



UNIVERSITÀ
DI TRENTO



THE GENERAL PRINCIPLES OF OPEN SCIENCE | 2025

Module 1

CULTURAL FOUNDATIONS OF OPEN SCIENCE

Tuesday 25th November 2025

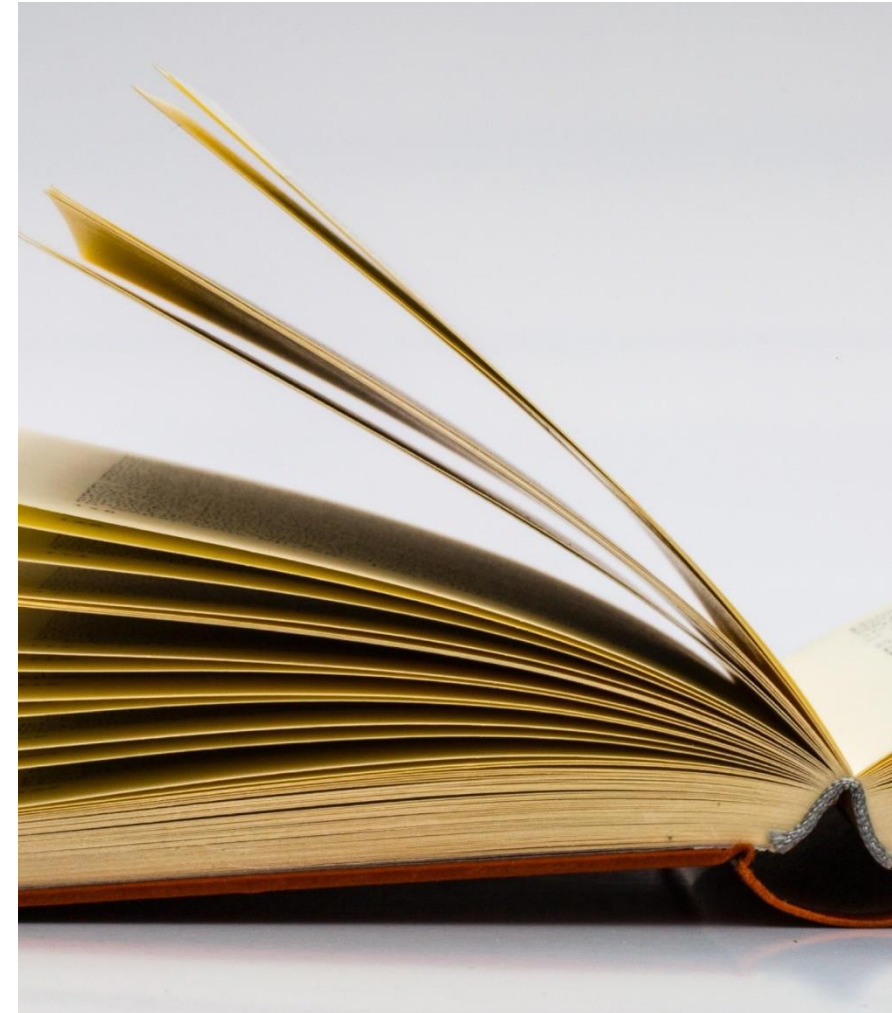
Giorgia Bincoletto



Agenda

Outline:

1. A brief history of the Open Science movement
1. The dimensions of OS in (selected) declarations and regulations
1. Intellectual property and Open Science
1. The main challenges in university research





1. A brief history of the Open Science movement

*If you ask a sensible person, “**Who does science belong to?**”,*

*I think the most likely answer is, “**Everyone!**”.*

Behind the veil of an instinctive and (apparently) superficial answer lies the story of the eternal conflict between openness and closure of knowledge, between publicity and secrecy.

A conflict that takes on peculiar connotations in the digital age.

The OS is a particular way of understanding science communication.

Caso, 2020



1. A brief history of the Open Science movement

Constraining Open Science within a rigid definition is no easy task since (Paseri, 2024):

1. the concept of “**science**” has been the subject of study in epistemology and gnoseology for decades and many conceptions have been created
 1. “**science**”, like any human phenomenon, **is subject to constant change**, especially considering its mutual link with technological advancement
 1. **OS is a relatively recent phenomenon**. It began as a *bottom-up* movement, represented by a set of demands put forward by part of the scientific community
- ☐ At present, it still seems to be searching for its own identity, but many policies, declarations and regulations are already related to it...



1. A brief history of the Open Science movement

However, OS may even find its origins in ancient Greek philosophy
(Resnik, 2023):

- Greek philosophers developed the **Socratic method**:

a form of dialogue in which participants ask each other questions about fundamental philosophical and scientific topics and attempt to develop rigorous answers in response to queries

- the modern scientific method is based, in part, on this approach, because **science involves continuous questioning and examination** of ideas, hypotheses, and theories





1. A brief history of the Open Science movement

- ❑ **Free and open debate is essential for using the Socratic method, then the modern scientific method, too**





1. A brief history of the Open Science movement

- The American sociologist **R. Merton** studied the function of openness in scientific communities
- *Social Structure and Anomie* of 1938
- *The Normative Structure of Science* of 1942
- *Four sets of institutional imperatives - universalism, communism, disinterestedness, organized skepticism - are taken to comprise the **ethos of modern science***
- Science develops in democratic societies





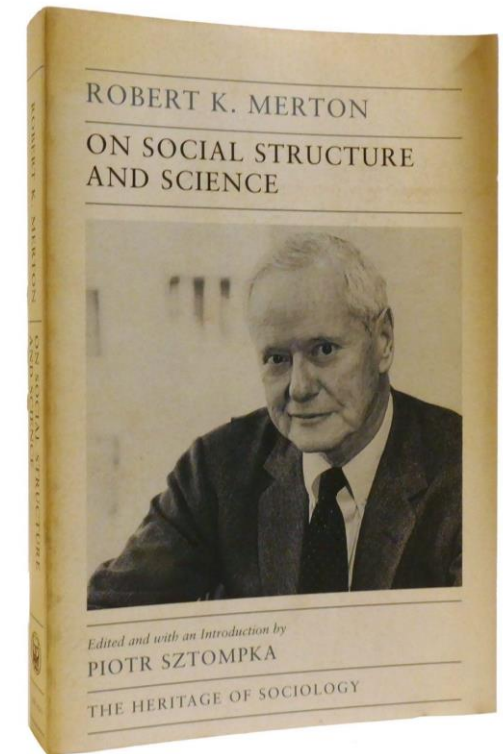
1. A brief history of the Open Science movement

Science is a deceptively inclusive word which refers to a variety of distinct though interrelated items. It is commonly used to denote

- (1) a set of characteristic methods by means of which knowledge is certified;*
- (2) a stock of accumulated knowledge stemming from the application of these methods;*
- (3) a set of cultural values and mores governing the activities termed scientific;*
- or (4) any combination of the foregoing (Merton, 1973)*

Institutional goal of science is the extension of certified knowledge

- ☐ **Science is and should be devoted to extend knowledge**





1. A brief history of the Open Science movement

- *The substantive findings of science are a product of social collaboration and are assigned to the community* (Merton, 1973)
- Scientific results constitute a **common heritage** in which the **property** of the individual should be severely **limited** (**commodification**)





