APRE
Agenzia per la Promozione della Ricerca Europea

OPEN SCIENCE E HORIZON EUROPE: LE POLITICHE E LE INFRASTRUTTURE EUROPEE

Claudia Iasillo

Project Manager, APRE

16 dicembre 2021

UNIPI (online)

Agenda

09.45	BENVENUTO E INTRODUZIONE ALLA GIORNATA (TECHNICAL CHECK)
10.00	Apertura dei lavori (Angelica Salvadori, Unità Servizi per la Ricerca, Università di Pisa)
	Open Science: definizione, strumenti e policy europea
	Open Access in Horizon Europe
11.15	Pausa
11.30	Open Data: Data Management Plan, EOSC e altri strumenti
	Cenni su Public Engagement e Citizen Science
	Q&A
13.00	Conclusioni

Who am I?

- Biotechnology Degree
- PhD in Molecular Biology
- Post graduation course in Science Communication
- Project Manager

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Science-Society relationship
Science Communication
Open Science
Citizen Science
Public Engagement and Stakeholder Engagement

Let’s Slido: #OSUNIPI

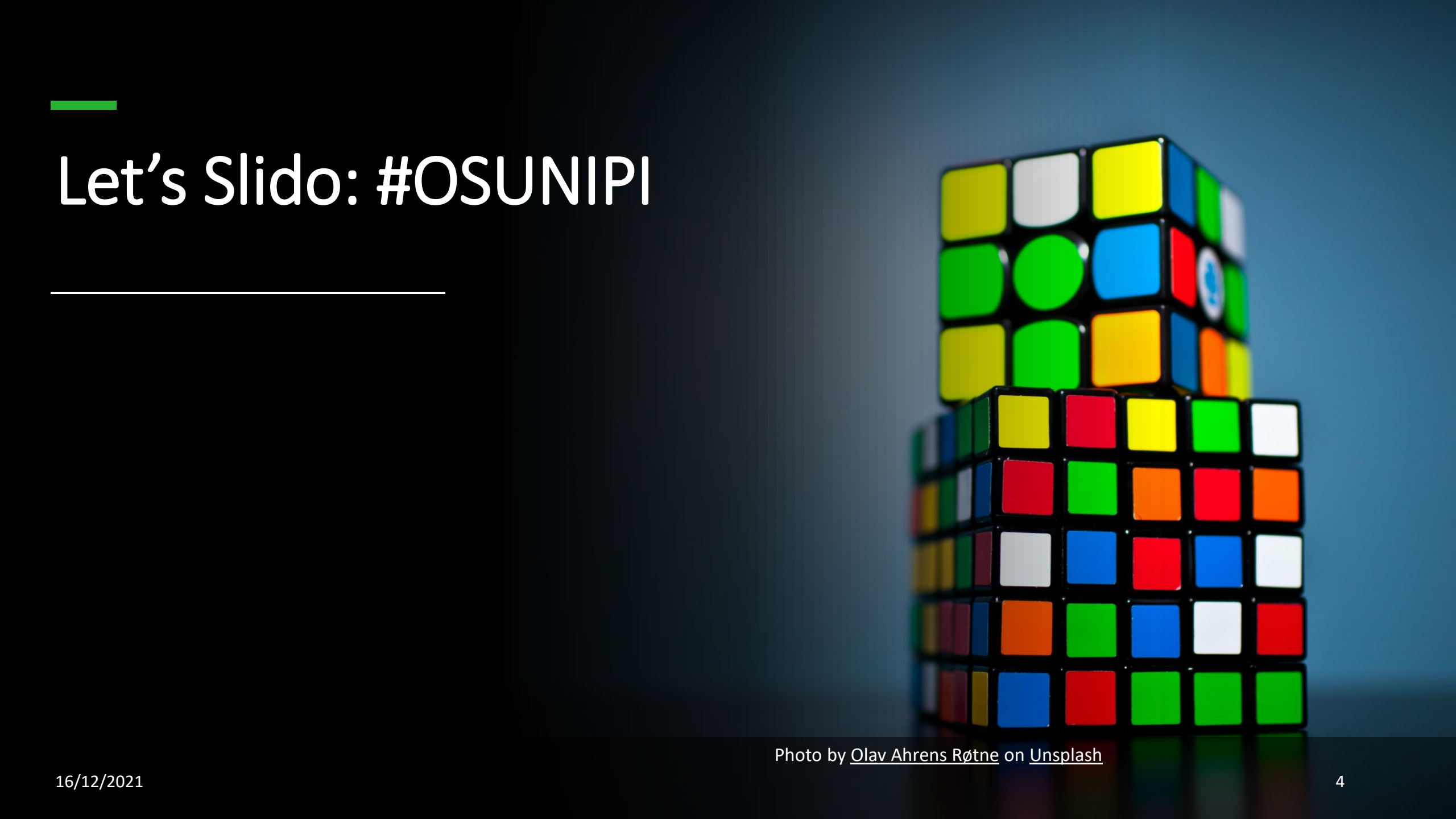


Photo by Olav Ahrens Røtne on Unsplash

Open Science

Policies

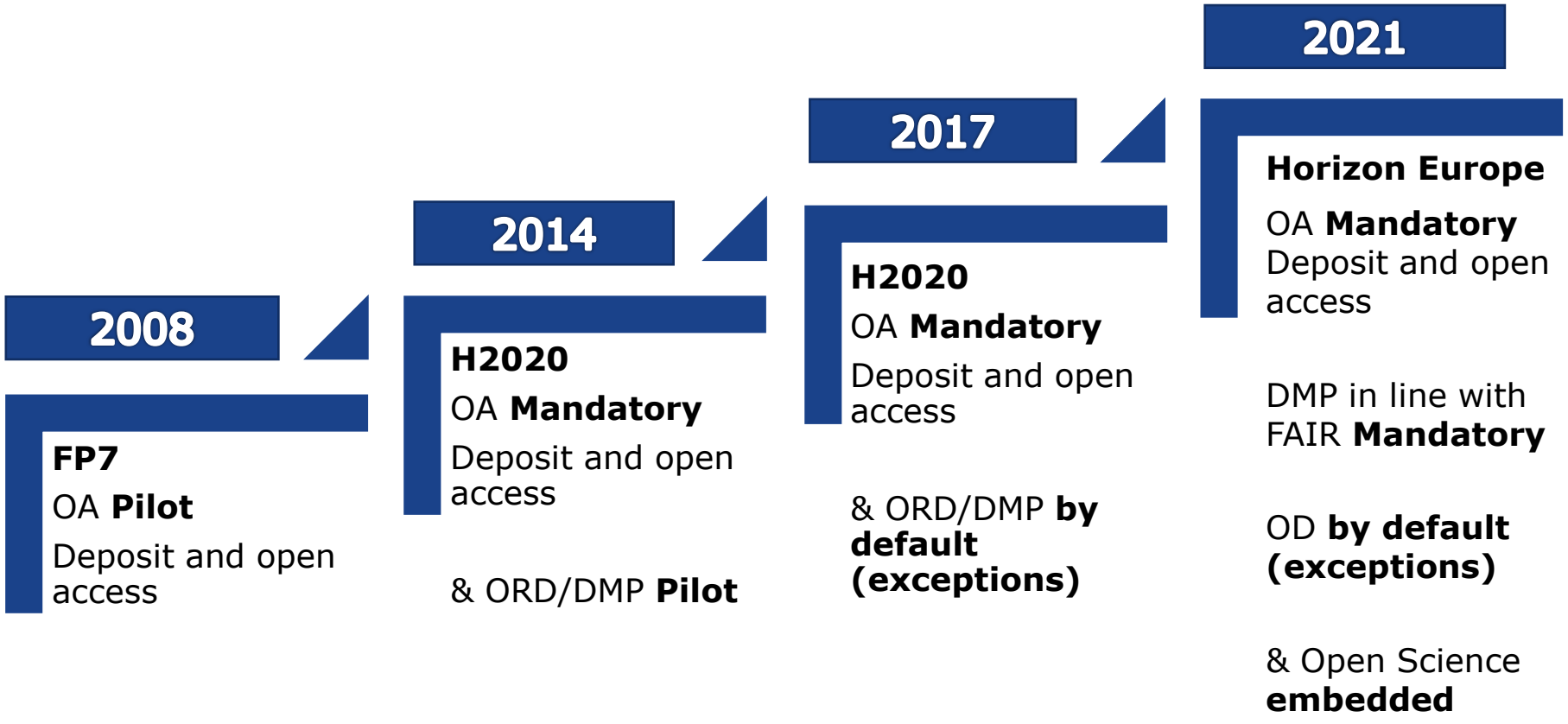
Definitions

Benefits

I am convinced that excellent science is the foundation of future prosperity, and that **openness is the key to excellence**. We are often told that it takes many decades for scientific breakthroughs to find commercial application.

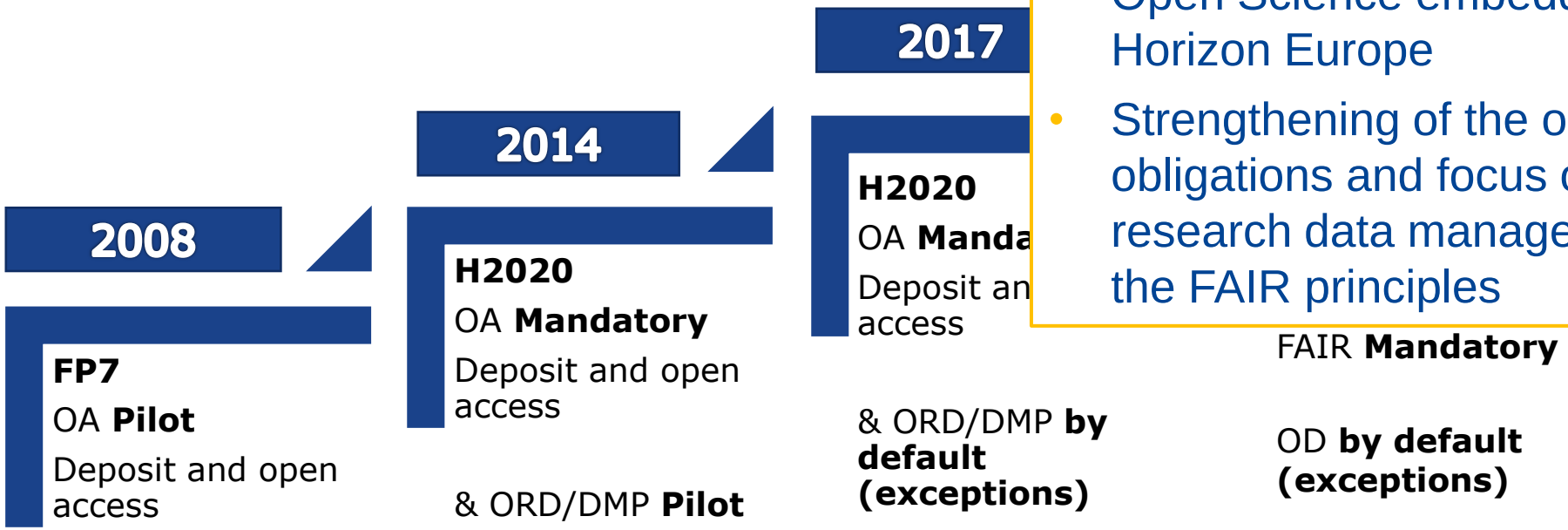
From 2014 until 2019, Moedas served as European Commissioner covering the portfolio of Research, Science and Innovation under the leadership of President Jean-Claude Juncker.

European Policies evolution



From «Fit for Purpose! Shaping Open Access and Open Science Policies for Horizon Europe» Victoria Tsoukala, PhD - DG RTD Open Science (Unit G4) - PUBMET 2019, Zadar, September 19th, 2019

European Policies evolution

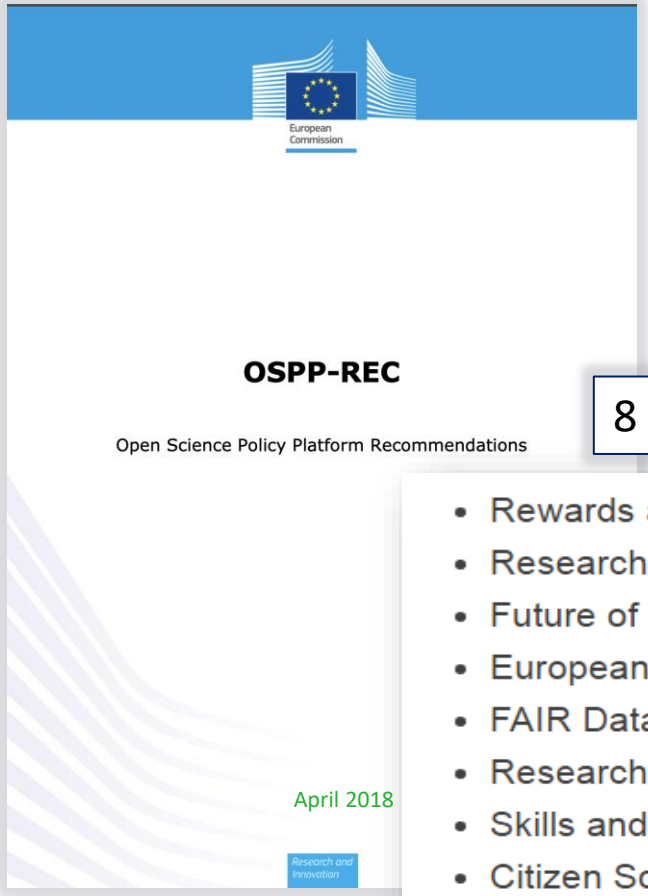


Under **Horizon Europe (2021)**

- Open Science embedded across Horizon Europe
- Strengthening of the open access obligations and focus on responsible research data management in line with the FAIR principles

From «Fit for Purpose! Shaping Open Access and Open Science Policies for Horizon Europe» Victoria Tsoukala, PhD - DG RTD Open Science (Unit G4) - PUBMET 2019, Zadar, September 19th, 2019

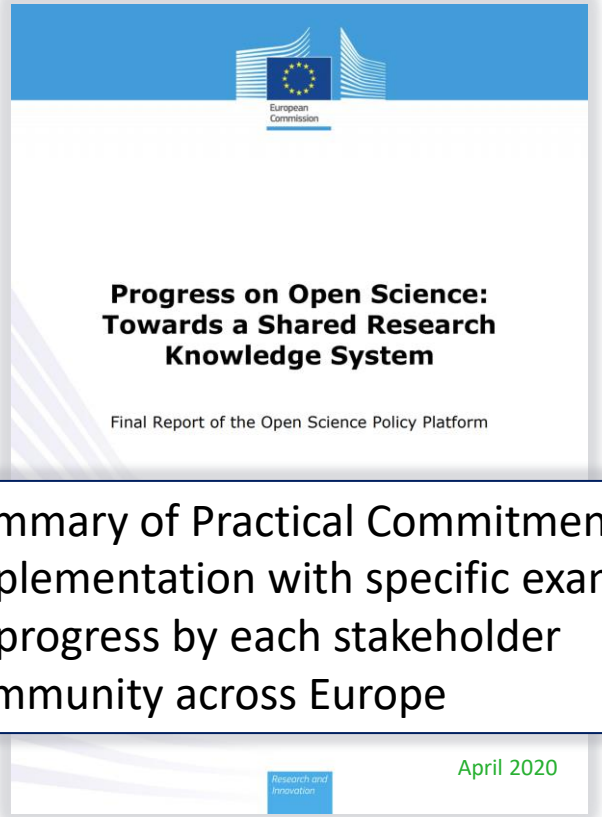
Open Science in Europe: Open Science Policy Platform



- Expert Group to provide advice about the development and implementation of open science policy in Europe (2016-2020)

8 priorities identified

- Rewards and Incentives
- Research Indicators and Next-Generation Metrics
- Future of Scholarly Communication
- European Open Science Cloud
- FAIR Data
- Research Integrity
- Skills and Education
- Citizen Science



Summary of Practical Commitments for Implementation with specific examples of progress by each stakeholder community across Europe

Open Science in Europe

April, 2018

EUROPEAN COMMISSION

National and Academic Policies on Open Access and Open Data

Brussels, 25.4.2018
C(2018) 2375 final

COMMISSION RECOMMENDATION

of 25.4.2018

on access to and preservation of scientific information

September 2017

Providing researchers with the skills and competencies they need to practise Open Science

Open Science Skills Working Group Report

Evaluation of Research Careers fully acknowledging Open Science Practices

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

Report on OS and careers, July 2017

Report, 2016

European Commission

Realising the European Open Science Cloud

First report and recommendations of the Commission High Level Expert Group on the European Open Science Cloud

Plan S

Accelerating the transition to full and immediate Open Access to scientific publications

September 2018

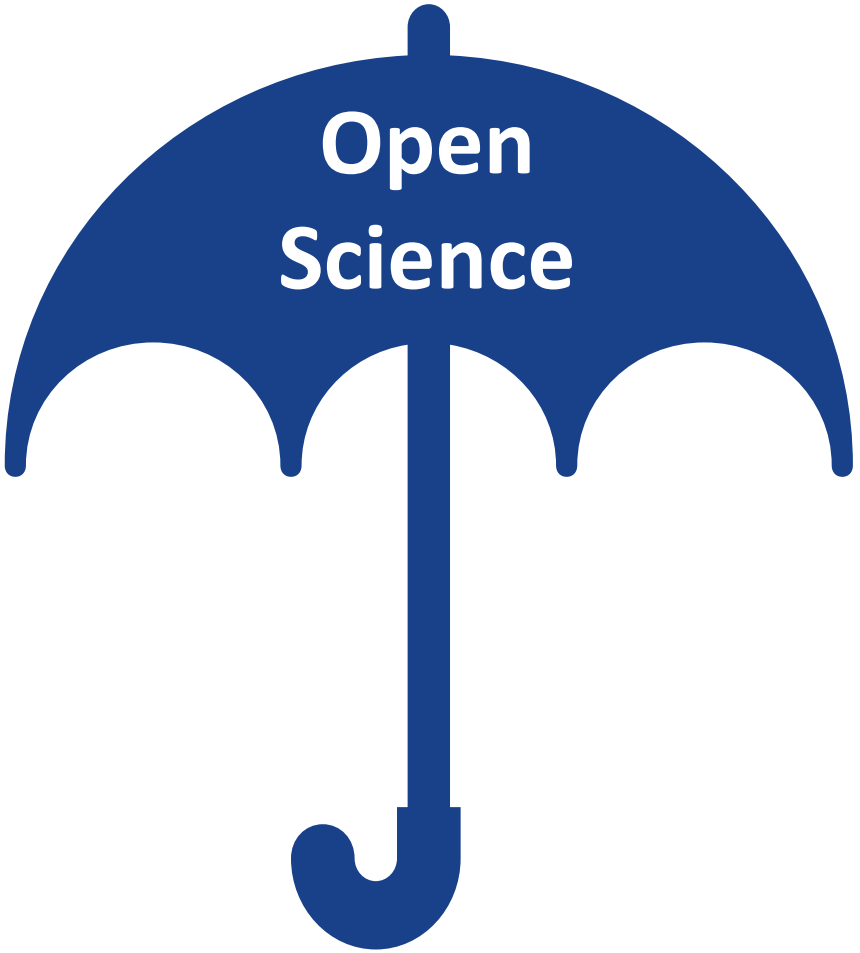
Open Science

Policies | **Definitions** | Benefits

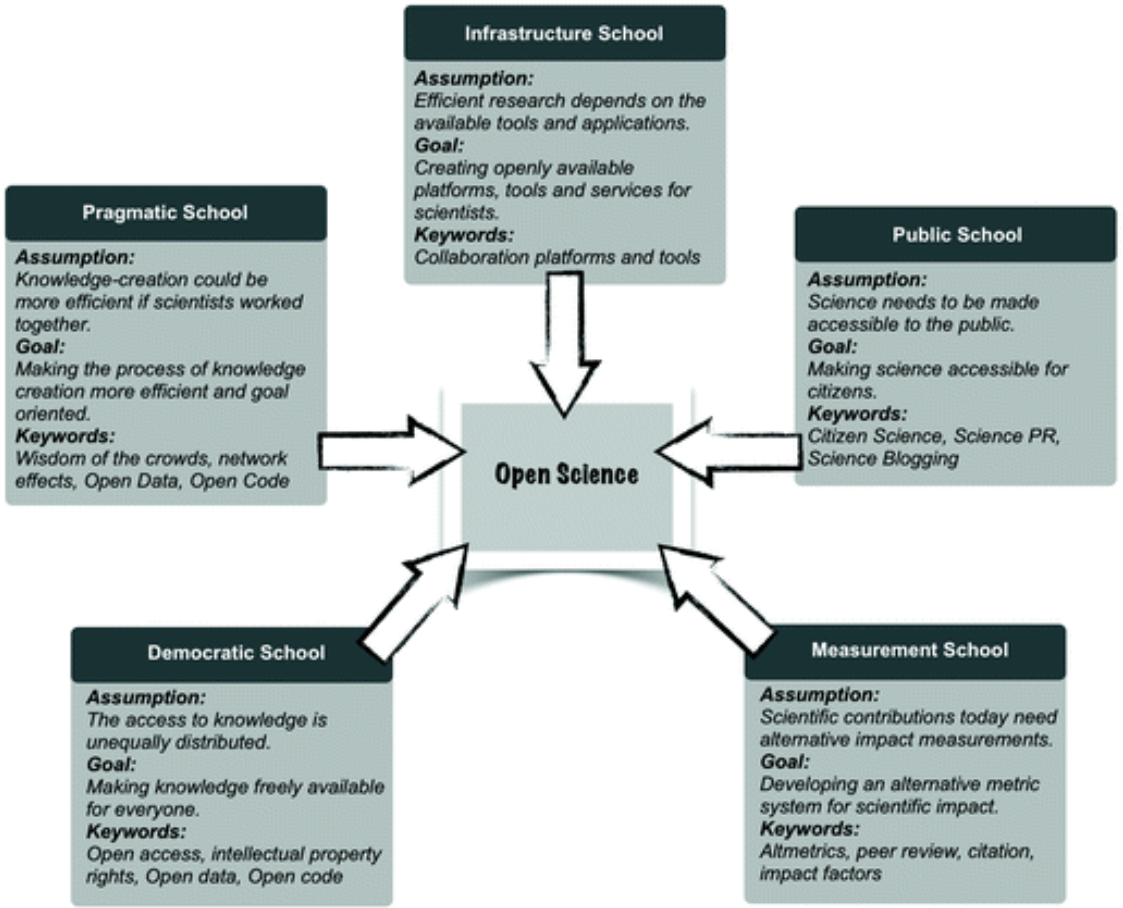
What is Open Science?

"Open Science represents a **new approach** to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools. The idea captures a **systemic change** to the way science and research have been carried out for the last fifty years: 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: One Term, Five Schools of Thought



*Fecher, Friesike (2013) DOI: 10.1007/978-3-319-00026-8_2

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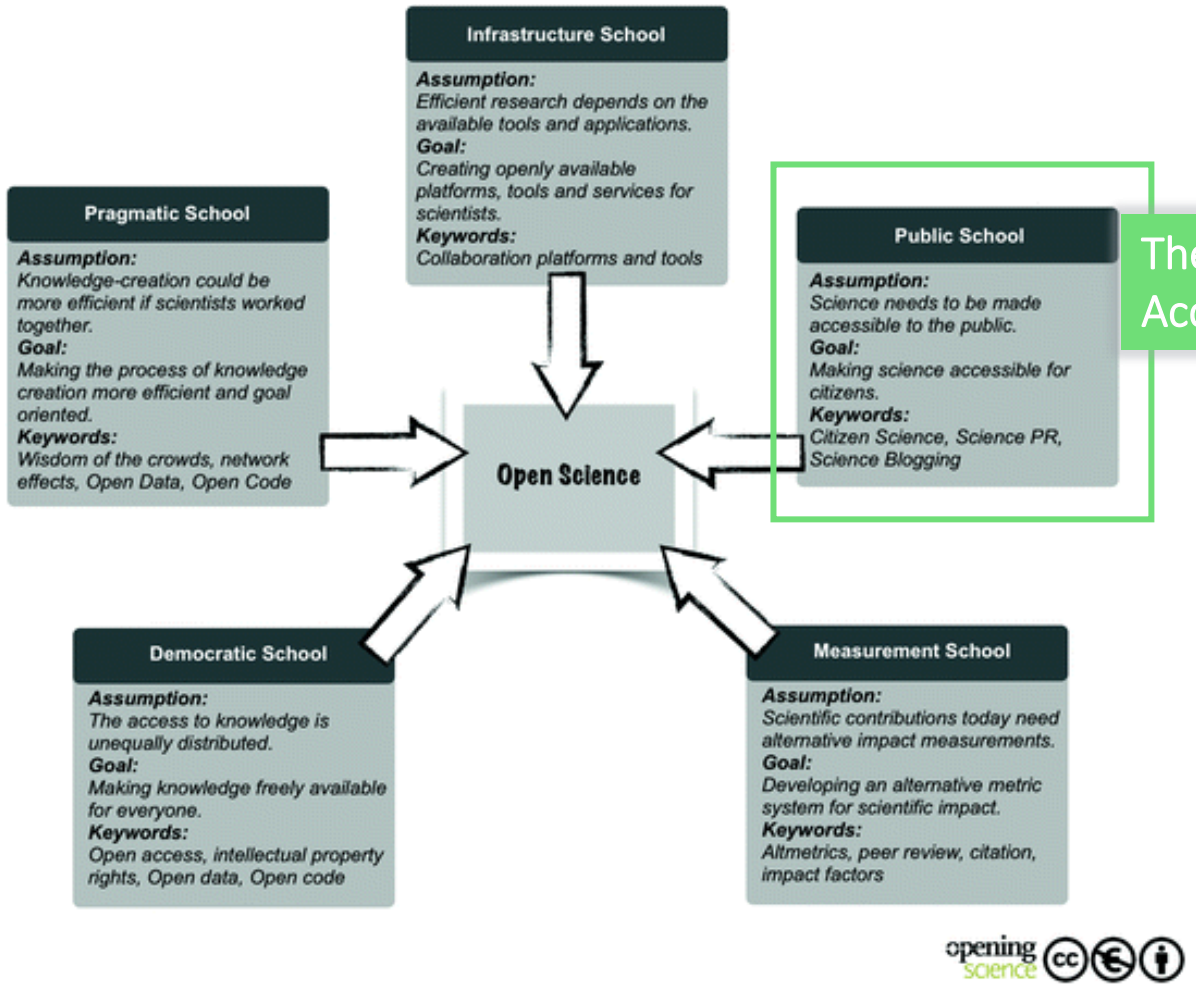

The Obligation to Make Science Accessible to the Public

- **accessibility** of the research process (the production) and **participation**
- **comprehensibility** of the research result (the product)

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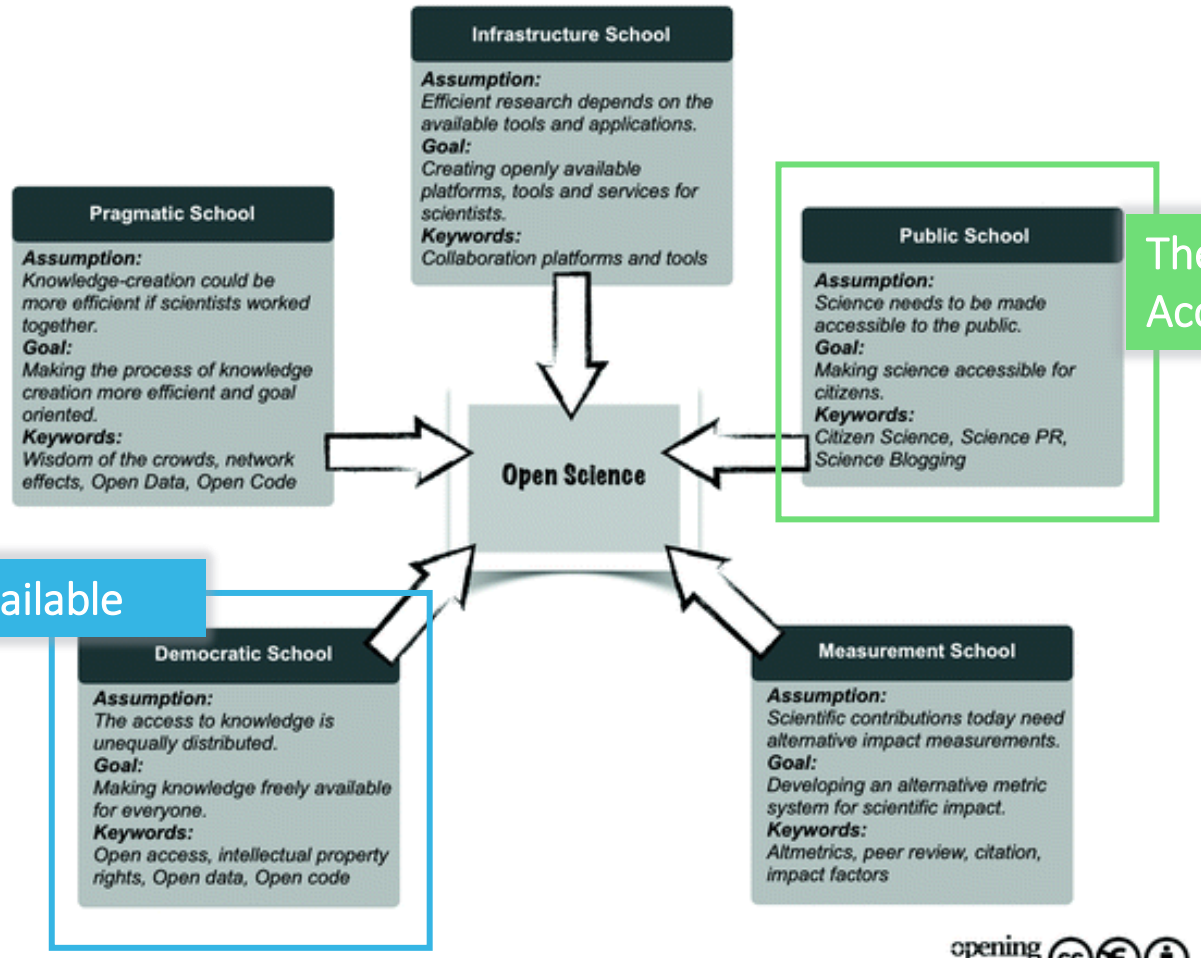

Making Research Products Available

- Research publications (**Open Access**)
- Scientific data (**Open Data**)

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opening science

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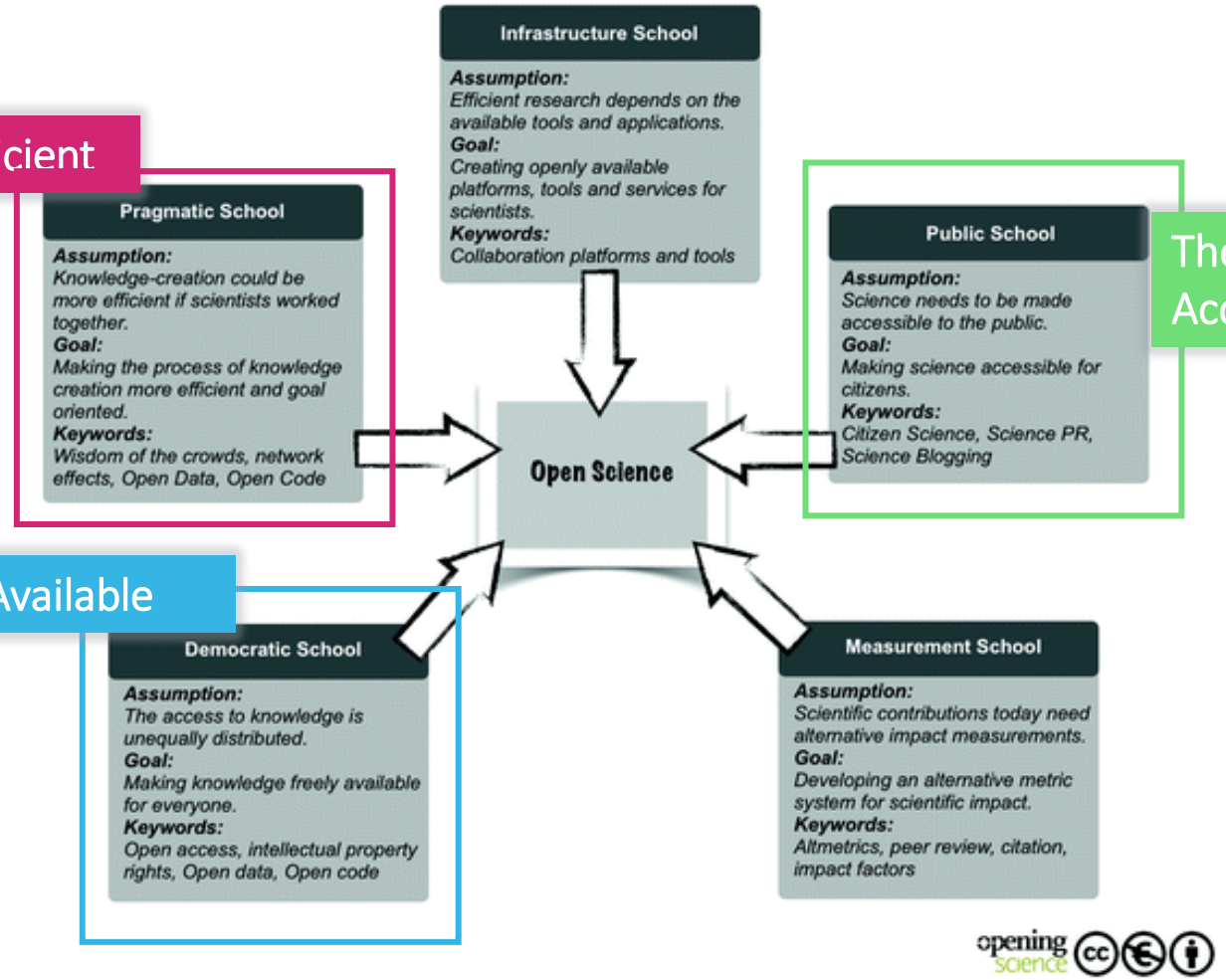
Making Research More Efficient

opening the scientific value chain (external knowledge, collaboration through online tools)

Making Research Products Available

Research publications (**Open Access**)

Scientific data (**Open Data**)



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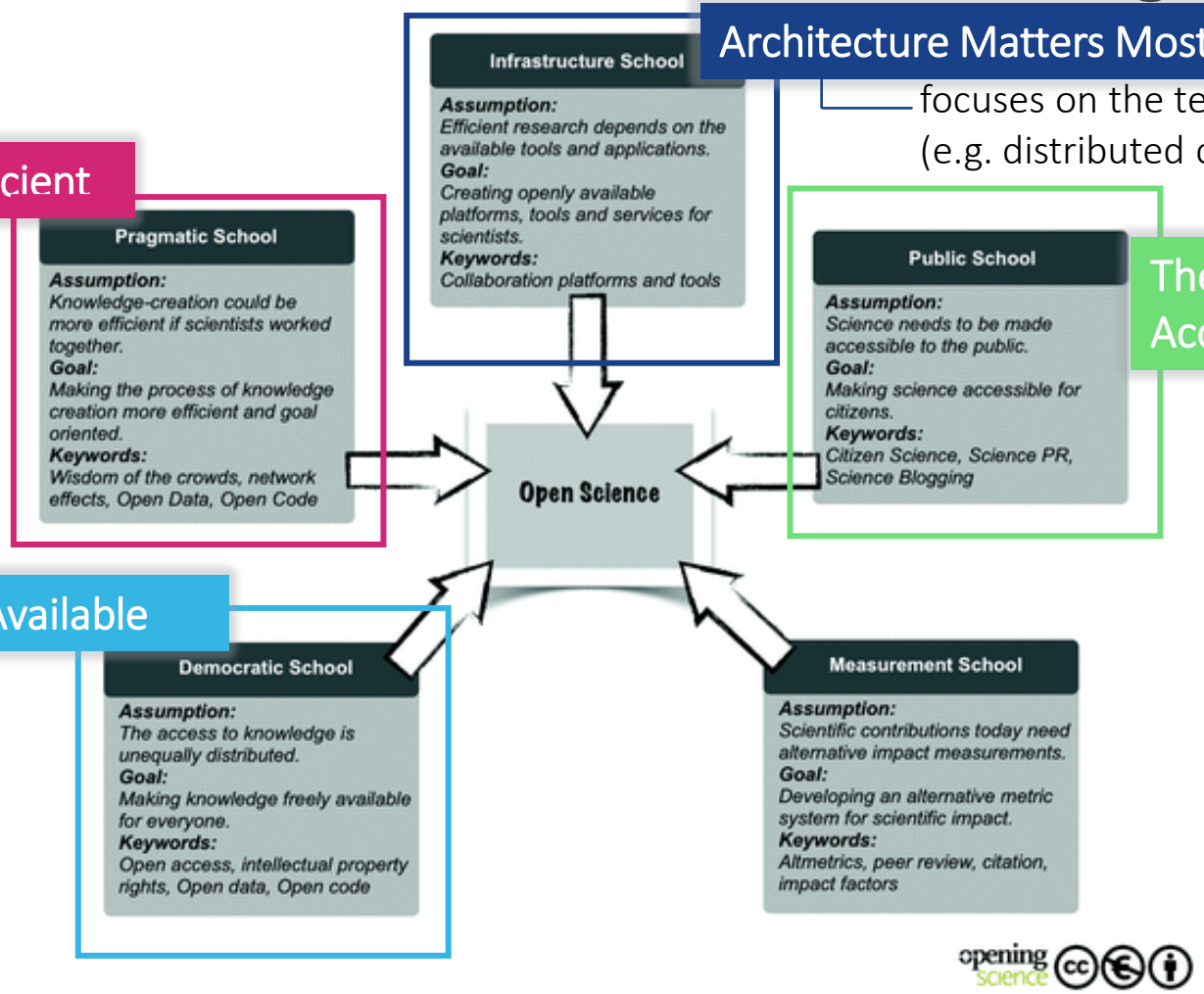

Architecture Matters Most

focuses on the technological requirements (e.g. distributed computing, social networks)

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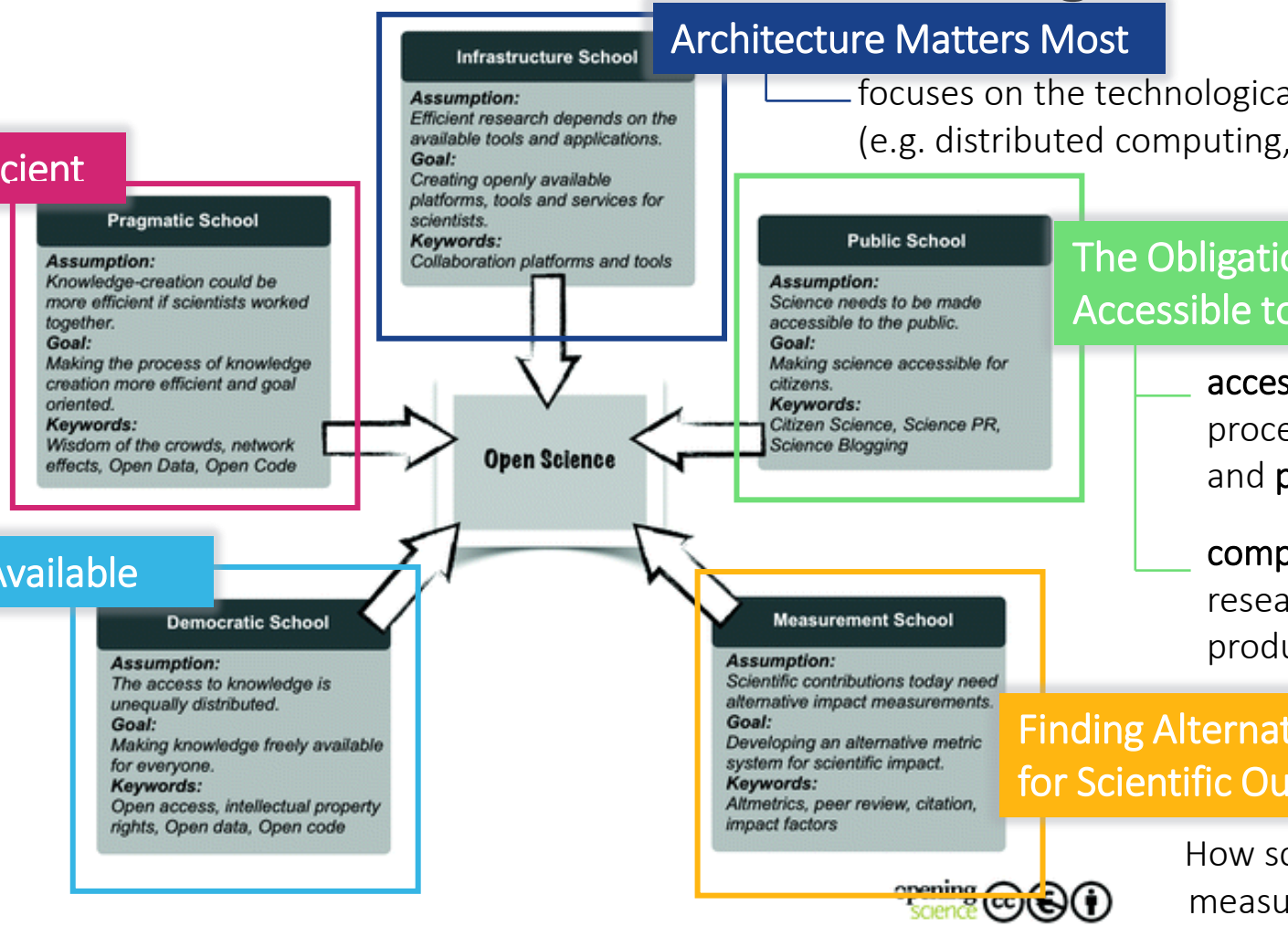

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The Obligation to Make Science Accessible to the Public

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comprehensibility of the research result (the product)

Finding Alternative Measurements for Scientific Output

How scientific impact can be measured in the digital age? (**Altmetrics**)

*Fecher, Friesike (2013) DOI: 10.1007/978-3-319-00026-8_2

What is Open Science?

