Open science policy for more equitable, accessible science

2021 UNESCO Recommendation on Open Science

Dr Tiffany Straza

19 February 2025

openscience@unesco.org

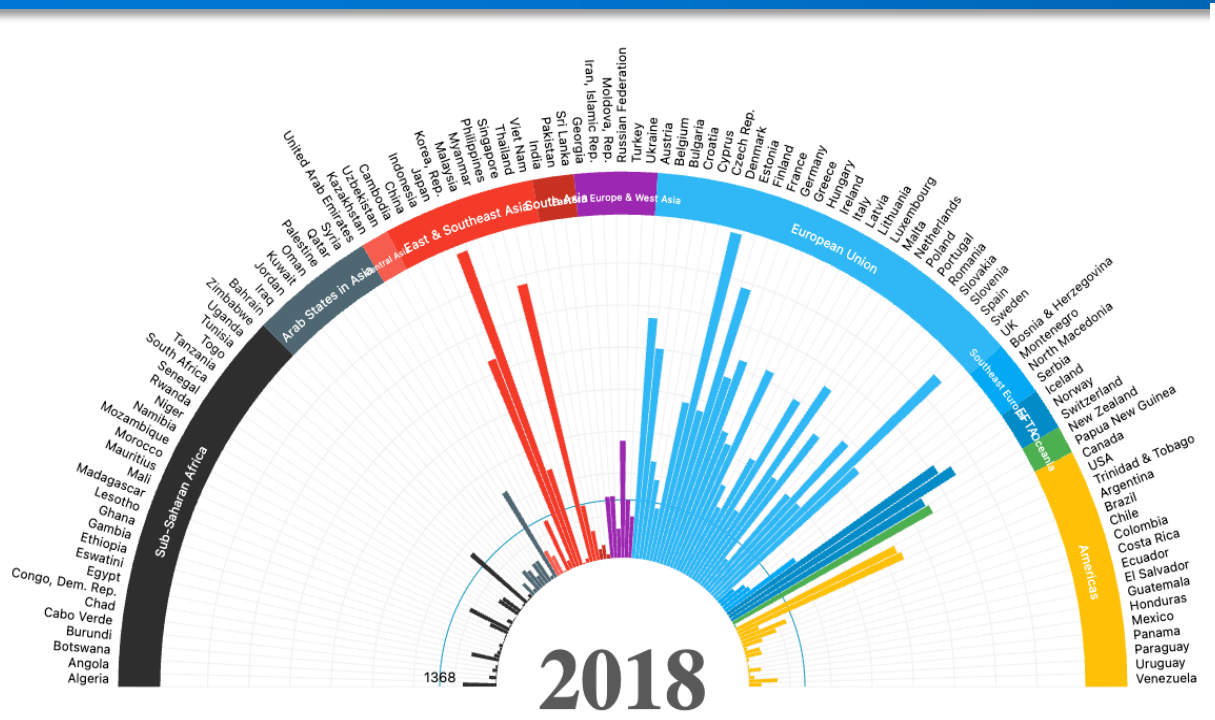
Why Open Science in UNESCO?

- Need for **science** to be **more connected to societal needs** and **more accessible for all**.
- Need to **bridge the STI gaps between and within countries**.

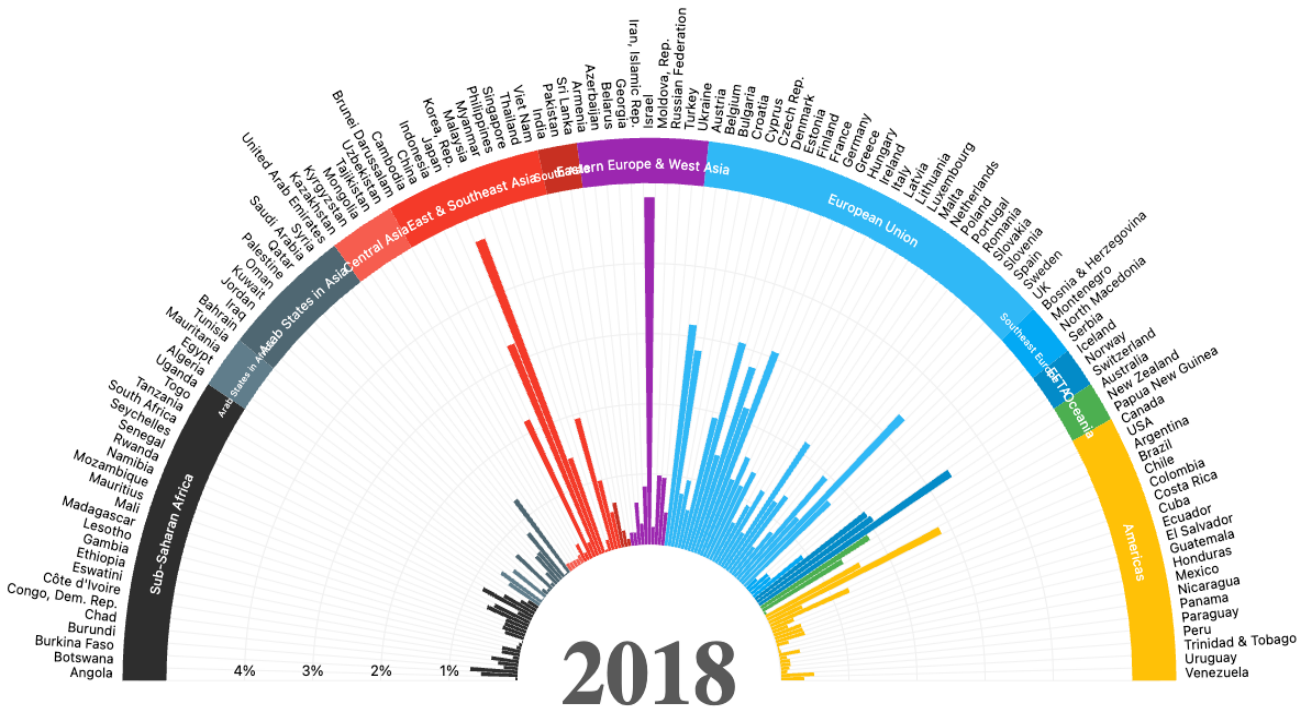
Achieving SDGs and overcoming the global challenges require an efficient, equitable, transparent, collaborative and inclusive science, that can lead to innovative and sustainable solutions.