1. A brief history of the Open Science movement

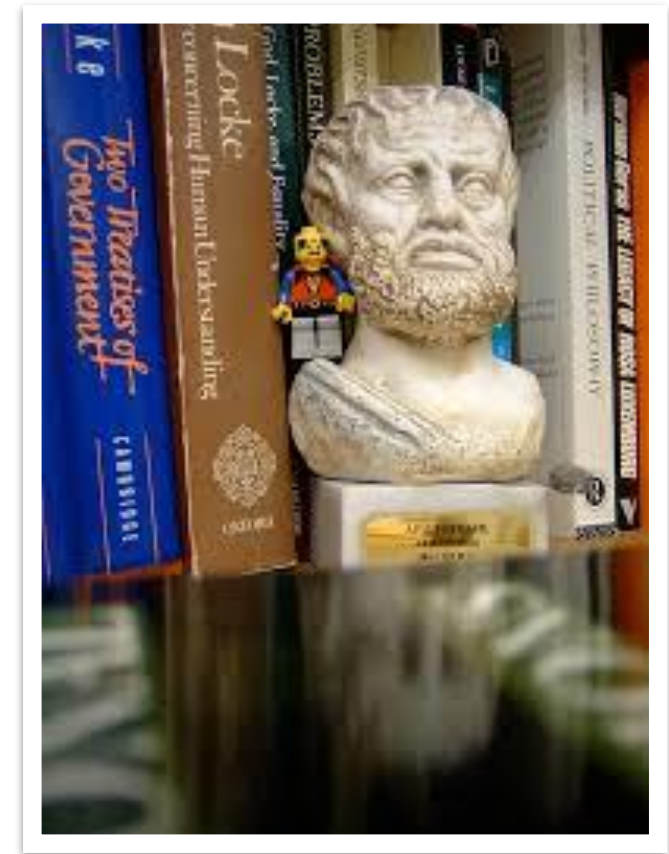
- *The pressure for diffusion of results is reenforced by the institutional goal of advancing the boundaries of knowledge and by the incentive, e of **recognition** which is, of course, contingent upon **publication** (Merton, 1973)*
 - *A scientist who does not communicate his important discoveries to the scientific fraternity-thus, a Henry Cavendish-becomes the target for ambivalent responses. He is esteemed for his talent and, perhaps, for his modesty. **But, institutionally considered, his modesty is seriously misplaced, in view of the moral compulsive for sharing the wealth of science** (Merton, 1973)*
- ☐ A scientist must communicate its findings for the **wealth of science**





1. A brief history of the Open Science movement

- *The communal character of science is further reflected in the recognition by scientists of their dependence upon a **cultural heritage** to which they lay no differential claims (Merton, 1973)*
- *Newton's remark -"**If I have seen farther, it is by standing on the shoulders of giants**" -- expresses at once a sense of **indebtedness** to the common heritage and a recognition of the essentially cooperative and selectively cumulative quality of scientific achievement (Merton, 1973)*
- *The **humility** of scientific genius is not simply culturally appropriate but results from the realization that scientific advance involves the collaboration of past and present generations (Merton, 1973)*





1. A brief history of the Open Science movement

- ❓ Scientific results are achieved since scientists base their work on the previous work of others (“the giants”)

= **Sharing** is part of what a scientist do and must do

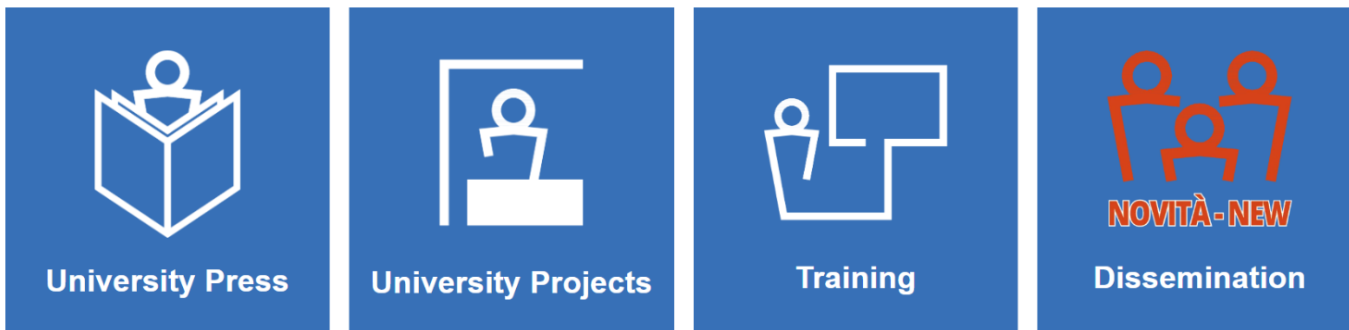




1. A brief history of the Open Science movement

- Openness is obviously at the core of Open Science (OS)
- **Possible definition of OS:**

Open Science: an approach to the scientific process based on the principles and values of democratic societies, such as: collaboration, open and timely sharing of results, methods of knowledge dissemination based on networked digital technologies (that use recognized standards and protocols), and transparent methods for validating and evaluating research outputs to promote their integrity and reproducibility (UNITN, 2025)





1. A brief history of the Open Science movement

- Scientific openness is the commitment to **publicly** and **freely** sharing the **products** and **means** of scientific investigation, including data, results, theories, models, hypotheses, methods, protocols, materials, and computer code used in processing and analyzing data and images (Resnik, 2023)
- ☐ OS is an “**umbrella term**” and embeds many dimensions...





1. A brief history of the Open Science movement

Some pillars of OS:

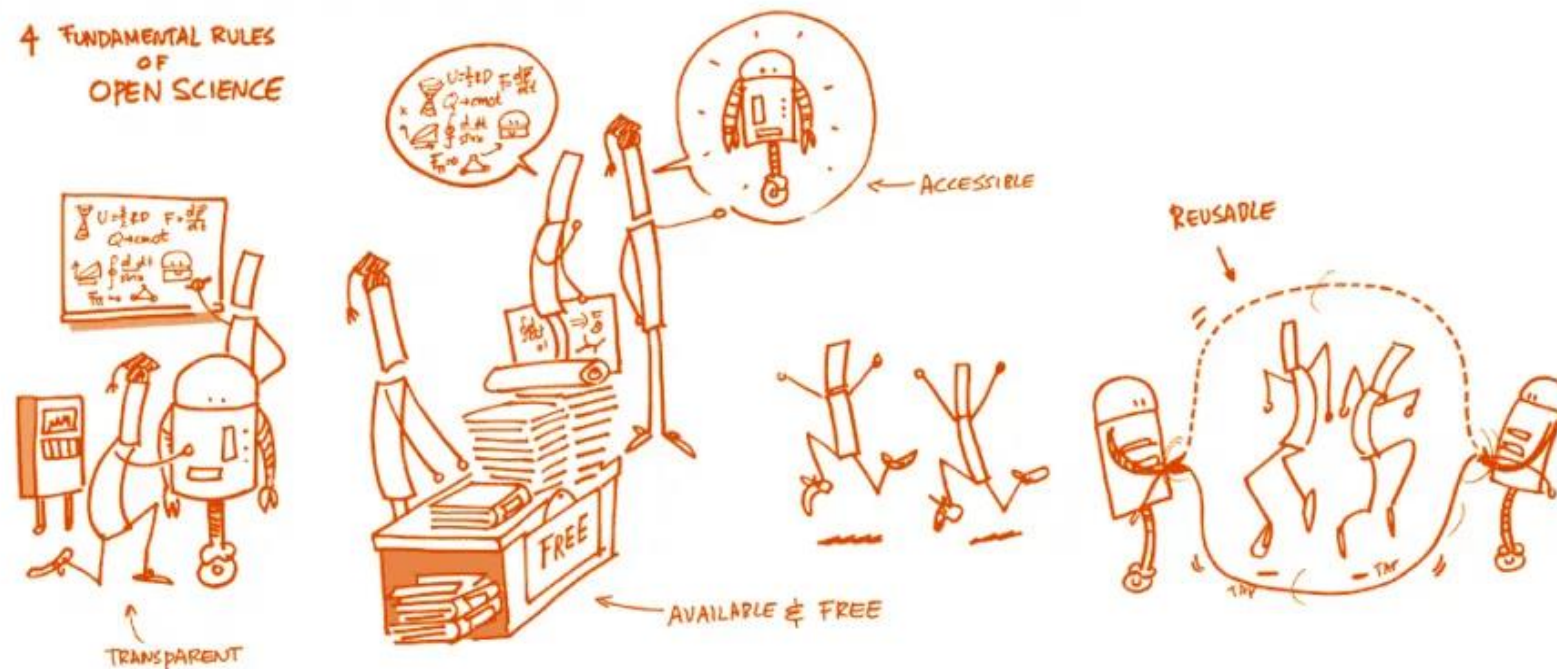
1. **Access**

1. **Collaboration**

1. **Sharing**

1. **Transparency**

1. **Integrity**



□ Openness of every phase of the research...to the benefit of science, or better of humanity as a whole!



