







Research Data & Open Science

6 Novembre 2023

PART 1

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This presentation is on Zenodo

DOI 10.5281/zenodo.10074214











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Special thanks to Francesca Di Donato https://orcid.org/0000-0003-0144-8934

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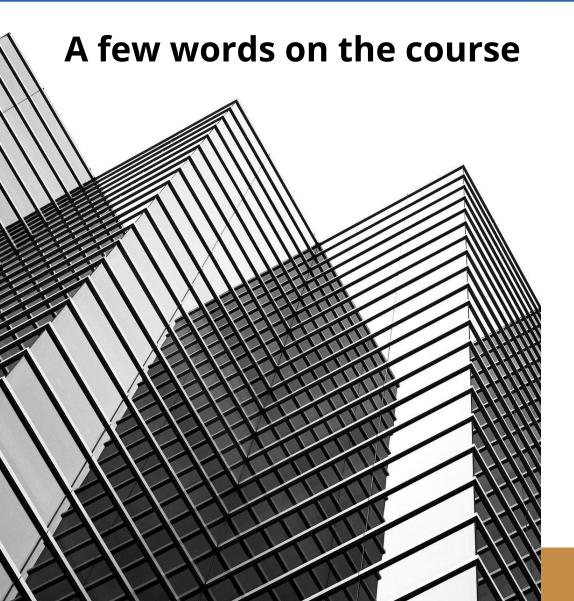
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The course methodology:

- the aim of the course is to introduce you to the concepts and practices underlying research data and open science, and to provide you with tools to help you get started.
- your involvement is crucial!

Structure of the course

• modules, frontal lesson

In each module:

- Test your understanding as we go (questions to be answered by you, on Mentimeter)
- Final open Q&A









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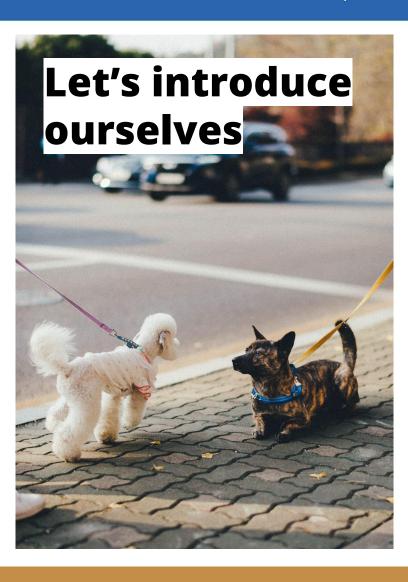
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A few facts about me

- Half French half English
- CNR-ILC in Pisa, Italy
- International Project Management

My work focuses on:

- Open science practices
- Open workflows
- Scientific communication



Currently:

- GraspOS project, co-leader WP6 Communication, Engagement, Exploitation
- member of the OpenAIRE Community of Practice for Training coordinators
- member of the EOSC Association Working Group on Community and Engagement in Horizon Europe
- member of GraspOS Community of Practice on Open Science and Responsible Research Assessment









Today's journey (PART 1)

Introduction

WHAT IS OPEN SCIENCE?

Q&A

OPEN SCIENCE AND RESEARCH ASSESSMENT

Q&A

Biopause 10 min











Your turn!

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OPEN SCIENCE

Definitions of Open Science Is it new? Current issues









1. Let's start with some definitions









One term, many definitions



UNESCO Open Science Brochure

"Open science is defined as an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community. It comprises all scientific disciplines and aspects of scholarly practices, including basic and applied sciences, natural and social sciences and the humanities, and it builds on the following key pillars: open scientific knowledge, open science infrastructures, science communication, open engagement of societal actors and open dialogue with other knowledge systems."