Everyone has the right to freely share in scientific advancement and its benefits.
Article 27 of the **Universal Declaration on Human Rights**

But inequalities in science persist…



Where are the world's researchers?



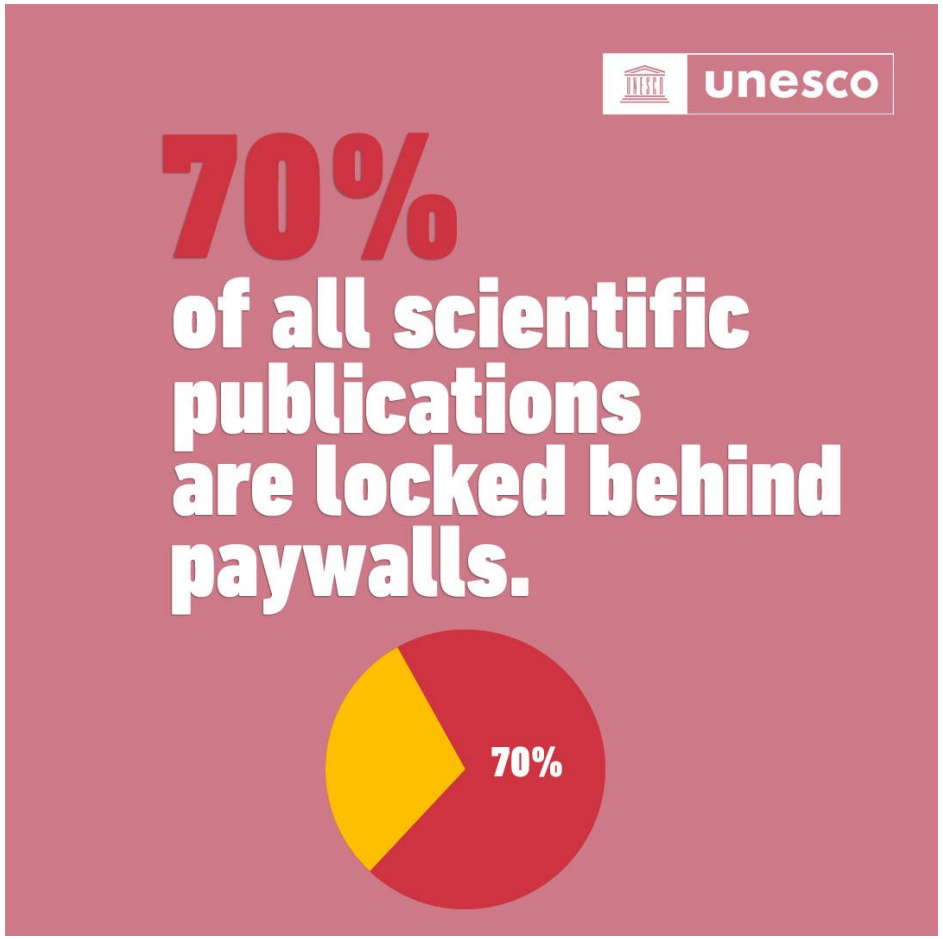
Who is investing in science?

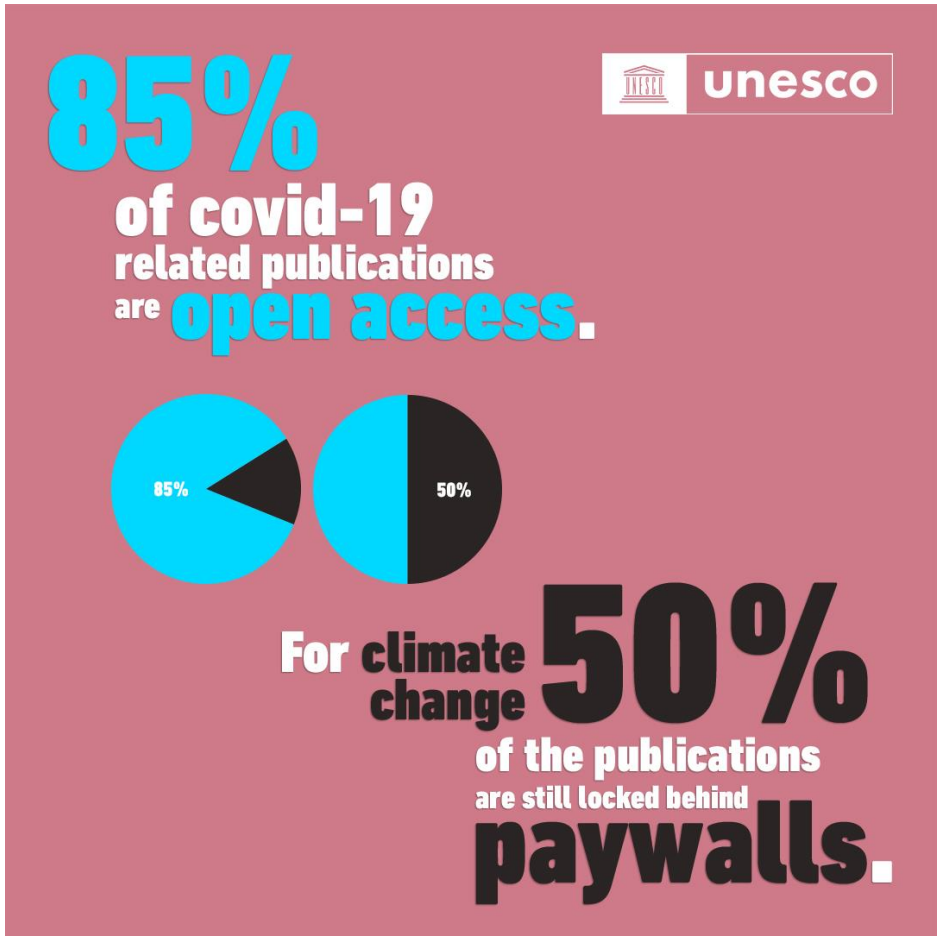
Limited access to knowledge products, like articles and datasets, and to infrastructures

