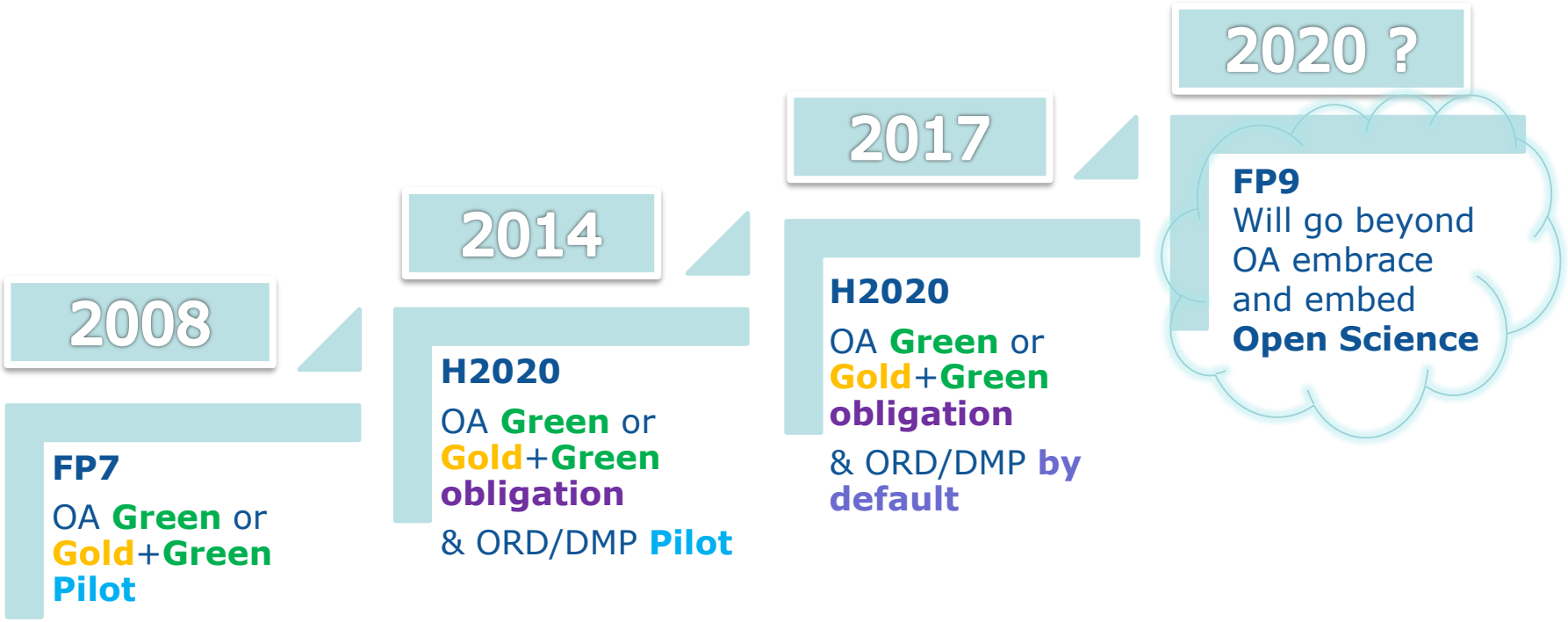
- Targeted primarily towards data underlying publications (other data as specified in Data Management Plan)
- Robust opt outs options for IPR, confidentiality/privacy and security reason as well as if OA runs against the main objective of the project
- Whether projects opt-out or not does not affect the evaluation

Required to develop DMP as a deliverable

- Significance placed on **DMP as avenue to streamline sound data management practices**
- What data will be generated; how curation, preservation and sustainability will be ensured; what parts will be open