Open scientific knowledge

Scientific publications

Open research data

Open educational resources

Open source software and code

Open hardware

Open engagement of societal actors

Crowdfunding

Crowdsourcing

Scientific volunteering

Citizen and participatory

science

Open science infrastructures

Virtual / Physical

Open dialogue with other knowledge systems

Indigenous people

Marginalised scholars

Local communities

Image by Ashkan Forouzani on Unsplash

Istruzione e Ricerca

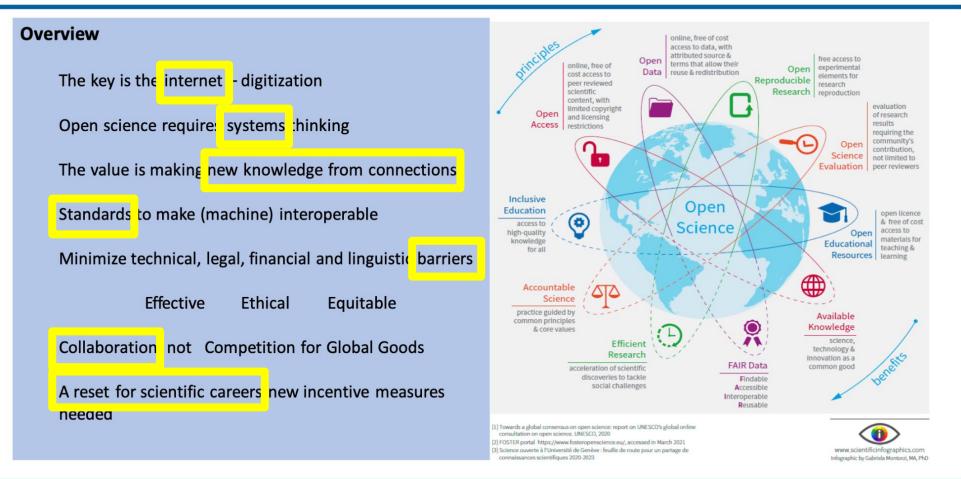








Open Science – time to unlock the potential of the digital age



Another way to look at Open Science











Motivations for Open Science "one term, five schools of thought"

School of thought	Main Assumption
Democratic	Access to knowledge is unequally distributed
Pragmatic	Knowledge creation is more efficient through collaboration and strengthened through critique
Infrastructure	Efficient research requires readily available platforms, tools and services for dissemination and collaboration
Public	True societal impact requires societal engagement in research and readily understandable communication of scientific results.
Measurement	Traditional metrics for evaluating scientific contributions are problematic