Haphazard and unequitable cooperation, collaboration and engagement

Restricted access to funding and decision-making about science

Access to scientific knowledge is restricted…





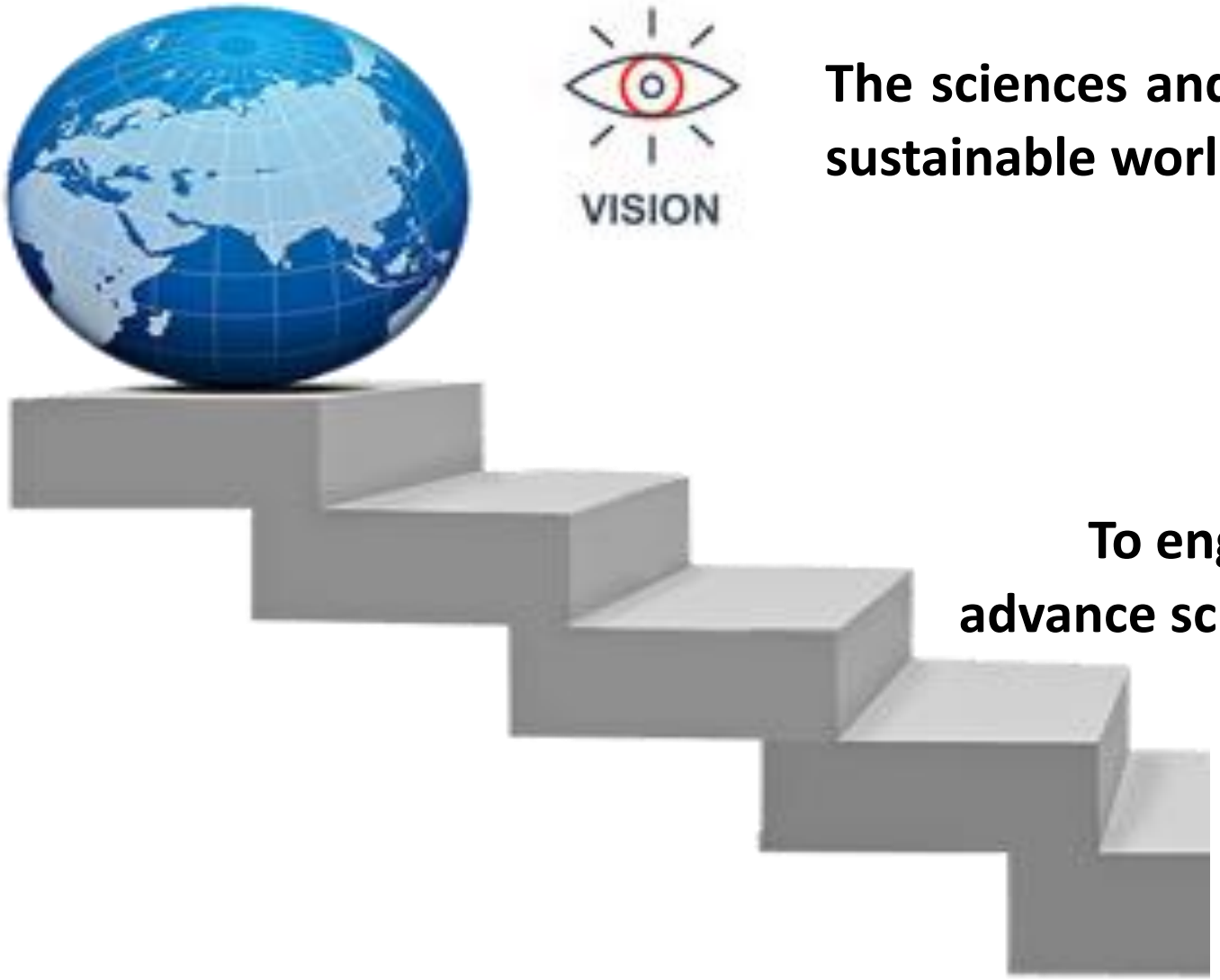
International Decade of Sciences for SD (2024-2033)

A unique opportunity for humanity to use **the critical role that sciences play in the pursuit of sustainable development in responding to the complex challenges of our time to ensure a safe and prosperous future for all**.

- Raise awareness of the **importance of all sciences**
- Promotion of **a coordinated, collaborative, scientific approach** to policymakers
- **UNESCO** to lead the implementation
- UN Member States and all other relevant stakeholders to actively support
- Foster **a spirit of global partnership and solidarity**- full and equal access to and participation in science, technology and innovation
- Recognises that open science can help in promoting and strengthening international cooperation
- **Bridge the science and technology divides** within and between countries

On 25 August 2023, **the UN General Assembly** proclaimed the years 2024-2033 to be the **"International Decade of Sciences for Sustainable Development"**