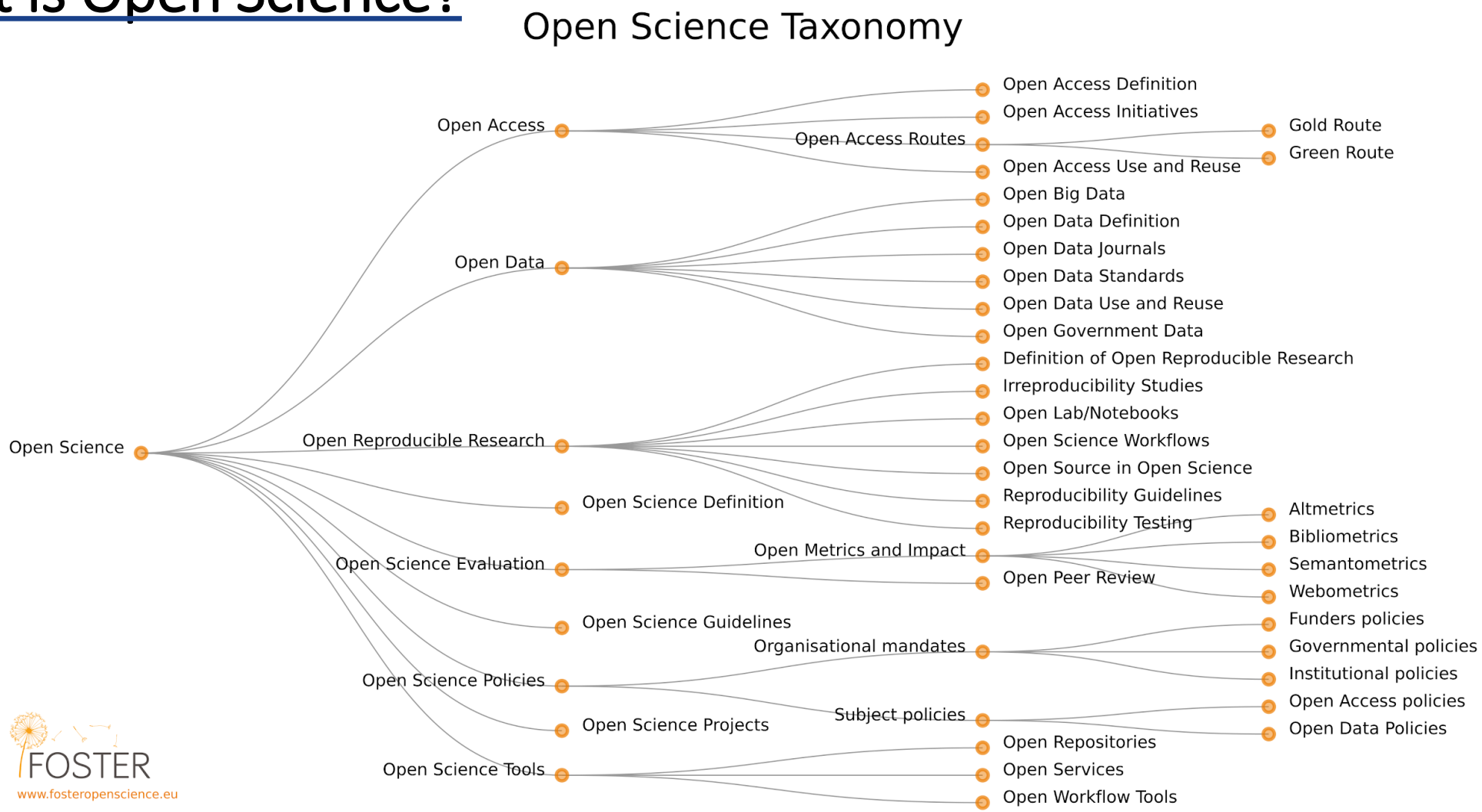
- ***Open Science*** *refers to a scientific culture that is characterized by its openness. Scientists share results almost immediately and with a very wide audience. (Bartling and Friesike, 2014)*
- ***Open Science*** *is not about dogma; it is about greater efficiency and productivity, more transparency and a better response to interdisciplinary research needs (Leru 2018)*
- ***Open Science*** *is a "movement which aims to make scientific research, data and dissemination accessible to all levels of an inquiring society" (FosterOpenScience.eu)*
- ***Open science*** *is the practice of making everything in the discovery process fully and openly available, creating transparency and driving further discovery by allowing others to build on existing work (Watson, 2015)*
- ***Open Science*** *is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods. In a nutshell, Open Science is transparent and accessible knowledge that is shared and developed through collaborative networks (Vicente-Sáez & Martínez-Fuentes 2018).*

Towards a definition of open science

four major goals

1. Public **accessibility** and **full transparency** of scientific communication
2. Public availability and **reusability of scientific data**
3. **Transparency** in experimental methodology, observation, and collection of data
4. Complete scientific **collaboration**

What is Open Science?

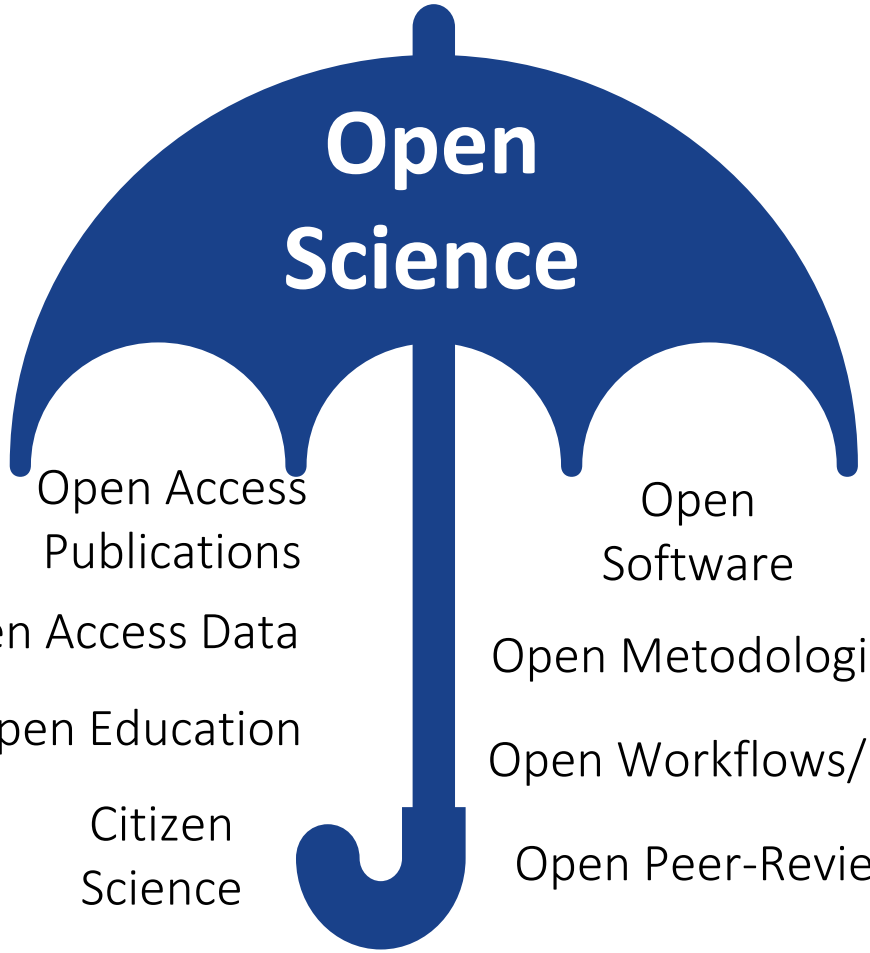


FOSTER
www.fosteropenscience.eu

What is Open Science?

Research Infrastructures

Research Integrity



Evaluation: Altmetrics

Open Science

Policies Definitions **Benefits**

How does science work?

Observation and/or problem definition

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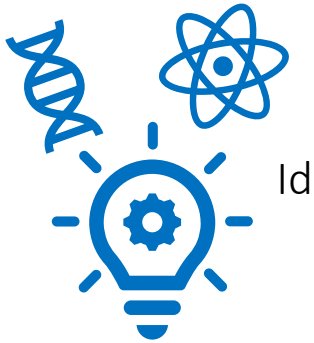

Idea

Observation and/or problem definition

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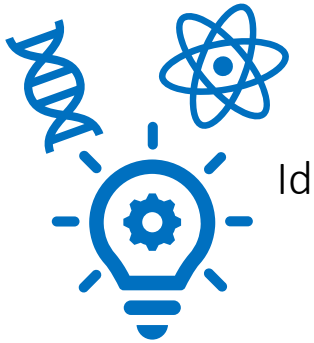

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Experiments

Observation and/or problem definition

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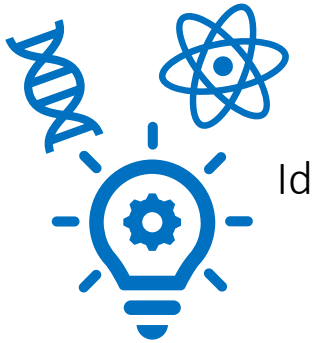

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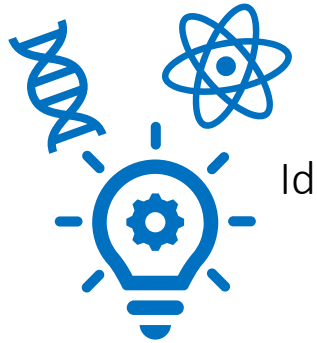


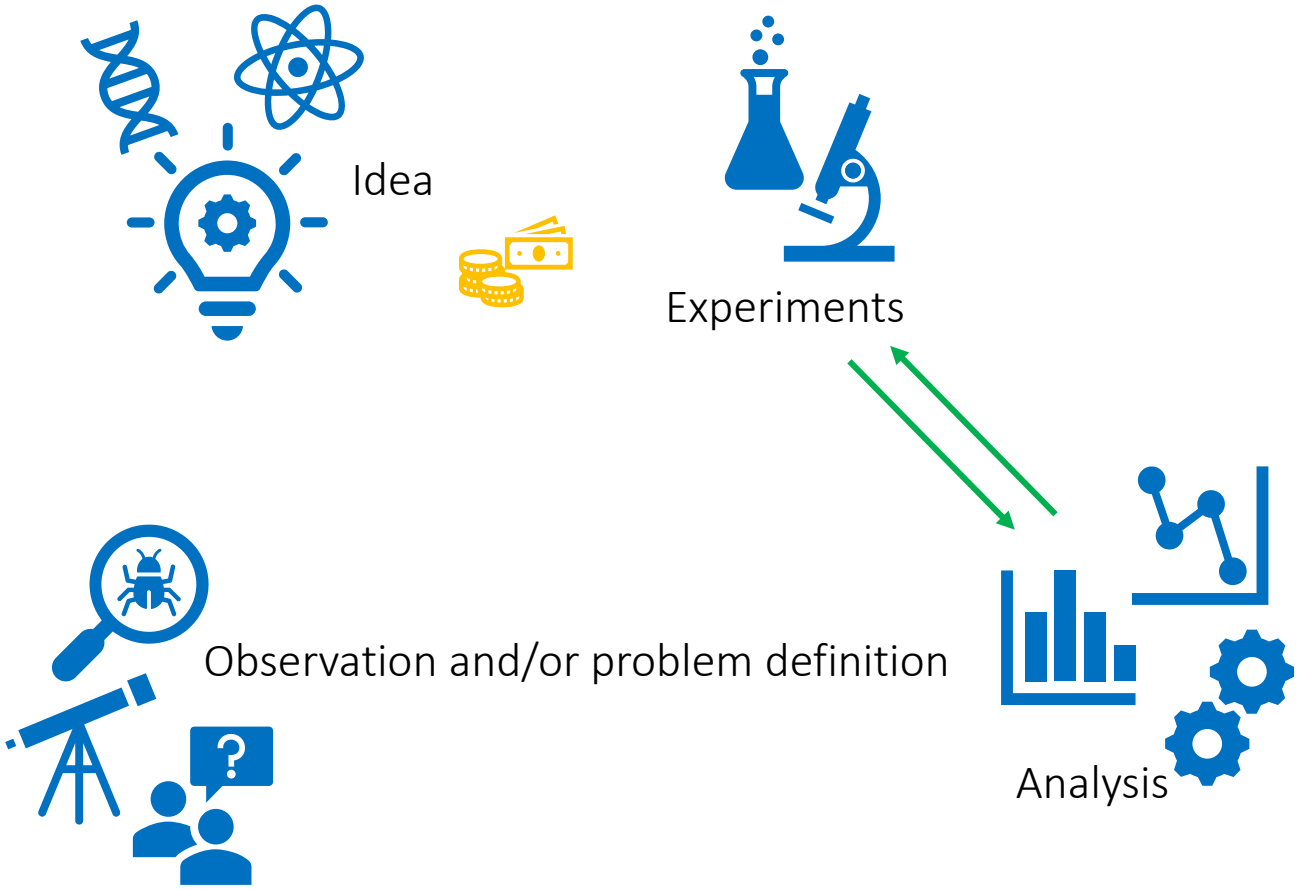
Idea

Experiments

Observation and/or problem definition

Analysis

How does science work?



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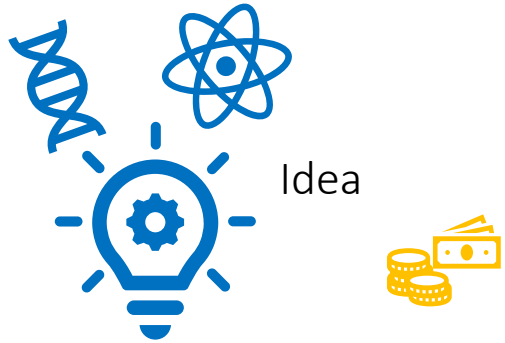
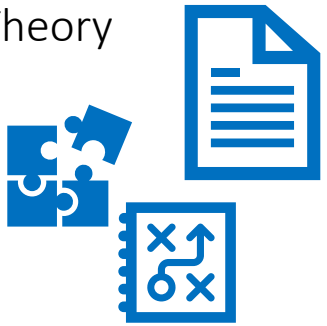


Idea

Experiments

Theory



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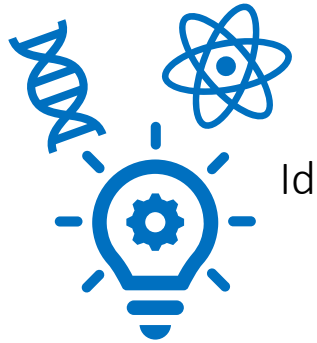

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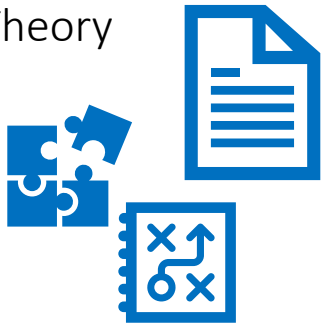


Communication

Observation and/or problem definition

Analysis

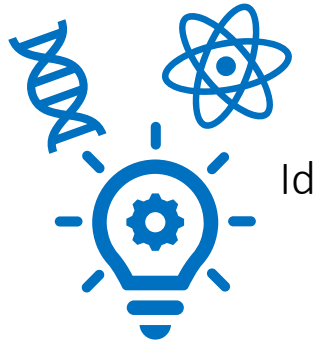
Science Communication in the past

Galileo wrote some of his essays in *volgare*

Faraday gave regular lectures at the Royal Institution about the last science progresses.
He initiated the **Christmas Lecture series** in 1825.
The lectures present scientific subjects to a general audience, including young people, in an informative and entertaining manner[1]

[1]https://en.wikipedia.org/wiki/Royal_Institution_Christmas_Lectures

How does science work?



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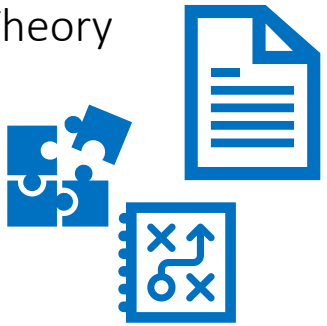
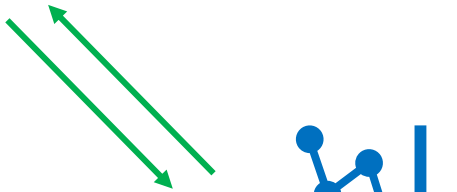


Communication

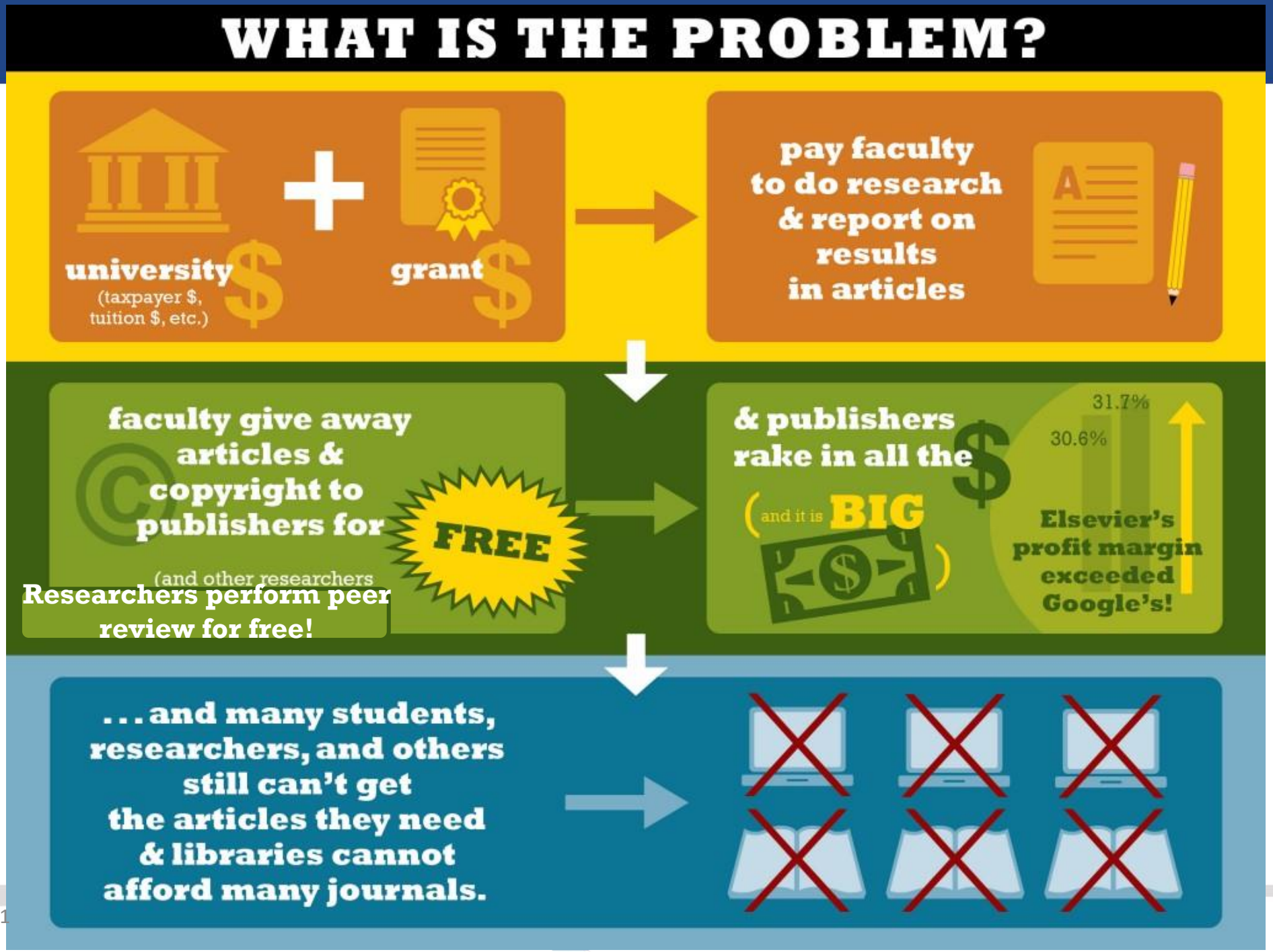


Observation and/or problem definition

Analysis

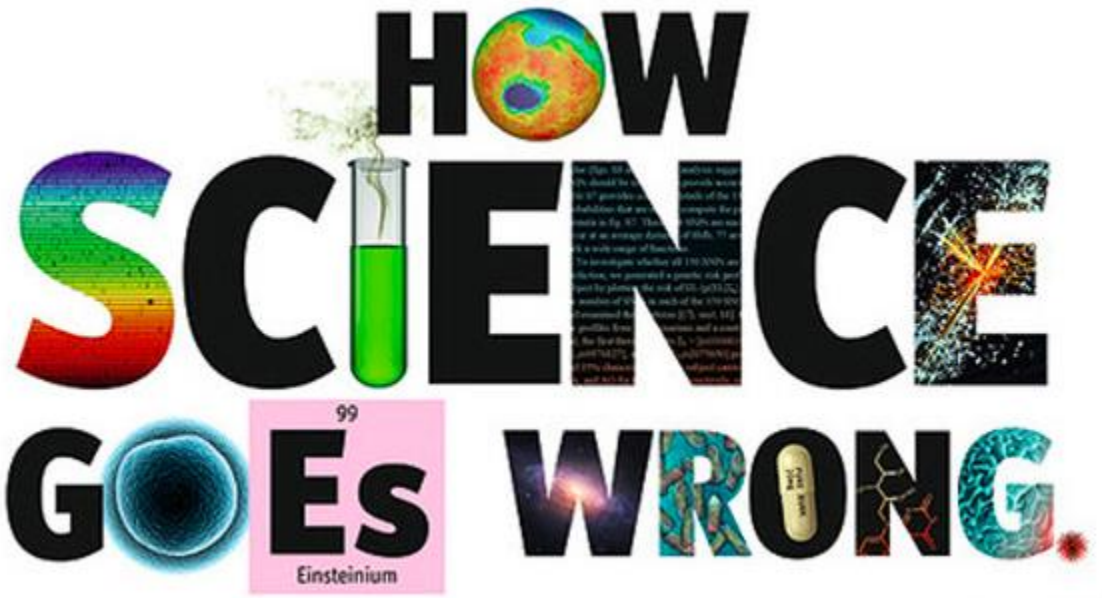
It's a business model

Scientific Journal *closed*



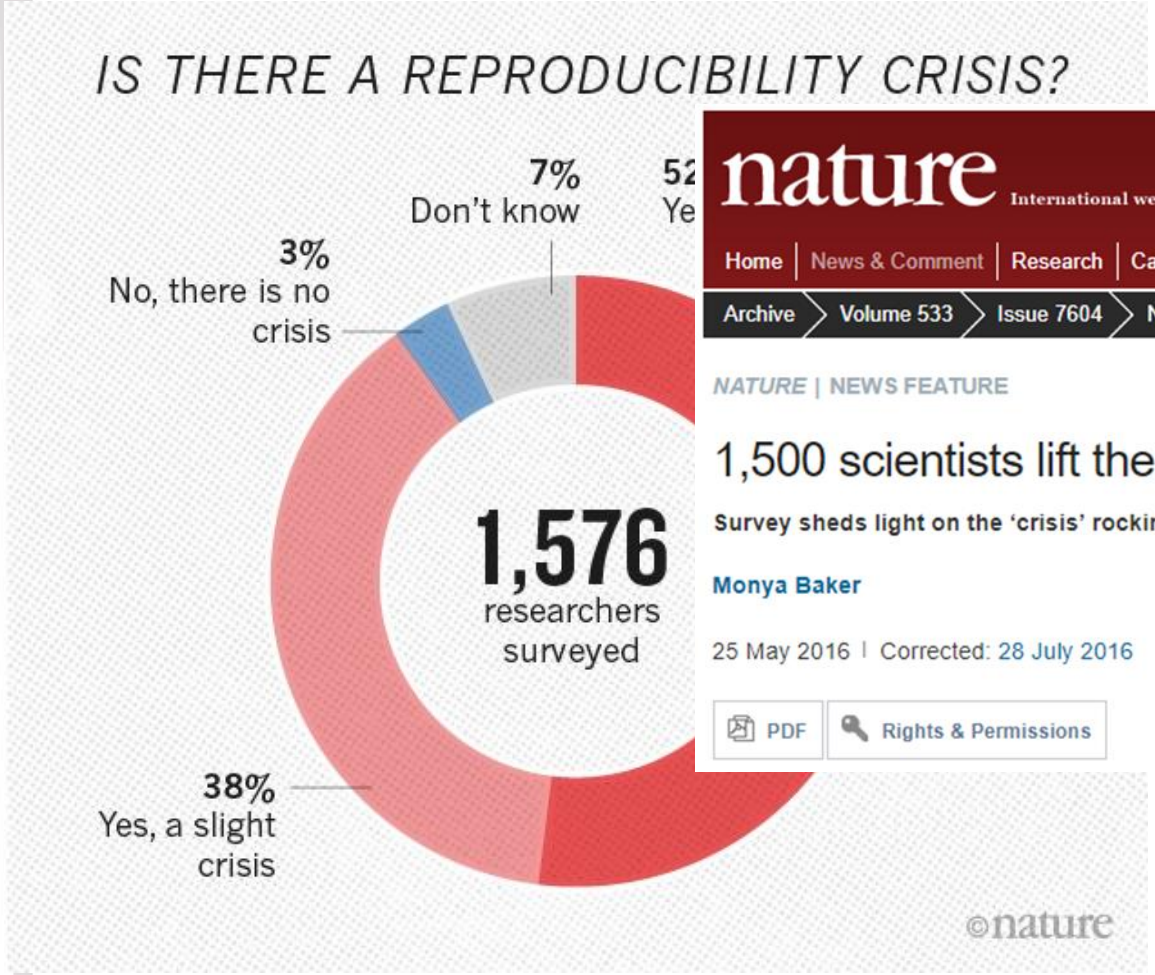
Researchers perform peer review for free!

Why the Science goes wrong?



- **Reproducibility**
- **Access Cost**
- **Evaluation Metrics**

Is there a reproducibility crisis?



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International weekly journal of science

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Archive > Volume 533 > Issue 7604 > News Feature > Article

NATURE | NEWS FEATURE

1,500 scientists lift the lid on reproducibility

Survey sheds light on the 'crisis' rocking research.

Monya Baker

25 May 2016 | Corrected: 28 July 2016

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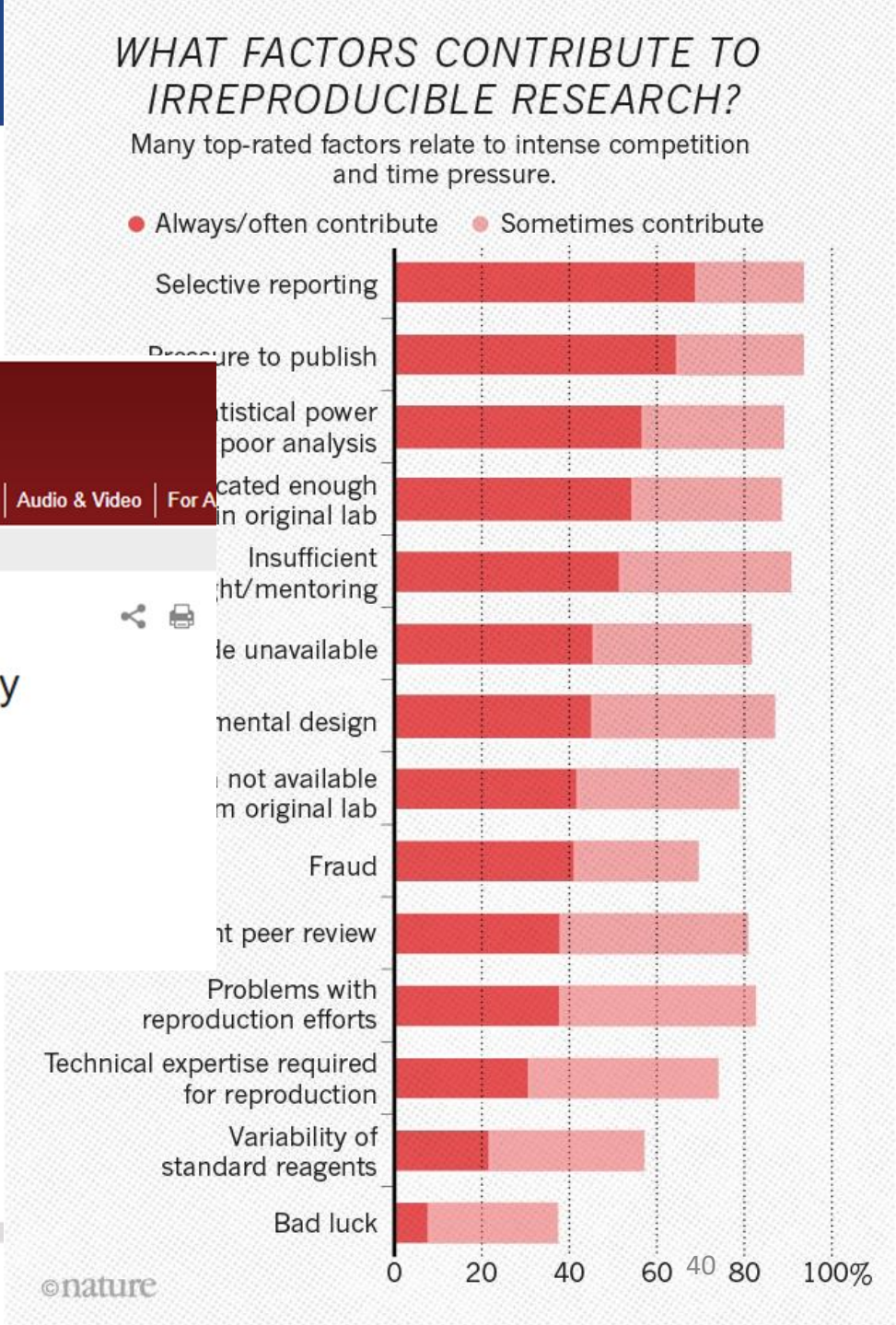

NATIONAL

Most Scientific Research Data From the 1990s Is Lost Forever

A new study has found that as much as 80 percent of the raw scientific data collected by researchers in the early 1990s is gone forever, mostly because no one knows where to find it.