1. A brief history of the Open Science movement

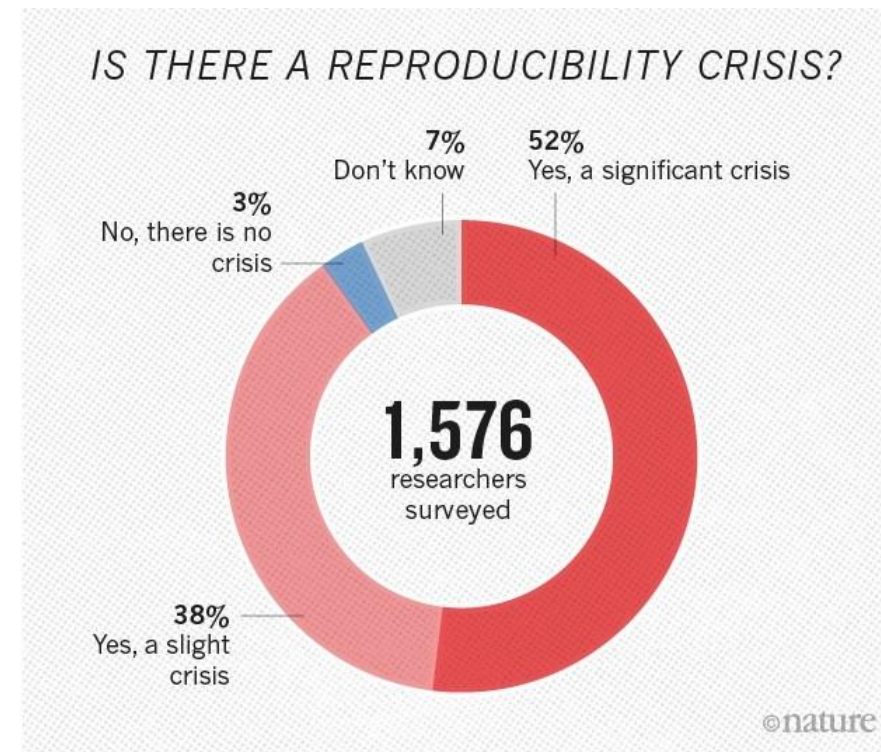
- Openness is necessary for **progress** in science: a researcher need to have access to the past findings
- Openness avoid **duplication** of scientific studies





1. A brief history of the Open Science movement

- **Openness involves disclosing the information needed to reproduce, verify, or evaluate research:** a researcher must have access to information to reproduce or verify another scientist's work (Resnik, 2023)
- Where, reproducibility and verifiability are indicators of **objectivity** and **truthfulness**





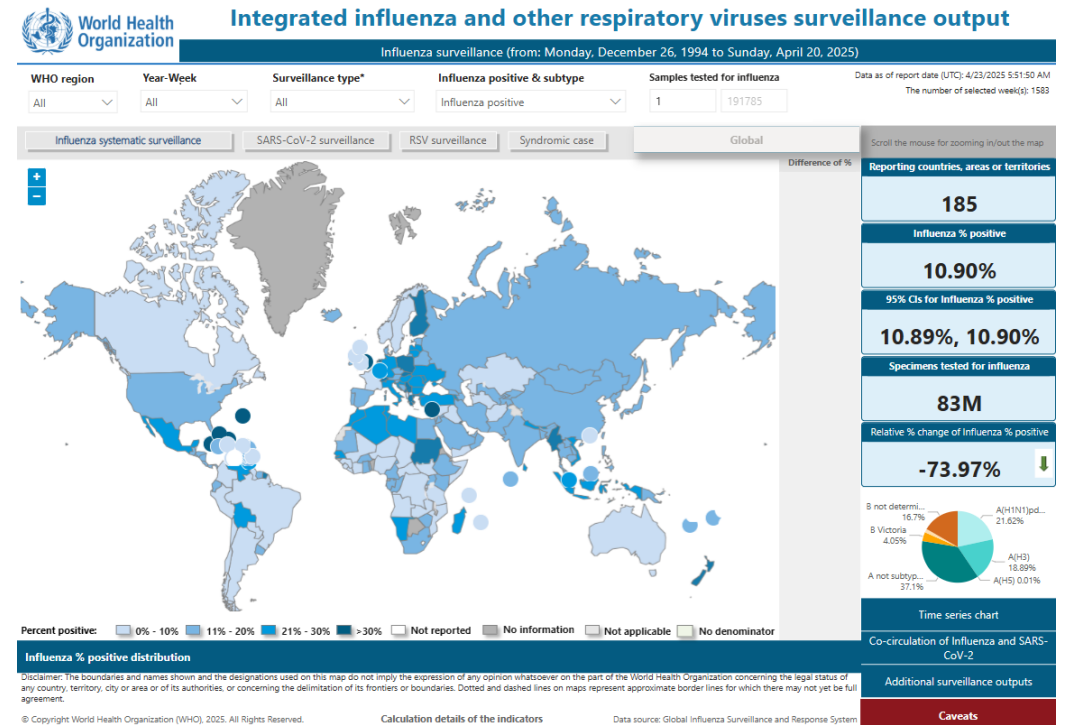
1. A brief history of the Open Science movement

- Openness is also important for **collaboration** among researchers: **it increases efficiency!**
- **Transparency** is then ensured for the evaluation process (of results and academics)



1. A brief history of the Open Science movement

- **Openness can also benefit the public:** scientific information has relevance for public policy and anyone, including common citizens and public officials, can use it to make private and public decisions





1. A brief history of the Open Science movement

COVID-19 Open Research Dataset (CORD-19)

This tracker is a repository of research on the COVID-19 and the coronavirus family of viruses, with the aim of mobilising researchers and generating new insights.

It can be accessed here:

<https://www.semanticscholar.org/cord19>

The dataset records around 130,000 scholarly articles, and is updated regularly as new research is published.

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1. A brief history of the Open Science movement

- **Openness is also related to democracy:** having access to knowledge expands the number of people who could benefit from it
- ❓ Accessing scientific knowledge, in all its forms, should be free of charge and without limits
- ❓ However, as anticipated, OS is not limited to access...**reducing OS to the sharing and reuse of research resources and results may represents a significant advantage for private actor....**





1. A brief history of the Open Science movement

- By extent, the researcher is **free from undue influence (i.e. academic freedom)**
- **Kant** promoted a **public use of reason**: *when the public use of reason is free, a few of free thinkers can inspire everybody to rationally appraise their own value and to become aware of their call to think for themselves* (Kant, 1784)
- As analysed by **Pievatolo**: *in Kant's opinion, scholars cannot conceive themselves as functionaries of particular collective organizations: they should consider themselves as member of the cosmopolitan society - the society of the citizens of the world* (Pievatolo, 2020)





1. A brief history of the Open Science movement

- **S. Rodotà** explained that openness is necessary to preserve the **autonomy** and **independence** that intrinsically characterize the work of universities and research centers as *places for the production of what is not immediately profitable, of critical knowledge, of disinterested knowledge, of the safeguarding of diversity* (Rodotà, 2011)
- **Integrity** as an ethical component: **inclusiveness, sustainability, and equity** should be promoted
- In a context where research evaluation parameters are based more on quantitative than qualitative analysis, generating harmful competition and pushing for ever-increasing production of results (*“publish or perish”*), bringing transparency and integrity back to the center is fundamental...

...when did all this start?