Vision and Mission of IDSSD



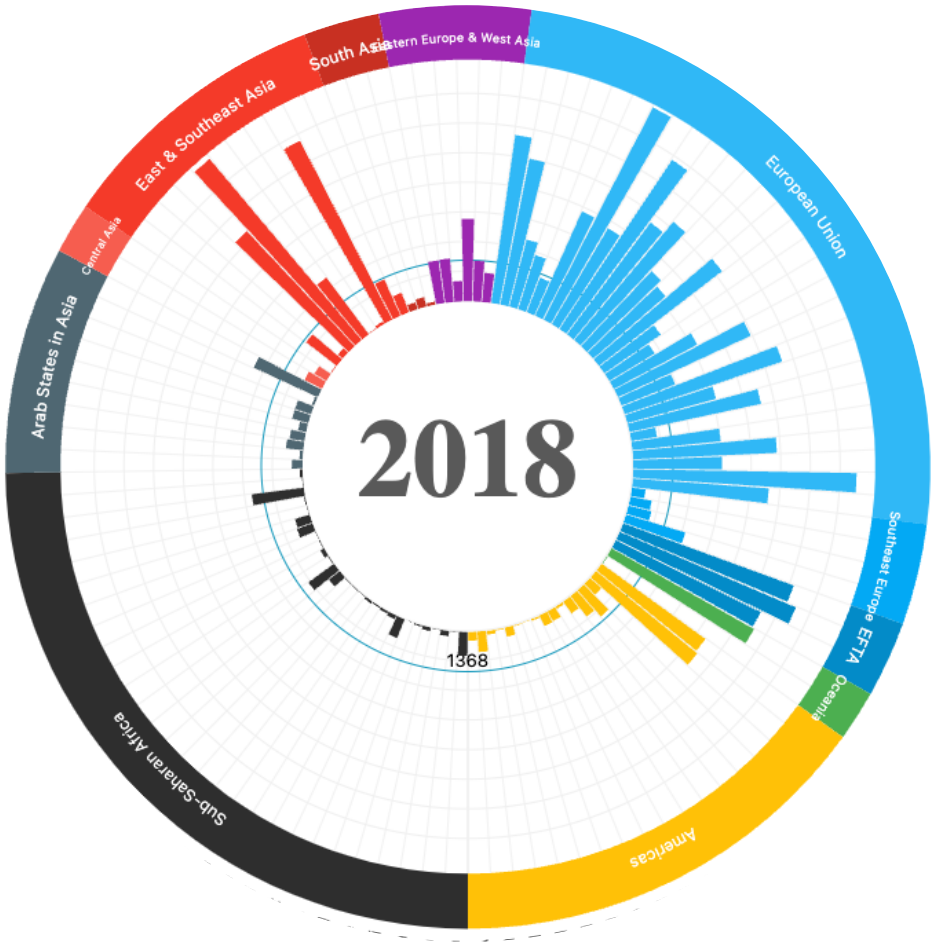
VISION

The sciences and a science culture required for a sustainable world developed and accessible to all

To engage all societal actors to further advance science and equally benefit from it

MISSION

Moving towards more equitable science



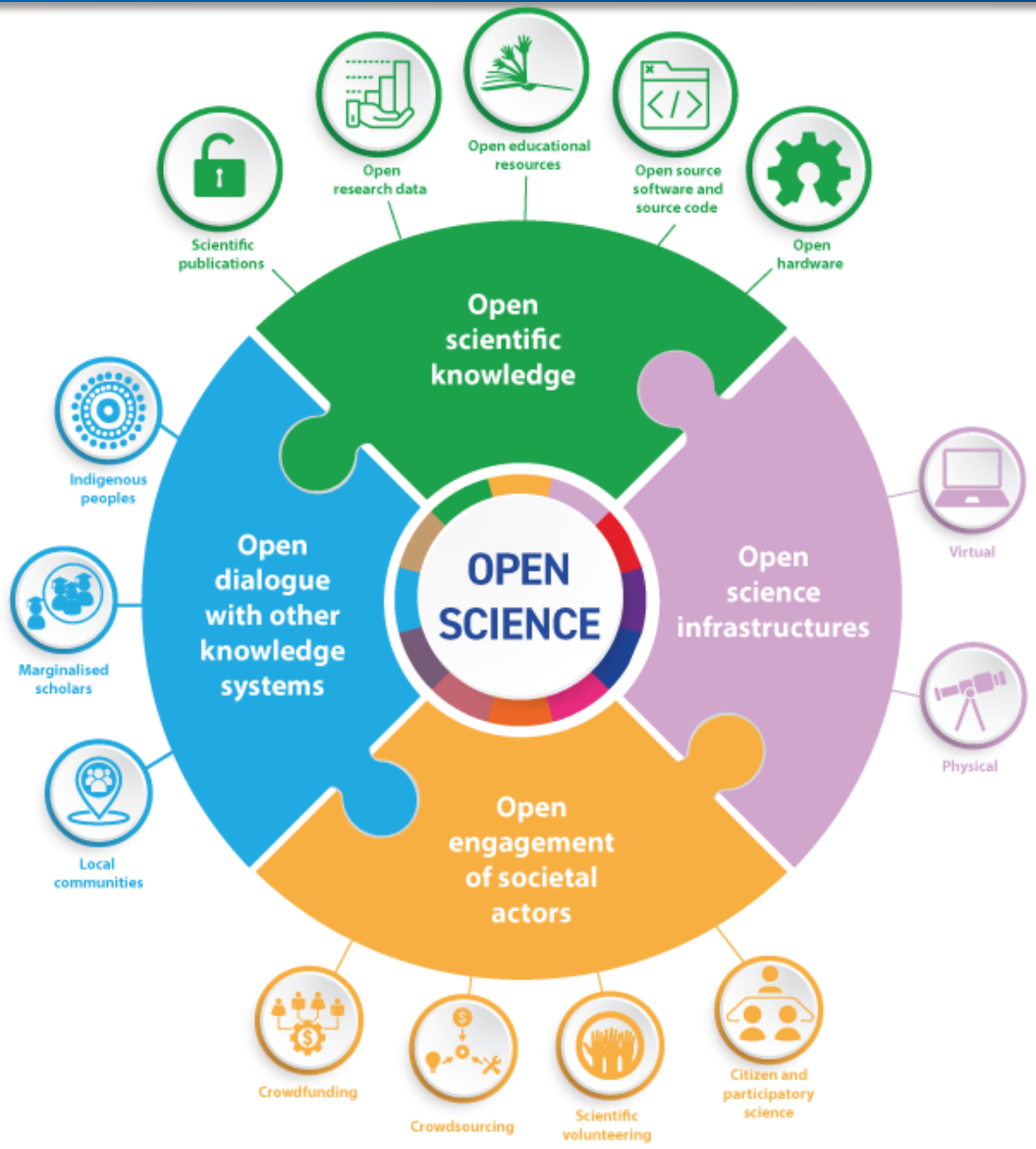
Highlights of the Recommendation

- It is the first **international normative instrument** on Open Science;
- It contains the first **internationally agreed definition** of Open Science;
- It spells out the consensus **core values and guiding principles** of Open Science;
- It addresses **multiple actors and stakeholders** of Open Science;
- It recommends **actions on different levels** to operationalize the principles of Open Science;
- It proposes **innovative approaches for Open Science at different stages** of the scientific cycle;
- It calls for development of a **comprehensive Open Science monitoring framework**.