DANIELLE WIENER-BRONNER DEC 23, 2013

Highlights

- We examined the availability of data from 516 studies between 2 and 22 years old
- The odds of a data set being reported as extant fell by 17% per year
- Broken e-mails and obsolete storage devices were the main obstacles to data sharing
- Policies mandating data archiving at publication are clearly needed

Current Biology

REPORT | VOLUME 24, ISSUE 1, P94-97, JANUARY 06, 2014

The Availability of Research Data Declines Rapidly with Article Age

Timothy H. Vines • Arianne Y.K. Albert • Rose L. Andrew • ... Jean-Sébastien Moore • Sébastien Renaut • Diana J. Rennison • Show all authors

Open Archive • Published: December 19, 2013 • DOI: https://doi.org/10.1016/j.cub.2013.11.014 •

https://www.cell.com/current-biology/fulltext/S0960-9822(13)01400-0

File Drawers effect

It’s a bias that occurs when authors are more likely to submit positive results than negative or inconclusive results. The term arose from the image that these nonsignificant results are placed in researchers’ file drawers, never to be seen by others

or editors are more likely to accept positive results than negative or inconclusive results

the results available provide a biased portrayal

Access cost for Academia: Paywall

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Open access scientific publishing

Harvard University says it can't afford journal publishers' prices

University wants scientists to make their research open access and resign from publications that keep articles behind paywalls

Ian Sample, *science correspondent*

@iansample

Tue 24 Apr 2012 17.45 BST

which bill the library around $3.5m a year

THE WORLD UNIVERSITY RANKINGS

PROFESSIONAL | JOBS | EVENTS | RANKINGS | STUDENT | AB

UK universities 'paid big publishers £1 billion' in past decade

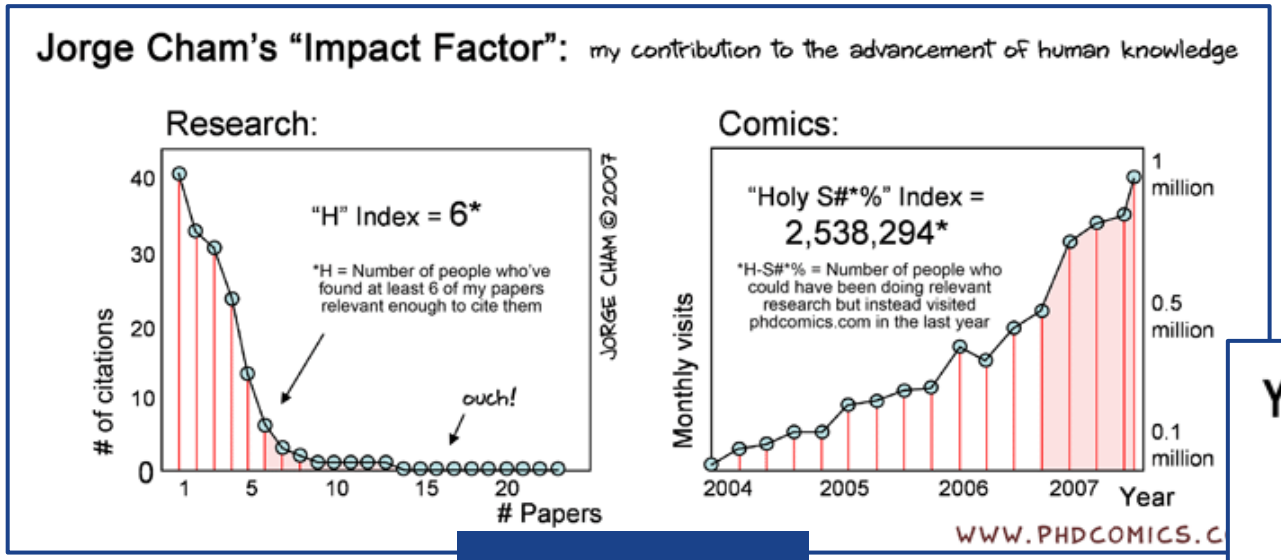
Huge bill for journal access revealed as UK institutions begin strategy talks over Elsevier renewal deal

March 12, 2020

By Jack Grove

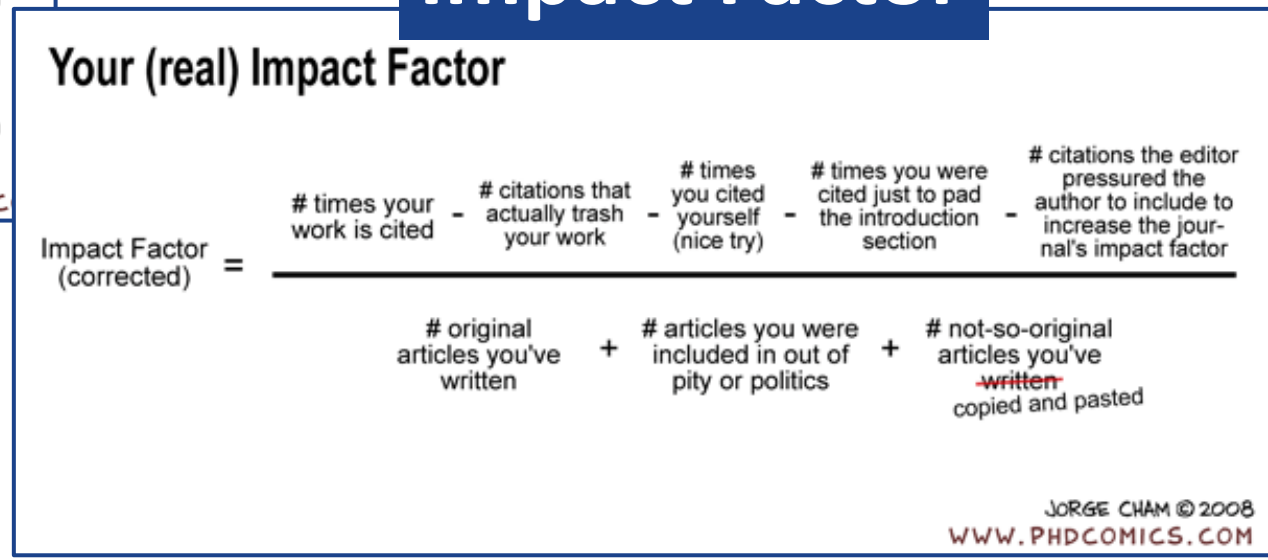
Twitter: @jgro_the

Evaluation metrics



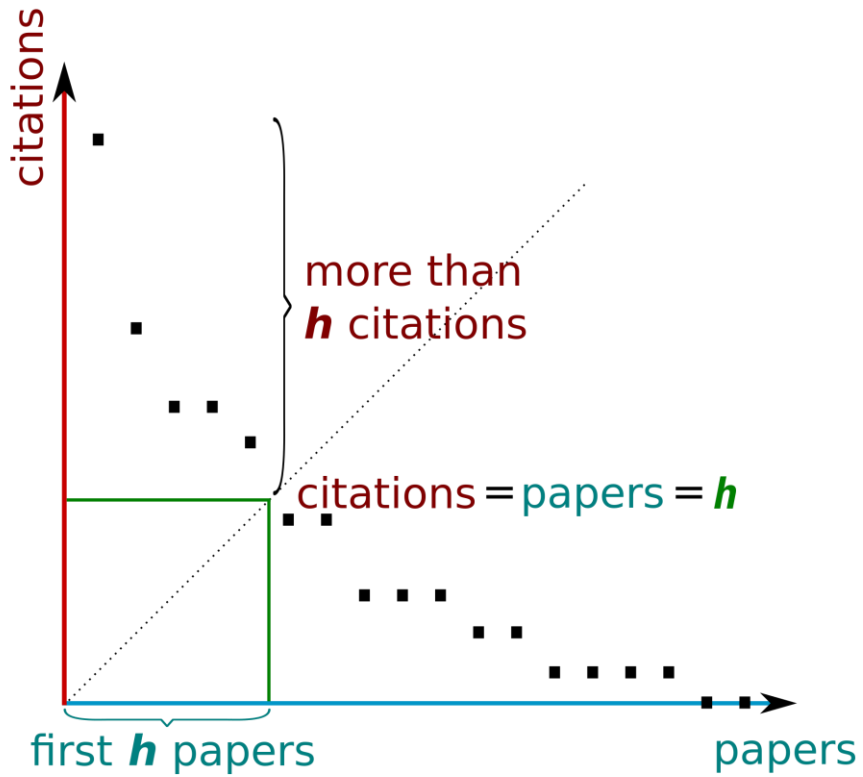
H-Index

Impact Factor



https://en.wikipedia.org/wiki/Piled_Higher_and_Deeper

H-INDEX



Number of citations: H-index

The index is based on the set of the scientist's **most cited papers** and the **number of citations** that they have received in other publications.

The *h*-index is defined as the maximum value of *h* such that the given author/journal has published *h* papers that have each been cited at least *h* times.

Simply put, if an author's *h*-index is *n*, then the author has *n* publications that each have at least *n* citations, where *n* is as great as it can be. For example, if an author's *h*-index is 8, that means eight of their publications each have at least eight citations (and any remaining publications by the author have fewer than eight citations)

Source: Wikipedia

H-INDEX: critical points

Number of citations: H-index

The index is designed to improve upon simpler measures such as the total number of citations or publications

however…

- It puts a disadvantage the early careeer scientists
- It does not take into account the context of citations (good vs bad) nor the self-citations
- It does not take into account how many authors an article has and the real contribute of each of them to the research
- It seems to amplify the outcomes of big collaborations
- It works best when comparing scholars working in the same field, since citation conventions differ widely among different fields

Source: Wikipedia

Impact Factor

Performance Indicator of the Journal

It reflects the yearly average number of citations of articles published in the last two years in a given journal.

In a given year, the IF of a journal is the average number of citations received per article published in that journal during the 2 preceding years.

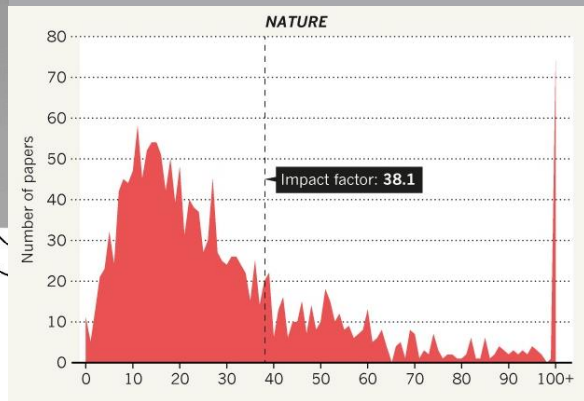
It is frequently used as a proxy for the relative importance of a journal within its field; journals with higher impact factor values are often deemed to be more important, or carry more intrinsic prestige in their respective fields, than those with lower values.

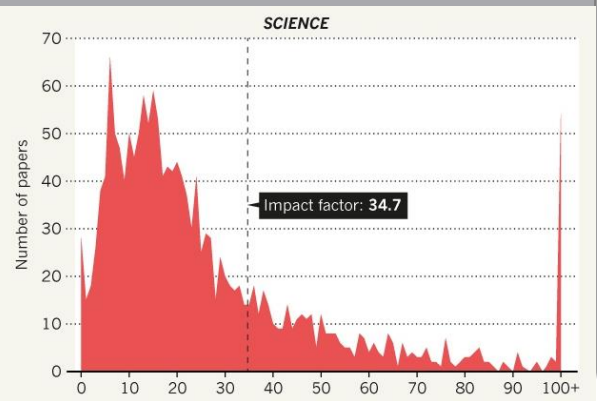
In a given year, the two-year journal impact factor is the ratio between the number of citations received in that year for publications in that journal that were published in the two preceding years and the total number of "citable items" published in that journal during the two preceding years

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

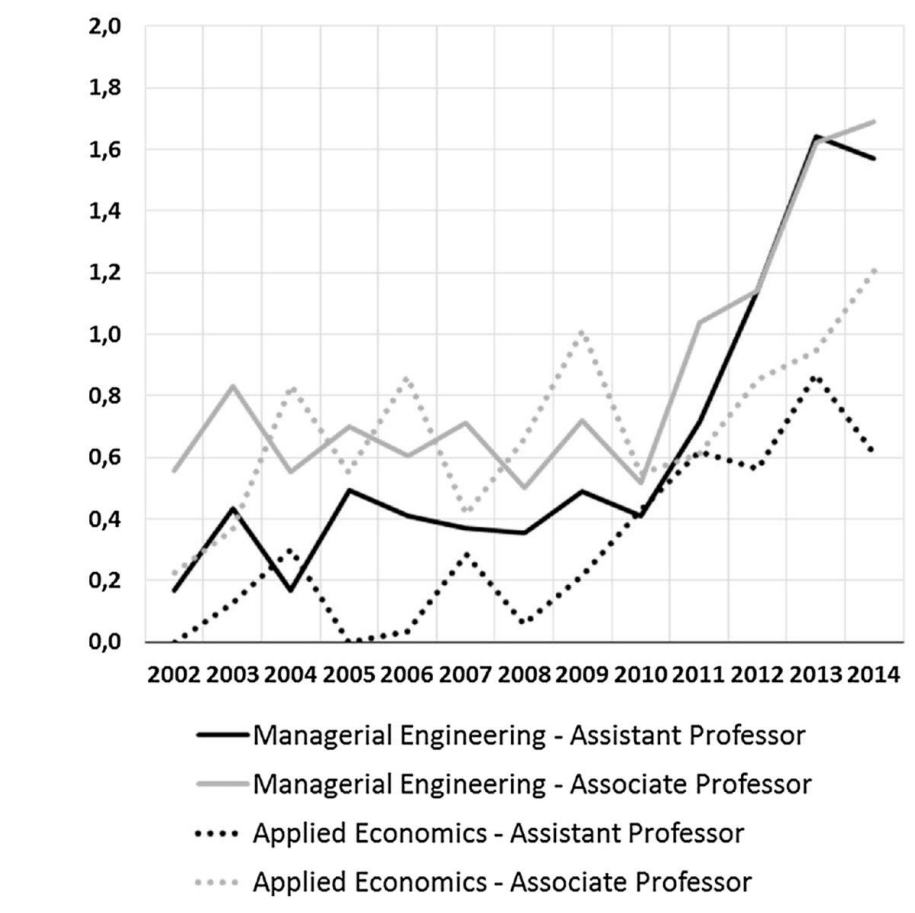
Impact Factor: critical points

- The mantra ‘publish or perish’ is dead, replaced by ‘publish and perish’
- It’s about the Journal and not the single paper
- Take in consideration only the impact inside the academia
- It’s an average





Impact factor: critical points



When in 2010 Italian universities incorporated citations in promotion decisions, self-citation rates among social scientists went up by 81-179%

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Self-citations as strategic response to the use of metrics for career decisions

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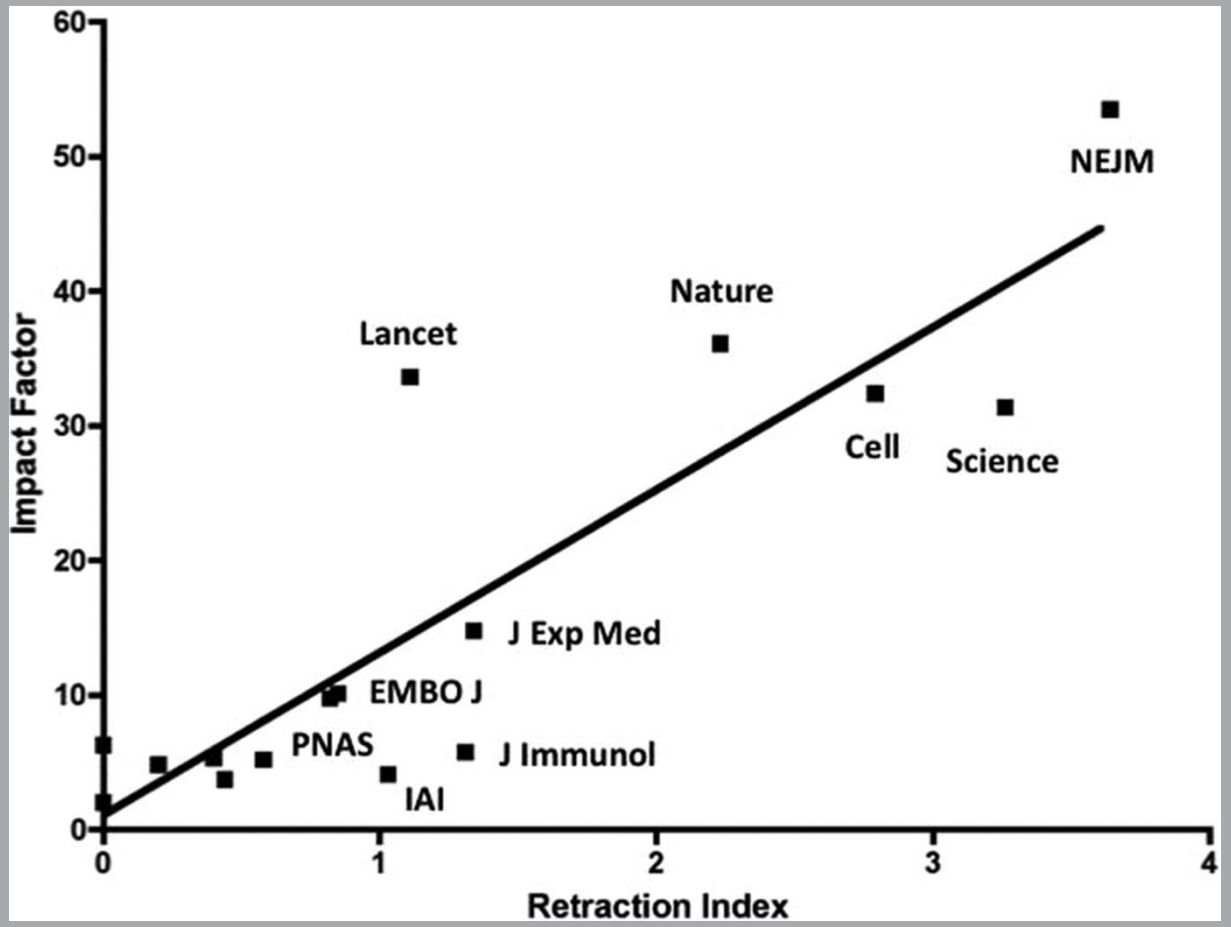
ARTICLE INFO

Keywords:
Self-citations
Post-production misconducts
Incentives in science
Strategic scientists
Sociology of science
Economics of science

ABSTRACT

There is limited knowledge on the extent to which scientists may strategically respond to metrics by adopting questionable practices, namely practices that challenge the scientific ethos, and the individual and contextual factors that affect their likelihood. This article aims to fill these gaps by studying the opportunistic use of self-citations, i.e. citations of one's own work to boost metric scores. Based on sociological and economic literature exploring the factors driving scientists' behaviour, we develop hypotheses on the predictors of strategic increase in self-citations. We test the hypotheses in the Italian Higher Education system, where promotion to professorial positions is regulated by a national habilitation procedure that considers the number of publications and citations received. The sample includes 886 scientists from four of science's main disciplinary sectors, employs different metrics approaches, and covers an observation period beginning in 2002 and ending in 2014. We find that the introduction of a regulation that links the possibility of career advancement to the number of citations received is related to a strong and significant increase in self-citations among scientists who can benefit the most from increasing citations, namely assistant professors, associate professors and relatively less cited scientists, and in particular among social scientists. Our findings suggest that while metrics are introduced to spur virtuous behaviours, when not properly designed they favour the usage of questionable practices.

Impact factor: critical points



Correlation between impact factor and retraction index. The 2010 journal impact factor (37) is plotted against the retraction index as a measure of the frequency of retracted articles from 2001 to 2010 (see text for details). Journals analyzed were *Cell*, *EMBO Journal*, *FEMS Microbiology Letters*, *Infection and Immunity*, *Journal of Bacteriology*, *Journal of Biological Chemistry*, *Journal of Experimental Medicine*, *Journal of Immunology*, *Journal of Infectious Diseases*, *Journal of Virology*, *Lancet*, *Microbial Pathogenesis*, *Molecular Microbiology*, *Nature*, *New England Journal of Medicine*, *PNAS*, and *Science*.

Why do we need Open Science?

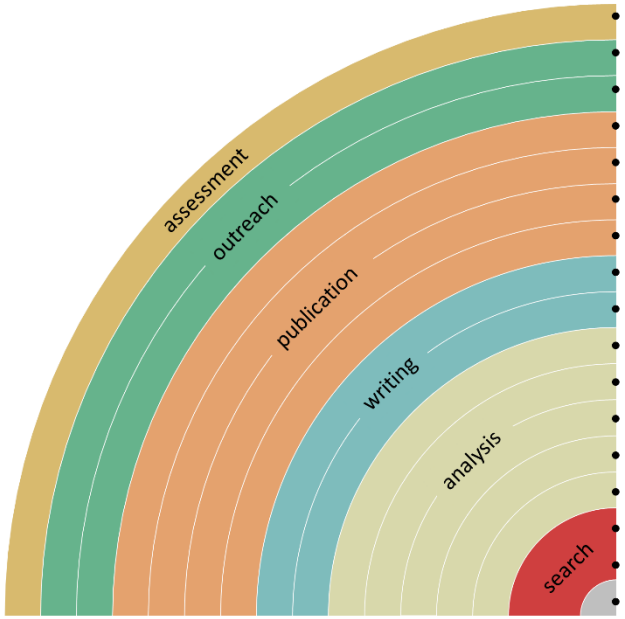
*"**Open Science**" means an approach to the scientific process based on open cooperative work, tools and diffusing knowledge*

(Horizon Europe Regulation and Model Grant Agreement)

- Open Science has the potential to increase
  - **Quality & efficiency of R&I**, if all the produced results are shared, made reusable, and if their reproducibility is improved
  - **Creativity**, through collective intelligence and cross-disciplinary research that does not require laborious data wrangling
  - **Trust** in the science system, by engaging both researchers & citizens

Open Science in your research activities

You can make your workflow more open by …



- adding alternative evaluation, e.g. with altmetrics
- communicating through social media, e.g. Twitter
- sharing posters & presentations, e.g. at FigShare
- using open licenses, e.g. CC0 or CC-BY
- publishing open access, 'green' or 'gold'
- using open peer review, e.g. at journals or PubPeer
- sharing preprints, e.g. at OSF, arXiv or bioRxiv
- using actionable formats, e.g. with Jupyter or CoCalc
- open XML-drafting, e.g. at Overleaf or Authorea
- sharing protocols & workfl., e.g. at Protocols.io
- sharing notebooks, e.g. at OpenNotebookScience
- sharing code, e.g. at GitHub with GNU/MIT license
- sharing data, e.g. at Dryad, Zenodo or Dataverse
- pre-registering, e.g. at OSF or AsPredicted
- commenting openly, e.g. with Hypothes.is
- using shared reference libraries, e.g. with Zotero
- sharing (grant) proposals, e.g. at RIO

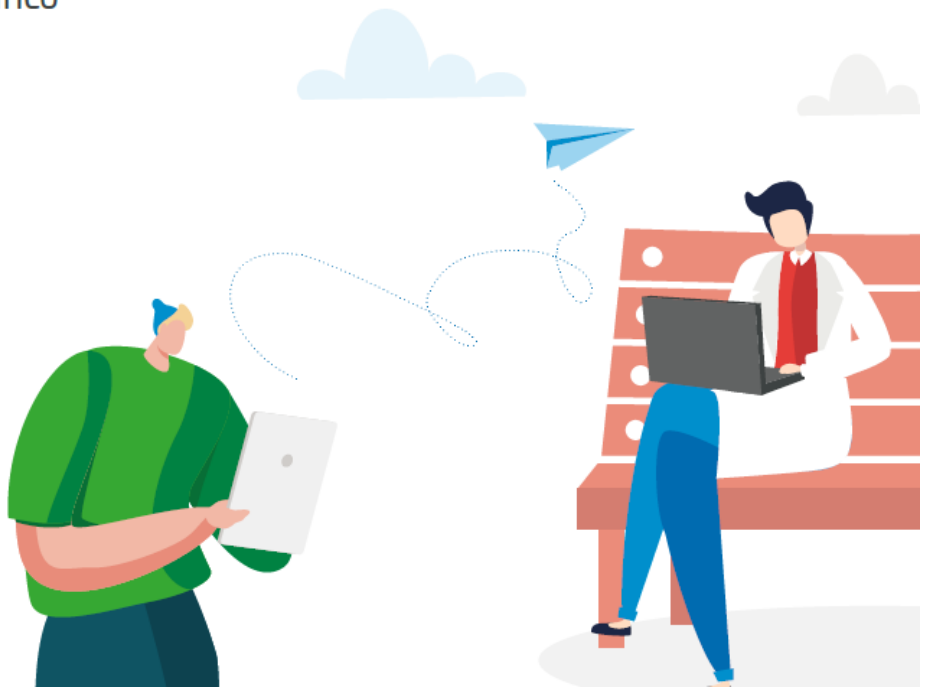
DOI: 10.5281/zenodo.1147025

Le pratiche dell'Open Science in Proposta

In cosa consistono le pratiche di scienza aperta

In che cosa consistono le pratiche di scienza aperta?

- Accesso aperto ai prodotti della ricerca quali pubblicazioni, dati, software, modelli, algoritmi e flussi di lavoro
- Condivisione precoce e aperta della ricerca, ad esempio mediante preregistrazione, relazioni registrate, preprint e crowd-sourcing di soluzioni a un problema specifico
- Utilizzo di infrastrutture di ricerca aperte per la condivisione di conoscenze e dati
- Partecipazione a valutazione tra pari (peer-review) aperta
- Misure per garantire la riproducibilità dei risultati
- Collaborazione aperta nell'ambito della scienza e con altri operatori della conoscenza, anche tramite il coinvolgimento dei cittadini, della società civile e degli utenti finali, ad esempio nell'ambito della «scienza dei cittadini»



Open Science practices

What?	How?	Mandatory in all calls/recommended
Early and open sharing of research	Preregistration, registered reports, preprints etc.	Recommended
Research output management	Manage responsibly in line with FAIR; Data management plan (DMP)	**Mandatory**
Measures to ensure reproduciblity of research outputs	Information on outputs/tools/instruments and access to data/results for validation of publications	**Mandatory**
Open access to research outputs through deposition in trusted repositories	• Open access to publications • Open access to data • Open access to software, models, algorithms, workflows etc.	• **Mandatory** for peer-reviewed publications • **Mandatory** for research data **but** with exceptions (‘as open as possible…’) • Recommended for other research outputs
Participation in open peer-review	Publishing in open peer-reviewed journals or platforms	Recommended
Involving all relevant knowledge actors	Involvement of citizens, civil society and end-users in co-creation of content (e.g. crowd-sourcing, etc.)	Recommended

1.2 Methodology [e.g. 15 pages]

- Describe how appropriate open science practices are implemented as an integral part of the proposed methodology. Show how the choice of practices and their implementation are adapted to the nature of your work, in a way that will increase the chances of the project delivering on its objectives [e.g. 1 page]. If you believe that none of these practices are appropriate for your project, please provide a justification here.

Open science is an approach based on open cooperative work and systematic sharing of knowledge and tools as early and widely as possible in the process. Open science practices include early and open sharing of research (for example through preregistration, registered reports, pre-prints, or crowd-sourcing); research output management; measures to ensure reproducibility of research outputs; providing open access to research outputs (such as publications, data, software, models, algorithms, and workflows); participation in open peer-review; and involving all relevant knowledge actors including citizens, civil society and end users in the co-creation of R&I agendas and contents (such as citizen science).

Please note that this question does not refer to outreach actions that may be planned as part of communication, dissemination and exploitation activities. These aspects should instead be described below under 'Impact'.

1.2 Methodology [e.g. 15 pages]

- Research **data management and management of other research outputs:** Applicants generating/collecting data and/or other research outputs (except for publications) during the project must provide maximum 1 page on how the data/ research outputs will be managed in line with the FAIR principles (Findable, Accessible, Interoperable, Reusable), addressing the following (the description should be specific to your project): *[1 page]*
  - **Types of data/research outputs** (e.g. experimental, observational, images, text, numerical) and their estimated size; if applicable, combination with, and provenance of, existing data.
  - **Findability of data/research outputs:** Types of persistent and unique identifiers (e.g. digital object identifiers) and trusted repositories that will be used.
  - **Accessibility of data/research outputs:** IPR considerations and timeline for open access (if open access not provided, explain why); provisions for access to restricted data for verification purposes.
  - **Interoperability of data/research outputs:** Standards, formats and vocabularies for data and metadata.
  - **Reusability of data/research outputs**: Licenses for data sharing and re-use (e.g. Creative Commons, Open Data Commons); availability of tools/software/models for data generation and validation/interpretation /re-use.
  - **Curation and storage/preservation costs**; person/team responsible for data management and quality assurance.

Proposals selected for funding under Horizon Europe will need to develop a detailed data management plan (DMP) for making their data/research outputs findable, accessible, interoperable and reusable (FAIR) as a deliverable by month 6 and revised towards the end of a project's lifetime.

For guidance on open science practices and research data management, please refer to the relevant section of the HE Programme Guide on the Funding & Tenders Portal.

Evaluation of proposals and Open Science

“Excellence” criterion

(methodology)

- Evaluation of the quality of open science practices
- E.g.1 page to describe Open Science practices + 1 page to describe research data/output management [RIA,IA]

“Quality and efficiency of implementation” criterion

(capacity of participants and consortium as a whole + list of achievements)

- Explain expertise/track record on Open Science
- List publications, software, data, etc, relevant to the project with qualitative assessment and, where available, persistent identifiers

Publications are expected to be open access; datasets are expected to be FAIR and ‘as open as possible, as closed as necessary‘. **Significance of publications to be evaluated on the basis of proposers’ qualitative assessment** and not per Journal Impact Factor

Come applico Open Science alla proposta?

HORIZON EUROPE

Open Science (OS) gioca un ruolo fondamentale in Horizon Europe e le pratiche Open Science sono considerate nella valutazione della proposta di progetto.
Ci sono pratiche obbligatorie (Open Access a testi e dati) e raccomandate (open peer preview, preprint, pre registrazione...).
Se non fossero applicabili, occorre fornire una giustificazione solida.

Part A: Application form

Lista di 5 fra pubblicazioni, datasets, software, protocolli, ogni altro risultato rilevante per il progetto

- le pubblicazioni devono essere Open (NON "pubblicate", ok "depositate")
- i dataset devono essere FAIR e Open*

* "As open as possible, as closed as necessary"

Part B: Project proposal - Technical description

1 Excellence

1.1 Objectives and ambition

1.2 Methodology

Open Science [max 1 pag.]

In che modo il progetto adotterà /adatterà le pratiche Open Science obbligatorie e raccomandate?

Pratiche OS obbligatorie	Pratiche OS raccomandate
Open Access# per le pubblicazioni: deposito+accesso immediato	Condivisione aperta e immediata
Open Access* per i dati	Preregistrazione, open peer-review
Informazioni e documentazioni per validare la ricerca / per il riuso	Citizen science, public engagement
Gestione responsabile dei dati in linea con i principi FAIR	Gestione degli altri elementi della ricerca (oltre ai dati)
	Riproducibilità

#1) pubblico in ORE-Open Research Europe
2) pubblico su rivista Open Access
3) pubblico su rivista tradizionale MA mantengo i diritti per deposito e accesso immediato

Research Data Management (RDM) and management of other research outputs (exc. publications) [max 1 pag.]

Come saranno gestiti i dati e altri elementi della ricerca in modo FAIR?

Dati e altri elementi...	...devono essere Findable Accessible* Interoperable Reusable	costi e responsabilità nella gestione, deposito e conservazione dei dati

2 Impact

2.1 Project's pathways towards impact

2.2 Measures to maximize impact. Dissemination, exploitation & communication

Es. Serve solo uno schema. Fate riferimento alle pratiche Open Science descritte nella sezione Methodology (Open Access ai risultati, condivisione aperta e immediata...)

Controllate che le pratiche propsote siano compatibili con il Dissemination and exploitation plan (es. protezione della propietà intellettuale) e con il Consortium agreement

3 Quality and efficiency of the implementation

3.1 Work plan and resources

Es. Date visibilità alla gestione dei dati con specifici tasks/work packages

Includete il Data Management Plan (DMP) completo come deliverable (M6)

Includete altre attività di gestione dati/elementi e mettete a budget i costi

3.2 Capacity of participants & consortium as a whole

Es. Descrivete le competenze dei partners nel fare Open Science

Maggiori dettagli in Guida all'Open Science in Horizon Europe

https://doi.org/10.5281/zenodo.4826662

GHENT UNIVERSITY Data Stewards

Traduzione e adattamento: Elena Giglia

Important documents and resources

- **Model grant agreement (MGA), article 17** –lists the obligations you have, i.e. the requirements of the policy
- **Work Programme General Annexes**, evaluation criteria described; open science- a couple of additional obligations outlined there (access for validation and public emergency).
- **Proposal template**- shows where and how to address open science- definition of open science practices
- **Annotated Grant Agreement (AGA), article 17**- offers explanations and guidance for open science requirements
- **Horizon Europe Programme Guide** – presents what is required at proposal stage and how open science is evaluated; open science practices analysed and resources provided-useful for proposers and evaluators


Any
Questions

Open Access

Green and Gold Model

Open Access in HE

What is Open Access?

Open access (OA) can be defined as the practice of providing on-line access to scientific information that is free of charge to the user and that is re-usable. In the context of R&D, open access to 'scientific information' refers to two main categories:

- ***Peer-reviewed scientific publications*** (primarily research articles published in academic journals)
- ***Scientific research data***: data underlying publications and/or other data (such as curated but unpublished datasets or raw data)

From: H2020 AGA — Annotated Model Grant Agreement: V4.1 – 26.10.2017

Open Access for European Commission

- Open access policies aim to provide researchers and the public at large with **access to peer-reviewed scientific publications**, **research data and other research outputs free of charge** in an open and non-discriminatory manner as early as possible in the dissemination process and enable the use and re-use of scientific research results. Open access helps enhance quality, reduce the need for unnecessary duplication of research, speed up scientific progress, help to combat scientific fraud, and can overall favour economic growth and innovation. Beside open access, data management planning is becoming a standard scientific practice.
- Open access is a means of dissemination for researchers who may decide to publish their work, in particular in the context of publicly-funded research. Licensing solutions should aim at facilitating the dissemination and re-use of scientific publications.

From Commission Recommendation (EU) 2018/790 of 25 April 2018 on access to and preservation of scientific information C/2018/2375

Scientific publication: definition

The dominant type of **scientific publication** is the **journal article**

Research data: data underlying publications and/or other data (such as curated but unpublished datasets or raw data)

Grant beneficiaries are also strongly encouraged to provide open access to other types of scientific publications including:

- monographs
- books
- conference proceedings
- grey literature (informally published written material not controlled by scientific publishers, e.g. reports).

Some definitions…

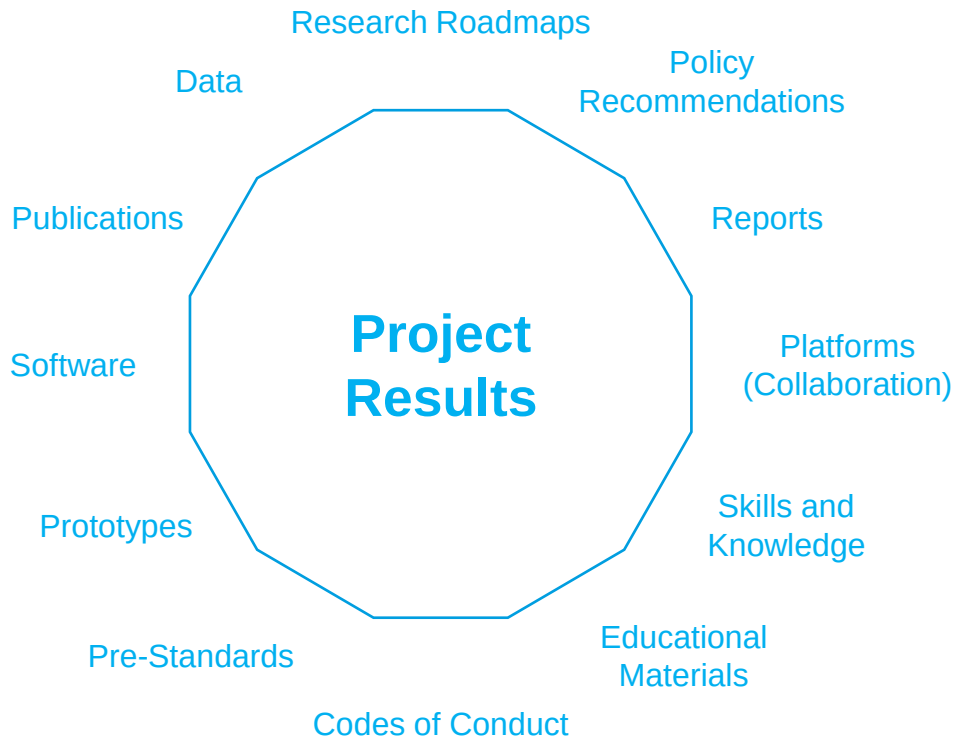
Results:

Results' means any tangible or intangible effect of the action, such as data, know-how or information, whatever its form or nature, whether or not it can be protected, as well as any rights attached to it, including intellectual property rights…

Key results are the **outputs generated during the project which can be used and create impact**, either by the project partners or by other stakeholders

Project results can be reusable and exploitable (e.g. inventions, prototypes, services) as such, or elements (knowledge, technology, processes, networks) that have potential to contribute for further work on research or innovation

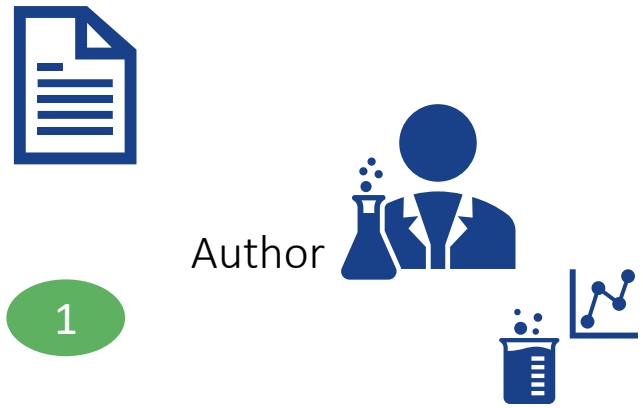
Research Communities **MS, EU Policymakers**