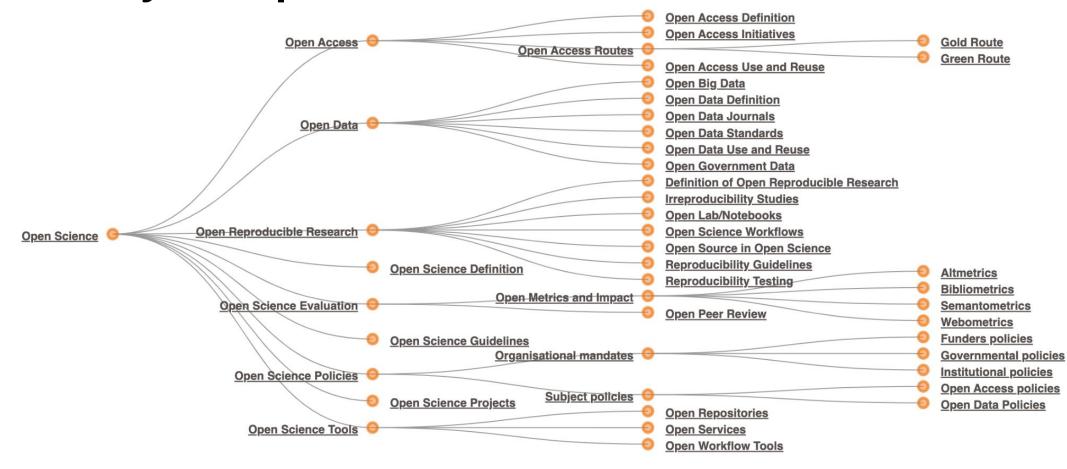








A taxonomy for Open Science











Open Science is about rigour, accountability and

reproducibility for research

Benefits from Open Science include

opportunity for **new scientific discoveries**

reproducibility of scientific results

facilitating cross-disciplinary cooperation

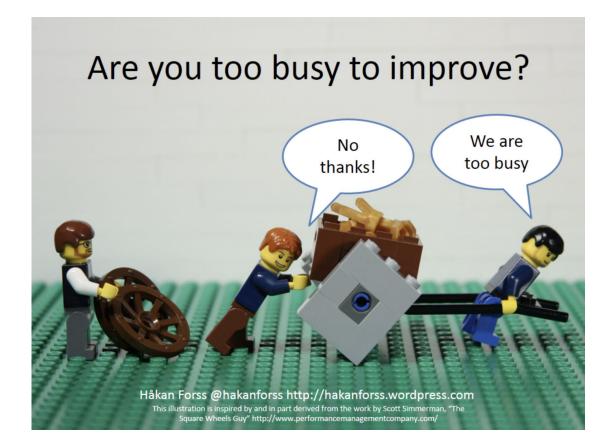
increased resource **efficiency**

improved transparency and accountability

regarding disbursement of public funds

better return on public investment

increasing **public trust** in research





















2. Is Open Science new?









2002. <u>Budapest Open Access Initiative</u> 2003. Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities 2007. OECD Principles and Guidelines on Access to Research **Data from Public Funding** 2014. The FAIR data principles

No, it's not!









Strategic and political orientations are more recent

2015. OECD "Making Open Science a Reality"

2016. European Commission, Directorate-General for Research and Innovation, *Open innovation, open science, open to the world : a vision for Europe*

2017. G7 Science Ministers Communiqué









The pandemic, and the urge to open up the research results

"I call on all countries, companies and research institutions to support open data, open science, and open collaboration so that all people can enjoy the benefits of science and research"

T.A. Ghebreyesus, 'WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 - 6 April 2020'









La pandemia e l'urgenza di aprire i risultati della ricerca

"I call on all countries, companies and research institutions to support open data, open science, and open collaboration so that all people can enjoy the benefits of science and research"

(Ghebreyesus TA, 'WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 - 6 April 2020', 6 Aprile 2020)

Robert Terry (OMS): Meno del 25% del materiale scientifico incluso nelle Linee Guida COVID dell'OMS viene da pubblicazioni tradizionali.

"Si sono rivelati inutili, proprio nel momento in cui avevamo più bisogno di loro"

(Video: Time to unlock the potential of the digital age, OpenScienceFair2021, 22 settembre 2021, slides)









3. What's the problem?









10 milioni di dollari

costo annuale degli abbonamenti alle riviste scientifiche nel mondo

Schimmer, R., Geschuhn, K. K., & Vogler, A. (2015). Disrupting the subscription journals' business model for the necessary large-scale transformation to open access. doi:10.17617/1.3.



36 %

margine degli editori scientifici commerciali

https://www.theguardian.com/science/2 017/jun/27/profitable-business-scientific -publishing-bad-for-science

26 miliardi di euro

persi ogni anno in Europa perché i dati della ricerca non sono gestiti correttamente.

European Commission, Directorate-General for Research and Innovation, *Cost-benefit analysis for FAIR research data: cost of not having FAIR research data*, Publications Office, 2019, https://data.europa.eu/doi/10.2777/02999

The long read

Is the staggeringly profitable business of scientific publishing bad for science?