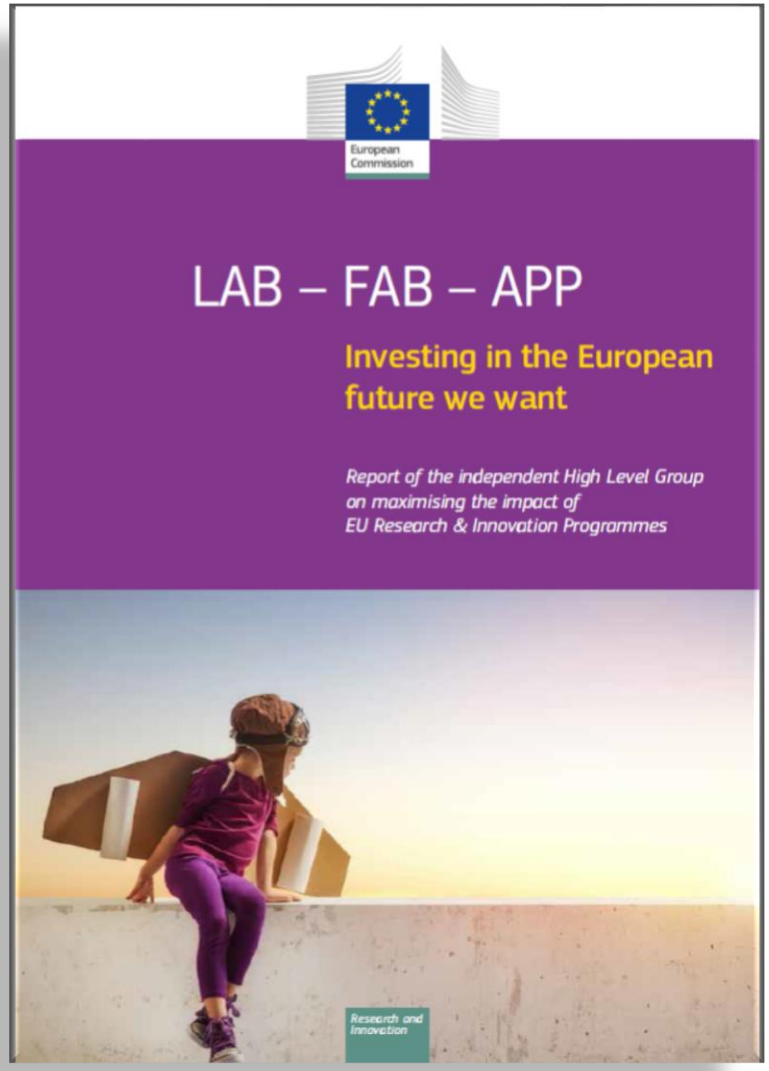
Costs for open access to research data fully eligible

The evolution of the EU funding programmes for R&I



"FP9"

- The 'Lamy report' proposes a new FP that fully supports **Open Science at all levels**
- The new FP will probably strengthen & clarify current open access requirements, and incentivize and reward Open Science
- Open Science should also be considered from our side as a funder (in the evaluation of proposals, monitoring of the impact of "FP9" etc.)



How politically important is OS?

- One of the three priorities of Cssr Moedas
- The Netherlands make the goal of default OS, Finland created a cross cutting OS policy approach, France is creating one, several Lander in Germany have dedicated platforms or approaches & federal approach in the making, DK issued an analysis on implementing FAIR data etc.
- Australia, China, G7 countries...
- **The EU Framework Programmes and all national funding programmes must be in sync with Open Science**

A European Research Area

Going together in the same direction

2012 Recommendation on scientific information

- Still valid but **technical update** expected in spring 2018
- Sharper focus on aspects such as copyright/TDM, rewards, skills etc.

Amsterdam Call for Action on Open Science

- EU Dutch Presidency conference on Open Science of April 2016 (key principles and goals)
- Follow up on its way: national plan on Open Science, various initiatives etc.

Open Science Policy Platform

- The EC bringing stakeholders at the same table

EU Member States (and Norway) support Open Science

The Council Conclusions of 26-27 May 2016:

- *ACKNOWLEDGES that open science has the potential to increase the quality, impact and benefits of science and to accelerate advancement of knowledge by making it […] better understandable by society and responsive to societal challenges […]*
- *AGREES to further promote the mainstreaming of open access to scientific publications by continuing to support a transition to immediate open access as the default by 2020*
- Research data: *'as open as possible, as closed as necessary'*.

National Points of Reference

- Website and activities
- Norway: Katrine Weisteen Bjerde (CERES)
- Report to be released in spring 2018