1. A brief history of the Open Science movement

- In 1989, **R. Stallmann**, then a programmer at MIT, founded the Free Software Foundation, the organisation from which the *free software movement* would develop
- A program is free software if the program's users have the four essential freedoms:
 1. *The freedom to run the program as you wish, for any purpose (freedom 0).*
 2. *The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.*
 3. *The freedom to redistribute copies so you can help others (freedom 2).*
 4. *The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this*

<https://www.gnu.org/philosophy/free-sw.html.en>
- The **GNU** operating system was released as free software





1. A brief history of the Open Science movement

- In 1991, L. Torvalds developed the **Linux kernel** which, combined with the GNU operating system, was released with a license allowing its free use, modification and redistribution
 - These initiatives started as sort of “rebellions” but had an impact on the general system
-
- In the intellectual property domain, a **license** is a contract: a party (“*the copyright holder or the right holder*”) grants permission to others to use a creative work under certain conditions





1. A brief history of the Open Science movement

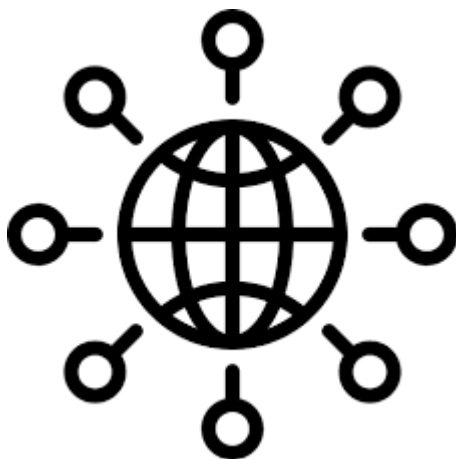
- First “open” dimension is “**Open source**”
- This dimension OS supports the adoption of open licenses that allow the study, modification and redistribution of the source code
- **Today, despite the declamations, researchers often do not share their source code**
- **So, looking at the initial arguments, **not sharing** source code can be an **ethical problem**:** not being able to access the source code of the algorithm developed as a result of a research project limits the ability of other members of the scientific community to analyse the accuracy and integrity of the results...





1. A brief history of the Open Science movement

- Between the late 1990s and early 2000s, a series of seemingly unrelated events, such as the birth of the **Web** at CERN in Geneva and the creation of the “**arXiv**” archive on the servers of the Los Alamos laboratory, opened up the possibility of **sharing all the scientific knowledge developed at the time** (Paseri, 2024)



arXiv is a free distribution service and an open-access archive for nearly 2.4 million scholarly articles in the fields of physics, mathematics, computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics. Materials on this site are not peer-reviewed by arXiv.

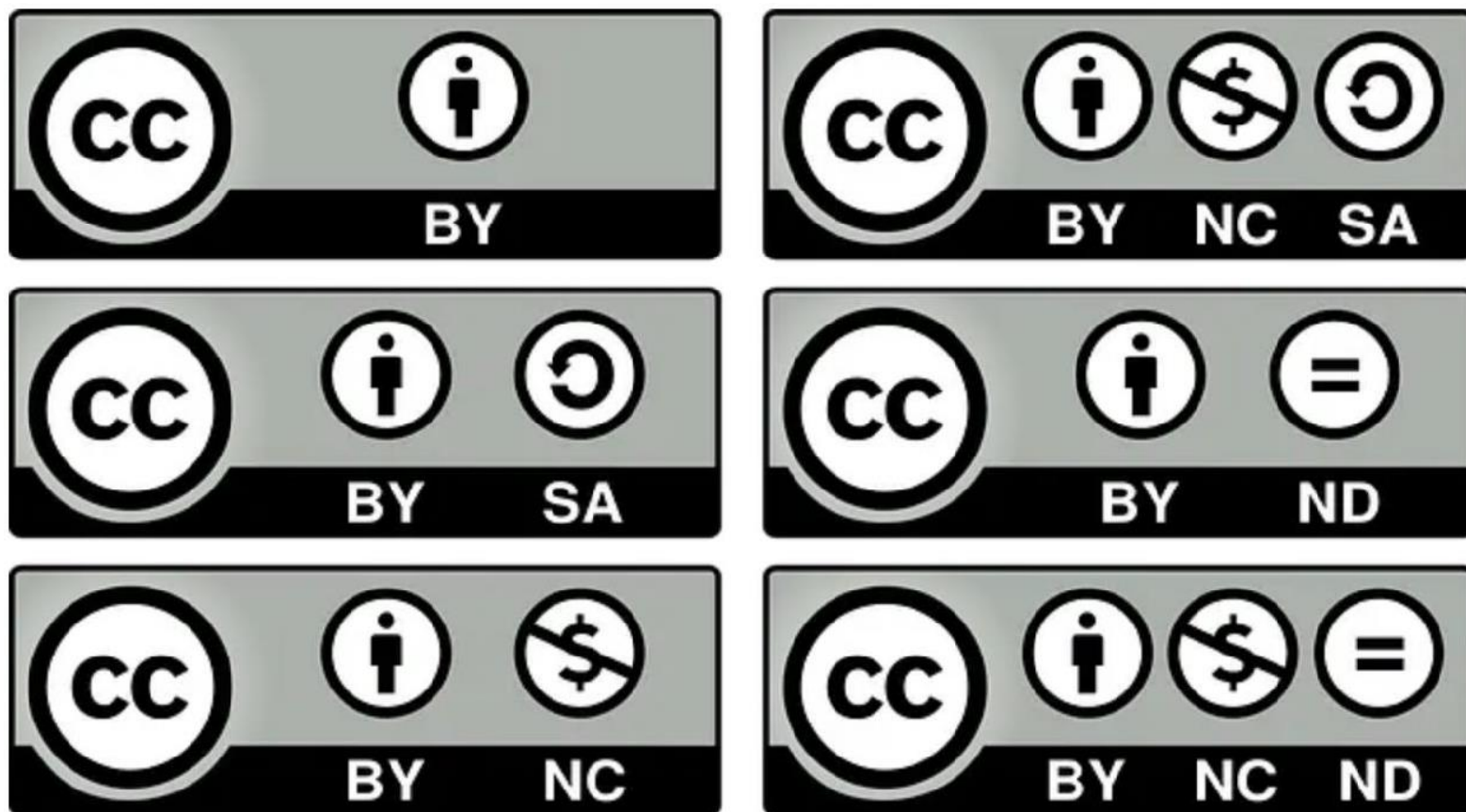


1. A brief history of the Open Science movement

- In 2001, **Creative Commons** was founded: a non-profit corporation
- Its goal is to facilitate the creation of works based on the work of others, **making it easy for authors to assert that others are free to draw on their work and build upon it**
- All thanks to licenses with simple tags, linked to descriptions that people can read easily: legal level, but also machine-readable one
- *Six licenses and the public domain dedication tool give creators a range of options*
- **The free license cannot be revoked** + *The author must own or control copyright:*
<https://creativecommons.org/share-your-work/cclicenses/>

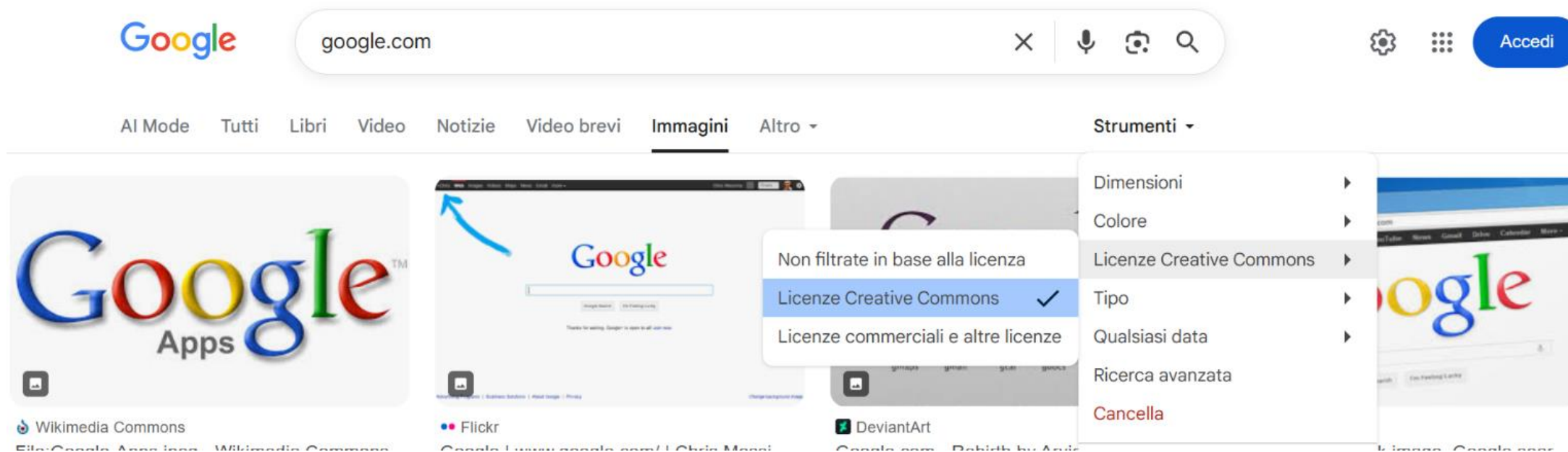


1. A brief history of the Open Science movement





1. A brief history of the Open Science movement





1. A brief history of the Open Science movement

- The so-called **open access movement** started, represented by a section of the scientific community that fought to obtain digital scientific literature that was online, free of charge and free from most of the constraints imposed by copyright law (Paseri, 2024)
- In the early 2000s, a series of (not legally binding) international declarations of commitment to embracing the open access approach were adopted in the form of proclamations of intent
- Examples include: the *Budapest Open Access Initiative of 2002*; the *Bethesda Statement on Open Access Publishing of 2003*; the *Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities of 2003*