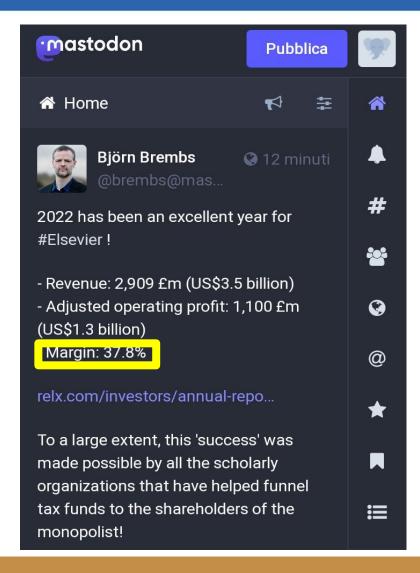
 illustration for science publishing long read Illustration: Dom McKenzie













https://www.open.online/2019/07/15/abbonamento-riviste-scientifiche-costo-eccessivo-universita-california-rinuncia/



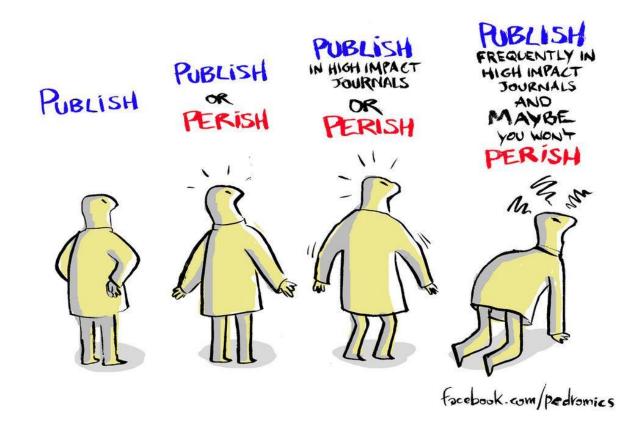






A broken system?

THE EVOLUTION OF ACADEMIA











Vendor lock in situation

Every player is at a disadvantage

"Neither researchers – forced to publish in journals due to the "publish or perish" reality – nor libraries – serving the reading and publishing needs of their faculty – are in a position to initiate reform."

Replacing Academic journals, https://doi.org/10.5281/zenodo.7643806







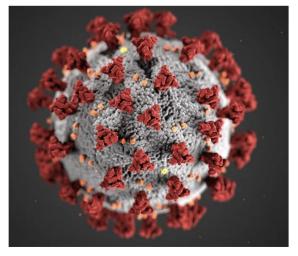


COVID-19 pandemic leads to flood of 'useless' science

25 Jun 2020 | News

Academics speak out against 'ridiculous' studies that are getting submitted to journals and urge 'self-restraint' be restored

Retracted coronavirus (COVID-19) papers



via CDC

The number of retracted papers proves that

Quantity # Quality

https://retractionwatch.com/

SCIENCE BUSINESS

- 1. "5G Technology and induction of coronavirus in skin cells," published in *Biological Regulators & Homeostatic Agents* on July 16, 2020, withdrawn on July 24, 2020. Our coverage here.
- "A Case Series of Stent Thrombosis During the COVID-19 Pandemic," published on May 27, 2020 in *JACC: Case Reports*; retraction date is unknown. Retracted as a duplicate publication by journal error.
- 3. "A data-mining based analysis of traditional Chinese medicine in diagnosing and treating COVID-19," published on June 24, 2021 in *The Anatomical Record*; unknown when retracted.
- 4. "A deep learning model and machine learning methods for the classification of potential coronavirus treatments on a single human cell," published on October 17, 2020 in the *Journal of Nanoparticle Research*; retracted on August 16, 2021.
- "A Discourse Analysis of Quotidian Expressions of Nationalism during the COVID-19 Pandemic in Chinese Cyberspace," published on September 8, 2020; retracted on April 12, 2022.
- 6. "A mechanistic analysis placental intravascular thrombus formation in COVID-19 patients," published on April 25, 2020 in Annals of Diagnostic Pathology. Retracted on June 22, 2020 as a duplicate publication by journal error.
- 7. "A meta-analysis of granulocyte-macrophage colony-stimulating factor (GM-CSF) antibody treatment for COVID-19 patients," published on August 20, 2021 in *Therapeutic Advances in Chronic Disease*; retracted on November 21, 2021. See our coverage here.
- "A Model Based Analysis for COVID-19 Pandemic in India: Implications
 for Health Systems and Policy for Low- and Middle-Income Countries,"
 preprint possted on June 12, 2020 in medRxiv; retracted on August 18,
 2020.