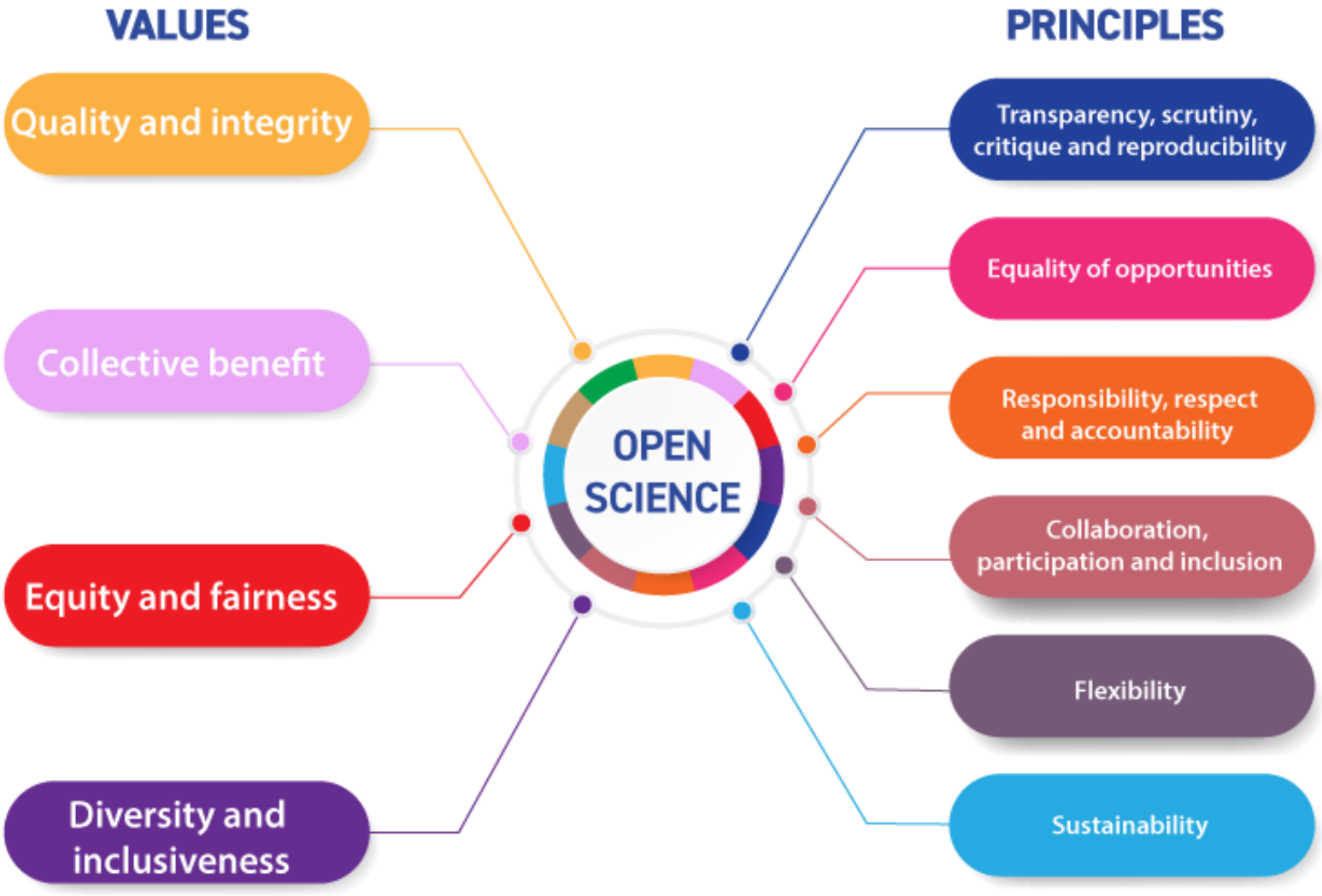
Definition of open science

Open Science:

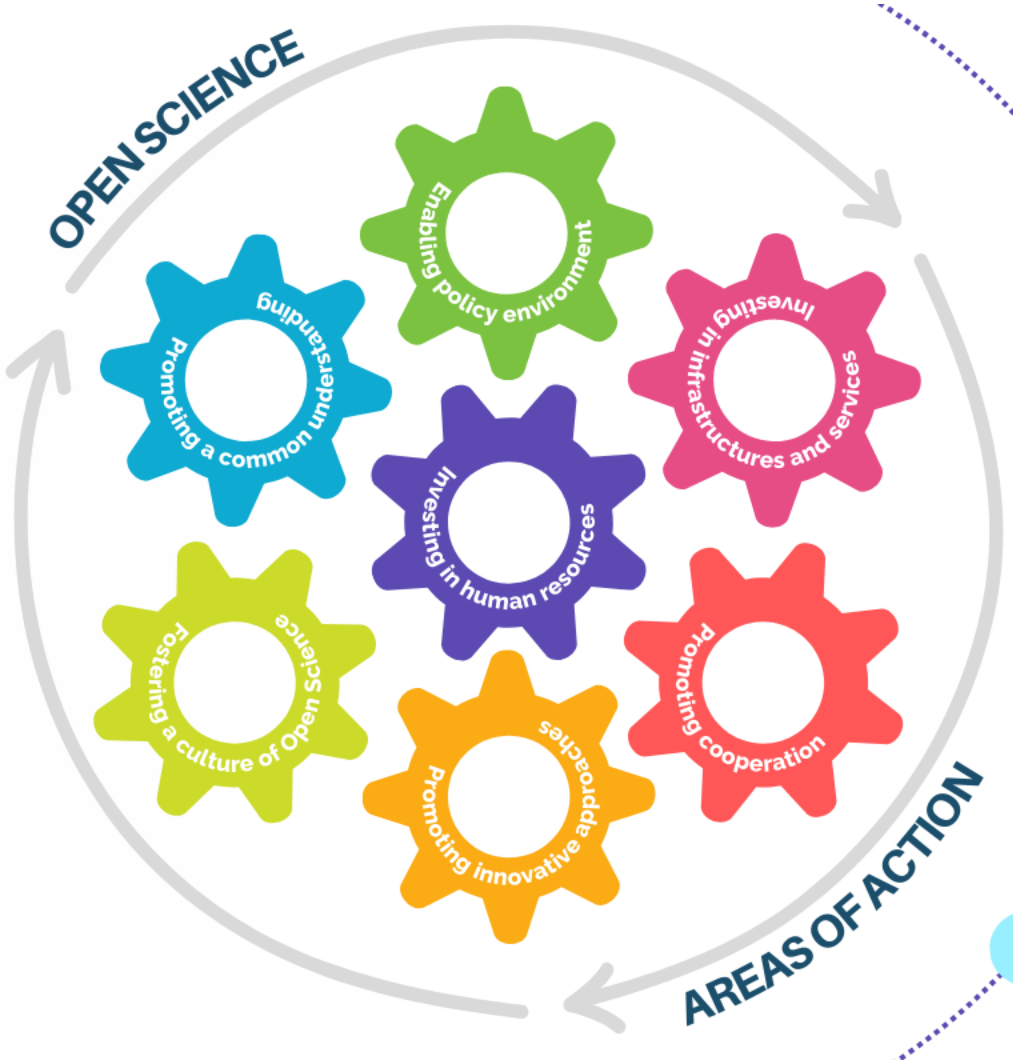
- makes scientific knowledge openly available, accessible and reusable for everyone,
- increases scientific collaborations and sharing of information for the benefits of science and society,
- opens the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the conventional scientific community.



Open science values and principles



Key areas of action



Member States are encouraged to prioritise seven areas in their implementation of the Recommendation:

- Promoting a **common understanding of OS** and its associated benefits and challenges, as well as the diverse paths to OS
- Developing an **enabling policy environment for OS**
- Investing in **infrastructure and services** which contribute to OS
- Investing in training, education, digital literacy and **capacity-building,** to enable researchers and other stakeholders to participate in OS
- Fostering a **culture of OS** and aligning incentives for OS
- Promoting **innovative approaches to OS** at different stages of the scientific process
- Promoting **international and multistakeholder co-operation** in the context of OS with a view to reducing digital, technological and knowledge gaps.

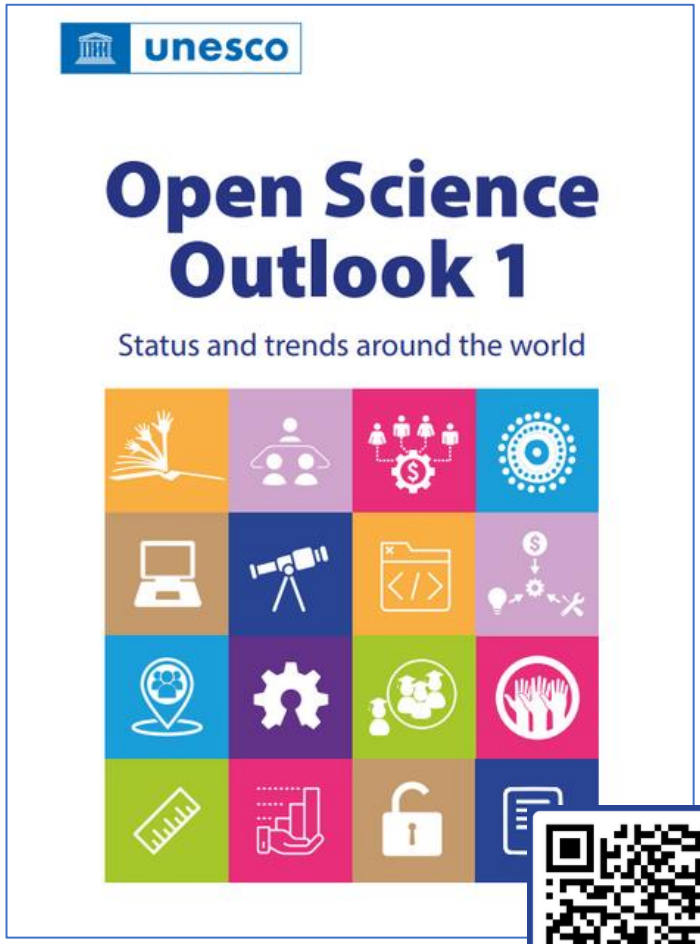
Key messages from the Open Science Outlook

For open science to reach its full potential, it must be a truly global, equitable phenomenon.

Open science is growing—but unevenly.

Obstacles remain, linked to existing inequities. There are:
- differences among pillars of open science.
- differences among disciplines.
- differences across contexts.

Collective, collaborative and coordinated action and investment are needed to accelerate the transition to a truly global, equitable open science.



WHY OPEN SCIENCE?