Industry, Innovators **Civic Society, Citizens**

European Commission

Scientific Publications



Scientific Publications

Scientific Publications

Scientific Publications

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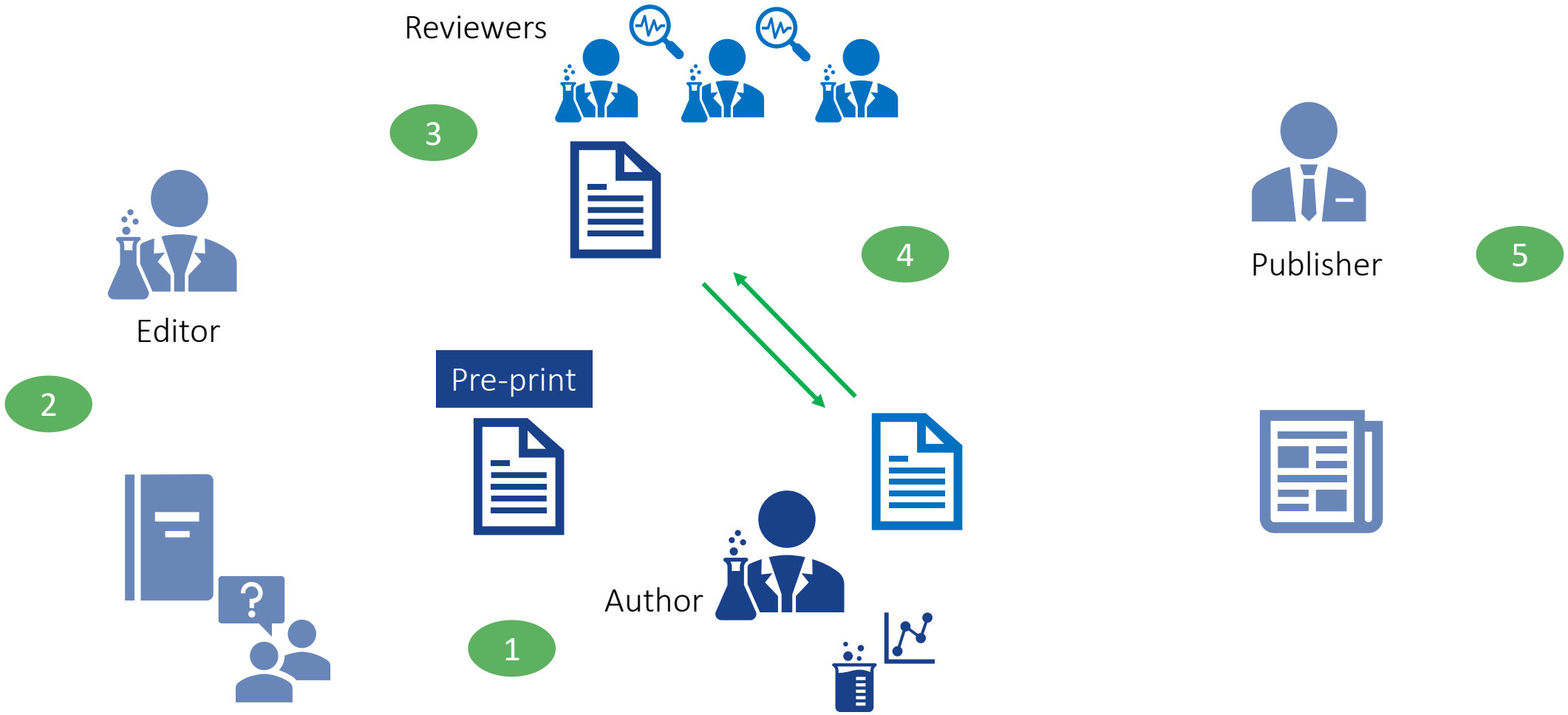
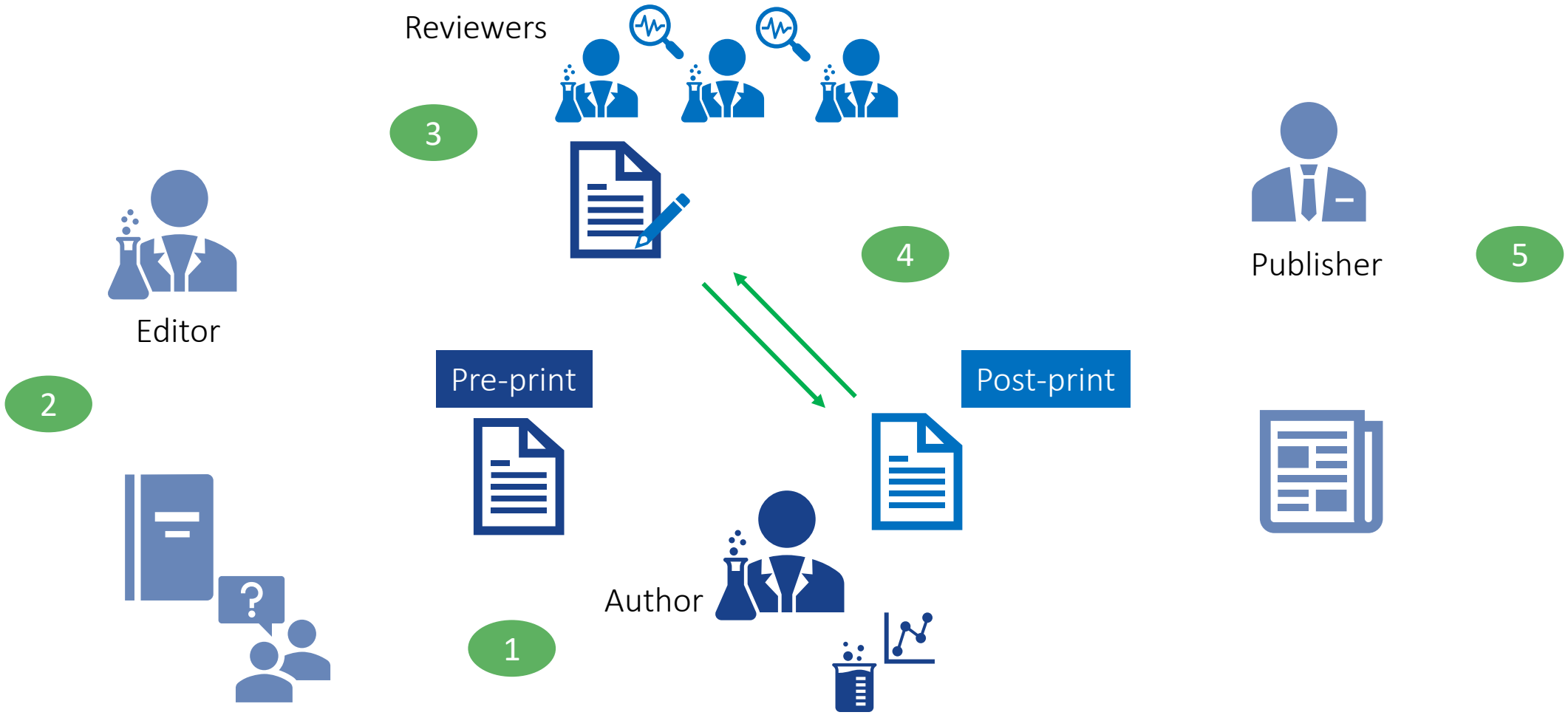
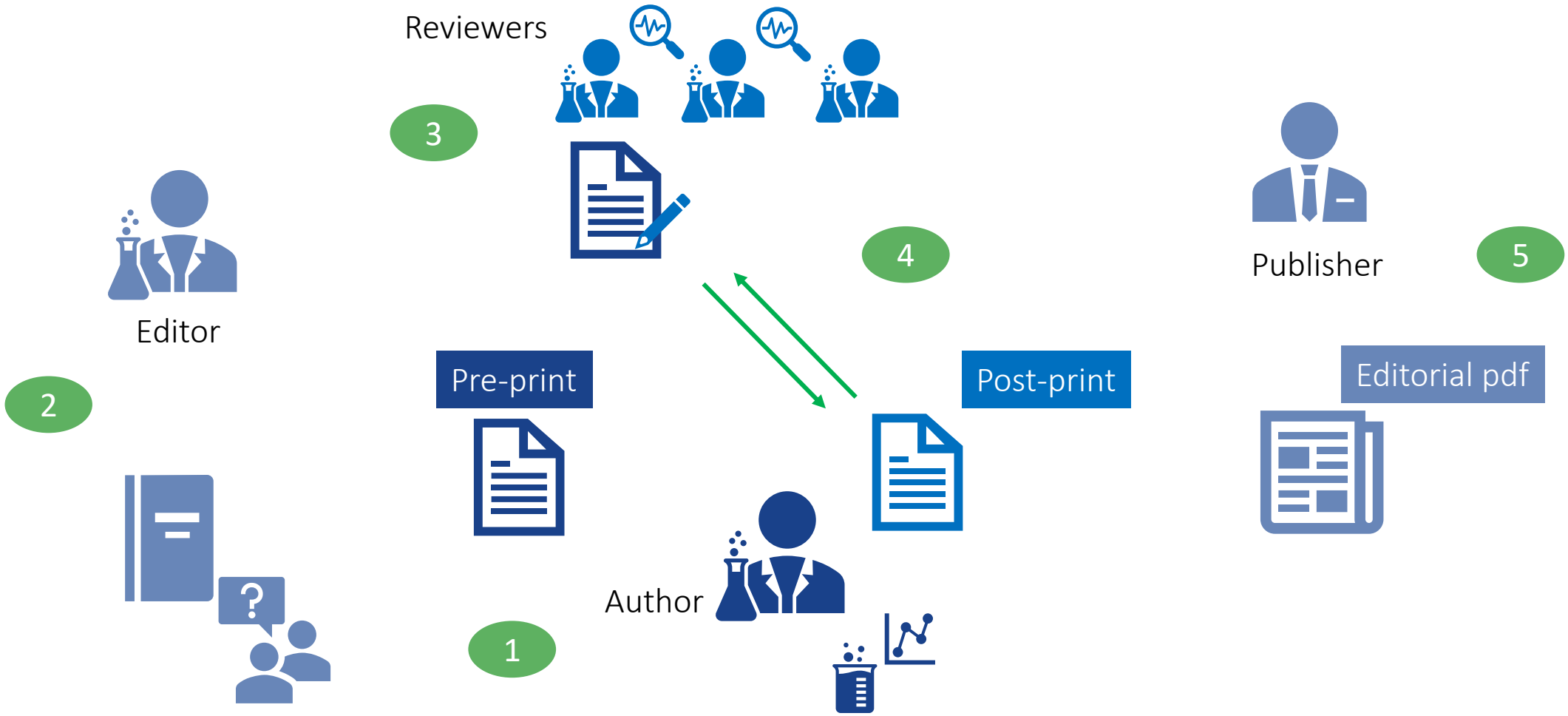


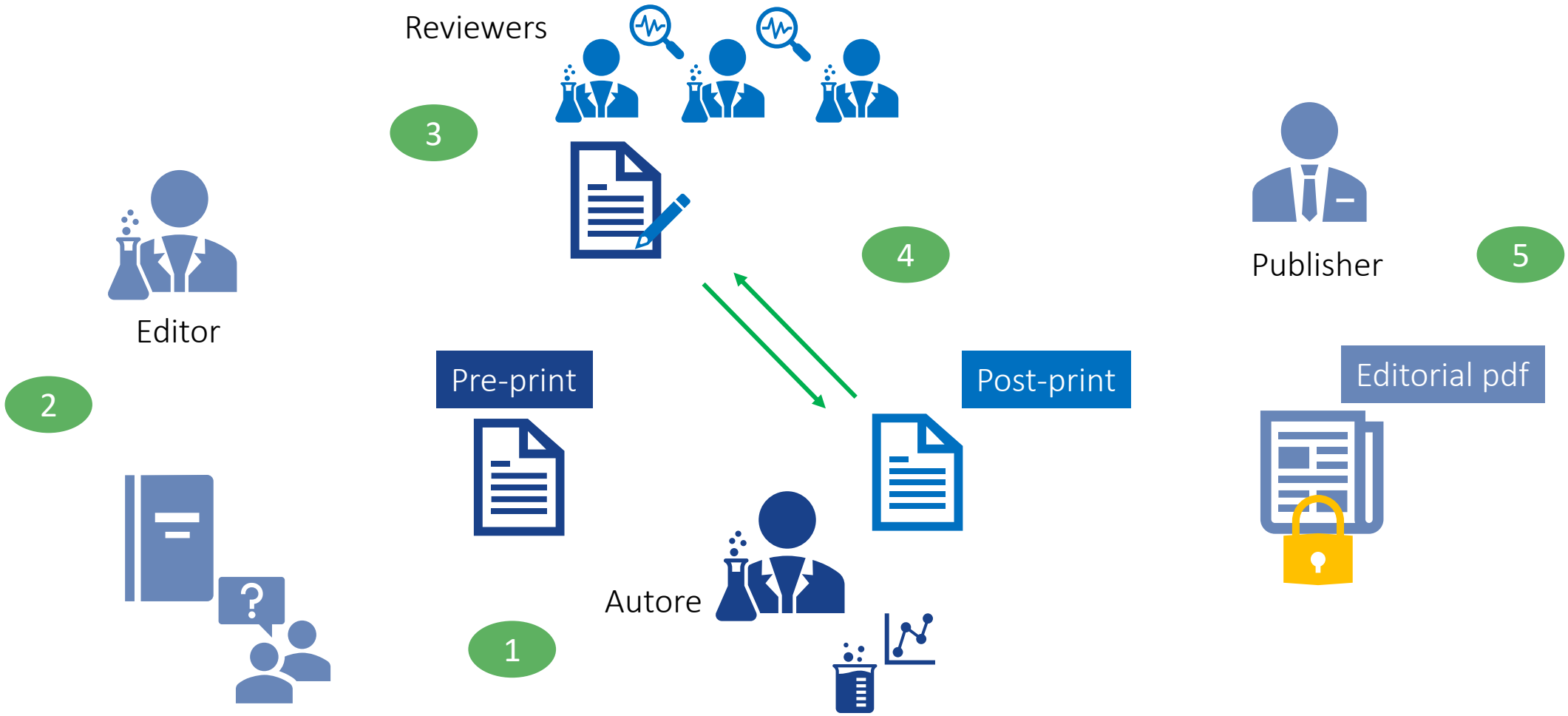
Scientific Publications



Scientific Publications



Scientific Publications



Pre-prints and post prints

- Amongst **academics: pre-print** is to describe the first draft of the article - before peer-review, even before any contact with a publisher
- Amongst **publishers: pre-print** is the finished article, reviewed and amended, ready and accepted for publication - but separate from the version that is type-set or formatted by the publisher
- The **copyright transfer agreement** lists **pre-prints** are the version of the paper before peer review and **post-prints** as being the version of the paper after peer-review, with revisions having been made
- This means that **in terms of content, post-prints are the article as published**. However, in terms of appearance this might not be the same as the published article, as publishers often reserve for themselves their own arrangement of type-setting and formatting (editorial layout). Typically, this means that the author cannot use the publisher-generated .pdf file, but must make their own .pdf version for submission to a repository.

*https://www.sherpa.ac.uk/romeoinfo.html

Open Access in H2020

Post-print or editorial version

Subscription publisher

Publish
Paper has been accepted in peer-reviewed venue, has been PRed and fully edited

-watch the contracts you sign with publishers- you can negotiate!

-make sure you can deposit

Deposit
Deposit final author copy or publisher pdf in repository at the same time as publication

-at your institutional repository or appropriate subject repository or zenodo

Open Access
Provide open access through repository at same time as publication

-max. acceptable embargo: 6/12 months (STEM/SSH)

Open Access publisher

Publish
Paper has been accepted in open access peer-reviewed venue and is published directly in open access by publisher

-you may need to pay fee (APC) or not (most journals don't charge)

-DOAJ.org

Deposit
Deposit final author copy or publisher pdf in repository at the same time as publication

-at your institutional repository or appropriate subject repository or zenodo

Open Access
Provide open access with a link from the repository to publisher's site

-no embargo here, since journal is open access

From «Open access policies and requirements in Horizon 2020» Victoria Tsoukala, DG RTD A.2 ITN 2018 – Coordinators Info Day, Brussels, 23rd November

Dear Prof. XYZ,

Our records show that, for the project in reference and of which you are coordinator the reported peer-reviewed publication indicated below still appear as non-available in open access:

Pubblication1

Pubblication2

I would like to remind you that, each beneficiary must ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results generated in a Horizon 2020 action, in accordance with the conditions set out in Article 29.2 of Horizon 2020 Grant Agreement. If a beneficiary breaches this obligation, the grant may be reduced (see Article 43 of the Grant Agreement). Such a breach may also lead to any other measures described in Chapter 6.

I would therefore like to ask you to take immediate action to ensure that the beneficiaries concerned provide open access to the peer-reviewed articles mentioned above. Please reply to this letter within 30 calendar days by indicating whether the non-compliance has been remedied, or in case of continued non-compliance provide the reasons for non-compliance.

For more information about open access to peer-reviewed scientific publications (and in particular, the obligation to deposit publications in repositories and to provide open access to these publications), please visit the section on Open Access available on the Funding & Tenders Portal or check the Annotated Grant Agreement (art 29).

For more information about how to encode or update the data of your peer-reviewed publications in the continuous reporting, please check the H2020 online manual.

Open Access in H2020

1

Depositing publications in repositories

#machine-readable electronic copy #preservations #repository #post-print

Green Road
#self-archiving #embargo

Gold Road
#cost

2

3

Providing open access to publications

(GOLD) immediately, if the publication itself is published 'open access' (i.e. if an electronic version is also available free of charge to the reader via the publisher) or (GREEN) within at most 6 months (12 months for publications in the social sciences and humanities).

SHERPA ROMEO

Not an obligation to publish - Not at odds with patenting - OA publications go the same peer review process

Open Access Repository

A repository is a **digital** platform working as an open archive, that holds research outputs and provides **free, immediate and permanent access** to research results for anyone to download, use and distribute

How select the right repository?

Open Access Repository Directory
www.opendoar.org

Registry of Research Data Repository
https://www.re3data.org/

- Institutional
- Thematic

Deposit in a repository

Versions:

- **PRE-PRINT**: the version submitted to the journal (without comments of reviewers)
- **POST-PRINT o ACCEPTED MANUSCRIPT**: final version embedding the reviewers comments. Content-wise it's identical to the published version but WITHOUT the editorial layout
- **EDITORIAL PDF or PUBLISHED VERSION**: the published version WITH the editorial layout

If you need to know which version you need to deposit and the embargo, check

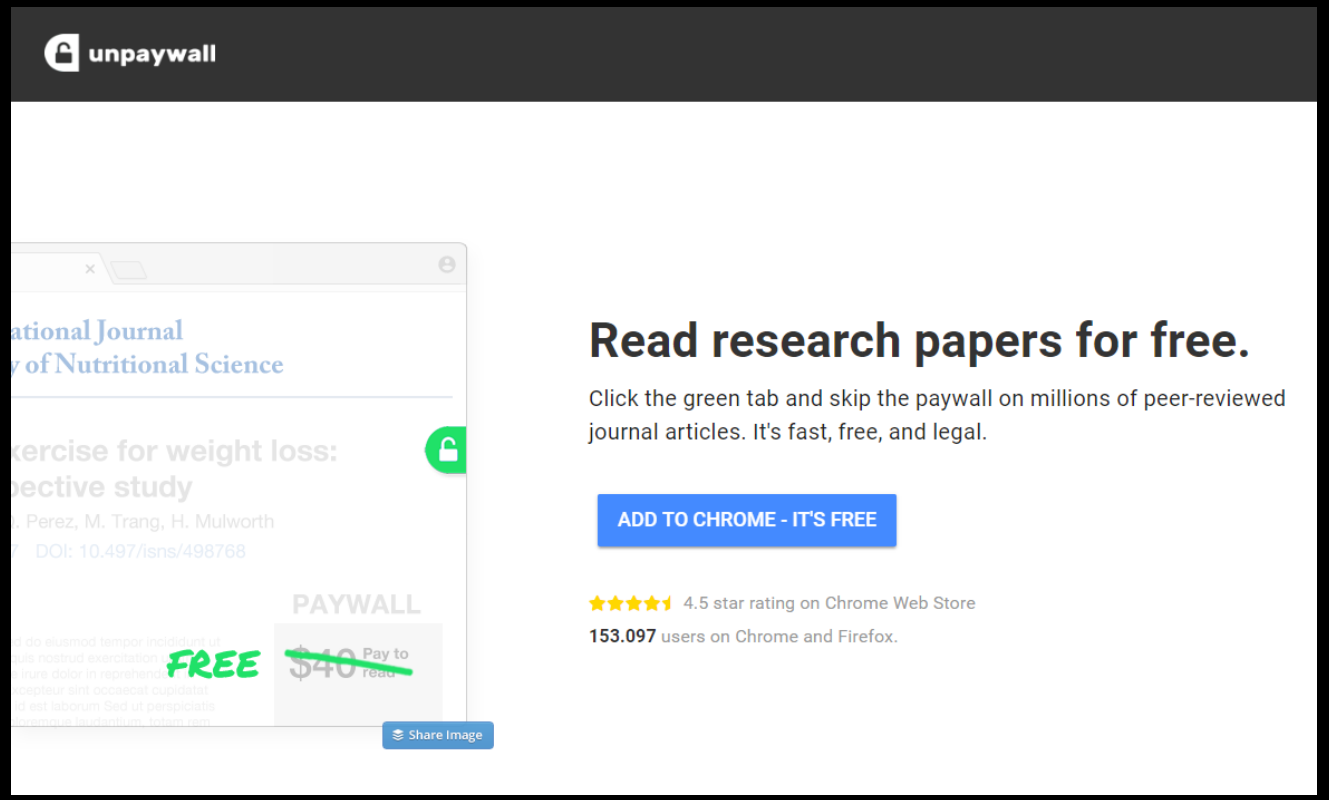
SHERPA-RoMEO

To find an Open Access journal and check the APC (Article Processing Charges) check DOAJ, Directory of Open Access Journals

What's the difference between ResearchGate, Academia.edu, and an institutional repository?

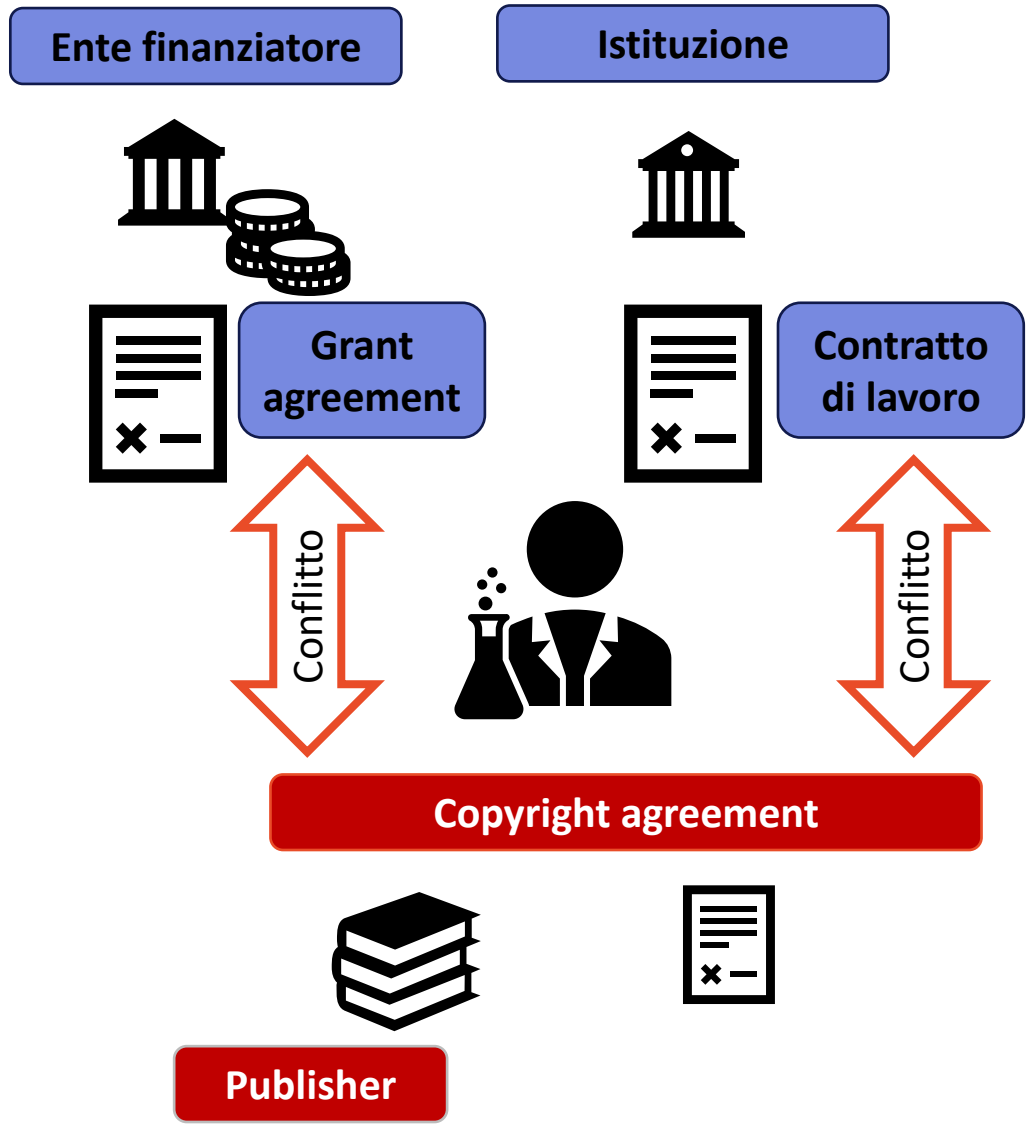
	Open access repositories	Academia.eu	ResearchGate
Support export or harvesting	Yes	No	No
Long-term preservation	Yes	No	No
Business model	Nonprofit (usually)	Commercial. Sells job posting services, hopes to sell data	Commercial. Sells ads, job posting services
Send you lots of emails (by default)	No	Yes	Yes
Wants your address book	No	Yes	Yes
Fulfills requirements of H2020 policies	Yes	No	No

Dark Open Access: how to get the pdf without paying



Ricordate

- Quando firmate un contratto con l'editore, siete voi che state cedendo i vostri diritti d'autore patrimoniali.
- Nessuno vi costringe
- Non è necessario ai fini della pubblicazione su una rivista scientifica: il copyright non è il contratto per accedere ai servizi di pubblicazione!
- La cessione di alcuni di questi diritti potrebbe entrare in conflitto con il contratto che avete già firmato con l'ente che finanzia la vostra ricerca (ad esempio la Commissione Europea, il MUR, ecc….) o con i regolamenti della vostra istituzione (che è il vostro datore di lavoro con cui avete firmato un contratto)



APRE

Lazzeri, Emma, Giglia, Elena, & Pavone, Gina. (2021, March). Open Science e finanziamenti europei: come ottemperare agli obblighi nei progetti H2020 e in Horizon Europe. Presented at the Open Science e finanziamenti europei: come ottemperare agli obblighi nei progetti H2020 e in Horizon Europe., Zenodo. http://doi.org/10.5281/zenodo.4570624

Open Access

Green and Gold Model

Open Access in HE

Open Access in Horizon Europe

Open science: open access to scientific publications

The beneficiaries must ensure open access to peer-reviewed scientific publications relating to their results. In particular, they must ensure that:

- ✓ at the latest at the time of publication, a machine-readable electronic copy of the published version, or the final peer-reviewed manuscript accepted for publication, is **deposited in a trusted repository** for scientific publications
- ✓ **immediate open access is provided** to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and
- ✓ information is given via the repository about any research output or any other tools and instruments needed to validate the conclusions of the scientific publication.

Beneficiaries (or authors) must retain sufficient intellectual property rights to comply with the open access requirements.

Metadata of deposited publications must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: publication (author(s), title, date of publication, publication venue); funding statement (see Article 17); grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for any research output or any other tools and instruments needed to validate the conclusions of the publication.

Only publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement.

From Art.17 - EU Grants: HE MGA — Multi & Mono: V1.0 DRAFT – 25.02.2021

Open Access in H2020

1

Depositing publications in repositories

#machine-readable electronic copy #preservations #repository #post-print

Green Road
#self-archiving #embargo

Gold Road
#cost

2

3

Providing open access to publications

(GOLD) immediately, if the publication itself is published 'open access' (i.e. if an electronic version is also available free of charge to the reader via the publisher) or (GREEN) within at most 6 months (12 months for publications in the social sciences and humanities).

SHERPA ROMEO

Not an obligation to publish - Not at odds with patenting - OA publications go the same peer review process

Open Access : what changes in HE

1

Depositing publications in repositories

#machine-readable electronic copy #preservations #repository #post-print

Green Road	Gold Road
#self-archiving ~~#embargo~~	#cost in full open access journal

2

3

Providing open access to publications immediately

~~(GOLD) immediately, if the publication itself is published 'open access' (i.e. if an electronic version is also available free of charge to the reader via the publisher) or (GREEN) within at most 6 months (12 months for publications in the social sciences and humanities).~~

SHERPA ROMEO

Not an obligation to publish - Not at odds with patenting - OA publications go the same peer review process

Open Access in HE

1

Depositing publications in trusted repositories

#machine-readable electronic copy #preservations #repository #post-print

Providing open access to publications immediately

2

- immediate open access is provided to the deposited publication via the repository, under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights; for monographs and other long-text formats, the licence may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND) and
- information is given via the repository about any research output or any other tools and instruments needed to validate the conclusions of the scientific publication

3

#Only publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement

SHERPA ROMEO

Not an obligation to publish - Not at odds with patenting - OA publications go the same peer review process

Trusted repositories under Horizon Europe

- Trusted repositories are either **certified repositories** (e.g. CoreTrustSeal, nestor Seal DIN31644, ISO16363) and/or **disciplinary/domain repositories** that are commonly used/endorsed by the research communities (e.g. ELIXIR deposition databases).
- **General-purpose repositories** and **institutional repositories** are, in general, also acceptable.
- Trusted repositories share essential properties:
  - Mechanisms to ensure **integrity** and **authenticity** of contents.
  - Offer clear **information** about their **policies/services**.
  - Provide broad, and ideally **open access** to content (consistent with legal and ethical constraints).
  - Assign **PIDs**, ask for detailed **metadata** in a standardized (e.g. Dublin Core) and machine-readable way.
  - Ensure mid- and long-term **preservation** of contents, **expert curation**, **quality assurance**.
  - Meet national and/or international **security** criteria

3. Additional Open Science practices

- Where the call conditions impose **additional obligations** regarding OS practices:
  - the beneficiaries must also comply with those

- All projects have additional **obligations regarding the validation of scientific publications** which must be complied with.
  - Beneficiaries must provide **(digital or physical) access** to data or other results needed for validation of the conclusions of scientific publications, to the extent that their legitimate interests or constraints are safeguarded (and unless they already provided the (open) access at publication)

3. Additional Open Science practices- Public emergency

- If imposed by the call conditions in case of a public emergency, beneficiaries must (if requested by the granting authority) immediately **deposit <u>any research output</u>** in a repository **+ provide open access to it under CC BY, CC 0** or equivalent.

  - As an exception, if the access would be against the beneficiaries' legitimate interests, beneficiaries **must grant non-exclusive licenses** — under fair and reasonable conditions — **to legal entities that need the research output to address the public emergency + commit to rapidly and broadly exploit the resulting products and services at fair and reasonable conditions**.

This provision applies up to four years after the end of the action.

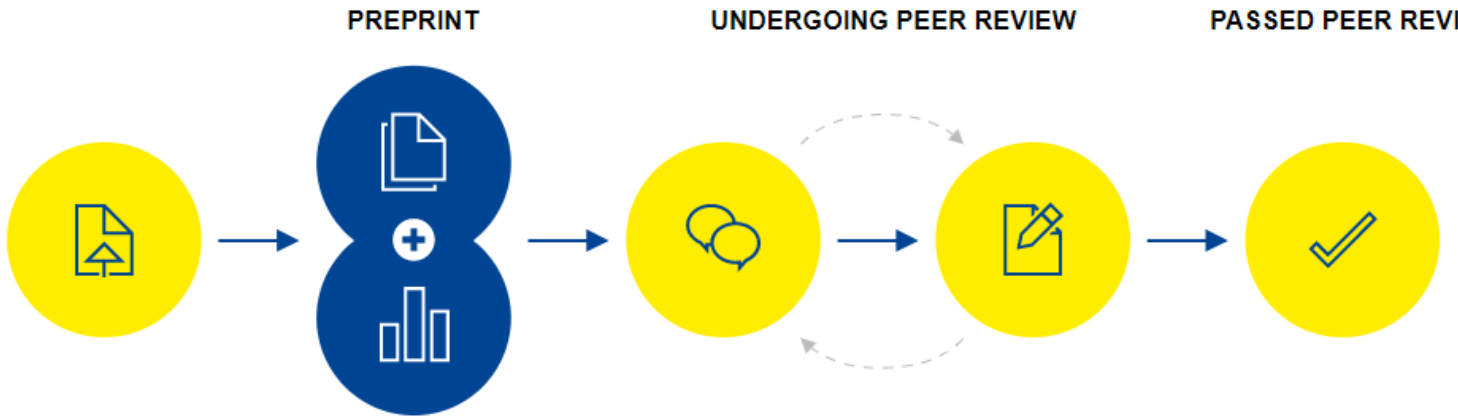
ORE: Open Research Europe,
the European Commission open access publishing service

"Open Research Europe is a great step forward for EU R&I programme beneficiaries and research communities from all scientific, social science and humanities fields. The new publishing platform will enable them to fully embrace Open Science meeting their publishing needs and openly share, use and find linked publications and data."

Mariya Gabriel
Commissioner, European Commission

https://open-research-europe.ec.europa.eu/

ORE: Open Research Europe,
the European Commission open access publishing service



Article Submission

Submission is via a single-page submission system. The in-house editorial team carries out a comprehensive set of prepublication checks to ensure that all policies and ethical guidelines are adhered to.

Publication & Data Deposition

Once the article has passed the prepublication checks, the preprint version is published within 10 days, enabling immediate viewing and citation.

Open Peer Review & Article Revision

Expert reviewers are selected and invited, and their reviews and names are published alongside the article, together with the authors' responses and comments from registered users. Authors are encouraged to publish revised versions of their article. All versions of an article are linked and independently citable.

Send to Indexers & Repositories

Articles that pass peer review are sent to major indexing databases and repositories.

- ✓ **Submissions as of end November 2020**
- ✓ **Tendered by the EC, total of 5.8 million euros/4 years**
- ✓ **Flat article fees paid by EC; 780 euros**
- ✓ **Powered by F1000 Research**
- ✓ **Commitment to the platform: new European Research Area**
- ✓ **No cost to authors/beneficiaries (publication fees paid by the Commission)**
- ✓ **Optional: no obligation to publish there: but if you do, you comply with HE policy**

https://open-research-europe.ec.europa.eu/

ORE: Open Research Europe,
the European Commission open access publishing service

Articles submitted now will be published at the formal launch of this platform in **March 2021**

We are accepting submissions for these subject areas

Natural Sciences

Engineering and Technology

Medical and Health Sciences

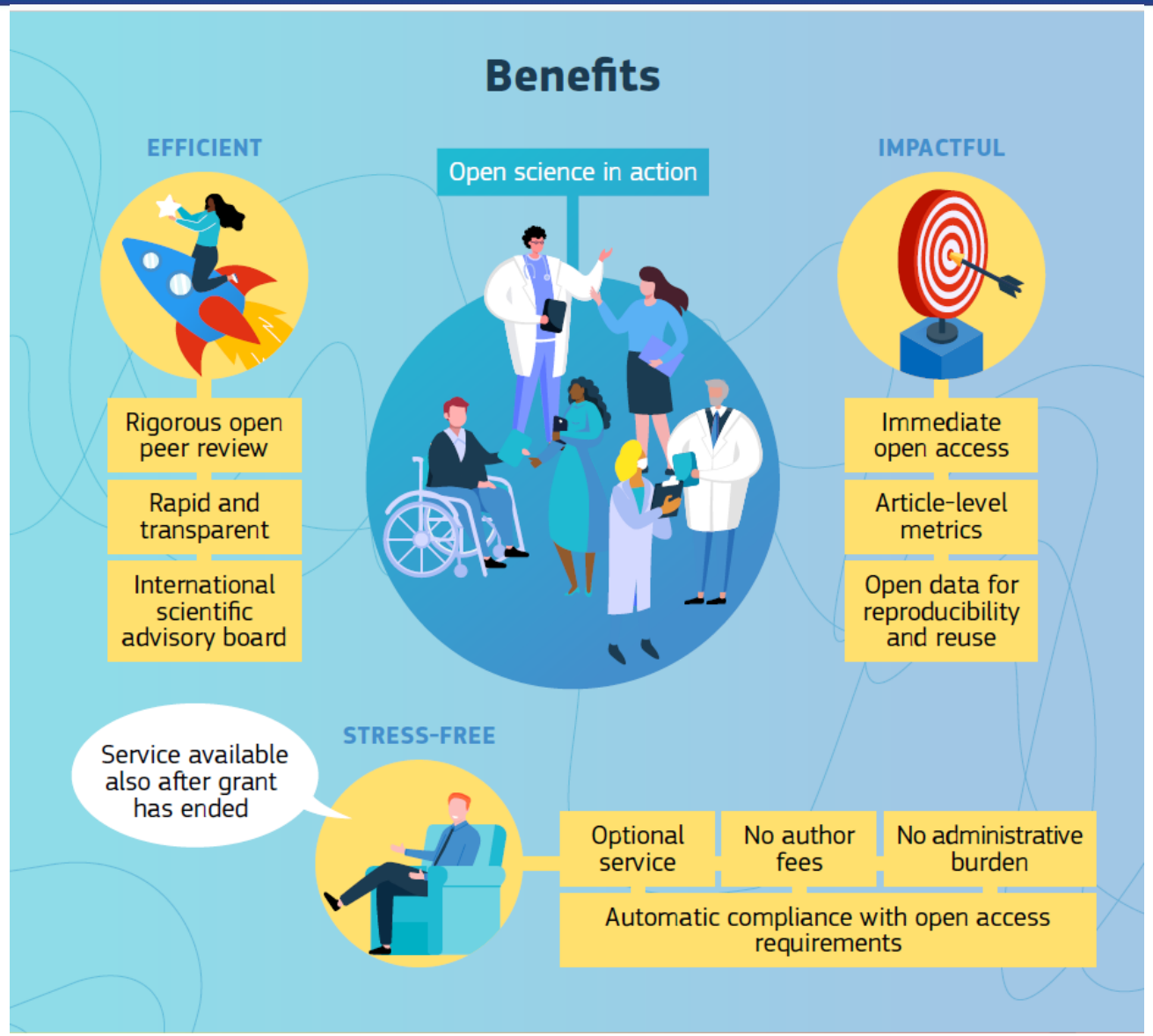
Agricultural and Veterinary Sciences

Social Sciences

Humanities and the Arts

https://open-research-europe.ec.europa.eu/

- **!!! Cannot submit elsewhere for review at the same time**


Benefits
EFFICIENT
Open science in action
IMPACTFUL
Rigorous open peer review
Rapid and transparent
International scientific advisory board
Immediate open access
Article-level metrics
Open data for reproducibility and reuse
Service available also after grant has ended
STRESS-FREE
Optional service
No author fees
No administrative burden
Automatic compliance with open access requirements

Let’s Slido: #OSUNIPI

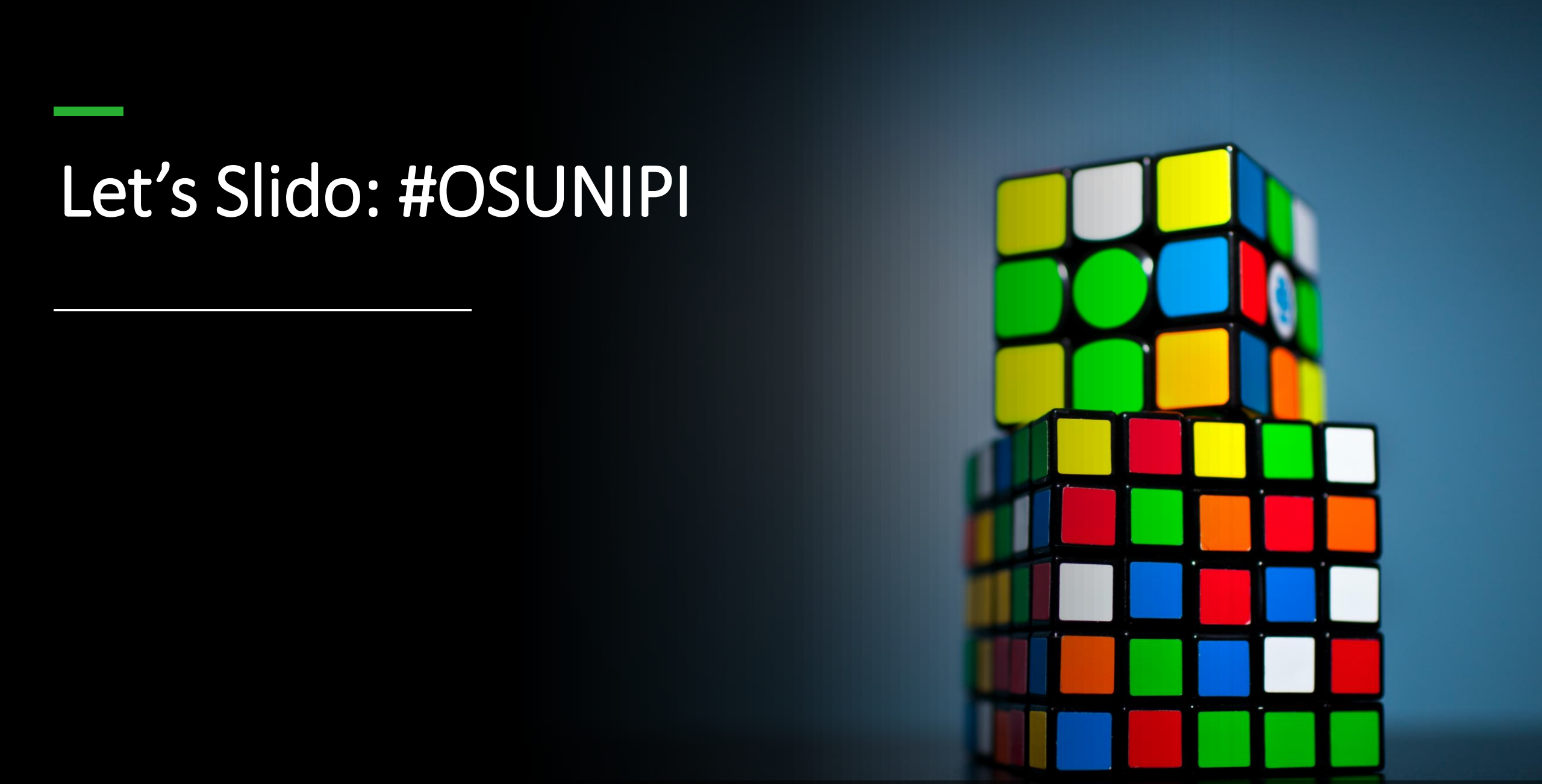


Photo by Olav Ahrens Røtne on Unsplash

Open Data

Data Management

FAIR data

EOSC

Open Data in Horizon Europe

The beneficiaries must manage the digital research data generated in the action ('data') responsibly, in line with the FAIR principles and by taking all of the following actions:

- establish a **data management plan** (DMP) (and regularly update it)
- as soon as possible and within the deadlines set out in the DMP, **deposit the data in a trusted repository**; if required in the call conditions, this repository must be federated in the **EOSC** in compliance with EOSC requirements
- as soon as possible and within the deadlines set out in the DMP, **ensure open access — via the repository — to the deposited data**, under the latest available version of the Creative Commons Attribution International Public License (CC BY) or Creative Commons Public Domain Dedication (CC 0) or a licence with equivalent rights, following the principle 'as open as possible as closed as necessary', unless providing open access would in particular:
  - ✓ *be against the beneficiary's legitimate interests, including regarding commercial exploitation, or*
  - ✓ *be contrary to any other constraints, in particular the EU competitive interests or the beneficiary's obligations under this Agreement; if open access is not provided (to some or all data), this must be justified in the DMP*
- **provide information** via the repository about any research output or any other tools and instruments needed to re-use or validate the data

Metadata of deposited data must be open under a Creative Common Public Domain Dedication (CC 0) or equivalent (to the extent legitimate interests or constraints are safeguarded), in line with the FAIR principles (in particular machine-actionable) and provide information at least about the following: datasets (description, date of deposit, author(s), venue and embargo); funding statement; grant project name, acronym and number; licensing terms; persistent identifiers for the dataset, the authors involved in the action, and, if possible, for their organisations and the grant. Where applicable, the metadata must include persistent identifiers for related publications and other research outputs.