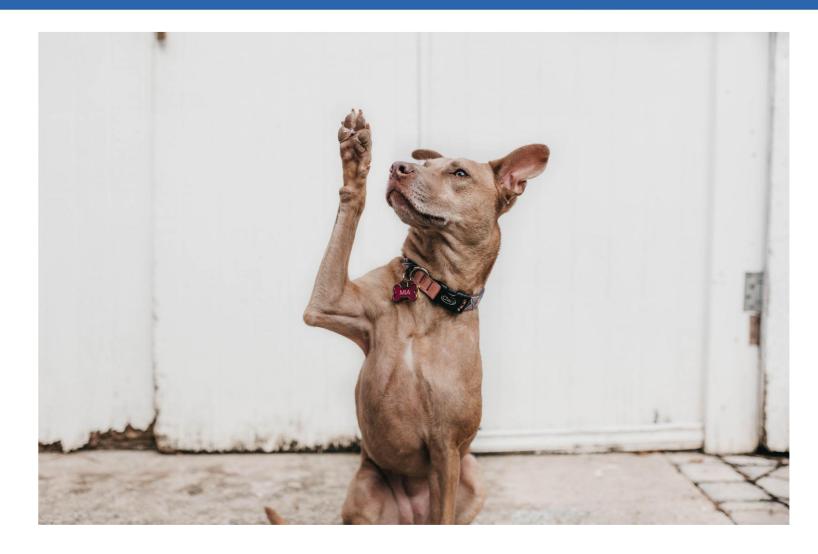








Any Questions?











RESEARCH ASSESSMENT AND OPEN SCIENCE

How did we get here? Recent changes









1. How did we get here?









What happened?



"Ostensibly aligned, publishing and communication have diverged. Journals and the concept of "version of record" are not only a legacy from print, but their roles have shifted to the point where some processes involved in scholarly publishing are getting in the way of optimal scholarly communication, as the present pandemic amply reveals"

Jean Claude Guédon, Scholarly Communication and Scholarly Publishing, 2021



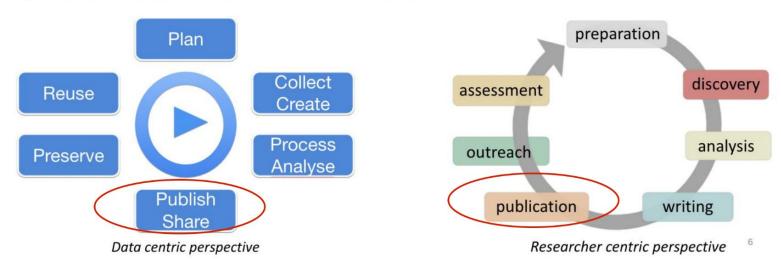






What is science/scholarly communication

"the system through which research and other scholarly writings are **created**, **evaluated** for quality, **disseminated** to the scholarly community, and **preserved** for future use" ACRL, Principles and Strategies for the Reform of Scholarly Communication 1, 2003.



Formalised publishing practices are just a subset of a larger pool of various communication practices (emails, social media, blogs, press, etc.), both between scholars and between scholars and the public.

Moreover, SC is a workflow, a process, and a set of practices and empowering tools which structure our "scholarly behaviour"









To change the system we need to rethink the research assessment system









How research is evaluated

Journal Impact Factor

For a given year, the two-year JIF is the ratio between the number of citations received in that year for publications in that journal that were published in the two preceding years and the total number of "citable items" published in that journal during the two preceding years.