- Innovation & networking
- Efficiency, cost-effectiveness & reproducibility
- Transparency & impact
- Collaboration, visibility, credit & purpose
- Quality & integrity
- Human rights & equity
- Economic benefits & access to resources
- Better-informed decision making
- Public engagement & trust
- Global goals & benefits

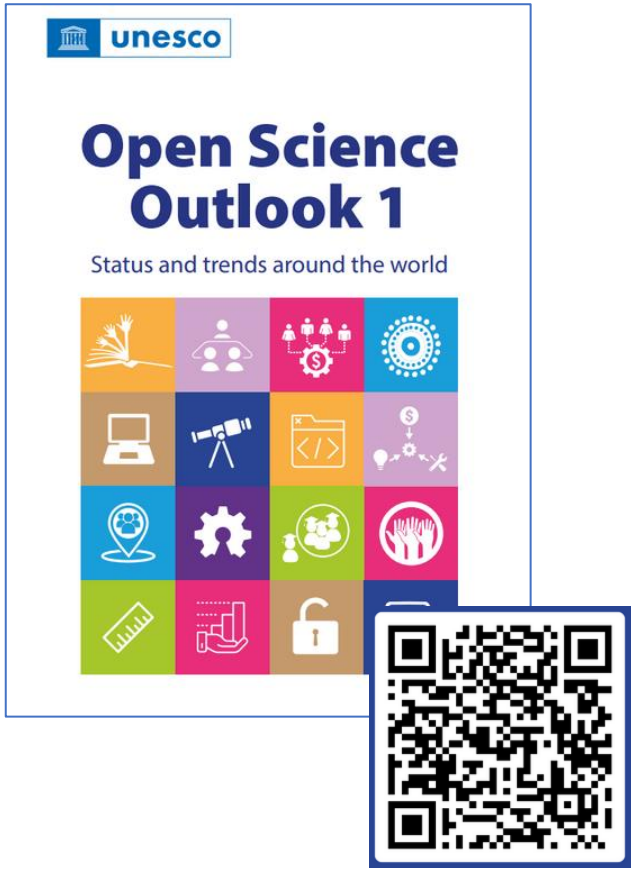
Global

Regional

National

Institutional

Individual

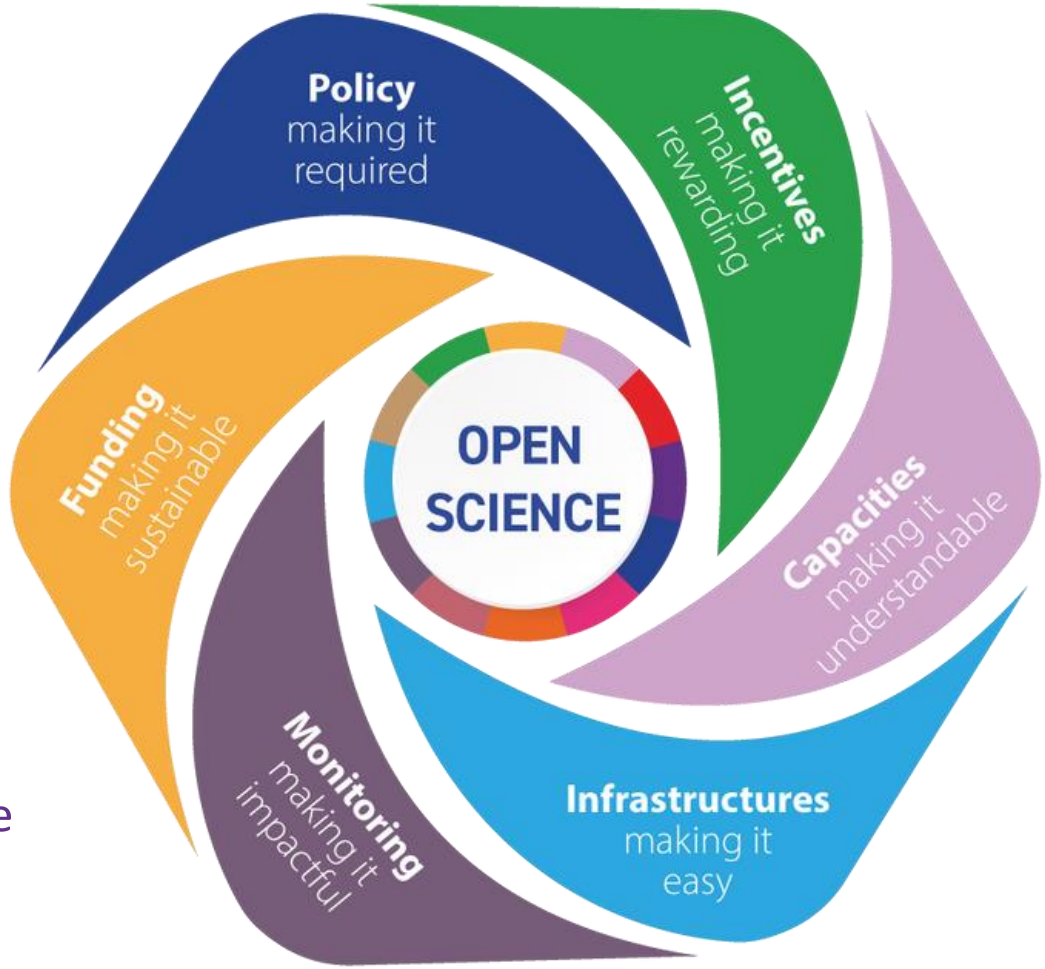


Shifting the culture of science

Need practical actions and cultural shifts

Equitable collaboration

Actions are underway around the world:
Cases from all regions demonstrate opportunities



Open Science

Open and equitable global science system	Open access to scientific knowledge	Open science infrastructures	Open engagement of societal actors	Open dialogue with other knowledge systems
An open science culture in an enabling policy environment with sustained resource commitments increases collaboration for the benefit of science and global society.	All scholarly outputs are published in a fully open access outlet or posted in an open repository, with free, immediate readership/ usership rights.	Sustainable community-led open infrastructures, both physical and digital, are available to all, regardless of location, language or ability.	Multiple entry points permit engagement. External actors contribute/initiate design, creation and application of scientific knowledge.	Diverse knowledge bases spark innovation and equitable decision-making.
A culture of open science is fostered with effort to align incentives for open [illegible] Investments are made in human resources, training, education, digital literacy and capacity building for open science.	Data, software and other outputs are FAIR* and [illegible]	Platforms permit usership for all. Digital [illegible] different languages and accessibility needs.	Capacity for societal engagement is [illegible] plans.	Capacity for ethical, open dialogue is integrated [illegible] planning and implementation at project and institutional levels.
Innovative approaches for open science are promoted at different stages of the scientific process.	All scholarly outputs are made freely available to read, in a journal or an open repository, after an embargo of no more than six months.	Open infrastructures are available to those who have existing access or commit to specified partnerships.	Societal actors have a few, defined, points of contact with scientific processes.	Dialogue is built into policies, creating time, opportunities and incentives for dialogue.
International and multi-stakeholder cooperation is initiated without a view to reducing digital, technological and knowledge gaps.	Scholarly outputs are shared without clear licensing or copyright.	Infrastructure sharing is opportunistic.	Stakeholder engagement is opportunistic.	Dialogue is facilitated in one-off events, with uneven expertise.
There is no common understanding of open science and its benefits.	Scholarly outputs are not published or are published under restrictive copyright.	Digital gaps and subscription costs hinder the use of scientific infrastructures.	Science is separate from "outreach". Science communication is one-way, outwards.	Science is separate from "outreach". Other topics or communities are research subjects.