Open Data

1. the **'underlying data'** (the data needed to validate the results presented in scientific publications), including the associated metadata (i.e. metadata describing the research data deposited), as soon as possible

2. **any other data** (for instance curated data not directly attributable to a publication, or raw data), including the associated metadata, as specified and within the deadlines laid down in the DMP – that is, according to the individual judgement by each project/grantee

Open Data

STEP 1 **The project must deposit the research data preferably in a research data repository.**

STEP 2 **as far as possible as closed as necessary, projects must then take measures to enable third parties to access, mine, exploit, reproduce and disseminate (free of charge for any user) this research data.**

Data Management Plan D M6

- the handling of research data during & after the end of the project
- what data will be collected, processed and/or generated
- which methodology & standards will be applied
- whether data will be shared/made open access and
- how data will be curated & preserved (including after the end of the project).

OPT OUT

- during the application phase
- during the grant agreement preparation (GAP) phase and
- after the signature of the grant agreement.

FAIR principles of 'Findability', 'Accessibility', 'Interoperability' and 'Reusability',

Exceptions to open access to research data

Data may be kept closed if:

- providing open access is against the **beneficiary's legitimate interests**, including regarding **commercial exploitation**;
- it is contrary to **any other constraints**, such **as data protection rules**, **privacy**, **confidentiality**, **trade secrets**, **Union competitive interests**, **security rules**, **intellectual property rights** or would be **against other obligations** under the Grant Agreement.

What is a Data Management Plan

Data Management Plans (DMPs) are a key element of good data management. A DMP describes the life cycle of the data management of data collected, processed and/or generated by a Horizon 2020 project. To make research data findable, accessible, interoperable and re-usable (FAIR), a DMP should include information on:

- How the research data will be managed during and after the end of the project
- What data will be collected, processed and/or generated
- Which methodology and standards will be applied
- Whether data will be shared/made accessible and
- How data will be treated and preserved (including after the end of the project)

Quality and Protection

A DMP is required for all projects participating in the extended ORD pilot, unless they opt out of the ORD pilot. However, projects that opt out are still encouraged to submit a DMP on a voluntary basis.

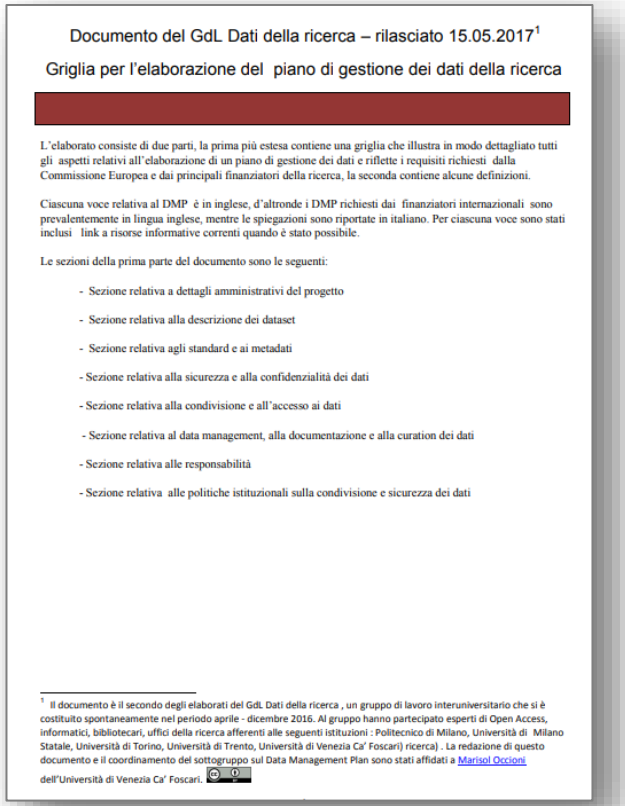
The DMP is a living document.
You are not required to provide detailed answers to all the questions in the first version of the DMP (due M6)

Un DMP dovrebbe essere

- **sintetico**: evitate sproloqui, non è una dissertazione. Frasi chiare che diano informazioni precise
- **schematico**: utilizzate il più possibile tabelle e punti elenco
- **preciso**: evitate frasi (viste davvero) tipo “we expect a huge size of data” o “data will be available”. Servono solo a far perdere tempo a chi lo scrive e achi lo legge. Quantificate: we expect max 50 GB; data will be available in Zenodo upon publication of the paper
- **specifico**: non copiate da modelli. Ogni ricerca è a sé, ogni ente ha le sue procedure
- **coerente**: scrivete solo ciò di cui siete certi, se non sapete, ditelo.

https://www.oa.unito.it/new/come-scrivere-un-data-management-plan/

Data Management Plan



Documento del GdL Dati della ricerca – rilasciato 15.05.2017[1]

Griglia per l'elaborazione del piano di gestione dei dati della ricerca

L'elaborato consiste di due parti, la prima più estesa contiene una griglia che illustra in modo dettagliato tutti gli aspetti relativi all'elaborazione di un piano di gestione dei dati e riflette i requisiti richiesti dalla Commissione Europea e dai principali finanziatori della ricerca, la seconda contiene alcune definizioni.

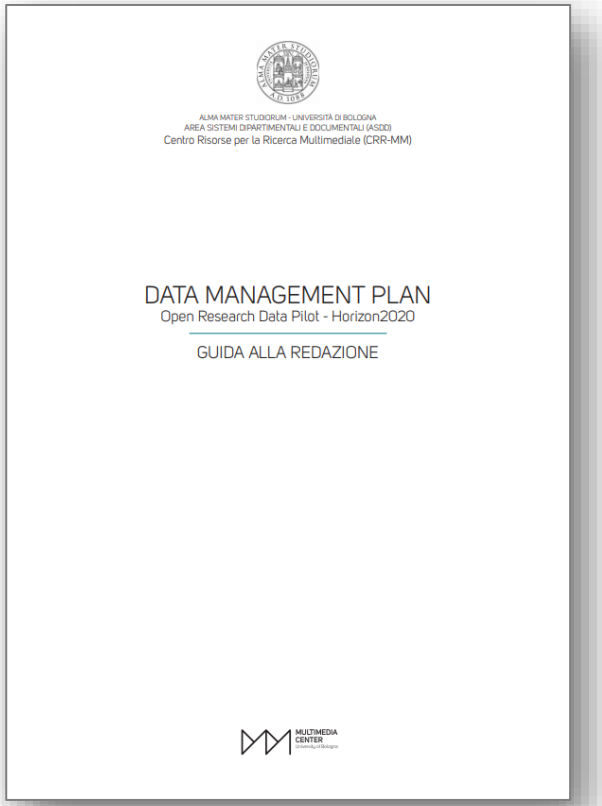
Ciascuna voce relativa al DMP è in inglese, d'altronde i DMP richiesti dai finanziatori internazionali sono prevalentemente in lingua inglese, mentre le spiegazioni sono riportate in italiano. Per ciascuna voce sono stati inclusi link a risorse informative correnti quando è stato possibile.

Le sezioni della prima parte del documento sono le seguenti:

- Sezione relativa a dettagli amministrativi del progetto
- Sezione relativa alla descrizione dei dataset
- Sezione relativa agli standard e ai metadati
- Sezione relativa alla sicurezza e alla confidenzialità dei dati
- Sezione relativa alla condivisione e all'accesso ai dati
- Sezione relativa al data management, alla documentazione e alla curation dei dati
- Sezione relativa alle responsabilità
- Sezione relativa alle politiche istituzionali sulla condivisione e sicurezza dei dati

[1] Il documento è il secondo degli elaborati del GdL Dati della ricerca , un gruppo di lavoro interuniversitario che si è costituito spontaneamente nel periodo aprile - dicembre 2016. Al gruppo hanno partecipato esperti di Open Access, informatici, bibliotecari, uffici della ricerca afferenti alle seguenti istituzioni : Politecnico di Milano, Università di Milano Statale, Università di Torino, Università di Trento, Università di Venezia Ca' Foscari) ricerca) . La redazione di questo documento e il coordinamento del sottogruppo sul Data Management Plan sono stati affidati a Marisol Occioni dell'Università di Venezia Ca' Foscari.

http://bit.ly/2N8TSXD



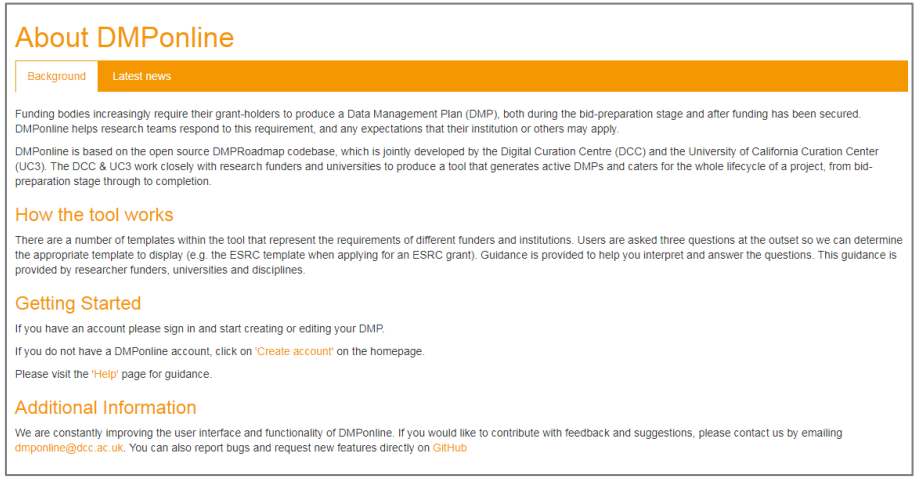
ALMA MATER STUDIORUM - UNIVERSITÀ DI BOLOGNA
AREA SISTEMI DIPARTIMENTALI E DOCUMENTALI (ASDD)
Centro Risorse per la Ricerca Multimediale (CRR-MM)

DATA MANAGEMENT PLAN
Open Research Data Pilot - Horizon2020

GUIDA ALLA REDAZIONE

MULTIMEDIA CENTER

http://bit.ly/2CTglTU



About DMPonline

Background | Latest news

Funding bodies increasingly require their grant-holders to produce a Data Management Plan (DMP), both during the bid-preparation stage and after funding has been secured. DMPonline helps research teams respond to this requirement, and any expectations that their institution or others may apply.

DMPonline is based on the open source DMPRoadmap codebase, which is jointly developed by the Digital Curation Centre (DCC) and the University of California Curation Center (UC3). The DCC & UC3 work closely with research funders and universities to produce a tool that generates active DMPs and caters for the whole lifecycle of a project, from bid-preparation stage through to completion.

How the tool works

There are a number of templates within the tool that represent the requirements of different funders and institutions. Users are asked three questions at the outset so we can determine the appropriate template to display (e.g. the ESRC template when applying for an ESRC grant). Guidance is provided to help you interpret and answer the questions. This guidance is provided by researcher funders, universities and disciplines.

Getting Started

If you have an account please sign in and start creating or editing your DMP.

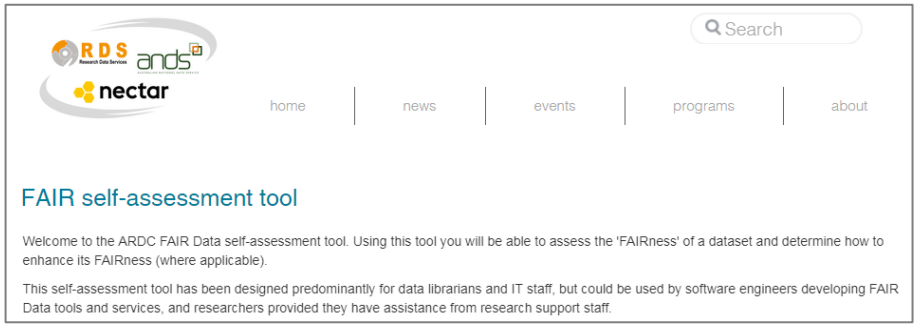
If you do not have a DMPonline account, click on 'Create account' on the homepage.

Please visit the 'Help' page for guidance.

Additional Information

We are constantly improving the user interface and functionality of DMPonline. If you would like to contribute with feedback and suggestions, please contact us by emailing dmponline@dcc.ac.uk. You can also report bugs and request new features directly on GitHub

https://dmponline.dcc.ac.uk/about_us



RDS Research Data Services | ands | nectar

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home | news | events | programs | about

FAIR self-assessment tool

Welcome to the ARDC FAIR Data self-assessment tool. Using this tool you will be able to assess the 'FAIRness' of a dataset and determine how to enhance its FAIRness (where applicable).

This self-assessment tool has been designed predominantly for data librarians and IT staff, but could be used by software engineers developing FAIR Data tools and services, and researchers provided they have assistance from research support staff.

https://www.ands-nectar-rds.org.au/fair-tool

10 TIPS FOR WRITING A DATA MANAGEMENT PLAN

1 START EARLY

Read the guidance and ask for advice early on in the process, as writing a DMP may take some time

2 CONSIDER REUSE

Think about reusing existing data. Describe what you will need to know about your data five years from now

3 CHECK POLICIES

Talk to your supervisor or lab members about existing data management policies and standards

4 MAKE USE OF SUPPORT

Use your in-house support services like RDM Support, the Library, IT department or legal desk

5 THINK BROAD

Also address software code, algorithms and any other valuable research assets in your DMP

6 COPY WHERE YOU CAN

Look at other (submitted) plans and copy when appropriate

7 BE UNIQUE WHERE NEEDED

Since every research project is unique, so are the data it generates. Copying from sample DMPs is not sufficient

8 BE CONCRETE

Make your answers as concrete as possible. Show that you have consulted RDM experts

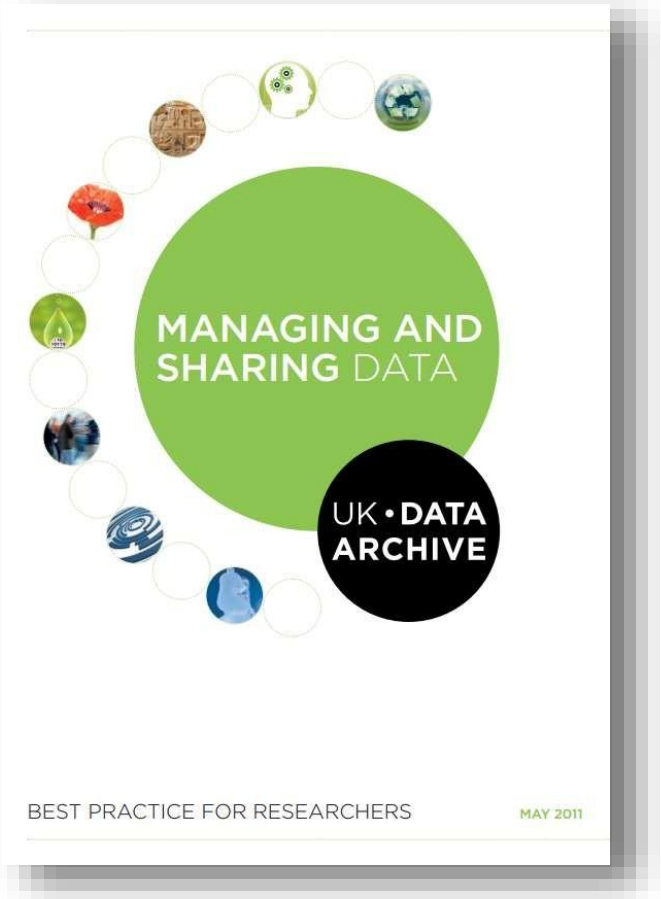
9 SAY SO IF YOU DON'T KNOW

Indicate what you do not yet know and how you will resolve these questions later

10 UPDATE

DMPs add to the planning of your research methods. Therefore define, carry out and update your DMP just as you would any method

Managing and sharing data – A best practice guide



http://data-archive.ac.uk/media/2894/managingsharing.pdf

Link utili

GUIDE AL DMP OVVERO: LE DOMANDE CHE DOVETE FARVI

- Science Europe Practical Guide to the International Alignment of Research Data Management (2021)
- DMP tips and tricks (2021)
- CESSDA Adapt your DMP (2019)

STRUMENTI ONLINE PER SCRIVERE UN DMP

- DMP online con modello per Horizon2020 – Video tutorial su come utilizzarlo
- Data wizard con modello Horizon2020 e Science Europe – Video tutorial su come utilizzarlo
- DMPtool per funder USA
- ARGOS OpenAIRE

COME VALUTARE UN DMP (ma serve anche a capire come scriverlo bene)

- NWO rubric

Un esempio

3 Data collection

This section describes the methods of data collection for each work package as indicated by the work package leaders. For each work package, the following items are checked and described, as far as applicable.

Type of data

In ZERO BRINE project, the following type of data will be documented:

- *Observational data*: this type of data will be captured real-time and, typically, cannot be reproduced exactly, which makes the strategies applied for documentation of this type of data extra important. Therefore, a careful and elaborated preparation of the way that data will be captured (instruments, calibration, conditions and observation method) is crucial before recording this type of data. Once this type of data is captured, all subsequent steps (filtering, aggregation, processing, analysis and visualization) will be reproducible.
- *Experimental data*: this type of data will be achieved from the laboratory analysis or from used equipment. This type of data can be reproduced most of the time, but the reproduction may be expensive. Also, for this type of data, a thorough and elaborated preparation is needed before the capturing. The steps after the capturing are reproducible for this type of data.
- *Simulation data*: this type of data will be obtained from models. The reproducibility of this data is subjected to knowing the input, version control of the input and software code as well as information about running environment such as operating system, release date, software dependencies, etc.
- *Derived or compiled data*: this type of data will be obtained from data mining or statistical analysis. The reproducibility of this data is subjected to a good documentation of original data.
- *Metadata*: metadata are information about the data. The reproducibility of metadata depends on the availability of the original data that metadata give information about.

Data can also be classified in the following three (3) broad categories: (a) Input or "raw data"; (b) Processed or "research-ready" data; and (c) Output or "Publication-ready" data.

Data collection process

This is provided by Work Package in the sections below.

Version control

Versioning is important for long term-research data management where metadata and/or files are updated over time. For scientific projects wherein different parties are involved, it is more efficient that the data storage system is with version control function to prevent losing of data. A version control system (or revision control system) is a system that tracks incremental versions (or revisions) of files and, in some cases, directories over time. Of course, merely tracking the various versions of a user's (or group of users') files and directories isn't very interesting in itself. What makes a version control system useful is the fact that it allows you to explore the changes which resulted in each of those versions.

Un esempio

3.1 Work Package 1

The information was collected by the Work Package leader (Roelof Moll/ TU DELFT) through the use of questionnaires. The results are summarized below.

Pre-existing data

Grant Agreement, Consortium Agreement, TSAT Agreement.

Source of pre-existing data

Project proposal preparation.

Conditions for use of pre-existing data

Data is available for internal use within ZERO BRINE; no specific conditions applicable.

Type of data collected

Agenda and minutes of meetings.

Aim of this data

Project coordination.

Process of data collection

Generation internally.

Format of data collected

☑	.doc / .docx	☐	Photo formats	☐	.txt
☑	.xls / .xlsx	☐	Video formats	☐	.csv, .tab
☑	.ppt / .pptx	☐	.xml	☐	.sgm / .sgml
☑	.pdf	☐	Others	☐	.nc, .cdf

Estimated size of data

500 MB.

Software needed to create/process/visualize the data

Standard Microsoft software.

Storage of data

DataVerse as successor to SURFDrive. SURFDrive will still be used for minutes of meetings related to the organization of the Work Packages (non confidential data).

Access to data

ZERO BRINE partners only.

4 Data storage and backup

Storage media and location

ZERO BRINE involves collaboration with 22 partners and a large amount of data is being and will be generated. To manage such quantities of data and allow the partners (and other researchers) to share them with each other, suitable storage media should be used that comply with European privacy legislation.

The following storage media are NOT appropriate for storing the data generated in ZERO BRINE project:

- Cloud storage, such as Dropbox and Google Drive,
  These are popular services by general public and not appropriate for sensitive data storage. If cloud storage is used for storage of a part of data their service level agreements should be studied before using them;
- Local drives, cloud storage and external portable storage devices
  These are storage facilities that do not fall under surveillance of this data management plan. Local drives such as PCs and Laptops are convenient for short-term storage and data processing. However, relying on local drives for storing master copies should not be encouraged, unless backup of data is made through networked drives regularly; and
- External portable storage devices, such as external hard drives and USB drives,
  These are very common among individual researchers and students because they are convenient, cheap and portable. However, they are not recommended for long-term storage as their longevity is uncertain and they can be easily damaged or lost.

The consortium partners will deposit the data generated by the project in the data archive provided by the 4TU.Center for Research Data (4TU.ResearchData in short) belonging to TU Delft. A **Data Lab** will be established in order to store data generated during the project, to share this data with project partners, to process them and to visualise them. A data lab is a secure online environment (with or without screening) for storing, processing and sharing dynamic research data, digital tools and software, visualisations and other items with fellow researchers. DataverseNL is one of the possibilities offered for 4TU-ResearchData as a type of Data Lab.

This data repository can be accessed here: https://data.4tu.nl/repository/

DataverseNL (see also here)
DataverseNL is an open source application that makes research data accessible to others. DataverseNL is specifically designed to store, back-up, organise, annotate and share research data with colleagues all over the world. This open source application can grant multiple individuals controlled access to data. DataverseNL provides for the following:

- Organization of data files in dataverses and datasets
- Addition of metadata and documentation
- Version management
- Management of access rights
- Easy collaboration with fellow researchers or project partners, beyond university or research institute

Un esempio

5 Data documentation

This section describes how data will be documented to help new members of the team and future (secondary) users understand and reuse it. A simple file identification system is prepared to upload files to selected system (DataverseNL) and to communicate on files amongst consortium/work package partners. The same identification system is used for files that are uploaded to the EU participants portal.

Below more information are provided regarding the type of documentation that will accompany the data to help secondary users to understand and reuse the data, as well as information regarding the identification of the data.

Meta-data

Along with the data files, metadata records will be produced to describe and contextualize the data. Both descriptive and substantive metadata will be produced:

- ✓ **Descriptive metadata** are indispensable for the preservation, retrieval and re-use of datasets. These provide answers to questions concerning the person creating the data, the subject of the data, the type of file, geographic information and other aspects. In other words, metadata are 'data about data'. Metadata make use of international standards for data exchange. This ensures that the information and the associated dataset can be found by search engines. The descriptive metadata that will be produced are listed in Table 5-1.

- ✓ **Substantive metadata** is important primarily for the user of the data. For example, consider a codebook that tells how the data should be read or interpreted. In many cases, such information is added in the form of Readme.txt files or similar descriptions

Table 5-1: Descriptive metadata that will be included in the documentation of ZERO BRINE data

Creator*	Main researchers involved in producing the data.
Title*	Name or title by which the dataset is known.
Contributor	Institution where the data was created or collected. A person or organization responsible for making contributions to the dataset.
Publisher*	A holder of the data (including archives appropriate) or institution which submitted the work. Any others may be listed as contributors.
Publication year*	The year when the data was or will be made publicly available.
Date created*	Date the resource itself was put together; this could be a date range or a single date.
Description*	Concise description of the contents of the dataset. Describe the research objective, type of research, method of data collection and type of data.
Subject	Subject, keyword, or key phrase describing the resource.
Temporal coverage	Indicate the dates to which the data refer. Enter the year, or beginning and ending dates.
Spatial coverage	Describe the geographic area to which the data refer (e.g. municipality, town/city, region, country). The geographic coordinates of the area may be included, if desired.
Identifier	4TU.ResearchData automatically assigns a DOI to a dataset once the entire deposit procedure has been completed. In some cases, a dataset may be known by one or more other (persistent) identifiers.
Language*	The primary language of the resource. When no language is added, 4TU.ResearchData will automatically assign 'English'.

Open Data in Horizon Europe Proposal Template

Research **data management and management of other research outputs**: Applicants generating/collecting data and/or other research outputs (except for publications) during the project must provide maximum 1 page on how the data/ research outputs will be managed in line with the FAIR principles (Findable, Accessible, Interoperable, Reusable), addressing the following (the description should be specific to your project): [1 page]

- **Types of data/research outputs** (e.g. experimental, observational, images, text, numerical) and their estimated size; if applicable, combination with, and provenance of, existing data.
- **Findability of data/research outputs:** Types of persistent and unique identifiers (e.g. digital object identifiers) and trusted repositories that will be used.
- **Accessibility of data/research outputs:** IPR considerations and timeline for open access (if open access not provided, explain why); provisions for access to restricted data for verification purposes.
- **Interoperability of data/research outputs:** Standards, formats and vocabularies for data and metadata.
- **Reusability of data/research outputs**: Licenses for data sharing and re-use (e.g. Creative Commons, Open Data Commons); availability of tools/software/models for data generation and validation/interpretation /re-use.
- **Curation and storage/preservation costs**; person/team responsible for data management and quality assurance.

Proposals selected for funding under Horizon Europe will need to develop a detailed data management plan (DMP) for making their data/research outputs findable, accessible, interoperable and reusable (FAIR) as a deliverable ***by month 6*** *and* ***revised towards the end of a project's lifetime.***

For guidance on open science practices and research data management, please refer to the relevant section of the HE Programme Guide on the Funding & Tenders Portal.

https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/temp-form/af/af_he-ria-ia_en.pdf

Open Data

Data Management

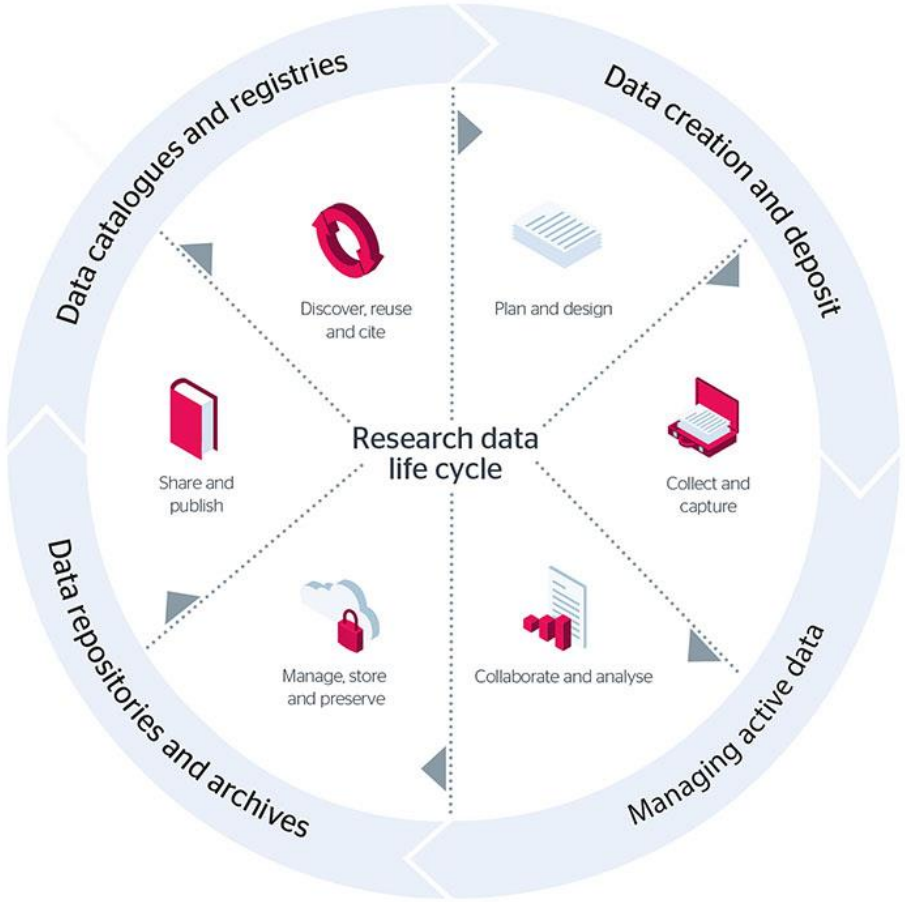
FAIR data

EOSC

Pubblicato il 2019-01-16
Corporate author(s): Directorate-General for Research and Innovation (European Commission) , PwC EU Services **Cost of not having FAIR research data**

Lazzeri, Emma, Giglia, Elena, & Pavone, Gina. (2021, March). Open Science e finanziamenti europei: come ottemperare agli obblighi nei progetti H2020 e in Horizon Europe. Presented at the Open Science e finanziamenti europei: come ottemperare agli obblighi nei progetti H2020 e in Horizon Europe., Zenodo. http://doi.org/10.5281/zenodo.4570624

Research data life cycle



FAIR Principles

- FAIR indicate a list of principles to make data ready for Open Science
- A group of different experts designed the FAIR principles between 2014 and 2016 (researchers, professional data publishers, software and tool-builders, funding agencies and data science community mining)
- They identified a set of 15 principles
- They were designed to enable optimal use of research data

Findable

The first step in (re)using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services, so this is an essential component of the FAIRification process.

- **F1**. (Meta)data are assigned a globally unique and persistent identifier
- **F2**. Data are described with rich metadata (defined by R1 below)
- **F3**. Metadata clearly and explicitly include the identifier of the data they describe
- **F4**. (Meta)data are registered or indexed in a searchable resource

https://www.go-fair.org/fair-principles/

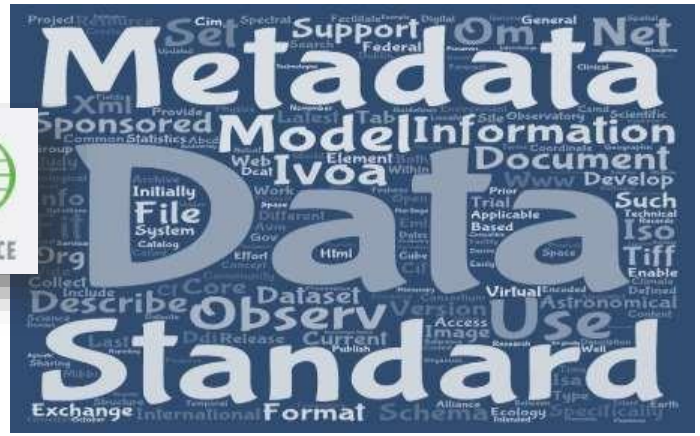
- Use **metadata** and **specify standards** for metadata creation (if any). If there are no standards in your discipline describe what type of metadata will be created and how
- Search **keywords**
- **Persistent and unique identifiers** such as DOIs, ORCID etc. (a long-lasting reference to a document, file, web page, or other object)
- **File and folder naming conventions**
- **Versioning** of the datasets and clear version numbers

Where to find metadata standards

Metadata Standards Directory Broad, disciplinary listing of standards and tools

Maintained by RDA group

http://rd-alliance.github.io/metadata-directory



Disciplinary metadata

https://www.dcc.ac.uk/guidance/standards/metadata

Biosharing

A portal of data standards, databases, and policies for life, environmental and biomedical sciences

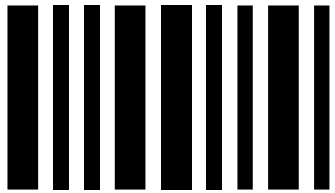
https://biosharing.org

Links to other Resources

FAIR Data point specification

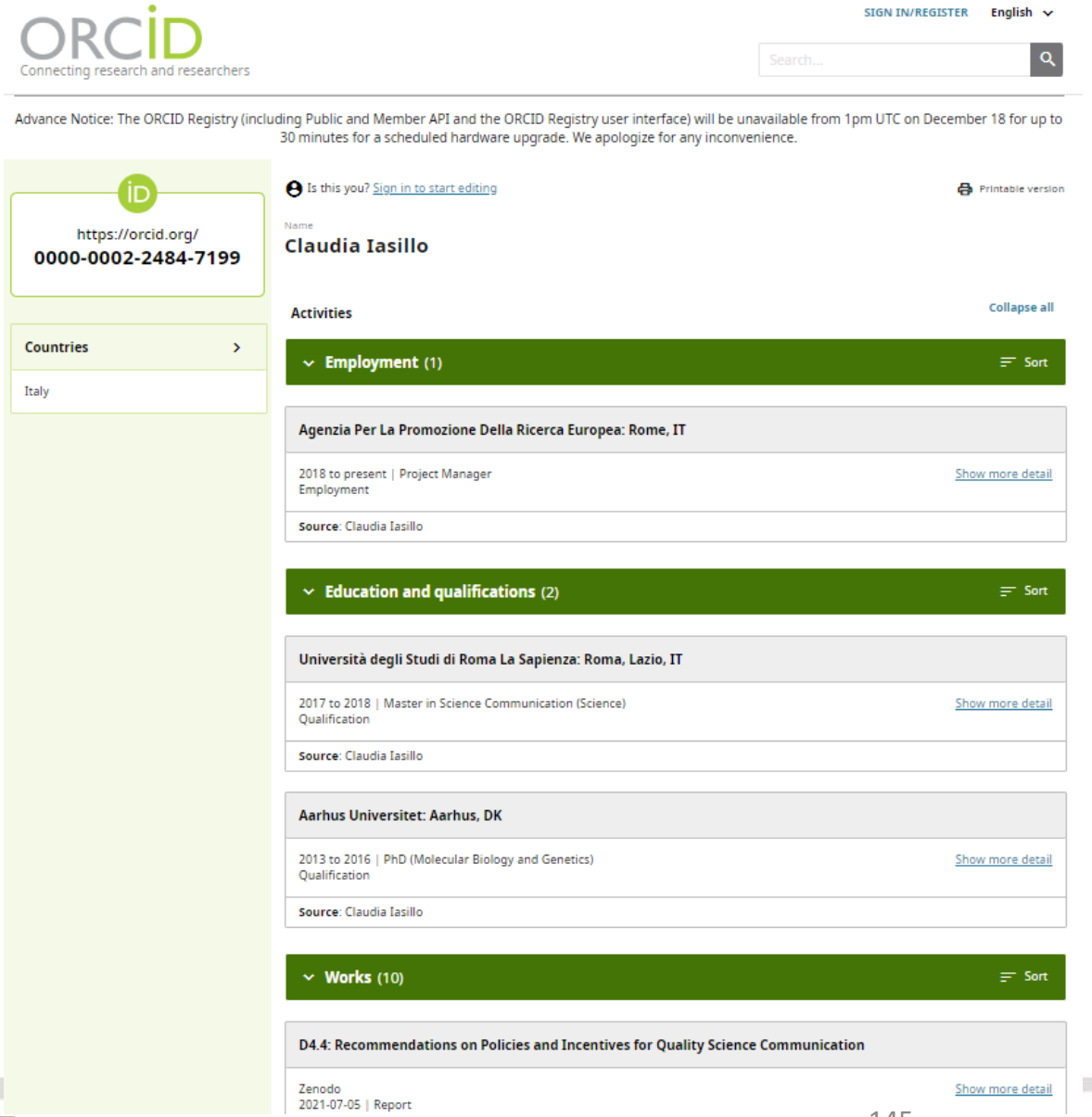
Persistent Identifiers

- A **persistent identifier** (PI or PID) is a long-lasting reference to a document, file, web page, or other object.
- The term persistent identifier is usually used in the context of **digital objects** that are accessible over the Internet.
- Typically, such an identifier is not only persistent but actionable: you can plug it into a web browser and be taken to the identified source.
- It is like the bar code used on products…



Orcid

- **Open Researcher and Contributor ID**) is a nonproprietary alphanumeric code to uniquely identify scientific and other academic authors and contributors
- Do you have one? **You should…**



DOI – Digital Object Identifier

- In computing, a digital object identifier (DOI) is a persistent identifier or handle used to identify objects uniquely, standardized by the International Organization for Standardization (ISO).
- A DOI aims to be resolvable, usually to some form of access to the information object to which the DOI refers.
- This is achieved by binding the DOI to metadata about the object, such as a URL, indicating where the object can be found
- a DOI differs from identifiers such as ISBNs and ISRCs which aim only to identify their referents uniquely
- **http://www.doi.org**

Accessible

Once the user finds the required data, she/he needs to know how can they be accessed, possibly including authentication and authorisation.