Aim: measure the frequency with which the average article in a journal has been cited in a particular year.

$$\text{IF}_y = \frac{\text{Citations}_{y-1} + \text{Citations}_{y-2}}{\text{Publications}_{y-1} + \text{Publications}_{y-2}}$$

H-index

For a researcher: the maximum value of h such that the given author has published h <u>papers</u> that have each been <u>cited</u> at least h times.

As an example, an h-index of 10 means that among all publications by one author, 10 of these publications have received at least 10 citations each.

Aim: estimate the productivity and impact of a research.









How did we get here?

The birth of the modern science system of communication

It's based on three major innovations:



Copyright

- 1710 Statute of Anne
- End of the system of privileges
- 14 years



Scientific Journals

- 1665: Philosophical Transactions of the Royal Society of London
- Public registry of Intellectual property
- Arbiter elegantiarum



Peer reviewing

- Perusal
- 1731 Royal Society of Edinburgh
- It becomes the standard evaluation practice

We will focus more deeply on the role and spread of scientific journals and on peer reviewing and the assessment of research quality and impact in the next module

J.-C. Guédon, In Oldenburg's long shadow, 2002.

A. Johns, The Nature of the Book: Print and Knowledge in the making, University of Chicago Press, 1998.

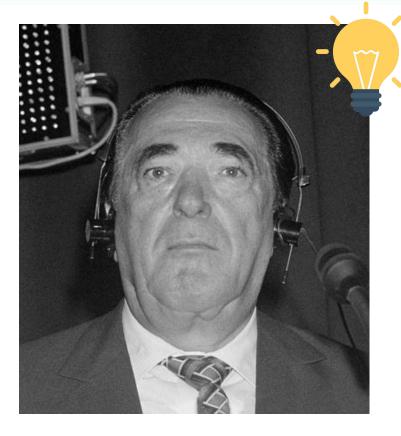
(Italian) F. Di Donato, La scienza e la rete. L'uso pubblico della ragione nell'età del web, FUP, 2009.











Robert Maxwell
Source Image

The rise of commercial journals

Post WWII: commercial opportunities for scholarly publishing

Worldwide audience
English
Libraries

Journals become even more central in scholarly communication system..





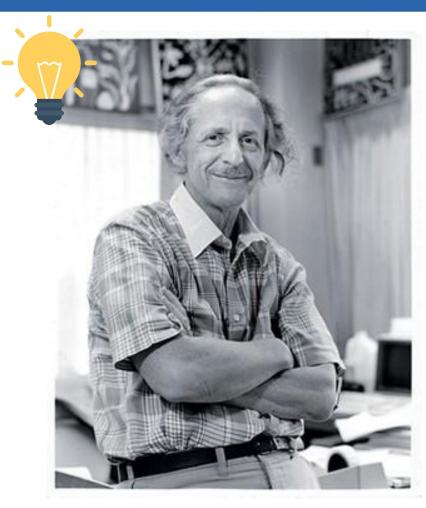




Bibliometric indicators

Core journals

Impact factor



Eugene Garfield

Credit: Neil Benson









Goodhart's law

The problem comes from the method

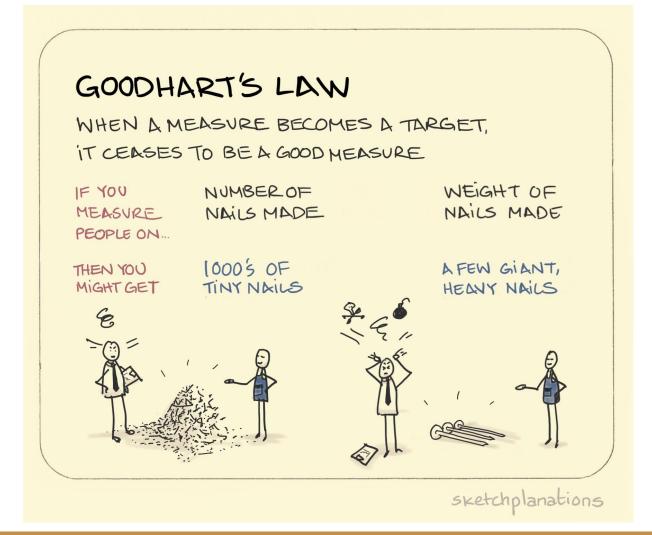


Image: Sketchplanations









The transformation of the scientific paper

"From a knowledge unit to an

accounting unit"

Gaming the Metrics'. https://mitpress.mit.edu/9780262537933/gaming-the-metrics/.