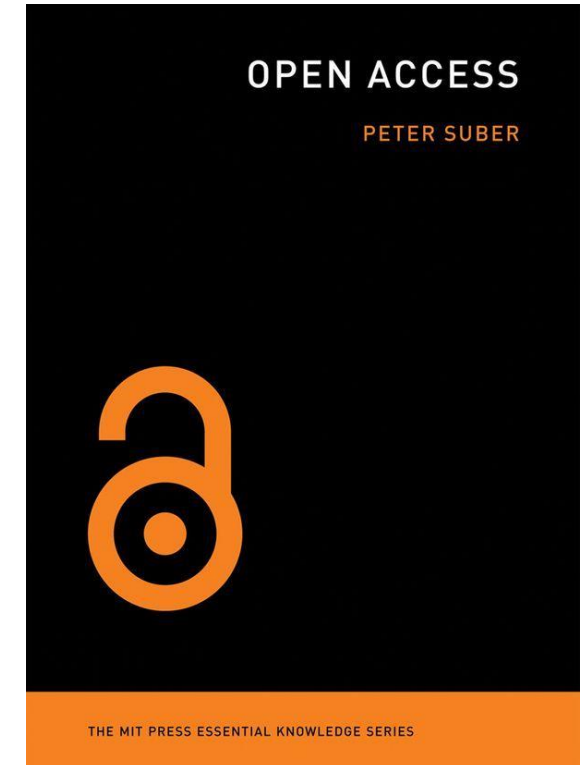
1. A brief history of the Open Science movement

- Second “open” dimension is “**Open Access**”
- This dimension OS supports the **free accessibility to scientific knowledge**
- Restricted publication is accessible in two ways:
 - 1) individual readers can pay the access fee
 - 2) universities and research centers can purchase subscriptions (costing thousands of euros per year) to allow students, researchers and professors to access them free of charge using their university credentials (i.e. through an authentication system)
- One risk of the publication system is dealing with **poorly allocated public funds** and **creating double expenditure**: the research institution or university first pays the researcher to carry out the research and then pays to access the results of the research it has previously funded....



1. A brief history of the Open Science movement

- Open Access involves an access that is **digital, online, free of charge, and free of most copyright and licensing restrictions** (Suber, 2019)
- *Removing permission barriers means that scholars are free to use or reuse literature for scholarly purposes* (Suber, 2019)
- *These purposes include reading and searching, but also redistributing, translating, text mining, migrating to new media, long-term archiving, and innumerable new forms of research, analysis, and processing we haven't yet imagined* (Suber, 2019)





1. A brief history of the Open Science movement

- **OA isn't an attempt to reform, violate, or abolish copyright.** (...) For older works, it takes advantage of the public domain, and for newer works, it rests on copyright-holder consent (Suber, 2019)
 - **OA isn't an attempt to deprive royalty-earning authors of income** (Suber, 2019)
 - **OA isn't an attempt to deny the reality of costs.** No serious OA advocate has ever argued that OA literature is costless to produce, although many argue that it is less expensive to produce than conventionally published literature, even less expensive than born-digital toll-access literature. The question is not whether research literature can be made costless, but whether there are better ways to pay the bills than charging readers and creating access barriers (Suber, 2019)
- ☐ The current system is based on **private editors and also “predators”**, i.e. entities that priorities their economic interests at the expense of researchers, universities and research centers



1. A brief history of the Open Science movement

1. Diamond OA

- ❑ No publication fees, no fees for the readers

But also....

2. Golden OA

- ❑ No fees for the readers, but publication fees paid by the university or research center, i.e. *Article processing charges* (APCs)

3. Green OA or «self-archive»

- ❑ The publication is referred to the pre-print version in the institutional repository
- ❑ See Modules 2 and 3 of the course



1. A brief history of the Open Science movement

- **There is resistance on the part of scientific publishers to adopt the diamond open access solution:** the option most favorably received is open access to scientific publications following payment of so-called APCs, but the cost are high (Caso, 2020)
- The fees for GOA and of the databases increase every year...
- ❑ **Covering the costs of APCs is not a viable approach**
- ❑ **It does not solve the economic problem of double expenditure of public money in the financing of scientific research and publication**
- ❑ **It also discourages small, less economically prosperous universities from publishing in the most prestigious journals in the field**



1. A brief history of the Open Science movement

- Researchers should also verify the attendability of the publishers (Galimberti, 2022)

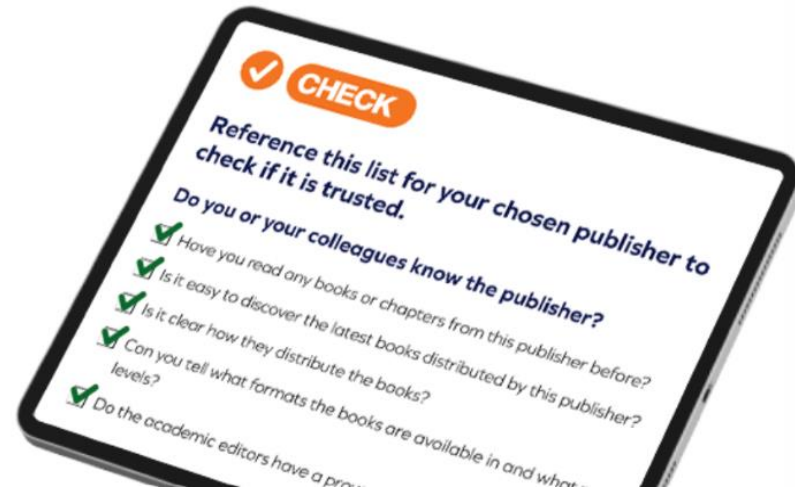
...since predators (often only) promotes gold OA...



[🏠 Books & Chapters](#) [📖 Journals](#) [📚 Resources](#) [📰 News](#) [👤 About](#) [🔍](#) [A](#) [A](#) [A](#)

Identify trusted publishers for your research

Through a range of **tools and practical resources**, this international, cross-sector initiative aims to **educate researchers, promote integrity**, and **build trust in credible research and publications**.