A1. (Meta)data are retrievable by their identifier using a standardised communications protocol

- **A1.1** The protocol is open, free, and universally implementable
- **A1.2** The protocol allows for an authentication and authorisation procedure, where necessary

A2. Metadata are accessible, even when the data are no longer available

- Explain which data can't be shared openly, if any
- Specify how access will be provided in case of restrictions, e.g., through a data committee, a license, or arranged with the repository
- Will the methods or software tools needed to access the data (if any) be included or documented?
- Deposit the data and associated metadata, documentation and code preferably in certified repositories which support Open Access

https://www.go-fair.org/fair-principles/

A= Accessibili

- I dati devono essere **Accessibili**, il che non significa “aperti”. È semplicemente necessario sapere come arrivare ai dati e come poterli eventualmente scaricare. Possono essere previsti sistemi di autenticazione.
- I **metadati descrittivi** giocano di nuovo un ruolo fondamentale, anche per segnalare la necessità di particolari protocolli di trasmissione (diversi da http://) o la presenza di API – Application programming Interface.

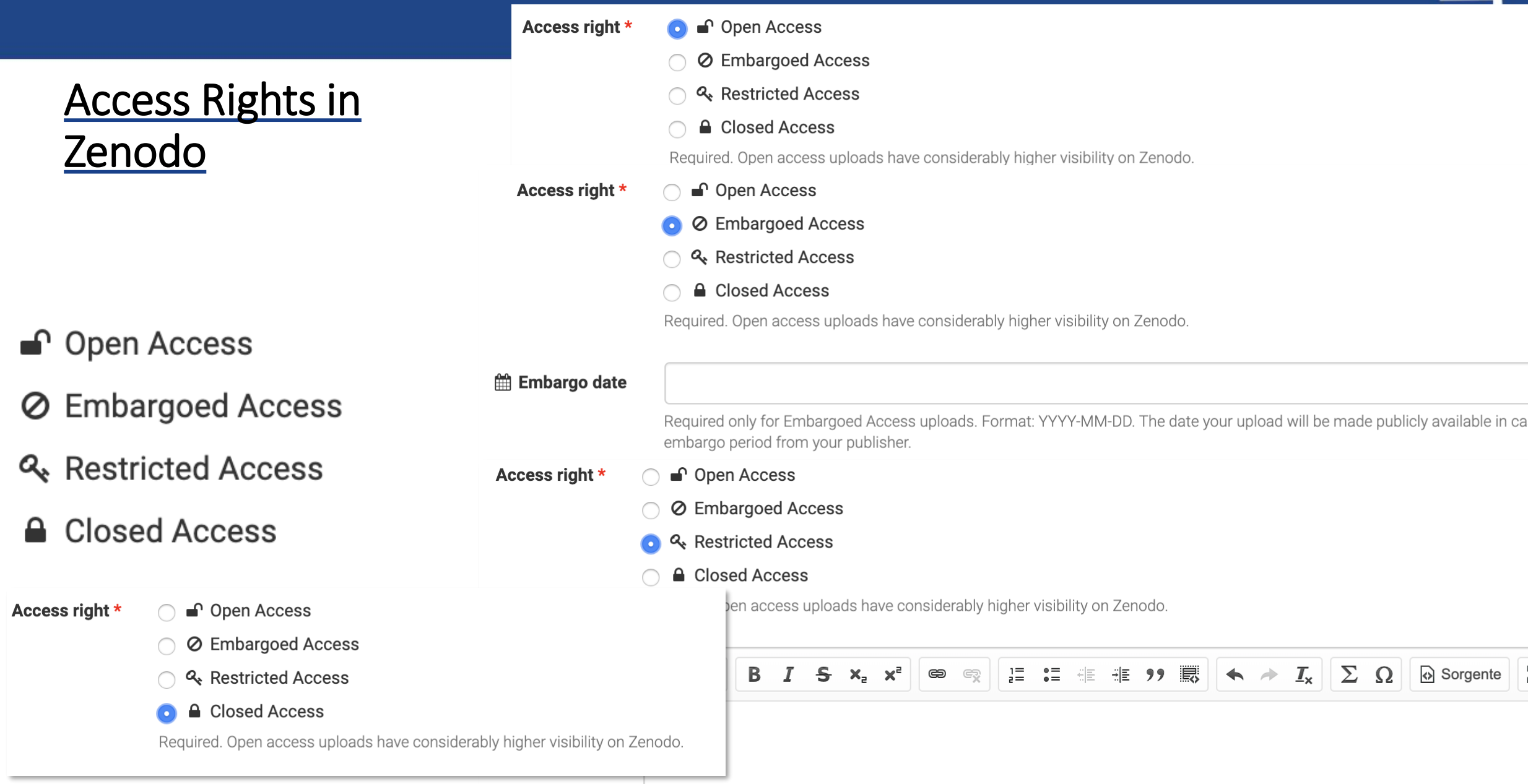
Access Rights in Zenodo

Open Access

Embargoed Access

Restricted Access

Closed Access



Interoperable

The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

I2. (Meta)data use vocabularies that follow FAIR principles

I3. (Meta)data include qualified references to other (meta)data

- Allowing data exchange and re-use between researchers, institutions, organisations, countries, etc:
- Specify what data and metadata vocabularies, standards or methodologies you will follow to facilitate interoperability
- Aim for compliance to globally accepted practices

https://www.go-fair.org/fair-principles/

I= Interoperable

- Idealmente, per essere **Interoperabili**, i dati dovrebbero essere salvati in formati non proprietari, non compressi, non criptati, con standard documentati. Nella scelta di un formato, occore tenere conto di alcune caratteristiche.
- Esempi di formati preferiti:
  - Containers: TAR, GZIP, ZIP
  - Databases: XML, CSV
  - Geospatial: SHP, DBF, GeoTIFF, NetCDF
  - Moving images: MOV, MPEG, AVI, MXF
  - Sounds: WAVE, AIFF, MP3, MXF
  - Statistics: ASCII, DTA, POR, SAS, SAV
  - Still images: TIFF, JPEG 2000, PDF, PNG, GIF, BMP
  - Tabular data: CSV
  - Text: XML, PDF/A, HTML, ASCII, UTF-8
  - Web archive: WARC
- Alcuni archivi inoltre assicurano la conservazione solo per alcuni formati (es. DANS, l'archivio olandese): di questo va tenuto conto fin dall'inizio del progetto.

Reusable

The ultimate goal of FAIR is to optimise the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

R1. (Meta)data are richly described with a plurality of accurate and relevant attributes

- **R1.1.** (Meta)data are released with a clear and accessible data usage license

R1.2. (Meta)data are associated with detailed provenance

R1.3. (Meta)data meet domain-relevant community standards

- **License** the data to permit the widest reuse possible
- Specify a data embargo, if needed
- If data re-use by third parties is restricted, explain why
- How long will the data remain reusable?
- Describe data quality assurance processes

https://www.go-fair.org/fair-principles/

R = Reusable

Per poter essere **Riusabili**, i dati devono avere una **licenza d'uso** e una **documentazione** adeguata.

In mancanza di una **licenza**, i dati sono inutilizzabili. Sui dati, di per sé, non esiste diritto d'autore (per saperne di più, Dati e diritti) perché il diritto tutela solo la forma espressiva con cui l'informazione è presentata, non l'informazione in sé. Le banche dati sono protette dal cosiddetto "diritto sui generis" (Direttiva 96/9/CE e artt. 102 bis e 102 ter della Legge 633/1941 sul Diritto d'autore), che tutela l'investimento economico del costitutore della banca dati più che l'originalità.

Quindi:

- sui semplici dati, la **licenza che si consiglia di usare è CC0 (Creative Commons Zero)**, ovvero il "rilascio in pubblico dominio". Significa che il creatore rinuncia formalmente alla paternità intellettuale – che nel caso dei dati, come abbiamo visto, non ha comunque per legge. Associare una licenza CC0 non significa rinunciare alle buone regole di una corretta etica scientifica, per cui va sempre attribuito il credito al lavoro che si sta riutilizzando. È possibile aggiungere una richiesta formale di attribuzione di credito.
- utilizzare la Licenza CC-BY, che richiede esplicitamente l'attribuzione, potrebbe essere una forzatura giuridica.

Tutti i dettagli, oltre a chiarimenti ulteriori sul perché non utilizzare una Licenza NC-Not Commercial, si trovano nel Factsheet di Creative Commons su Open Science e sono ben riussunti nell'articolo di Simone Aliprandi, I dati non sono di nessuno: ebbene sì, 2014.

Chi avesse particolari esigenze può consultare Alex Ball, How to licence research data, 2014

La **documentazione** da associare ai dati comprende ogni elemento utile alla loro comprensione e riuso: la provenienza, gli strumenti o i software con cui sono stati generati, i protocolli… Sarebbe buon anorma depositare anche i software (es. in GitHub) e i protocolli (es. in Protocols.io).

Esistono strumenti che facilitano la documentazione dei dati via via che la ricerca viene condotta.

Gli OpenLabNotebooks sono strumenti innovativi e aperti per tracciare l'intero ciclo di vita di un esperimento: contengono testi, dati, software, protocolli. Per saperne di più…

Licensing your data: Creative Commons

creative commons UK

FACT SHEET ON CREATIVE COMMONS & OPEN SCIENCE V.0.1

This information guide contains questions and responses to common concerns surrounding open science and the implications of licensing data under Creative Commons licences. It is intended to aid researchers, teachers, librarians, administrators and many others using and encountering Creative Commons licences in their work.

What is Open Science?

Open Science is the movement to make scientific research and data accessible to all for knowledge dissemination and public reuse.

How should I licence my data for the purposes of Open Science?

We recommend you use the CC0 Public Domain Dedication, which is first and foremost a waiver, but can act as a licence when a waiver is not possible.

CC ZERO LICENCE, 'NO RIGHTS RESERVED' LOGO

CC 0 ZERO

By applying CC0 to your data you enable everyone to freely reuse your data as they see fit by waiving (giving up) your copyright and related rights in that data.

You should keep in mind that there are many situations in which data is ***not*** protected as a matter of law. Such data can include facts, names, numbers – things that are considered 'non-original' and part of the public domain thus not subject to copyright protections. Similarly, your database (which is a structured collection of data) might be considered 'non-original' and thus ineligible for copyright, and it might additionally be excluded from other forms of protection (like the EU *sui generis* database right, also known as the 'SGDR', for non-original databases).

In these cases, using a Creative Commons licence such as a CC BY could signal to users that you claim a copyright in the non-original data despite the law, and perhaps despite your real intention.

Finally, if your data is in the public domain worldwide, you might state simply and obviously on the material that no restrictions attach to the reuse of your data and apply a Public Domain Mark.

PUBLIC DOMAIN MARK LOGO

PUBLIC DOMAIN

When in doubt, consider which use may be appropriate according to the chart below:

CC0 & PUBLIC DOMAIN LICENCES
WHICH LICENSE TO USE AND WHEN

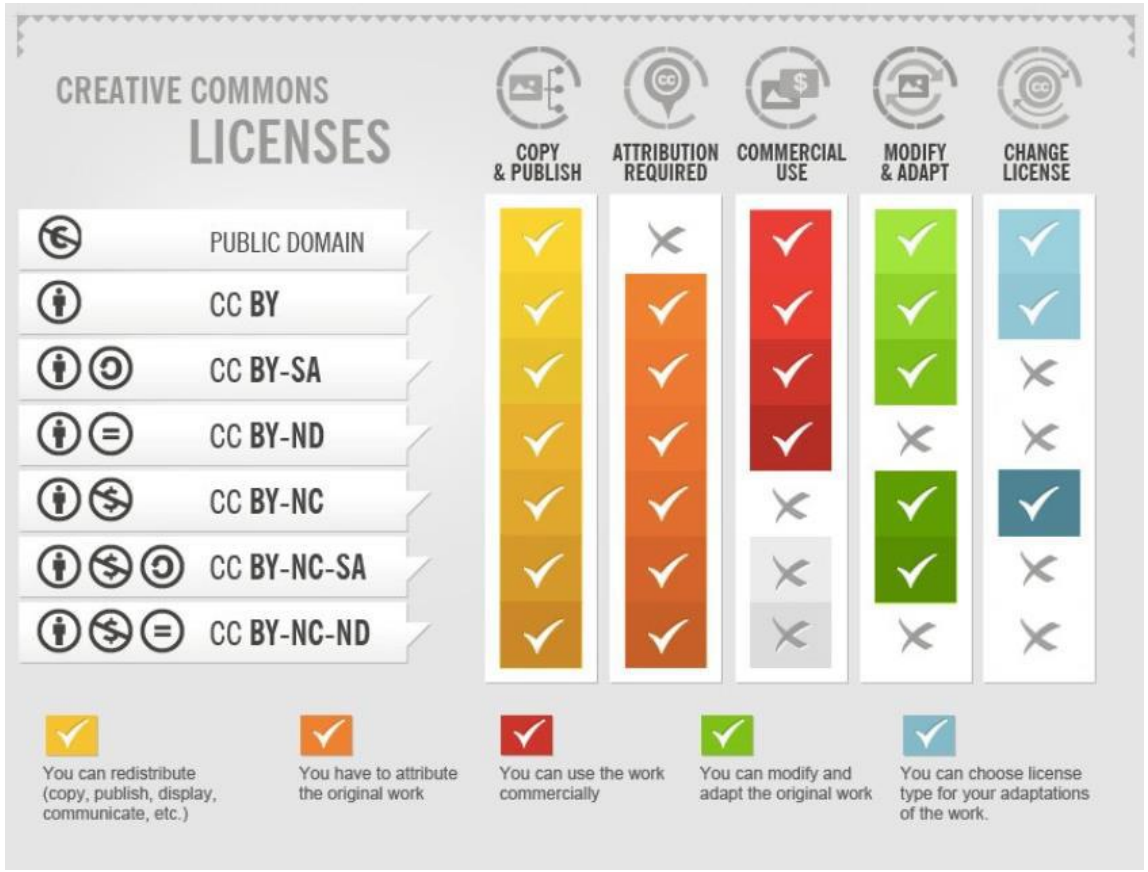
CC 0 ZERO	PUBLIC DOMAIN
'Creative arrangement' of data is original, but any copyright has been waived and content is made available copyright-free	'Creative arrangement' of data is not original; the author acknowledges this and communicates the data is in the public domain

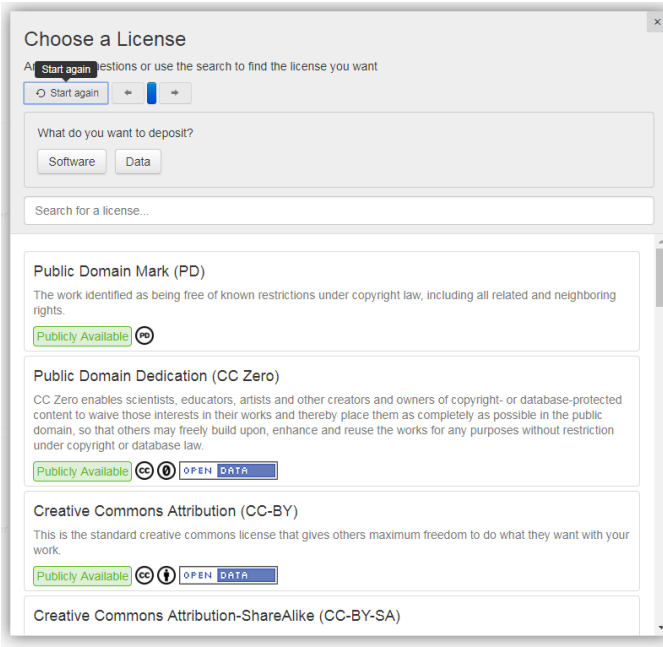
https://doi.org/10.5281/zenodo.840651

Dataset licensing

Horizon 2020 guidelines point to:

or





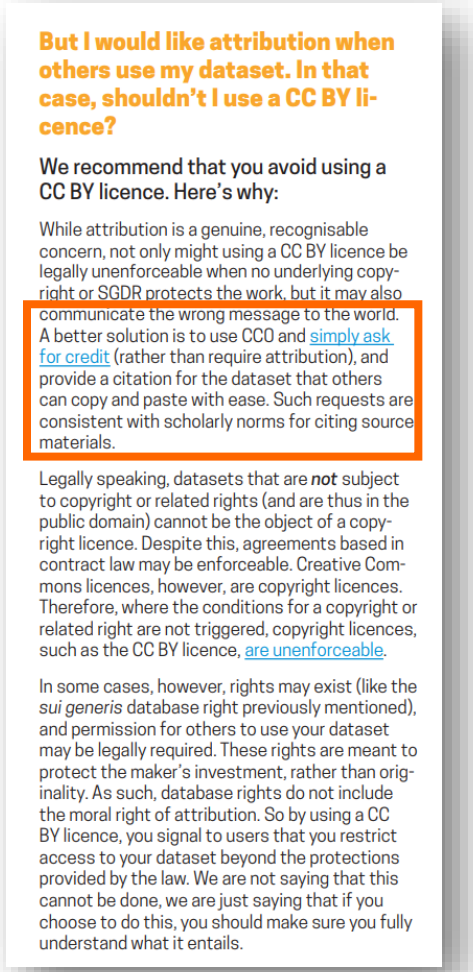
https://ufal.github.io/public-license-selector/

Same in HE

* **OA of publications:** for monographs and other long-text formats, the license may exclude commercial uses and derivative works (e.g. CC BY-NC, CC BY-ND)

Licensing your data: Creative Commons

- Use a CC0 or CC-BY
- Ask for credit
- Provide a citation that researchers using your data can simply copy and paste



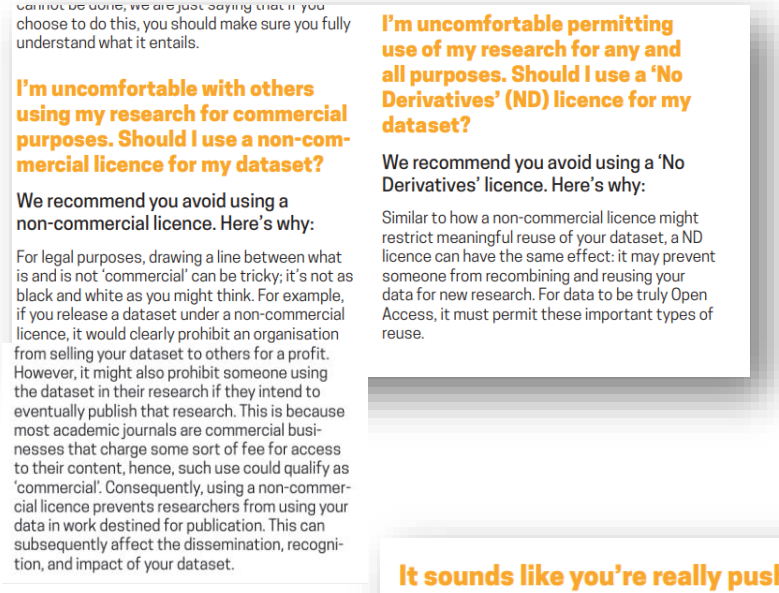
But I would like attribution when others use my dataset. In that case, shouldn't I use a CC BY licence?

We recommend that you avoid using a CC BY licence. Here's why:

While attribution is a genuine, recognisable concern, not only might using a CC BY licence be legally unenforceable when no underlying copyright or SGDR protects the work, but it may also communicate the wrong message to the world. A better solution is to use CC0 and simply ask for credit (rather than require attribution), and provide a citation for the dataset that others can copy and paste with ease. Such requests are consistent with scholarly norms for citing source materials.

Legally speaking, datasets that are ***not*** subject to copyright or related rights (and are thus in the public domain) cannot be the object of a copyright licence. Despite this, agreements based in contract law may be enforceable. Creative Commons licences, however, are copyright licences. Therefore, where the conditions for a copyright or related right are not triggered, copyright licences, such as the CC BY licence, are unenforceable.

In some cases, however, rights may exist (like the *sui generis* database right previously mentioned), and permission for others to use your dataset may be legally required. These rights are meant to protect the maker's investment, rather than originality. As such, database rights do not include the moral right of attribution. So by using a CC BY licence, you signal to users that you restrict access to your dataset beyond the protections provided by the law. We are not saying that this cannot be done, we are just saying that if you choose to do this, you should make sure you fully understand what it entails.



choose to do this, you should make sure you fully understand what it entails.

I'm uncomfortable with others using my research for commercial purposes. Should I use a non-commercial licence for my dataset?

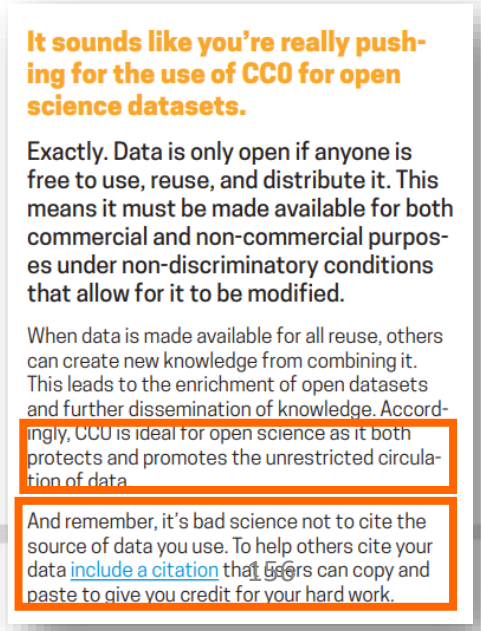
We recommend you avoid using a non-commercial licence. Here's why:

For legal purposes, drawing a line between what is and is not 'commercial' can be tricky; it's not as black and white as you might think. For example, if you release a dataset under a non-commercial licence, it would clearly prohibit an organisation from selling your dataset to others for a profit. However, it might also prohibit someone using the dataset in their research if they intend to eventually publish that research. This is because most academic journals are commercial businesses that charge some sort of fee for access to their content, hence, such use could qualify as 'commercial'. Consequently, using a non-commercial licence prevents researchers from using your data in work destined for publication. This can subsequently affect the dissemination, recognition, and impact of your dataset.

I'm uncomfortable permitting use of my research for any and all purposes. Should I use a 'No Derivatives' (ND) licence for my dataset?

We recommend you avoid using a 'No Derivatives' licence. Here's why:

Similar to how a non-commercial licence might restrict meaningful reuse of your dataset, a ND licence can have the same effect: it may prevent someone from recombining and reusing your data for new research. For data to be truly Open Access, it must permit these important types of reuse.



It sounds like you're really pushing for the use of CC0 for open science datasets.

Exactly. Data is only open if anyone is free to use, reuse, and distribute it. This means it must be made available for both commercial and non-commercial purposes under non-discriminatory conditions that allow for it to be modified.

When data is made available for all reuse, others can create new knowledge from combining it. This leads to the enrichment of open datasets and further dissemination of knowledge. Accordingly, CC0 is ideal for open science as it both protects and promotes the unrestricted circulation of data.

And remember, it's bad science not to cite the source of data you use. To help others cite your data include a citation that others can copy and paste to give you credit for your hard work.

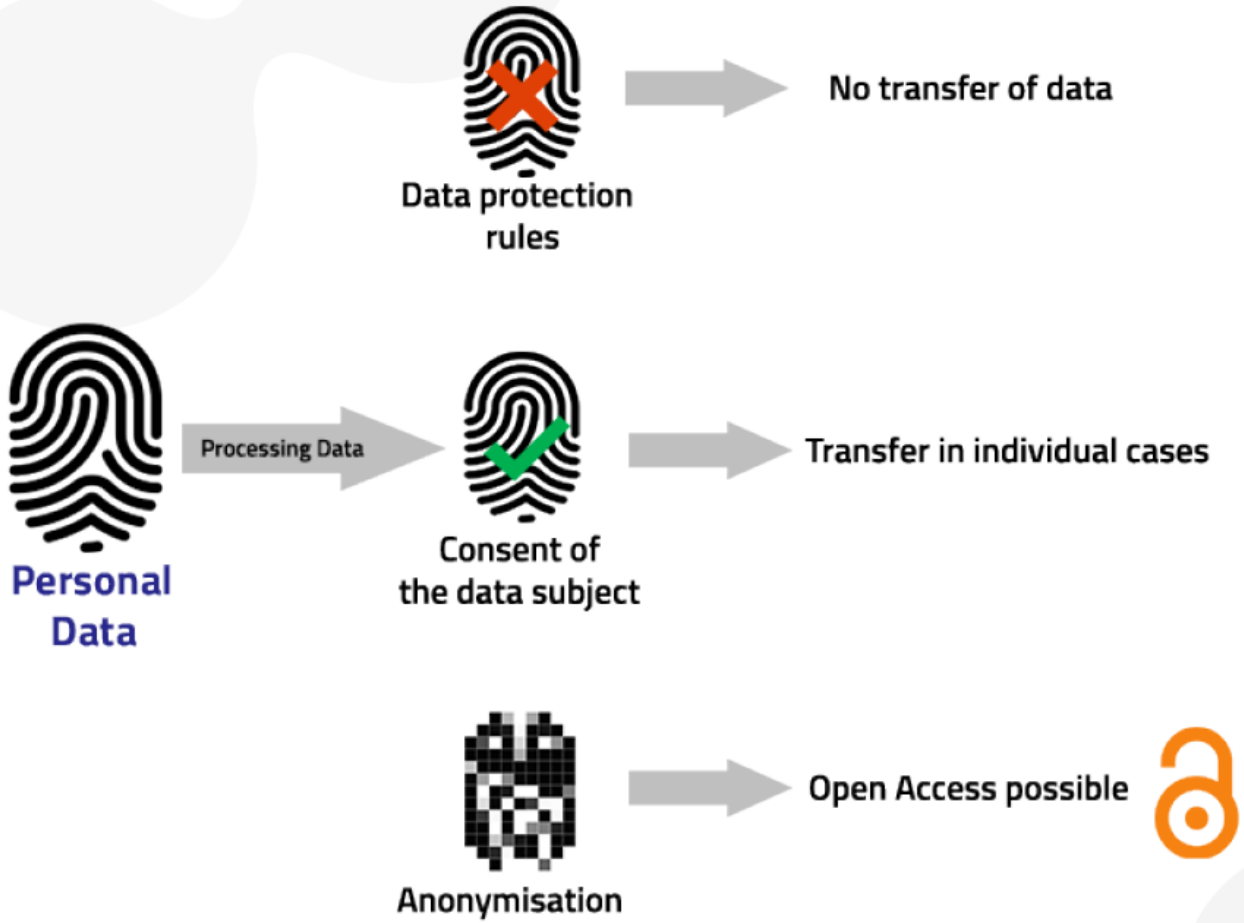
To summarise

FAIR data infographic (CC-BY except F.A.I.R logos CC-BY-SA by Sangya Pundir

Personal data and the Open Research Data Pilot

"Personal data" means any information relating to a natural person who is either identified or who could be identifiable by that data

Anonymisation of personal research data is the effective solution to comply with the data protection legislation and the requirements of the **Open Research Data Pilot**.



Open Data

Data Management

FAIR data

EOSC

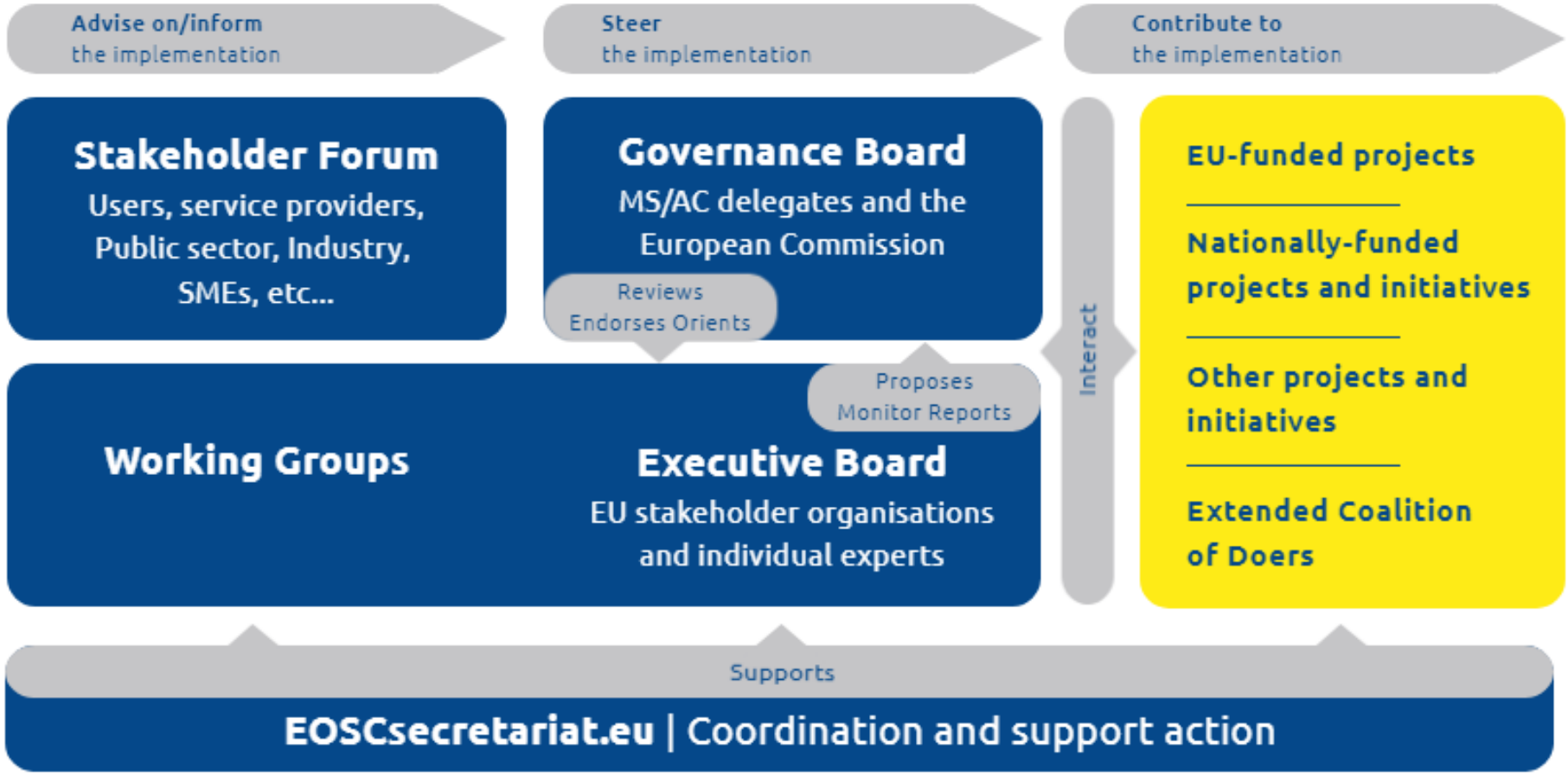
European Open Science Cloud - EOSC

EOSC aims at creating a **virtual research environment** to access and interoperate research data and other research otputs in Europe across the different disciplines

More info:

- www.eoscsecretariat.eu
- https://www.eosc-portal.eu/

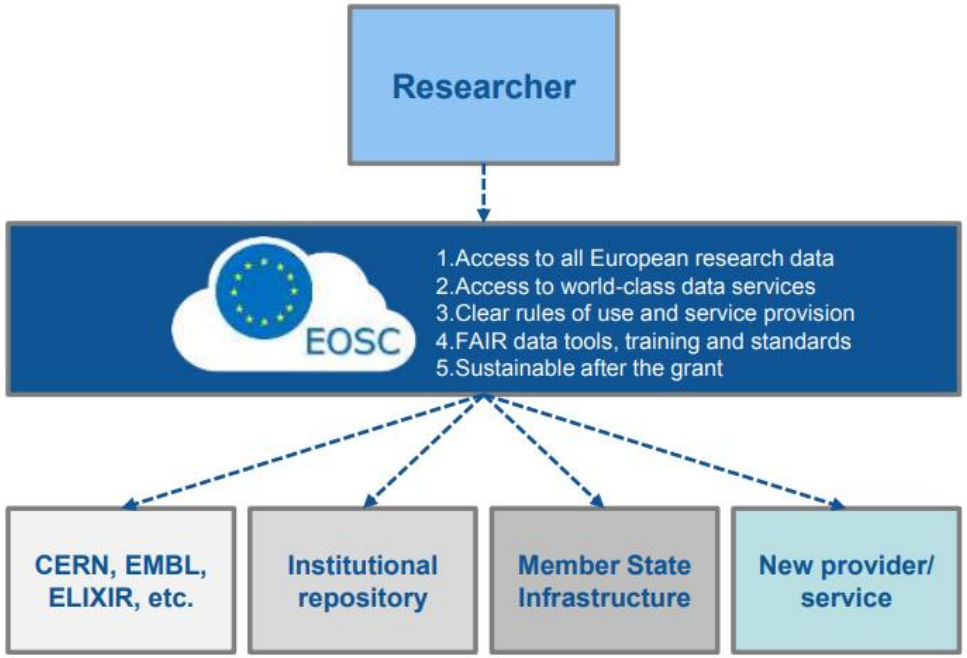
EOSC governance structure



https://eosc-portal.eu/about-eosc-portal

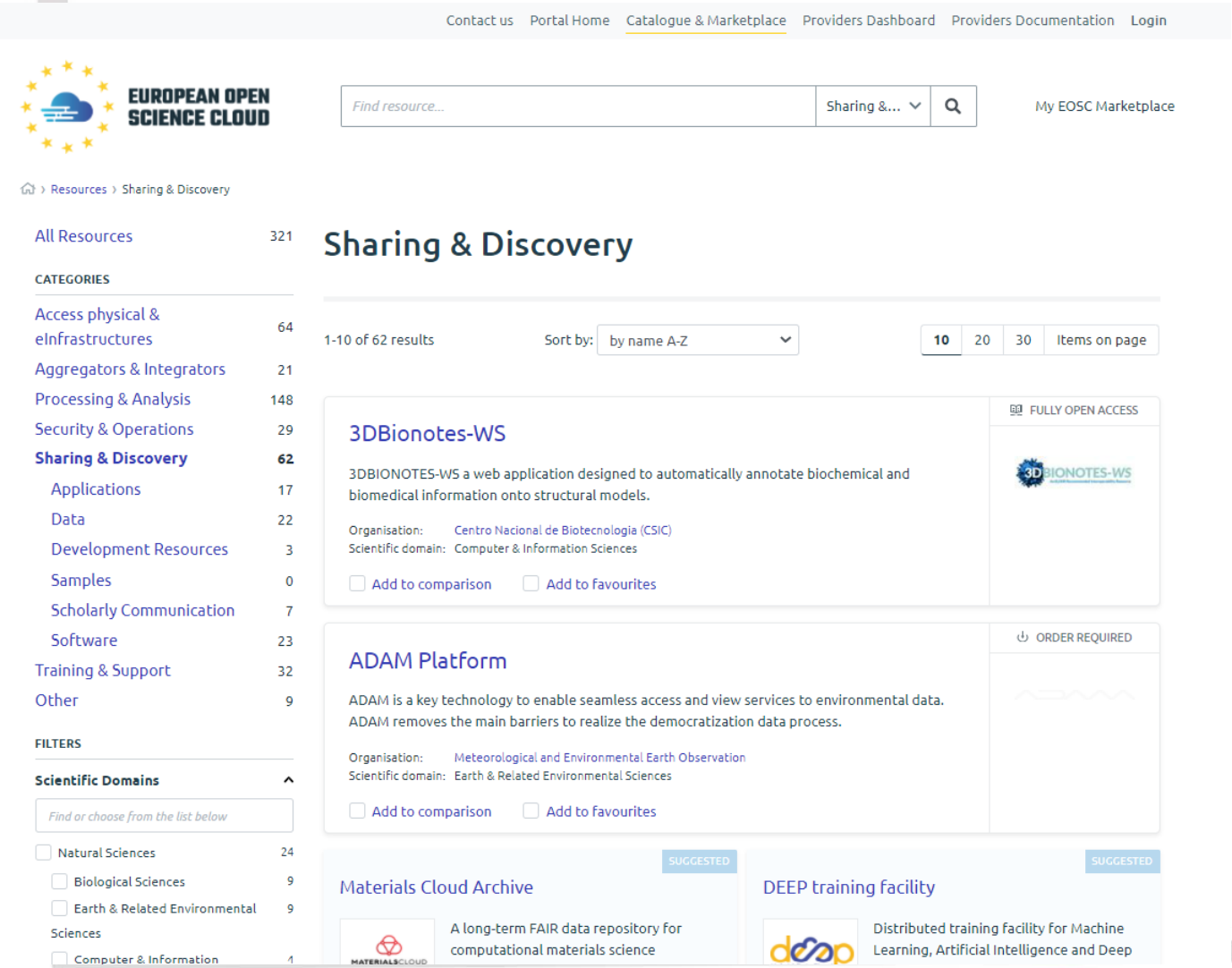
EOSC – European Open Science Cloud

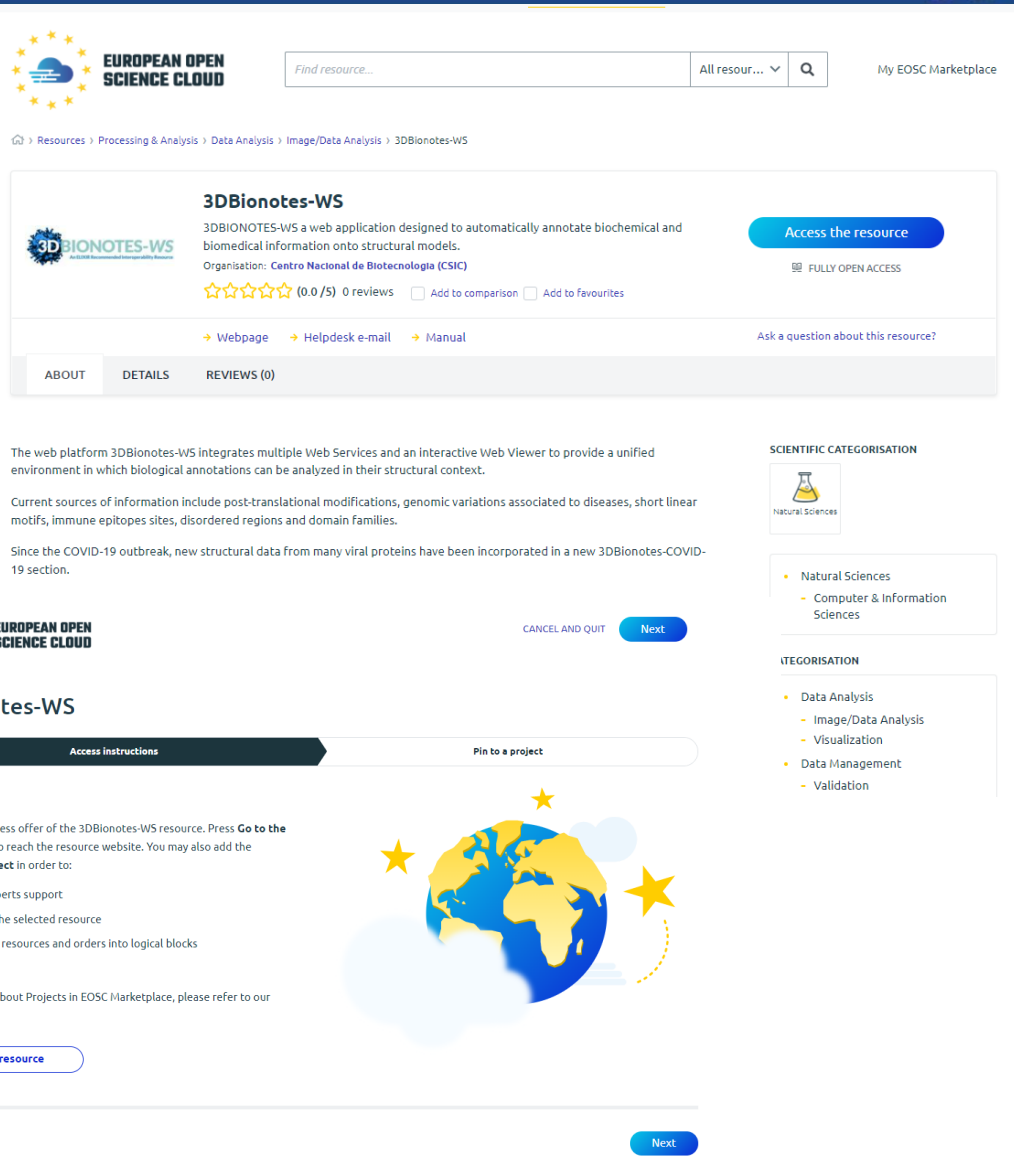
The EOSC will allow for universal access to data and a new level playing field for EU researchers