Two important challenges

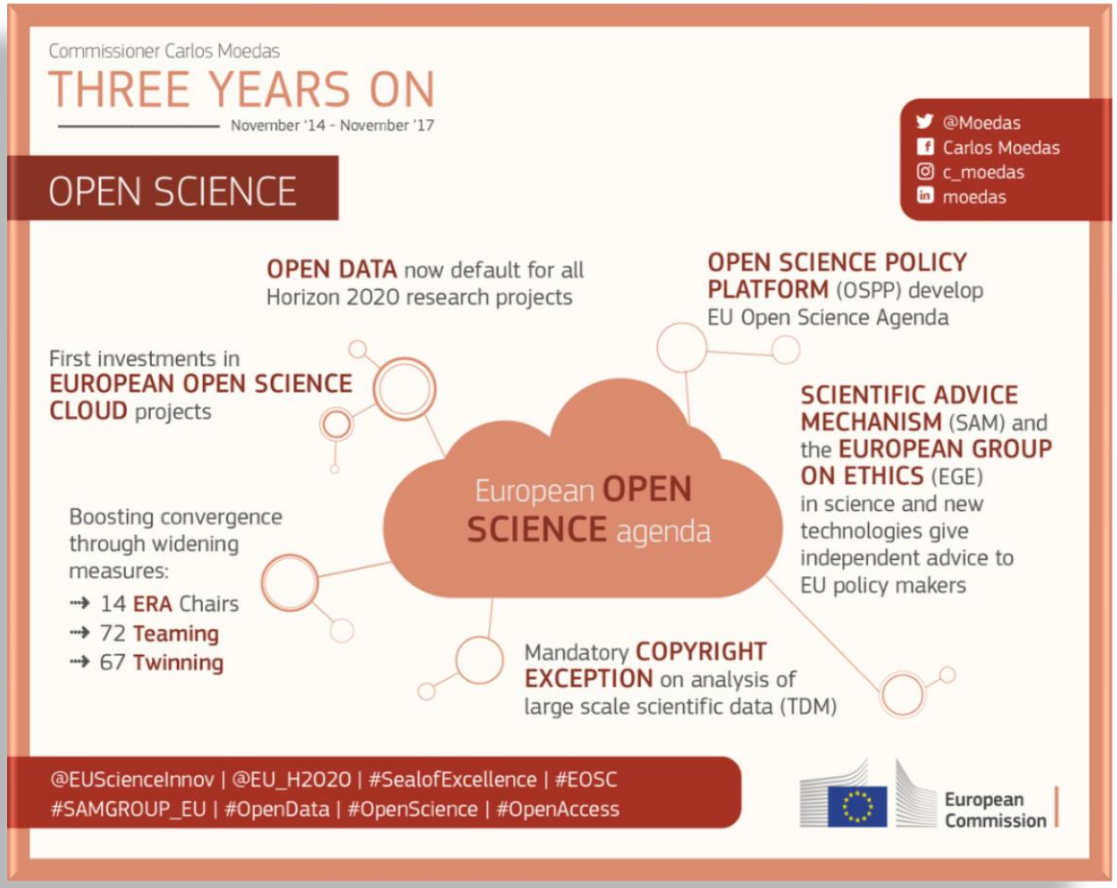
European Open Science Cloud

- A federated environment for cloud-based research and access to data
- Vision: *give Europe a global lead in scientific data infrastructures & offer a virtual environment with free at the point of use, open and seamless services for storage, management, analysis, and re-use of research data, across borders and scientific disciplines*

Open research publishing platform

- Aim: offer Horizon 2020 beneficiaries a free and fast publication possibility for peer reviewed articles & pre-prints
- Public procurement to be announced in spring 2018

So far...


Commissioner Carlos Moedas
THREE YEARS ON
November '14 - November '17
@Moedas
Carlos Moedas
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OPEN SCIENCE
OPEN DATA now default for all Horizon 2020 research projects
OPEN SCIENCE POLICY PLATFORM (OSPP) develop EU Open Science Agenda
First investments in EUROPEAN OPEN SCIENCE CLOUD projects
European OPEN SCIENCE agenda
SCIENTIFIC ADVICE MECHANISM (SAM) and the EUROPEAN GROUP ON ETHICS (EGE) in science and new technologies give independent advice to EU policy makers
Boosting convergence through widening measures:
→ 14 ERA Chairs
→ 72 Teaming
→ 67 Twinning
Mandatory COPYRIGHT EXCEPTION on analysis of large scale scientific data (TDM)
@EUScienceInnov | @EU_H2020 | #SealofExcellence | #EOSC
#SAMGROUP_EU | #OpenData | #OpenScience | #OpenAccess
European Commission

What next?

Personal thoughts

Overall aim

- kick-starting a **virtuous circle** and **change of culture**

Issues

- **Explanation**: paramount
- **Tools and support:** needed
- **Money:** both a bad *and* a good excuse
- **Feedback**: important
- **Monitoring**: complex (see Open Science Monitor)
- **Reward**: the key

Issues to watch

Legal issues

- Copyright Directive, Database Directive, Public Sector Initiative (PSI) Directive
- Licences and Text and Data Mining (TDM)

Alternative publishing models

- Including agreements with publishers, 'offsetting deals' etc.

FAIR data

- Findable, Accessible, Interoperable and Re-usable

Skills

- Access to professional training to develop appropriate skills to fully engage with open science

Metrics and indicators adapted to Open Science

- Incentives, acknowledgment and reward are key in a professional career
- Adapt the rewarding mechanisms to researchers for their sharing
- From ***Publish or perish*** to ***Share and succeed****?*

Thank you!

With Open Science, we want to give European researchers and innovators the best conditions to do their job.

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