2. Things are changing

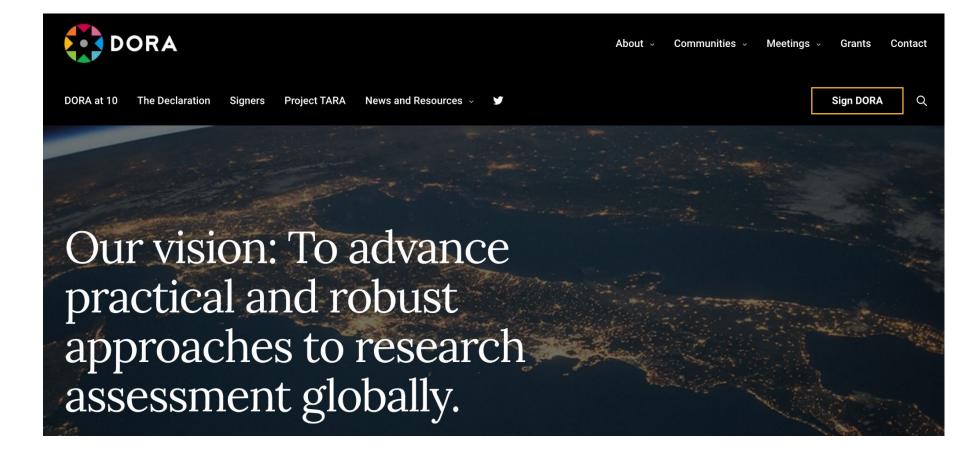








Declaration on Research Assessment (DORA)



https://sfdora.org/









Funders are pushing for OS adoption



European Commission

European Research Council

In Italy, MUR with the National Open

Science Plan

Many others across Europe and

worldwide

Image by Micheile Henderson on **Unsplash**











Overview
of actions for
the period
2022-2024

<u>European Research Area Policy Agenda (2022 – 2024)</u>

3. An ERA Policy Agenda with concrete actions

The new ERA Policy Agenda, annexed to the Council conclusions on the ERA governance, sets out 20 concrete ERA actions for the period 2022-2024 to contribute to the priority areas defined in the Pact for Research and Innovation.

- 1. Enable Open Science, including through the European Open Science Cloud (EOSC)
- 2. Propose an EU copyright and data legislative framework for research
- 3. Reform the Assessment System for research, researchers and institutions
- 4. Promote attractive research careers, talent circulation and mobility
- 5. Promote gender equality and foster inclusiveness
- 6. Protect academic freedom in Europe
- 7. Upgrade EU guidance for a better knowledge valorisation
- 8. Strengthen research infrastructures
- 9. Promote international cooperation
- 10. Make EU research and innovation missions and partnerships key contributors to the ERA
- 11. An ERA for green transformation
- 12. Accelerate the green/digital transition of Europe's key industrial ecosystems
- 13. Empower Higher Education Institutions
- 14. Bring Science closer to citizens











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EOSC



More about EOSC



Strategic Research and Innovation Agenda (SRIA)

of the European Open Science Cloud (EOSC)

Version 1.1 - 1 November 2022









Documents produced on Open Science and Research Assessment

2020: Commission Communication COM(2020) 628 of 30 September 2020 on a new European Research Area for R&I

2020: Council Conclusions on the new ERA of December 1st 2020

2020: Digital skills for FAIR and open science. Report from the EOSC Executive Board Skills and Training Working Group:

2021: RDA: Rewards and Incentives for Open Science

2021: Conclusions for the Competitiveness Council of 27-28 May on attractive and sustainable researchers' careers and working conditions

2021: Proposal for a Council Recommendation on a "Pact for Research and Innovation in Europe", as a first key achievement of the new European Research Area

2021: G7 Research Compact

2016: Amsterdam call for actions for OS

2017: Evaluation of research careers fully acknowledging Open Science practices.