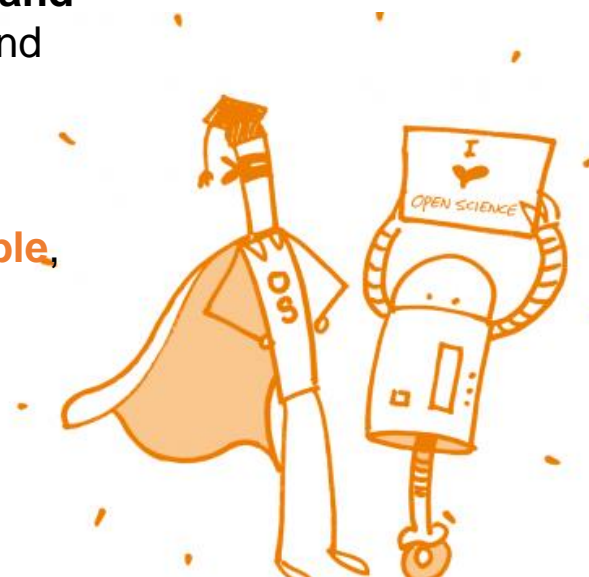
1. A brief history of the Open Science movement

- Another dimension of OS is “**Open Education**”
- This dimension OS supports the accessibility of teaching, learning and research materials in any medium
- Open textbooks, lesson plans, slide decks, manuals, etc.
- See the initiative of UNESCO: <https://www.unesco.org/en/open-educational-resources>



1. A brief history of the Open Science movement

- ❑ With OA and OE, **scientific results may be equally accessible to all scientist and actors** regardless of geographical location, personal circumstances and stages and any possible grounds limiting the person
- ❑ With OA and OE, **researchers are responsible for their results and accountable**, they should really share conflicts of interests and demonstrate integrity and transparency of the work
- ❑ With OA and OE, **collaborations are possible beyond the natural and disciplinary boundaries**





1. A brief history of the Open Science movement

- Another dimension of OS is “**Open Methodology**”
- This dimension OS supports sharing the methodologies adopted to carry out a study, meaning the detailed explanation of how the project was planned, what criteria were used to collect any data, what protocols were identified, etc.
- ❓ **It has a significant impact in terms of the reproducibility of experiments:** if a scientist who did not participate in the research project intends to repeat the experiments described in order to verify the results, they need access to the specific and detailed methodology (vs. “reproducibility crisis”)
- ❓ **It also reduces duplication of studies and **waste of resources** due to the proliferation of research projects with the same purpose**



1. A brief history of the Open Science movement

- The next dimension of OS is “**Open Evaluation**”
- This dimension OS refers to placing greater emphasis on quality rather than quantity, which is not solely based on the number of scientific publications, but also takes into account other activities related to research and teaching (Caso, 2020)
- ❓ **The value, frequency and relevance of publications remain important indicators, but they cannot be the only ones!**
- ❓ **Transparency of the processes of evaluation (open peer review, but also of the careers) and validation of scientific research results**



1. A brief history of the Open Science movement

- This dimension involves a genuine reform of the evaluation methodology: an important initiative in this regard was the **Declaration on Research Assessment** (DORA): <https://sfdora.org/>
- The **Coalition for Advancing Research Assessment (CoARA)** aims to establish a common direction for reforming the system by which research, researchers, and research organisations are evaluated
- In 2022, the **Agreement on Reforming Research Assessment** was published and it promoted the recognition of *diverse outputs, practices, and activities that maximise the quality and impact of research through an emphasis on qualitative judgement in assessment, for which peer review is essential, supported by the responsible use of quantitative indicators* (<https://www.coara.org/>)
- ❓ **This program promises to recognise diverse contributions to research, base research assessment on qualitative evaluation, abandon inappropriate uses of metric-based evaluation, avoid the ranking system**
- ❓ However, the project misses the reform of the institutions in charge of evaluation...



1. A brief history of the Open Science movement

- Others dimensions of OS are “**Open Data**” and “**Open research Data**”
- The first dimension is related to the accessibility of data collected, produced or paid for by the public institutions, the public bodies (i.e. public sector information), while the latter is dedicated to data produced by scientific research
- ❓ Two different fields of the law
- ❓ **Data is indispensable for the digital progress: the economy benefits from easier access to information**
- ❓ **Open Data is considered as such when it is freely usable and modifiable for everyone and for every purpose**



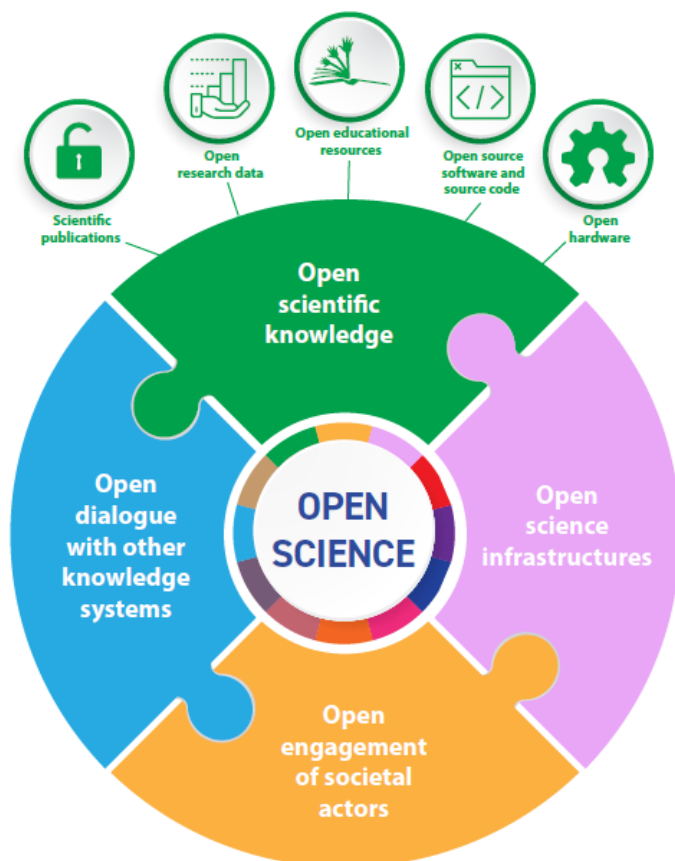
1. A brief history of the Open Science movement

- ORD may include **digital and not digital data**, raw and processed information, and the accompanying metadata
- The paradigm of ORD is frequently described as with the sentence *as open as possible, as closed as necessary*
- In this context the **FAIR principles** play a crucial role (i.e. Findable, Accessible, Interoperable and Reusable)
- ❓ Possible applicable **limits of openness** are the application of intellectual property rights, data protection law and the protection of private and family life, national security, and commercial interests protected under the law (e.g. pseudo-IP rights, trade secrets...)
- ❓ See Modules 4 and 5 of the course



1. A brief history of the Open Science movement

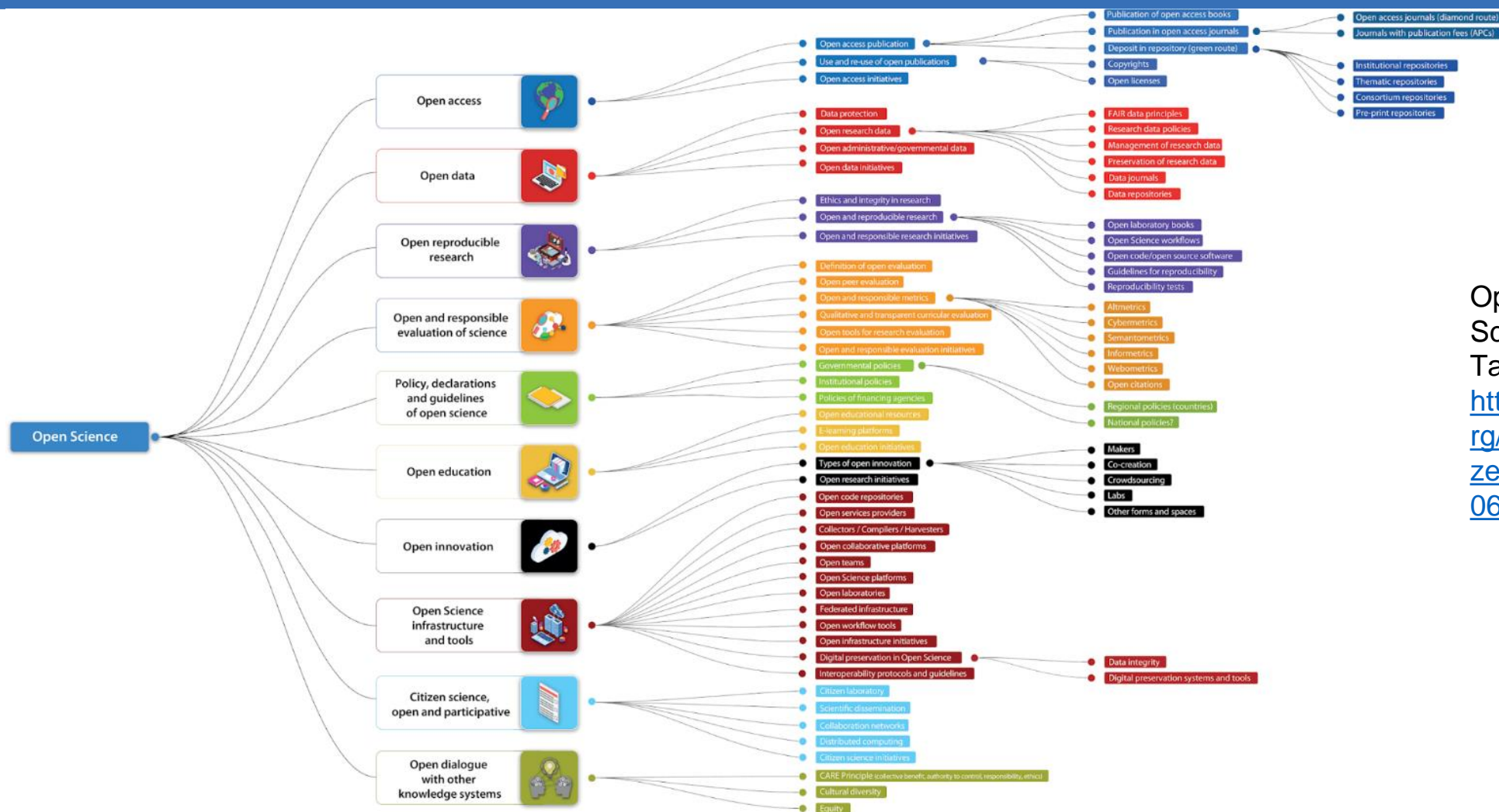
- Also the hardware and the infractures may and should be opened (see the image from UNESCO, 2021)