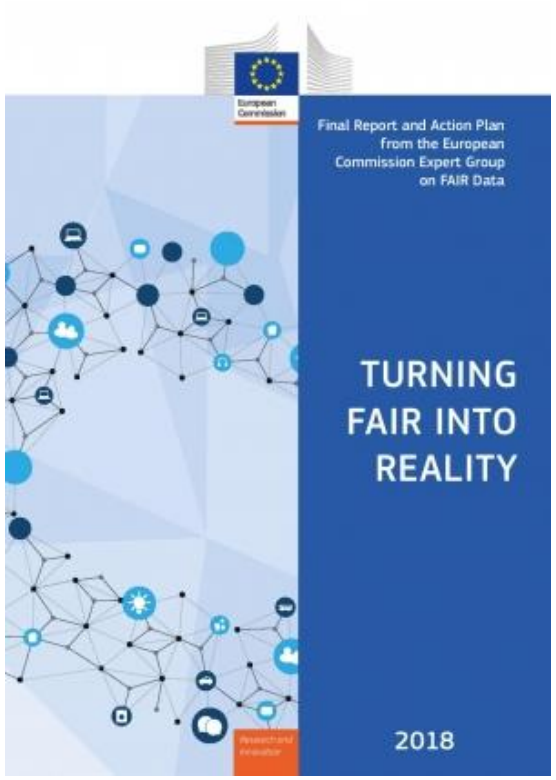
- Easy access through a universal access point for ALL European researchers
- Cross-disciplinary access to data unleashes potential of interdisciplinary research
- Services and data are interoperable (FAIR data)
- Data funded with public money is in principle open (as open as possible, as closed as necessary)
- EOSC will help increase recognition of data intensive research and data science

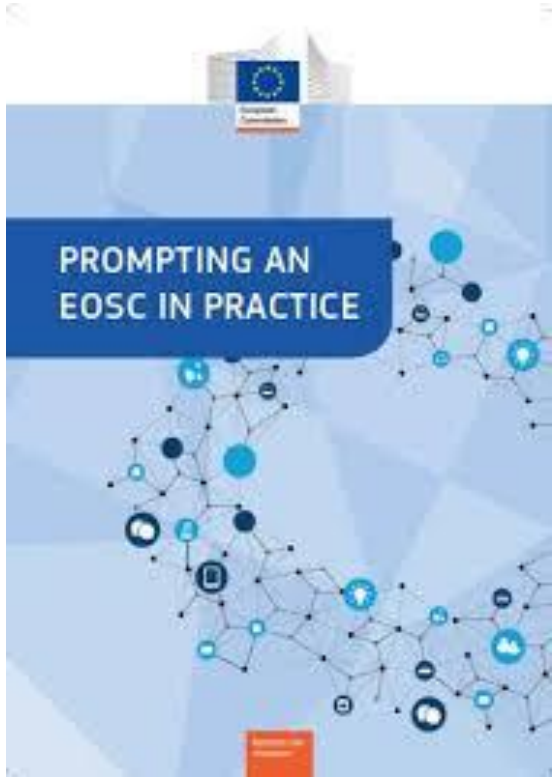
EOSC – European Open Science Cloud





2 important pubblications





Let’s Slido: #OSUNIPI

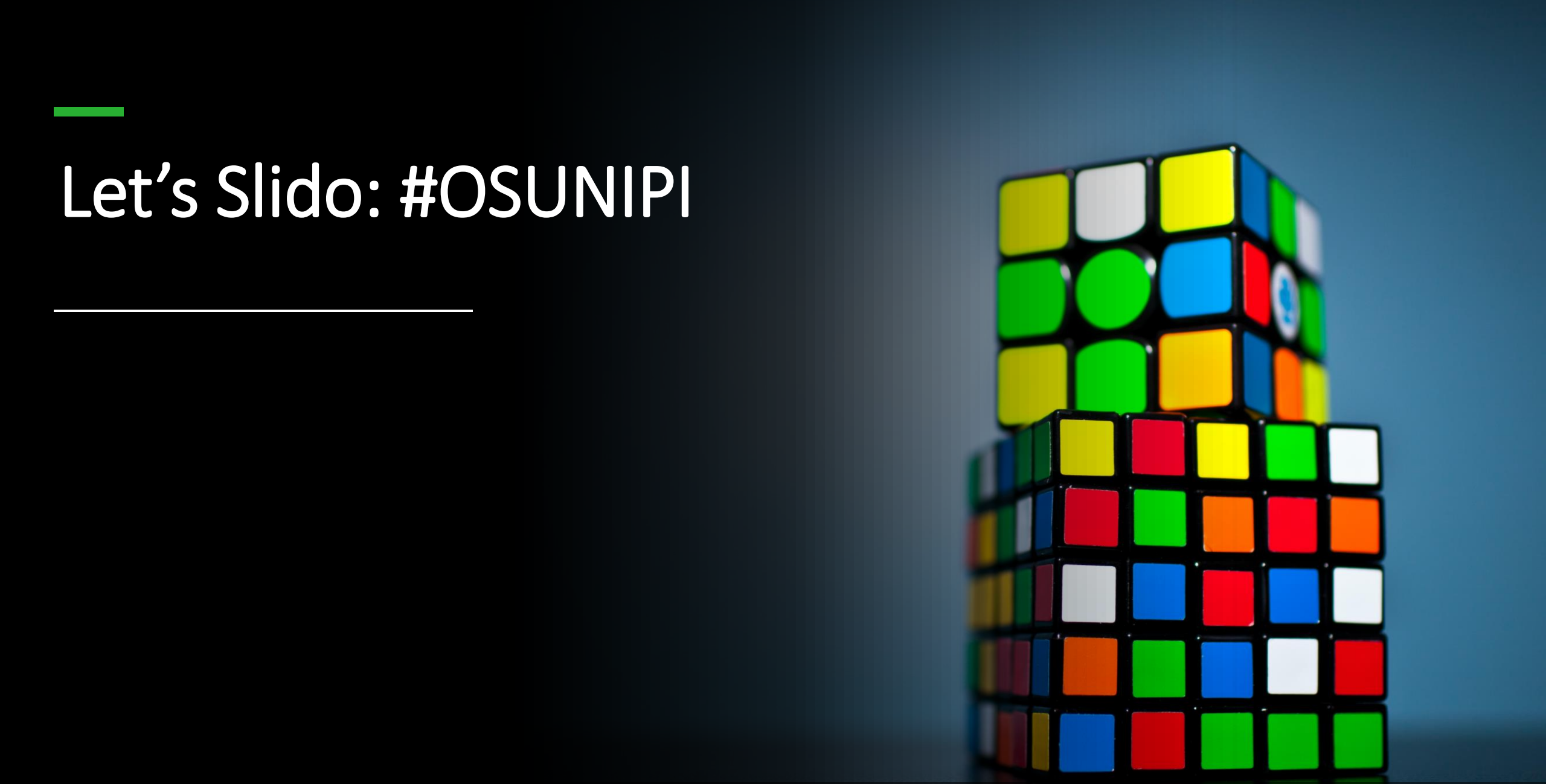


Photo by Olav Ahrens Røtne on Unsplash

Citizen Science

***Mariya Gabriel**, Commissioner for Innovation, Research, Culture, Education and Youth*

"**Interaction between citizens, scientists and policy makers is essential to enrich research and innovation** and reinforce trust of society in science. I am proud of the hundreds of thousands empowered citizens that already contributed to research and innovation in recent years and look forward to continue opening up research towards society and the world."

Citizen Science in H2020

This document reports on the Horizon 2020 Science with and for Society (SwafS), **citizen science and citizen engagement** project portfolio results.

The objective of this report is to convey the **achievements** of the citizen science and citizen engagement projects funded under the SwafS part of Horizon 2020.
Its purpose is to serve as input for the preparation of the Horizon Europe programme implementation.

Citizen Science and Citizen Engagement, Achievements in Horizon 2020 and recommendations on the way forward
doi:10.2777/05286

APRE

Citizen Science & Open Science

Open science

- Open science is based on **open co-operative work** and the systematic sharing of knowledge and tools as early and widely as possible in the process.
- Open science practices include involving all **relevant knowledge actors** such as citizens, civil society and end users in the **co-creation of R&I agendas and contents**.

Citizen Science

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Citizen science and the involvement of knowledge actors in the co-creation of R&I agendas and contents. 4 May 2021, The Research Council of Lithuania NCPs,
Linden Farrer, Policy Officer DG R&I, Open Science – Science and Society

European Commission

APRE

Citizen Science in the European Policies

2015

3 O's strategy

Open innovation

Open science

Open to the world

2016

The Council[1] recognised citizen science as an open science priority

2018

The Open Science Policy Platform (OSPP) included citizen science as one of eight Open Science ambitions

[1] **Council conclusions on the transition towards an Open Science system** https://data.consilium.europa.eu/doc/document/ST-9526-2016-INIT/en/pdf

Elaborated from **Citizen Science and Citizen Engagement,** Achievements in Horizon 2020 and recommendations on the way forward doi:10.2777/05286

Citizen Science in the European Policies

2015

3 O's strategy

Open innovation

Open science

Open to the world

The 'Integrating Society in Science and Innovation' call of the initial **SwafS 2014- 2015 work programme** included topics on public outreach and multi-actor engagement for scenario building.

2016

The Council[1] recognised citizen science as an open science priority

The **2016-2017 work programme** saw three topics focus specifically on the involvement of citizens (alongside other actors) in coproducing research content.

2018

The Open Science Policy Platform (OSPP) included citizen science as one of eight Open Science ambitions

Partly in response to the interim evaluation of Horizon 2020, the **SwafS work programme 2018-2020** included a strategic orientation on 'exploring and supporting citizen science' and developed a portfolio approach to work towards this orientation.

[1] **Council conclusions on the transition towards an Open Science system** https://data.consilium.europa.eu/doc/document/ST-9526-2016-INIT/en/pdf

Elaborated from **Citizen Science and Citizen Engagement,** Achievements in Horizon 2020 and recommendations on the way forward doi:10.2777/05286

Reccomendations for HE

- Reinforcing Citizen Science: mention explicitly CS in the **proposal template** (Excellence evaluation criterion)
- Develop Massive Open Online Courses (MOOC) on Citizen Science and advice projects to sign up for such **trainings** to guide them in the **integration of CS** in their activities
- Continue to **fund** CS actions
- Strengthening the **network**, coordinate communication among CS projects
- Support **CS newcomers** by raising public awareness on CS and delivering trainings to citizen scientists
- **HE Missions**: citizens' engagement for the definition and implementations of Missions is crucial. 3 stages: communication/awareness raising, co-design/co-creation and co-implementation
- Going local: use of cascading grants to **identify CS actors at local level**

What is Citizen Science?

What is Citizen Science?

The essence of Citizen Science is in that citizens are **involved** in one or **many stages of a scientific investigation**, including the assembling of research questions, conducting observations, analysing data, and using the resulting knowledge (Craglia and Granell, 2014). **Researchers** or (scientific) institutions can play a **leading or mediating role** within Citizen Science projects, or **no role at all** such as in the case of Extreme Citizen Science (Haklay, 2015).

What is Citizen Science?

A broad understanding of citizen science

- *Citizen science should be understood broadly, covering a range of different levels of participation, from raising public knowledge of science, encouraging citizens to participate in the scientific process by observing, gathering and processing data, right up to setting scientific agenda and co-designing and implementing science-related policies. It could also involve publication of results and teaching science* (European Green Deal Call).
- Haklay *et al.*: *A "proliferation of typologies of citizen science"; "fluidity of definitions reflect the diversity of the field"; "leave the necessary space for methodological advancements, disciplinary cross-fertilisation and overall, for the growth of citizen science as a field for science innovation*" (2020, Contours of citizen science: a vignette study).

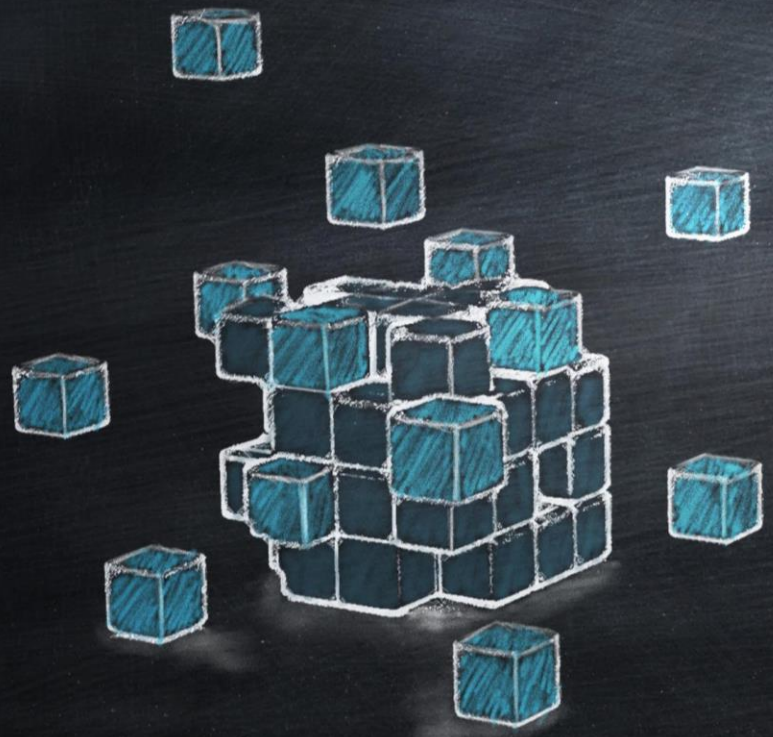
Citizen Science: key elements

Definition

Typologies

APRE

A challenge



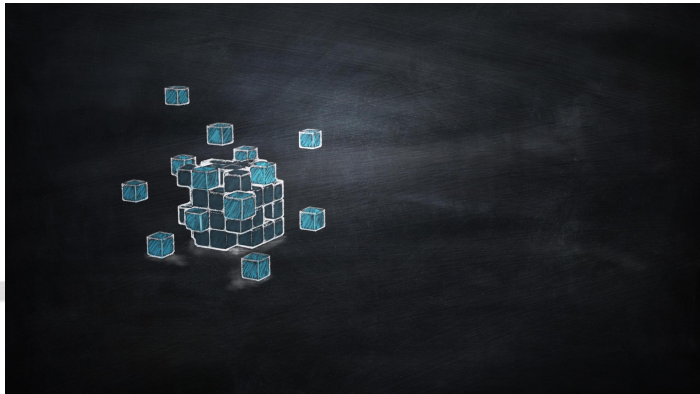
Why is it challenging to define citizen science?

Different typologies, definitions and criteria emerged in the past 15 years

Discussion about what practices and activities should be included in the CS definition

CS can be defined differently depending on the context

It’s important to understand such differences, both for practitioners and policymakers



The Science of Citizen Science, https://doi.org/10.1007/978-3-030-58278-4

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Some characteristics emerging since the beginning

First definition of CS in an issue of the MIT Technology Review in 1989: recruitment of volunteers in acid-rain campaign, to collect acid rain samples, test their acidity and report to scientists. The information were then used to influence the Congress (USA).

What we can learn from this example?

- It includes the **generation of scientific data** (through the testing of the acidity of rainwater),
- **engages volunteers** over a large area (the continental USA), and
- addresses a **politically relevant issue** (acid rain and the lobbying process to reduce it).

Key elements

Citizens

Scientists

Formal education on the specific field of research of the CS project
Working in academia/RPOs

Variety of skills and knowledge
May have or not a formal scientific education

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Citizen Science: Definition

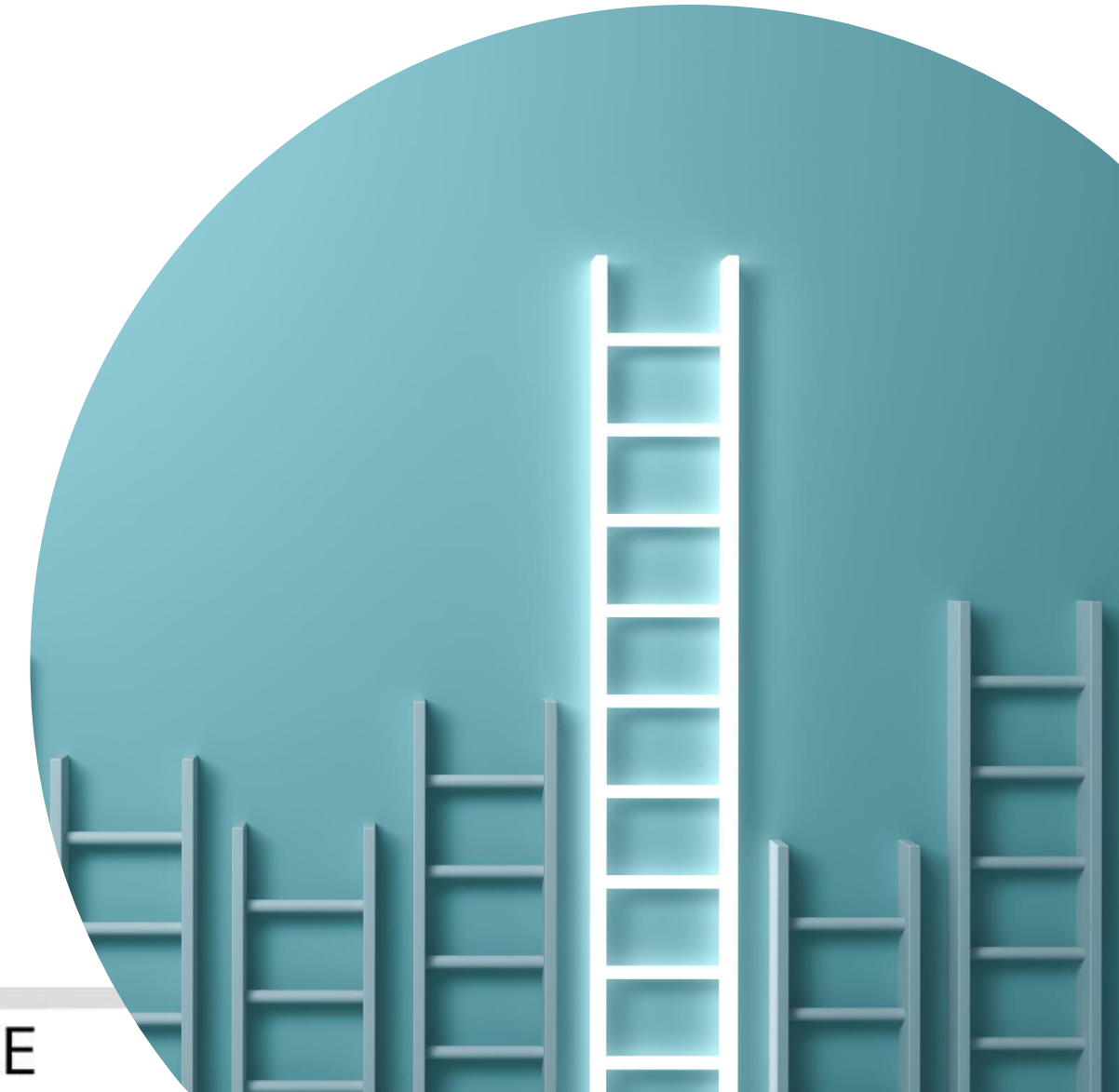
- **Citizen Science** refers to the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources. *(White paper on Citizen Science for Europe)*
- **Citizen Science** is "scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions." *(Oxford English Dictionary List of New Words, 13.09.2014)*
- **Citizen Science** […] covers a range of different levels of participation: from raising public knowledge about science, encouraging citizens to participate in the scientific process by observing, gathering and processing data, right up to setting scientific agenda and co-designing and implementing science-related policies. *(EC, Horizon 2020, Science with and for society Work Programme 2018-2020, p.30)*

Citizen Science: Definition

- **Citizen Science** is “the collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists.” *(Oxford English Dictionaries)*
- **Citizen science** describes the engagement of people in scientific processes who are not tied to institutions in that field of science. Participation can range from the short-term collection of data to the intensive use of leisure time in order to delve deeper into a research topic together with scientists and/or other volunteers. Although many volunteer scientists do have a university degree, this is not a prerequisite for participating in research projects. However, it is important that scientific standards are adhered to. This pertains especially to transparency with regard to the data collection methodology and the open discussion of the results. *(Green Paper CS Strategy 2020 for Germany, p. 13)*

What's the best definition of CS?

- No one size one-size-fits-all: it must reflect the objectives of the actors and the extent of the engagement of citizens in the different processes generating scientific knowledge
- It depends on the context



The Science of Citizen Science, https://doi.org/10.1007/978-3-030-58278-4

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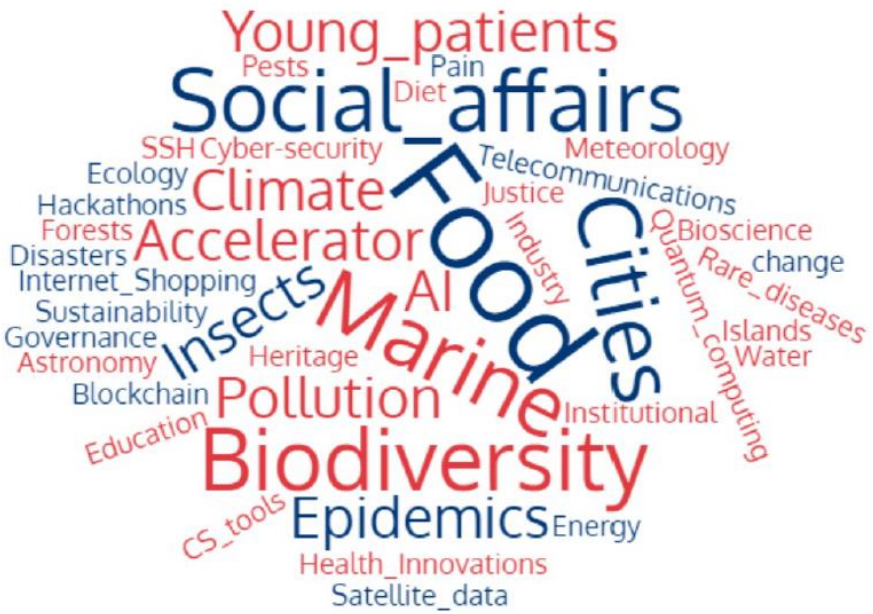
Scientific fields

Citizen science can apply across all areas of science and innovation



Source: *SwafS-27-2020 - Hands-on citizen science and frugal innovation –* Aggregated key themes of the 71 proposals

CS benefits

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Why promote citizen science and the co-creation of R&I agendas and contents?

- Contributes to excellence
  - Enlarges the scope of R&I, and the quality and quantity of data collected, discussed and analysed
  - Leads to – and enables – innovative and creative approaches
  - Increases the robustness of the outcomes and reduces the time-to-market of products and services
- Increases effectiveness
  - Leverages vast societal capabilities and collective intelligence often excluded from contributing to R&I
  - Increases the relevance and responsiveness of R&I, ensuring that its outcomes align with the needs, values and expectations of society
  - Triggers behavioural changes
- Improves the relationship between science and society
  - Improves transparency, co-ownership and trust of society in the process and outputs of R&I, helping respond to increased science denial
  - Ensures that the outcomes of R&I are more inclusive in nature and less likely to generate opposition
  - Encourages mutual learning between science and society (c.f. science-society literacy)

European Commission

Why promote citizen science and the co-creation of R&I agendas and contents?

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Good Science

Impactful Science

Science better linked to Society

European Commission

Why Citizen Science?

1. **Citizen Science increases scientific literacy and critical faculties**, so the public can discern between fake news and scientific facts like climate change or evolution, or contribute to increased consciousness among citizens of social conditions that influence their life and well-being

2. **Citizen Science can democratise the research process**. By conceptualising Citizen Science as part of Open Science and therefore interlinked with Open Innovation and Open to the World (3Os), over the coming years, citizens will be playing an expanded role in scientific research and will contribute more actively to defining the research agenda, and can contribute to strengthen the social voices of the most vulnerable, stigmatized and often marginalized citizens in public policy, effectively helping to democratise science.

Why Citizen Science?

3. **Citizen Science generates new knowledge and enables new forms of research**. As a method of "crowdsourcing research" by using "idle brains" of the citizens, Citizen Science offers new potential in areas where it would be impossible to get all the information/ data, for example by collecting data "for free" in an unconceivable amount and providing perspectives and experiences professional scientists otherwise would not have.

4. **Citizen Science can motivate young people to follow scientific careers**. When pupils get in touch with science at an early age they are more likely to continue being interested and willing to intervene in science when it comes to choosing their careers.

Why Citizen Science?

5. **Citizen Science can expand the skill set of researchers.** By engaging with citizen scientists, (academic) scientists will learn a range of new skills especially in the area of science communication

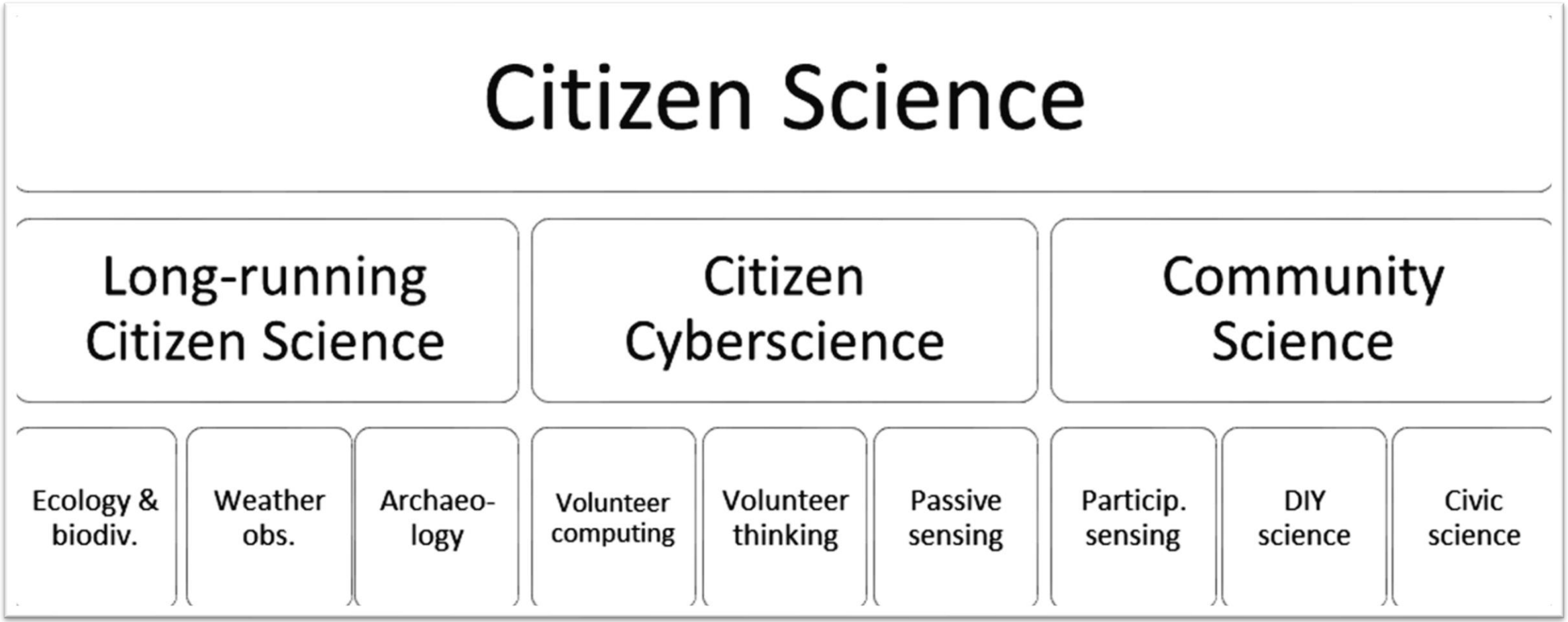
Citizen Science: key elements

Definition

Typologies

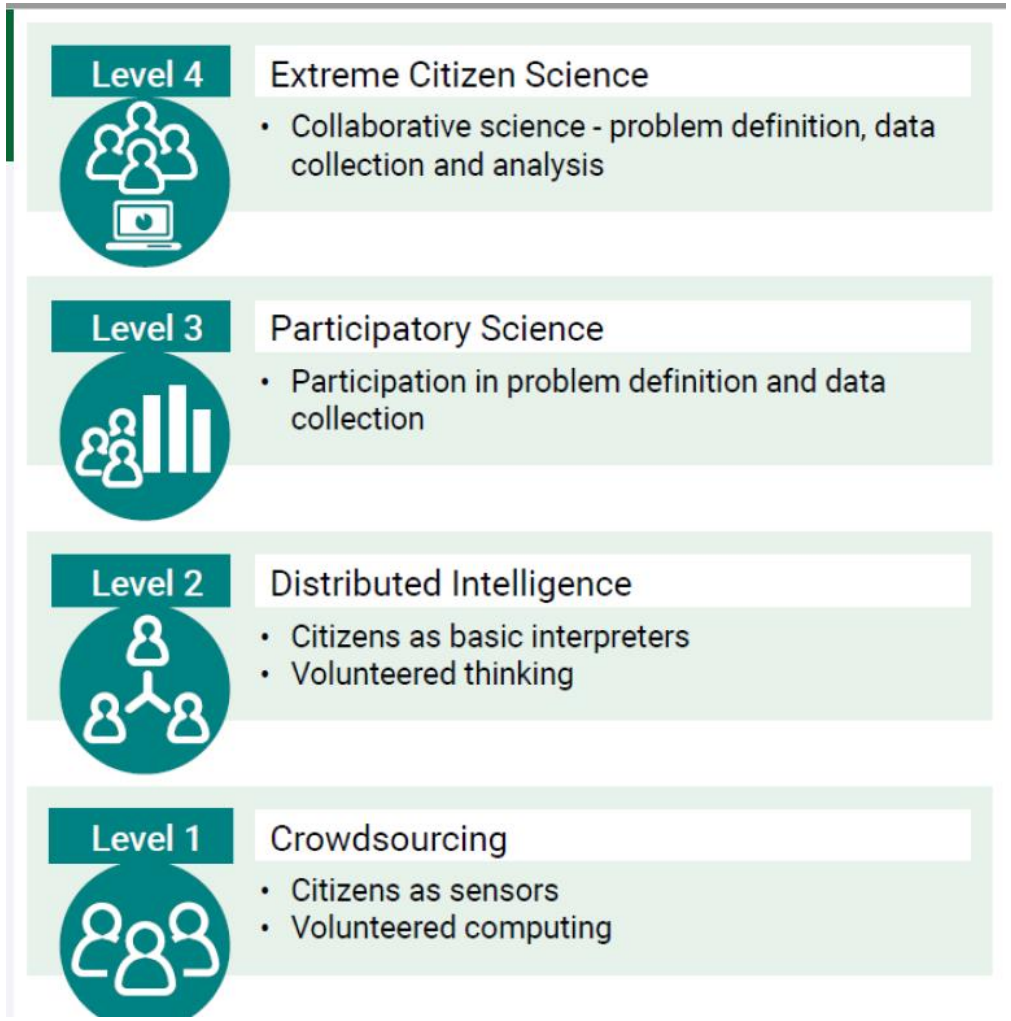
CS landscape

Mapping current citizen science activities by domains, technology and engagement



(Muki) Haklay M., Mazumdar S., Wardlaw J. (2018) Citizen Science for Observing and Understanding the Earth. In: Mathieu PP., Aubrecht C. (eds) Earth Observation Open Science and Innovation. ISSI Scientific Report Series, vol 15. Springer, Cham. https://doi.org/10.1007/978-3-319-65633-5_4

Citizen Science classification: level of engagement



Haklay 2013, Citizen Science and voluntereed geographic information: Overview and typology of participation, Crowdsourcing Geographic Knowledge

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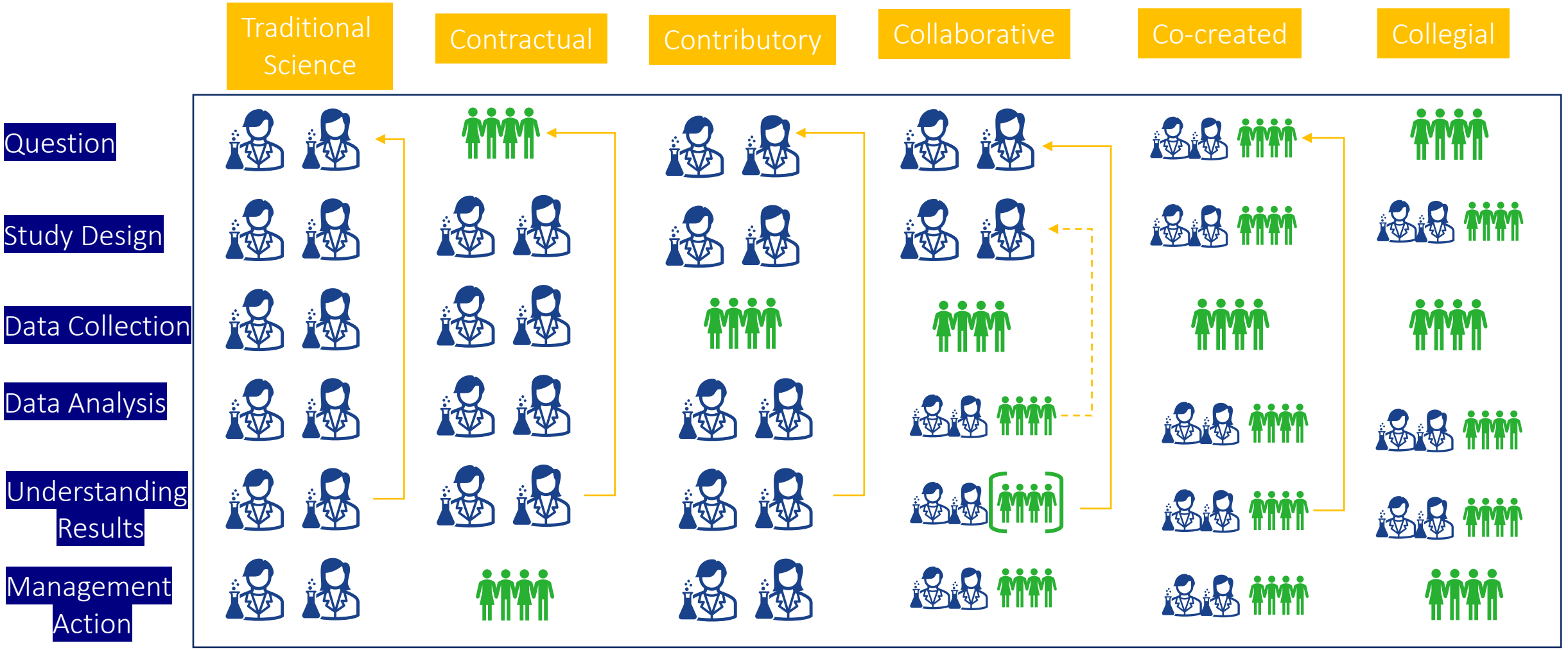
Citizen Science typologies

5 Cs classification

- **Contractual** - communities ask professional researchers to conduct a specific scientific investigation and report on the results;
- **Contributory** - generally designed by scientists and members of the public primarily contribute data;
- **Collaborative** - generally designed by scientists and members of the public contribute data, refine project design, analyse data, disseminate findings;
- **Co-Created -** designed by scientists and members of the public working together, some of the public participants are actively involved in most aspects of the research process; and
- **Collegial** - non-credentialed individuals conduct research independently with varying degrees of expected recognition by institutionalised science.