2017: Rewards, incentives and/or recognition for researchers practicing Open Science

2017: Responsible metrics and evaluation for open science

2017: EOSC Declaration

2018: COMMISSION RECOMMENDATION (EU) 2018/790 of 25 April 2018 on access to and preservation of scientific information

2019: Indicator frameworks for fostering open knowledge practices in science and scholarship

2019: Future of Scholarly Publishing and Scholarly Communication

2019: Report: Research Assessment in the Transition to Open Science

2020: Open Science Policy Platform final report

2020: EOSC Strategic Research and Innovation Agenda

2020: Science Europe, Position statement and recommendations on research assessment processes









Agreement on Reforming research assessment.

644 signatories as of 23 October 2023

"La nostra visione è che la valutazione della ricerca, dei ricercatori e delle organizzazioni di ricerca riconosca i diversi risultati, le pratiche e le attività che massimizzano la qualità e l'impatto della ricerca stessa. Ciò richiede di fondare la valutazione principalmente sul giudizio qualitativo, per il quale la peer-review è centrale, supportata da un uso responsabile degli indicatori quantitativi"

Source: <u>Agreement on Reforming Research Assessment</u>, p.1. Translated by Francesca Di Donato. (2022). Una questione di qualità o una formalità? L'Agreement on Reforming Research Assessment e il processo di riforma della valutazione della ricerca in Europa (1.0). Zenodo. https://doi.org/10.5281/zenodo.7433048













Have your say

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Menti results (1/3)

Name some of the issues in the current research system 19 responses











Menti results (2/3)









Strongly agree



Menti results (3/3)

Is Open Science only for a certain type of researchers?

Yes, Open Science is mostly for STEM resesarchers (Scienza, Tecnologia, Ingegneria e Matematica)

Open Science is mostly for senior researchers since early career researchers are already busy with other matters

1.1

I think that Open Science applies to all researchers from all disciplines



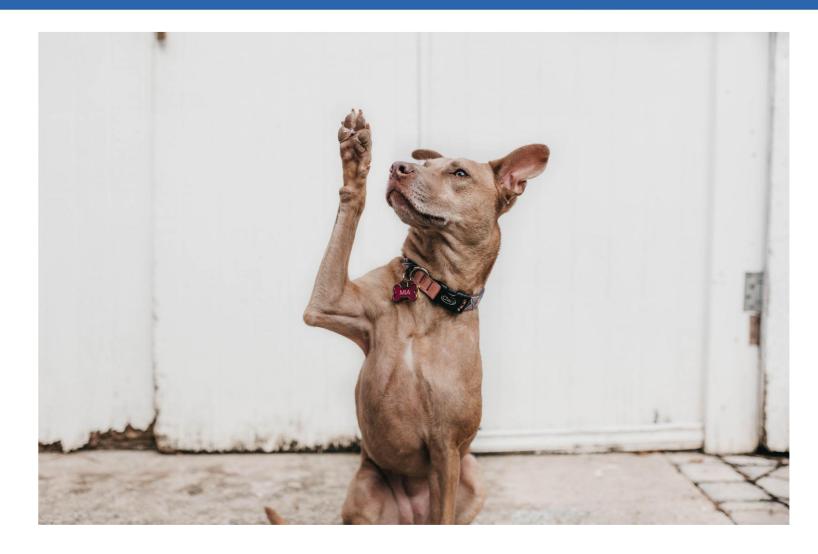








Any Questions?











THANK YOU!

Please write to lottiemiaprovost@cnr.it for any questions





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