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1. A brief history of the Open Science movement



Open
Science
Taxonomy
<https://doi.org/10.5281/zenodo.7940641>



1. A brief history of the Open Science movement

- With **Citizen Science** there is also *the promise to increase participation in research through activities such as the crowdsourcing of data collection and analysis* (Leonelli, 2023)
 - Since the first half of the 2010s, OS has been included in political agendas as an essential element for the advancement of knowledge, social progress and economic development
 - Although open science is frequently described as a movement or a set of practices, over the years its nature has changed (Paseri, 2024)
- ☐ **OS has gone from being a *bottom-up* movement to becoming a *top-down* policy**



2. The dimensions of OA in declarations and regulations

- UNESCO, **UNESCO Recommendation on Open Science**, 2021

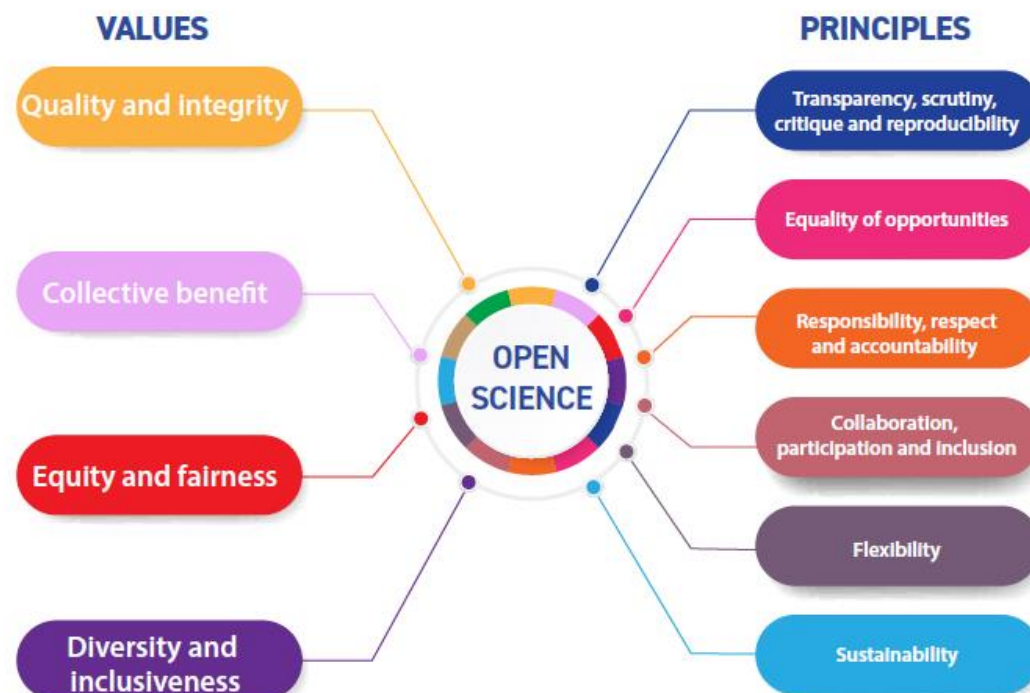
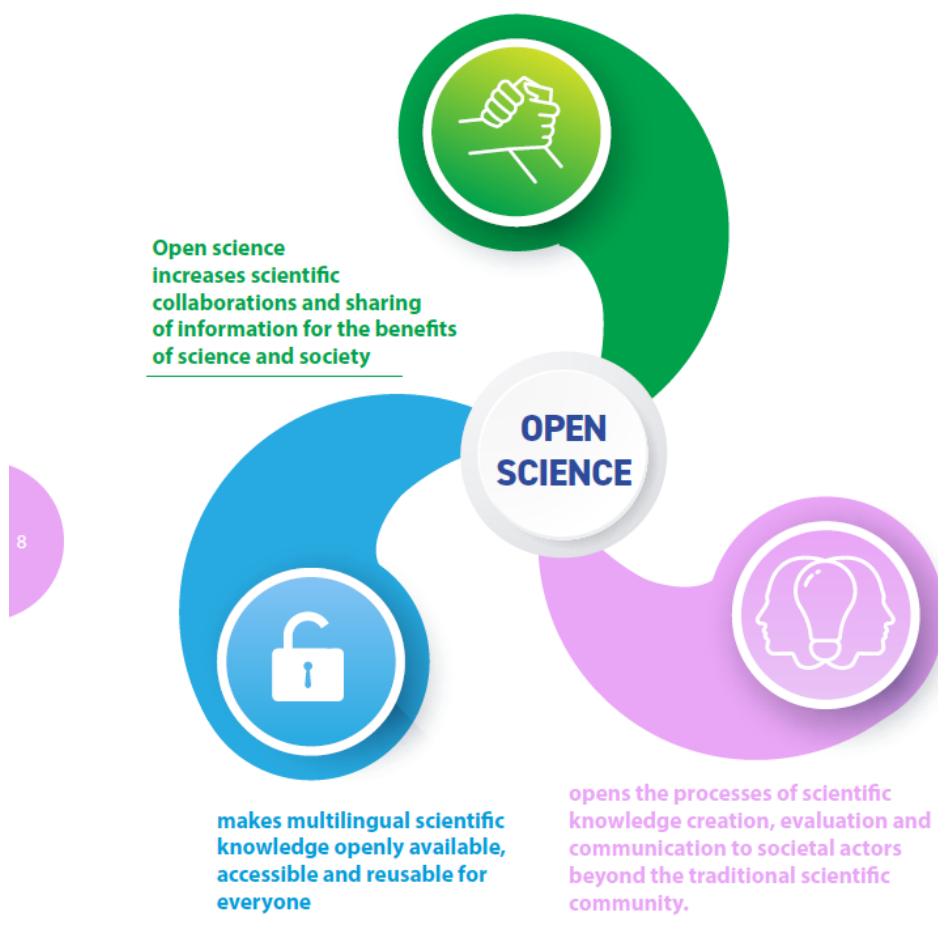
OS is a set of principles and practices that aim to make scientific research from all fields accessible to everyone for the benefits of scientists and society as a whole. Open science is about making sure not only that scientific knowledge is accessible but also that the production of that knowledge itself is inclusive, equitable and sustainable

- ☐ First international standard setting instrument on OS
- ☒ It aims to strike a balance in the advancement of open science policies across different geographical areas of the world and recognizes the need to develop more effective action in each country to address the profound changes facing scientific research

<https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en>



2. The dimensions of OA in declarations and regulations



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2. The dimensions of OA in declarations and regulations

- **Article 27 of the Universal Declaration of Human Rights of 1948**

Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

- **Article 15 of the International Covenant on Economic, Social and Cultural Rights**

The States Parties to the present Covenant recognize the right of everyone:

...