Shirk et al. (2012). Public participation in scientific research: a framework for deliberate design. *Ecology and Society*, 17(2).

Citizen Science typologies: 5Cs



Adapted from Cooper, C. B., J. Dickinson, T. Phillips, and R. Bonney. 2007. Citizen science as a tool for conservation in residential ecosystems. Ecology and Society 12(2): 11. [online] URL: http://www.ecologyandsociety.org/vol12/iss2/art11/

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Most common CS projects

Contributory Projects

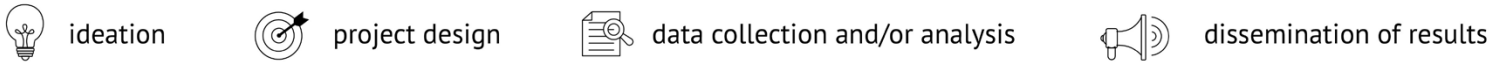
Designed by professional researchers, with members of the public primarily contributing data.

Collaborative Projects

Citizens provide data and may participate in analysis and communication of research results, assist in revision of project design.

Co-created Projects

Professional researchers and citizens work together on the project design and cooperate closely with each other in all project phases.



- **Contributory projects** – designed by professional researchers, with members of the public primarily contributing data.

- **Collaborative projects** – designed by professional researchers, with members of the public contributing data as well as helping to refine project design, analyse data and/or disseminate findings.

- **Co-created projects** – designed by professional researchers together with members of the public. At least some members of the public are actively involved in most or all aspects of the research process.

The 10 Citizen Science principles

https://ecsa.citizen-science.net/documents

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EUROPEAN CITIZEN SCIENCE ASSOCIATION

Dieci principi di Citizen Science

La Citizen science è un concetto flessibile, che può essere adattato e applicato a diverse situazioni e discipline. Le enunciazioni riportate in questo documento sono state sviluppate dal gruppo di lavoro 'Sharing best practice and building capacity' (Condivisione delle migliori pratiche e rafforzamento delle capacità) della **Associazione Europea di Citizen Science**, guidato dal Museo di Storia Naturale di Londra, con contributi da numerosi membri della Associazione, per stabilire alcuni principi chiave che come comunità crediamo debbano essere alla base di ogni buona pratica nella Citizen science. La traduzione in italiano è a cura di Andrea Sforzi, membro del Board of Directors di ECSA.

1. I progetti di Citizen science coinvolgono attivamente i cittadini in attività scientifiche che generano nuova conoscenza o comprensione. *I cittadini possono agire come contributori, collaboratori, o responsabili di progetto e ricoprono un ruolo significativo nel progetto.*
2. I progetti di Citizen Science producono un risultato scientifico originale. *Ad esempio, fornire una risposta ad un quesito di ricerca o mettere in pratica azioni di conservazione, decisioni gestionali o politiche ambientali.*
3. Sia gli scienziati professionisti sia i cittadini convolti traggono vantaggio dal prendere parte a progetti di Citizen Science. *I vantaggi possono includere la pubblicazione dei risultati di una ricerca, opportunità di apprendimento, piacere personale, benefici sociali, soddisfazione per aver contribuito a fornire una evidenza scientifica per, ad esempio: trovare risposte a questioni di rilevanza locale, nazionale e internazionale e, attraverso queste, avere l'opportunità di influire sulle politiche di settore.*
4. Le persone coinvolte in progetti di Citizen Science possono, se vogliono, prendere parte a più fasi del processo scientifico. *Questo può includere lo sviluppo di quesiti di ricerca, mettere a punto un metodo, raccogliere e analizzare dati e comunicare I risultati.*
5. Le persone coinvolte in progetti di Citizen Science ricevono feedback. *Ad esempio, come i loro dati vengono utilizzati e quali sono i risultati nel campo della ricerca, politico e sociale.*
6. La Citizen Science è considerata una metodologia di ricerca come qualunque altra, con limiti e margini di errore che devono essere considerati e tenuti sotto controllo. *Tuttavia, a differenza delle metodologie tradizionali di ricerca, la Citizen Science fornisce opportunità di un ampio coinvolgimento del pubblico e di democraticizzazione della scienza.*
7. Dati e metadati provenienti da progetti di Citizen Science sono resi pubblicamente disponibili e, ove possibile, i risultati sono pubblicati in un formato di libero accesso (open access). *La condivisione dei dati può avvenire durante o dopo il progetto, a meno che esistano motivi di sicurezza o privacy che lo impediscano.*
8. Il contributo delle persone coinvolte in progetti di Citizen Science viene riconosciuto ufficialmente nei risultati dei progetti e nelle pubblicazioni.
9. I programmi di Citizen Science vengono valutati per il loro risultato scientifico, per la qualità dei dati, l'esperienza dei partecipanti e l'ampiezza dell'impatto sociale e sulle politiche di settore.
10. I responsabili di progetti di Citizen Science prendono in considerazione aspetti legali ed etici relativi a copyright, proprietà intellettuale, accordi sulla condivisione dei dati, confidenzialità, attribuzione e impatto ambientale di ogni attività.

November 2015, Grosseto

The 10 Citizen Science principles

ecsa European Citizen Science Association

In 2015, the ECSA working group on 'Sharing best practice and building capacity for citizen science' developed a document outlining Ten Principles of Citizen Science.
Drawing from the collective experiences of many ECSA members, this series of statements set out the key principles which ECSA believes underlies good practice in citizen science, regardless of the academic discipline or cultural context in which it is applied.

https://ecsa.citizen-science.net/documents

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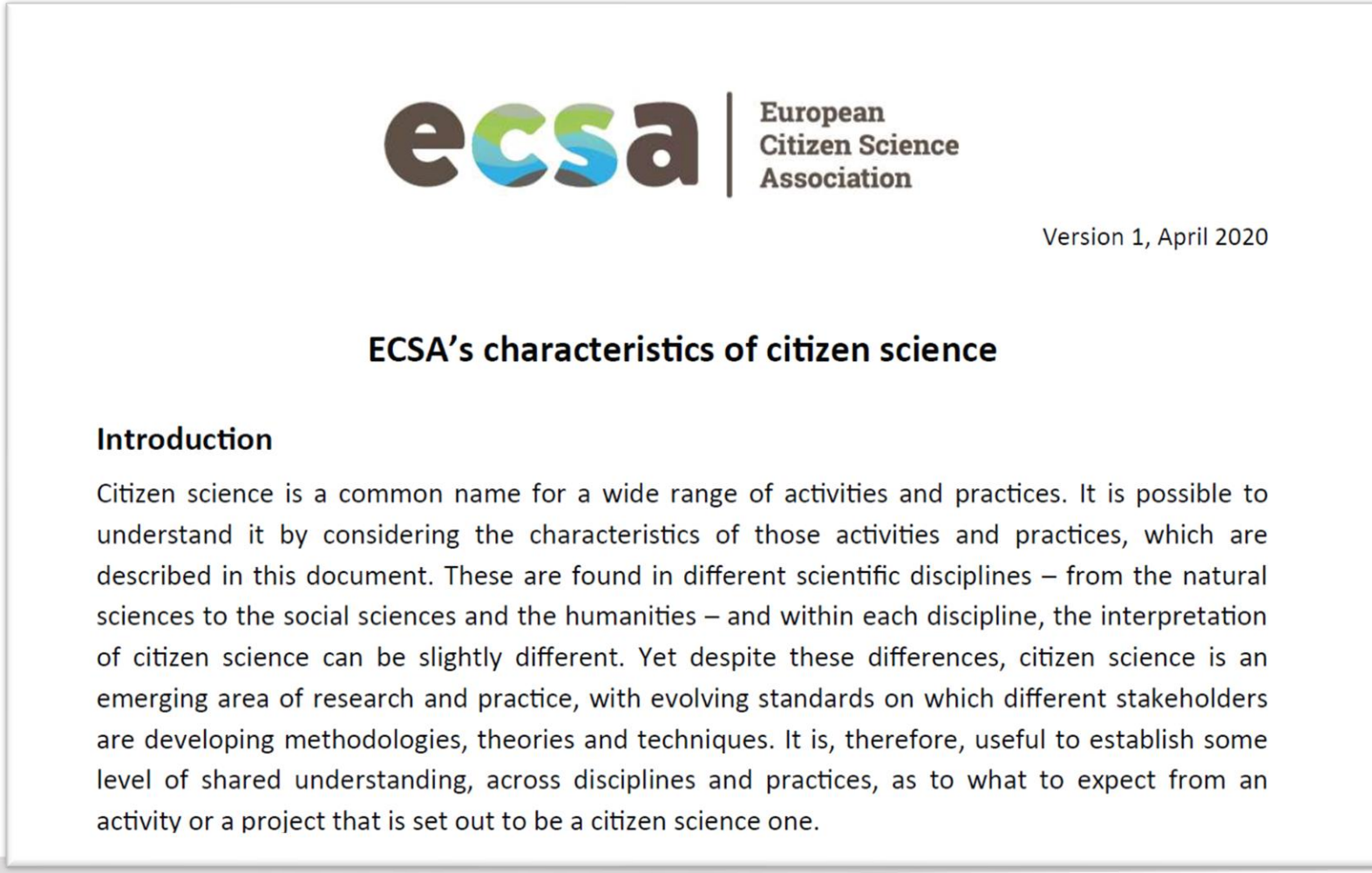
November 2015, Grosseto

The ECSA characteristic of Citizen Science

(1) core concepts;
(2) disciplinary aspects;
(3) leadership and participation;
(4) financial aspects; and
(5) data and knowledge.



ecsa | European Citizen Science Association

Version 1, April 2020

ECSA's characteristics of citizen science

Introduction

Citizen science is a common name for a wide range of activities and practices. It is possible to understand it by considering the characteristics of those activities and practices, which are described in this document. These are found in different scientific disciplines – from the natural sciences to the social sciences and the humanities – and within each discipline, the interpretation of citizen science can be slightly different. Yet despite these differences, citizen science is an emerging area of research and practice, with evolving standards on which different stakeholders are developing methodologies, theories and techniques. It is, therefore, useful to establish some level of shared understanding, across disciplines and practices, as to what to expect from an activity or a project that is set out to be a citizen science one.

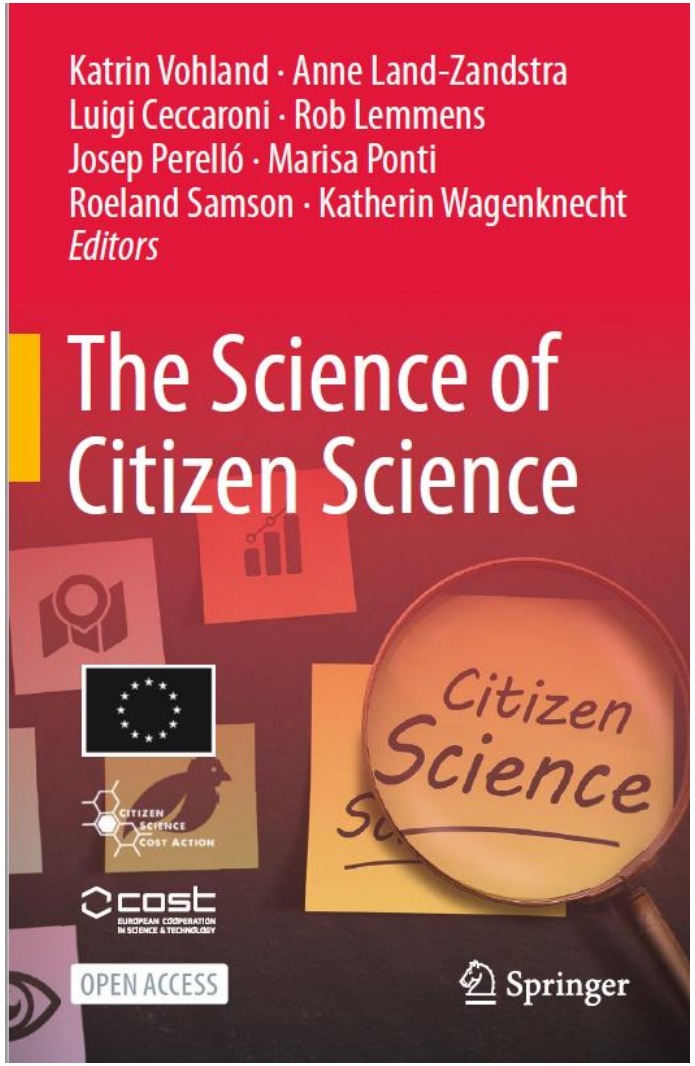
https://doi.org/10.5281/zenodo.3758668

The ECSA characteristic of Citizen Science

- The document combines the points of view of researchers, practitioners, public officials and the wider public
- The aim is to identify the characteristics that should be considered when setting criteria such a funding scheme (e.g. EU funded calls)
- The users should determine which subset of these characteristics is relevant to their own specific context and aims

https://doi.org/10.5281/zenodo.3758668

Resources


Katrin Vohland · Anne Land-Zandstra
Luigi Ceccaroni · Rob Lemmens
Josep Perelló · Marisa Ponti
Roeland Samson · Katherin Wagenknecht
Editors
The Science of Citizen Science
Citizen Science
CITIZEN SCIENCE COST ACTION
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY
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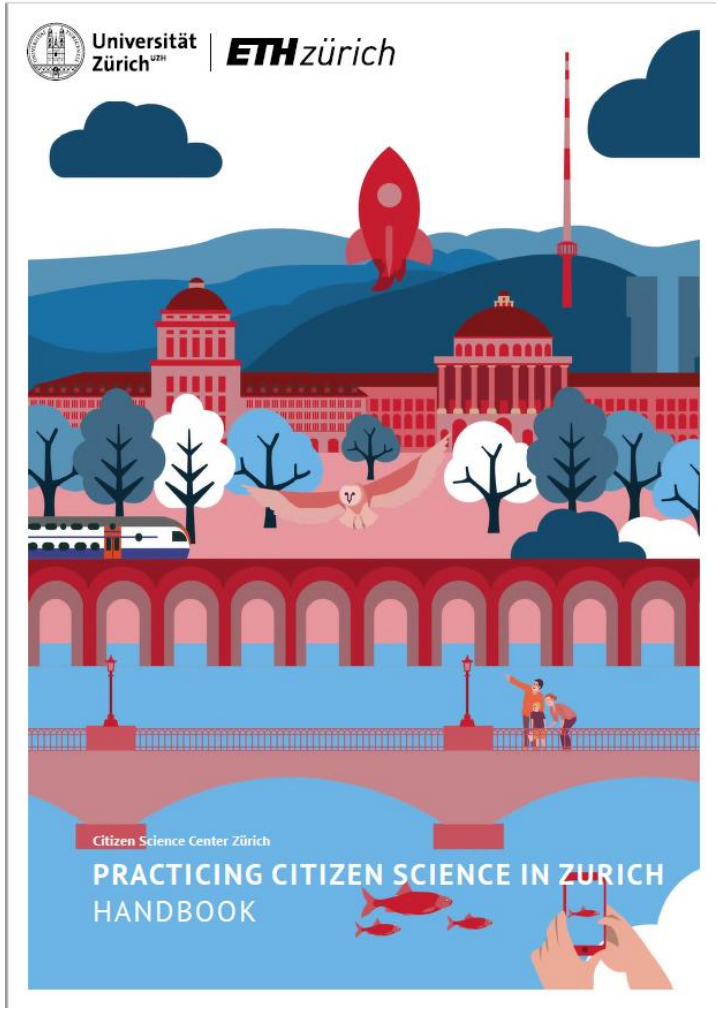
Universität Zürich
ETH zürich
Citizen Science Center Zürich
PRACTICING CITIZEN SCIENCE IN ZURICH
HANDBOOK

Citizen Science is a methodology

- ✓ **Data collected** from large geographical area and/or for long period are needed ----> data collected from participants can be cost-effective
- ✓ Analysis of large amount of data is needed ----> **volunteer thinking** approach!
- ✓ Local and/or social **impact** of the research ----> interdisciplinary collaboration and stakeholders engagement
- ✓ CS can facilitate the **understanding of the scientific question** and make it more locally relevant
- ✓ The research requires meaningful engagement in real life to **analyse individuals** on specific aspects (e.g. triggering behavioural changes)

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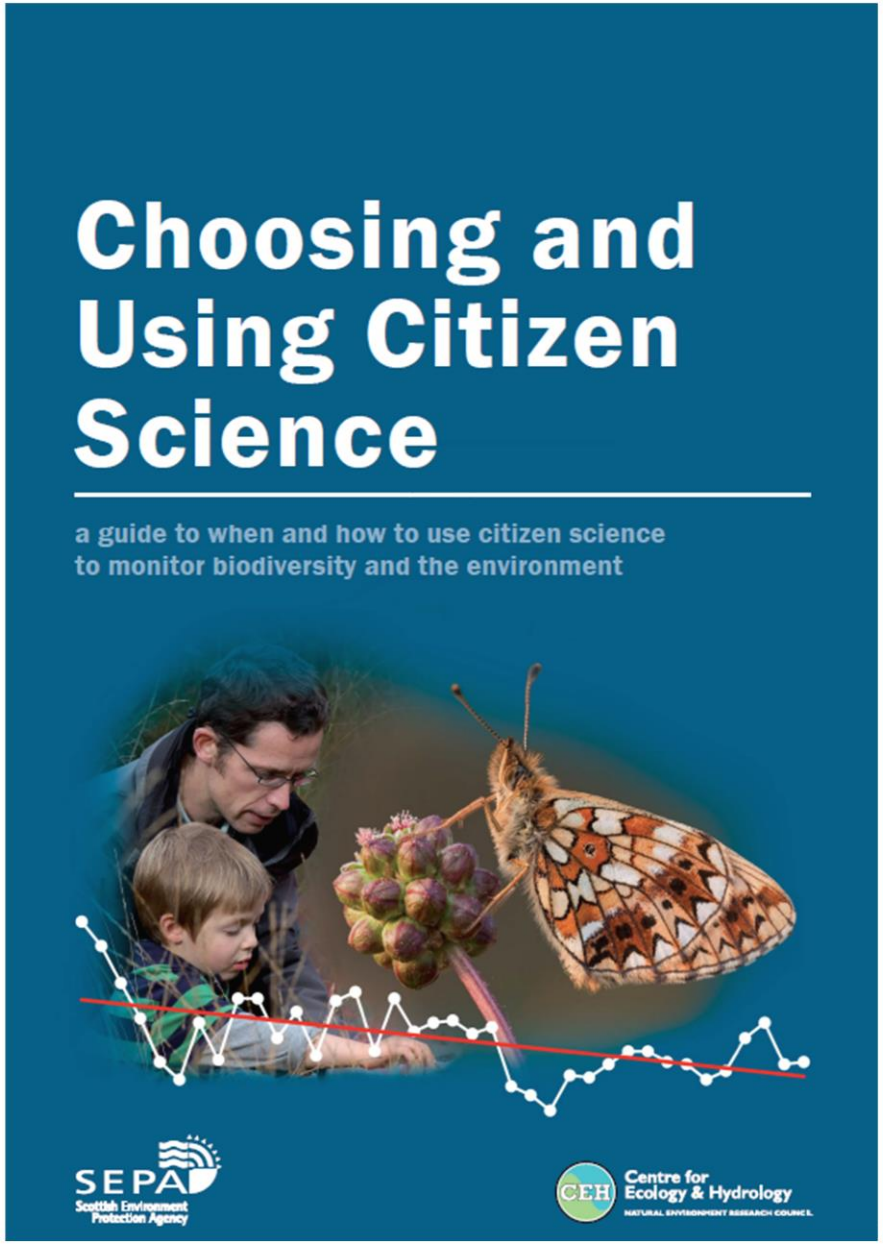
Where to start?



Pocock, M.J.O., Chapman, D.S., Sheppard, L.J. & Roy, H.E. (2014). **Choosing and Using Citizen Science: a guide to when and how to use citizen science to monitor biodiversity and the environment.** Centre for Ecology & Hydrology.

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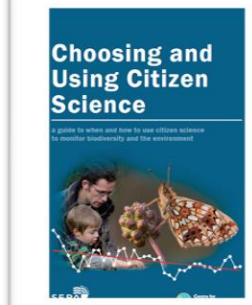
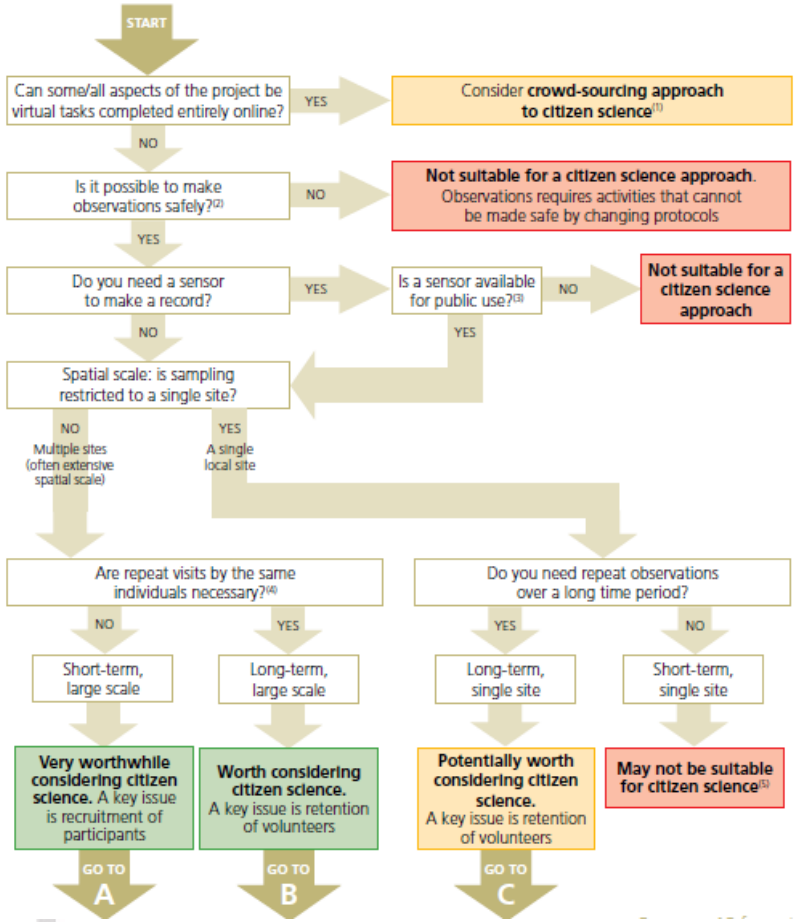
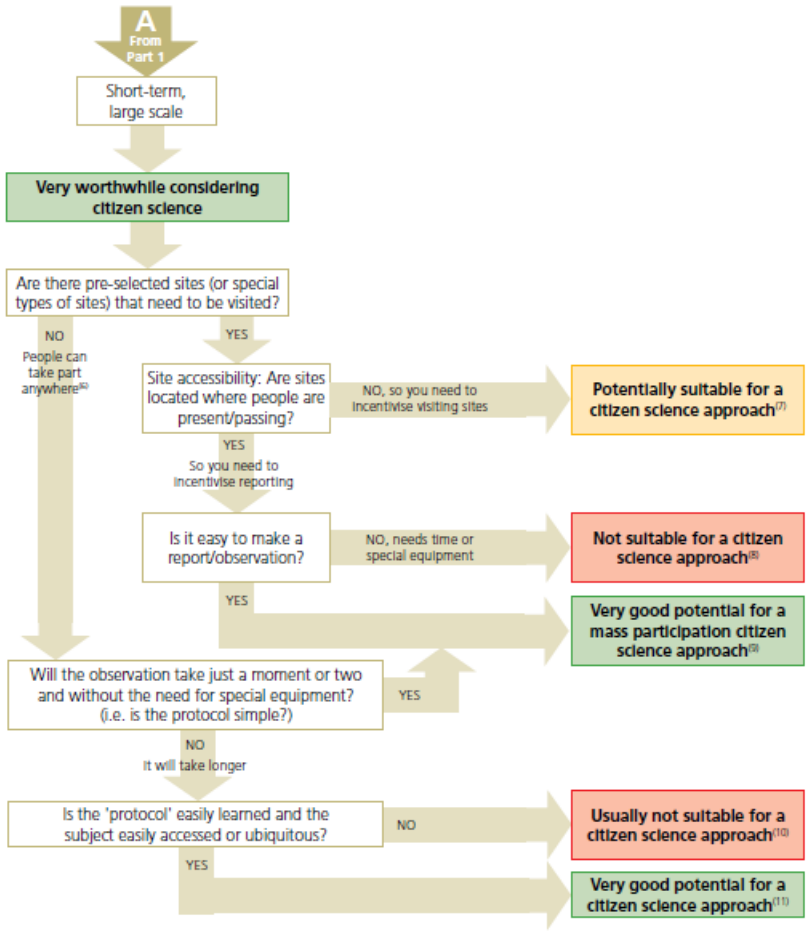


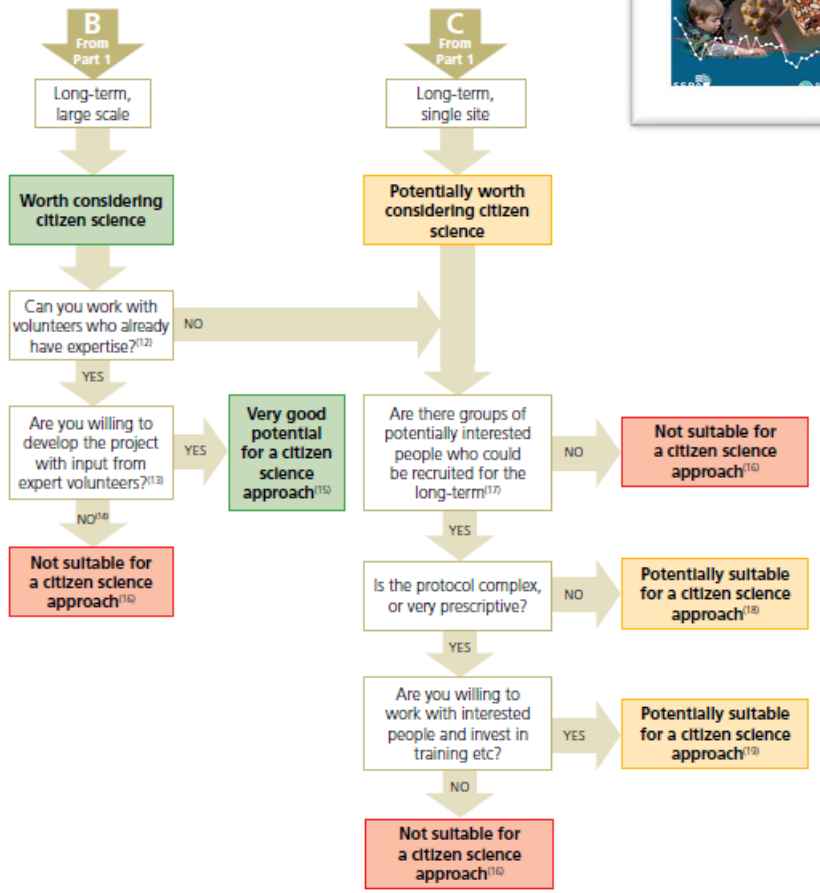
Part 1 of the decision framework



Part 2 of the decision framework *(continued)*



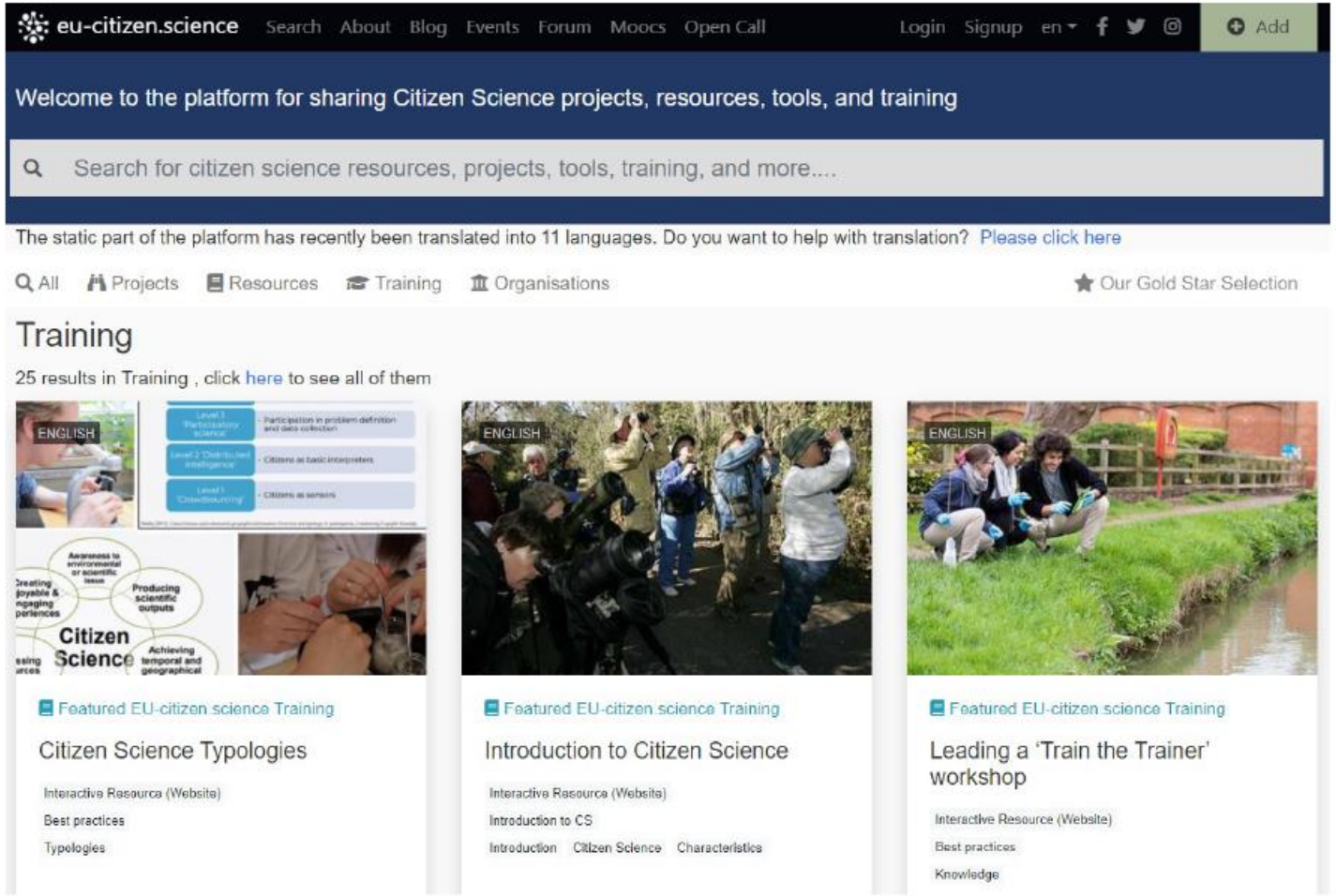
Part 2 of the decision framework *(continued)*



Pocock, M.J.O., Chapman, D.S., Sheppard, L.J. & Roy, H.E. (2014). **Choosing and Using Citizen Science: a guide to when and how to use citizen science to monitor biodiversity and the environment.** Centre for Ecology & Hydrology.

APRE

EU-Citizen.Science



EU-Citizen.Science is an online platform for sharing knowledge, tools, training and resources for citizen science – by the community, for the community.

After the project the platform will be sustained by ECSA.

Funding: H2020, SWAFS

https://eu-citizen.science/

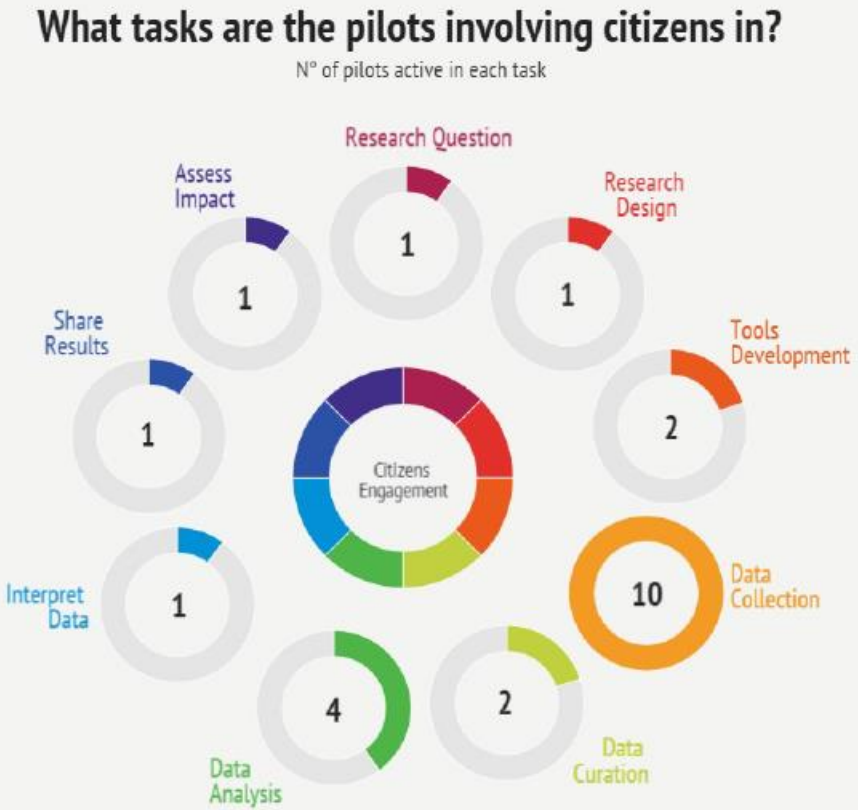
ACTION - Participatory science toolkit against pollution

660+

Volunteers

Data gathered by citizens:

- **7694** audio files
- **806** pictures
- **90** samples
- **55** datasets
- **5** software
- **5** composters
- **1** firmware



ACTION aims to transform science from a predominantly scientist-led process to a more participatory and inclusive, citizen-led one.

It will set up a CS accelerator, launch an open call for 10 pilot projects, co-design/develop methods, and create a digital infrastructure.

Funding: H2020, SWAFS

https://actionproject.eu/

Selection of projects from H2020 and the European Institute of Innovation and Technology (EIT)

CitieS-Health is involving citizen groups in experiments in five cities to explore how pollution in their living environment is affecting their health. An interactive toolkit has been produced, customised to different stakeholders and domains, with focus on air pollution, noise pollution and health factors.

D-NOSES tackles the problem of odours pollution by developing coordinated case studies in 10 countries. The International Odour Observatory Platform has the potential to become the one-stop-shop for all to participate in activities in their own local area using the Odour Collect app.

DITOs organised over 700 events, engaging over 550,000 people across Europe in Do-It-Yourself science throughout Europe.

Citizen Observatories projects – **WeObserve**, **LandSense**, **SCENT**, **GroundTruth 2.0**, **GROW** - enable citizens to become the 'eyes' of policy makers and to complement environmental monitoring systems.

EIT Food Citizen Science aims to increase consumer trust in the food system, inspiring citizens to become change agents as non-professional scientists, in the transition towards an inclusive and trusted food system based on science.

EU-Citizen.Science is an online platform for sharing knowledge, tools, training and resources for citizen science.

EUvsVirus Hackaton and Matchaton gathered more than 21,000 participants to create 2,164 multi-disciplinary, multi-nationality teams with innovative solutions, then sparked the development of 2,235 new cross-European partnerships by matching the best 120 teams with 458 supportive partners.

GRECO is involving citizens in the design of new photovoltaic solutions and in the provision of materials data.

REINFORCE aims to engage more than 100,000 citizens to contribute to advances in frontier physics, with citizen scientists managing the data avalanche and developing their own investigations.

SPARKS organised an interactive touring exhibition and 200 innovative participatory activities. The project produced a toolkit to prepare Science Espressos, Reverse Science Cafés, Pop-up Science Shops and Scenario Workshops together with a handbook with practical guidelines.

Let’s Slido: #UNIPIOS

Photo by Olav Ahrens Røtne on Unsplash

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