(b) To enjoy the benefits of scientific progress and its applications;

2. The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for the conservation, the development and the diffusion of science and culture.

...



2. The dimensions of OA in declarations and regulations

- **General comment No. 25 (2020) on science and economic, social and cultural rights** (article 15 (1) (b), (2), (3) and (4) of the International Covenant on Economic, Social and Cultural Rights), E/C.12/GC/25, 30 April 2020

States should promote open science and open source publication of research. Research findings and research data funded by States should be accessible to the public

Basic knowledge of science, its methods and results, has become an essential element for being an empowered citizen and for the exercise of other rights, such as access to decent work. States must exert every effort to ensure equitable and open access to scientific literature, data and content, including by removing barriers to publishing, sharing and archiving scientific outputs. However, open science cannot be achieved by the State alone

- ☐ **Human right to science** may embed OS



2. The dimensions of OA in declarations and regulations

- **Art. 13 of the Charter of Fundamental Rights of the European Union, Freedom of the art and sciences**

The arts and scientific research shall be free of constraint. Academic freedom shall be respected.

☐ **this freedom includes the right to academics to conduct research, to disseminate the results of their research, to educate students freely from influence**

- In 2009, the Open Access Infrastructure for Research in Europe (**OpenAIRE**) project was launched
- In 2016, the **European open science cloud (EOSC)** initiative was presented to allow data exchange across borders and scientific disciplines
- In 2020, the *European research area* was created by the European commission



2. The dimensions of OA in declarations and regulations

- Art. 2 of the **Directive (EU) 2019/1024 on Open Data** and the re-use of public sector information - “Open Data Directive” - defines “research data” as

documents in a digital form, other than scientific publications, which are collected or produced in the course of scientific research activities and are used as evidence in the research process, or are commonly accepted in the research community as necessary to validate research findings and results

- Under this framework, *Member States shall support the availability of research data by adopting **national policies and relevant actions** aiming at making **publicly funded research data openly available** (‘open access policies’), following the principle of ‘**open by default**’ and compatible with the FAIR principles (art. 10)*
- ☐ but, intellectual property rights, personal data protection and confidentiality, security and legitimate commercial interests may limit data sharing



2. The dimensions of OA in declarations and regulations

- Open Data is accessible online, released under open licenses, interoperable and in non-proprietary formats
- Ensuring the availability of public sector information pursues two objectives:
 - 1) to promote **transparency in administrative activities** through data accessibility
 - 1) to **allow such data to be further processed** by private individuals or other public entities to generate new economic value

....And the private sector?



2. The dimensions of OA in declarations and regulations

- **Regulation (EU) 2021/695 establishing Horizon Europe** defines Open Science as

an approach to the scientific process based on open cooperative work, tools and diffusing knowledge

- It encourages OS as an approach to the scientific process
- **It requires open access to scientific publications resulting research funded under the Programme and open access to research data under the principle “as open as possible as closed as necessary”**

+ **Data Strategy** of the European Commission and new regulations related to data of 2024 and 2025



2. The dimensions of OA in declarations and regulations

In Italy:

- **Art. 9** of the Constitution: *the Republic promotes the development of culture and scientific and technical research*
 - **Art. 33** of the Constitution establishes the so-called **freedom of science and art**, stating that *art and science are free, and their teaching is free.*
 - **Article 54** of the Constitution refers to the obligation to perform public functions with discipline and duty, an obligation that applies to every citizen assigned such functions
- 📌 The category of citizens assigned public functions must necessarily include professors and researchers
- + rules implementing the Open Data Directive



2. The dimensions of OA in declarations and regulations



National Research Programme 2021 - 2027

**ITALIAN NATIONAL PLAN FOR
OPEN SCIENCE**



3. Intellectual property and Open Science

- Driven mainly or exclusively by the anxiety to publish in high-impact journals – the so-called “publish or perish” logic – researchers have lost interest in copyright on their publications. According to a practice that is still common today, **researchers transfer copyright to the publisher, who then has full control over the reproduction and distribution of the scientific work**
- The **strengthening of intellectual property rights** has led to a corresponding decrease in the public domain, i.e. freely available knowledge. This strengthening has had devastating effects, especially in the academic and scientific fields, where the cumulative and incremental nature of knowledge progress is most evident. In other words, it is difficult to conduct research and teach without an extensive base of freely available knowledge

Caso, 2020





3. Intellectual property and Open Science

- IP law forbids the use of the asset protected unless one or more conditions are met
 - *For thousands of years, there has been creativity and innovation without legislation. IPR are a more **recent social construction**, created to regulate a domain that existed without formal rules. The assumption that creativity and innovation only exist if IP legislation exists is therefore false. It is challenged by ethnographic, anthropological, cultural and art studies (Directorate-General for Research and Innovation, EU Commission, 2022)*
 - **Copyright:** even in the OS scenario, the **right of attribution** pertains to the author
- ☐ Importance of licenses



3. Intellectual property and Open Science

- **Patents** on inventions (Novelty, Inventive step, Industriability)
- Technological transfer from the University to third organisations (industry)

E.g. *For over 50 years the Mario Negri Institute of Pharmacological Research, going against conceived wisdom, has never patented its own research. This is not because we are opposed to patents in the medical field: (...) Because we want to be free. Free to choose which direction to go in and which research topics to select. If our aim were to acquire patents and use them, that would inevitably move our focus towards the most financially rewarding research.* <https://www.marionegri.it/eng/not-patenting>





4. The main challenges in university research

- *Bibliometrics, metrics for measuring science, the production of all kinds of ratings and rankings, and the rhetoric of merit and excellence create a **competitive environment that emphasises individual achievement at the expense of collaborative, community-based and universal science***
- *Openness means, first and foremost, recognising the cooperative and community-based nature of science*
- *Furthermore, focusing solely on so-called “scientific output” overshadows teaching. Yet teaching is a fundamental aspect of scientific progress. As long as science and universities are dominated by metrics and the false belief that everything can be measured with numbers, the concentration of power in the hands of a few players will continue*
- ***We need an ethical awakening among scientists***

Caso, 2020



4. The main challenges in university research

- **Evaluation and positions**
- **Rewards and incentives**
- **Research indicators and next-generation metrics**
- **Investing in open science infrastructures, technologies and services**
- **Ensuring that the governance of the system is able to ensure access and reliability of disseminated knowledge**





4. The main challenges in university research, but also benefits

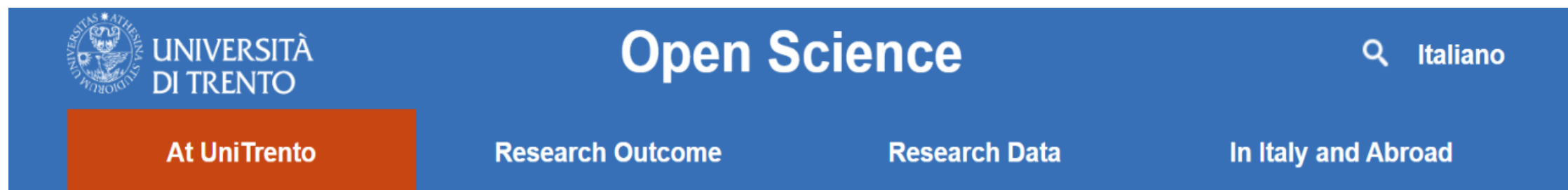
- **Visibility of the research**
- **Real dissemination of results**
- **Transparent peer-review and evaluation**
- **Less fees for libraries and universities**
- **Free circulation of ideas, innovation and progress of science**
- **Autonomy, independence, integrity, democracy....**





4. The main challenges in university research, but also benefits

<https://www.openscience.unitn.it/en/open-science-unitrento>



The University of Trento is also actively involved in national and international initiatives. It has been a member of **AISA** (**Italian Association for the Promotion of Open Science** [↗]) since 2016, has participated in **ICDI** (**Italian Computing and Data Infrastructure** [↗]) since 2021, and joined the Italian **National Chapter** [↗] of **CoARA** in 2023.



4. The main challenges in university research, but also benefits





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