'Closed' Conventional Science

The spectrum of openness is within reach of all.

Guidance for implementation

GUIDES

- **Developing policies** for open science
- **Building capacity** for open science
- **Funding** open science
- Bolstering open science **infrastructures** for all
- **Engaging society in open science**
- Supporting **opensource hardware for open science**

CHECKLISTS

- Checklist for **universities** on implementing the UNESCO Recommendation on Open Science
- Checklist for **open access publishers** on implementing the UNESCO Recommendation on Open Science

FACTSHEETS

- **Understanding open science**
- Identifying predatory academic journals and conferences

Explore Thursday!

OPEN INDEXES OF OPEN SCIENCE RESOURCES

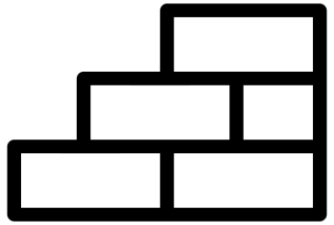
- UNESCO Open Science **Capacity Building index**
- UNESCO Index of Open Science **Knowledge Sharing Platforms**

OPEN SCIENCE OUTLOOK

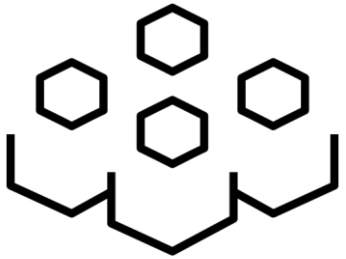
Guiding Principles for Open Science Policies

Why create an open science policy?

Show commitment



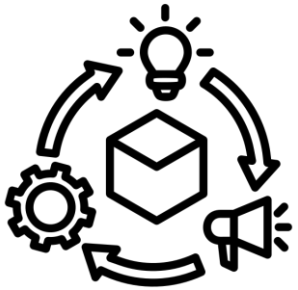
Build stability



Enhance clarity

↑ resourcing

↑ harmonization



Engage

Remove barriers

Open Science Policy: Guidance

Thanks to members of the Working Group on OS Policies & Policy Instruments!

Guidance:

What do we need?

How do we build it?

…how do we build alignment with other policies and instruments?

unesco UNESCO OPEN SCIENCE · TOOLKIT GUIDANCE

DEVELOPING POLICIES FOR OPEN SCIENCE

This document is part of the UNESCO Open Science Toolkit, designed to support implementation of the UNESCO Recommendation on Open Science. Developed through the discussions and inputs from the members of the Working Group on Open Science Policies and Policy Instruments, this guide sets out the key factors to consider when developing policies for open science.

What is an open science policy?

Open science policies can be defined as a set of guidelines, rules, regulations, laws, principles or directions to put open science values and principles into practice. Open science policies are crucial to foster a culture of open science and to develop science, technology and innovation systems which contribute to making research more efficient, trusted, impactful, inclusive and responsive to societal needs.

Open science policies can range from community to institutional, national, and regional to international policies. While this document focuses on national policies, the key factors identified to guide the development of open science policies are broadly applicable. It is important to note that institutional policies also have to address the specific needs, challenges and objectives of the related institutions, such as universities or other research-performing organizations, which can differ from the general scope of national policies and may need more targeted actions.

Open science policies can be used to:

- mandate or incentivize open science practices;
- manage the conduct of open science;
- address misconduct in open science;
- secure or enhance funding for open science;
- build capacity for open science;
- support the cultural changes needed to enhance open science practices;
- guide organizational changes needed to foster open science practices; and
- monitor open science and its impacts.

They can be designed to standardize open science processes to ensure consistent behaviour among institutions or researchers (e.g. open access and open data mandates and standards, including attribution standards) and/or to incentivize open science practices to support a culture of open science (e.g. bottom-up funding of open science practices, support of open communities, strategic development of an open science support services and infrastructure ecosystem, revision of research assessment and career evaluation aligned with open science principles).

Why have an open science policy?

As open science gains momentum across different scientific and non-scientific communities, the groundswell of action can benefit from the support and structure provided by relevant policy developments.

An open science policy can provide:

- longer-term stability, including of funding, which:
  - facilitates a genuine change in practice and culture;
  - facilitates infrastructure development and delivery; and
  - increases the likelihood that scientists will have access to the necessary training and support personnel to implement open science;
- clarity of funding and resourcing in line with a holistic view of open science, which increases the likelihood of funding projects that may not have access to or be competitive in other grant systems;
- demonstration of commitment to operationalize open science values and principles;
- opportunities for education and engagement of the scientific community in the transition to open science; and
- deconstruction of the legal impediments and structural boundaries that hinder open science practices.

Guiding Principles for Open Science Policies

What is in a strong open science policy?

- Rationale and a forward-looking vision for the policy;
- Jurisdiction and effect of the policy;
- Guidance for ensuring:
  - Open access to scientific knowledge,
  - Developing and using open science infrastructures,
  - Enhancing open engagement with societal actors and
  - Enhancing open dialogue with other knowledge systems;
- Roles, rights, responsibilities and duties of all those implementing and affected by the policy;
- Elements addressing:
  - Capacity building;
  - Research assessment and evaluation (open science metrics) – including how we know if the policy succeeds;
  - Monitoring policy compliance.

Resources

and

A plan for implementation

Policy factors enabling open science

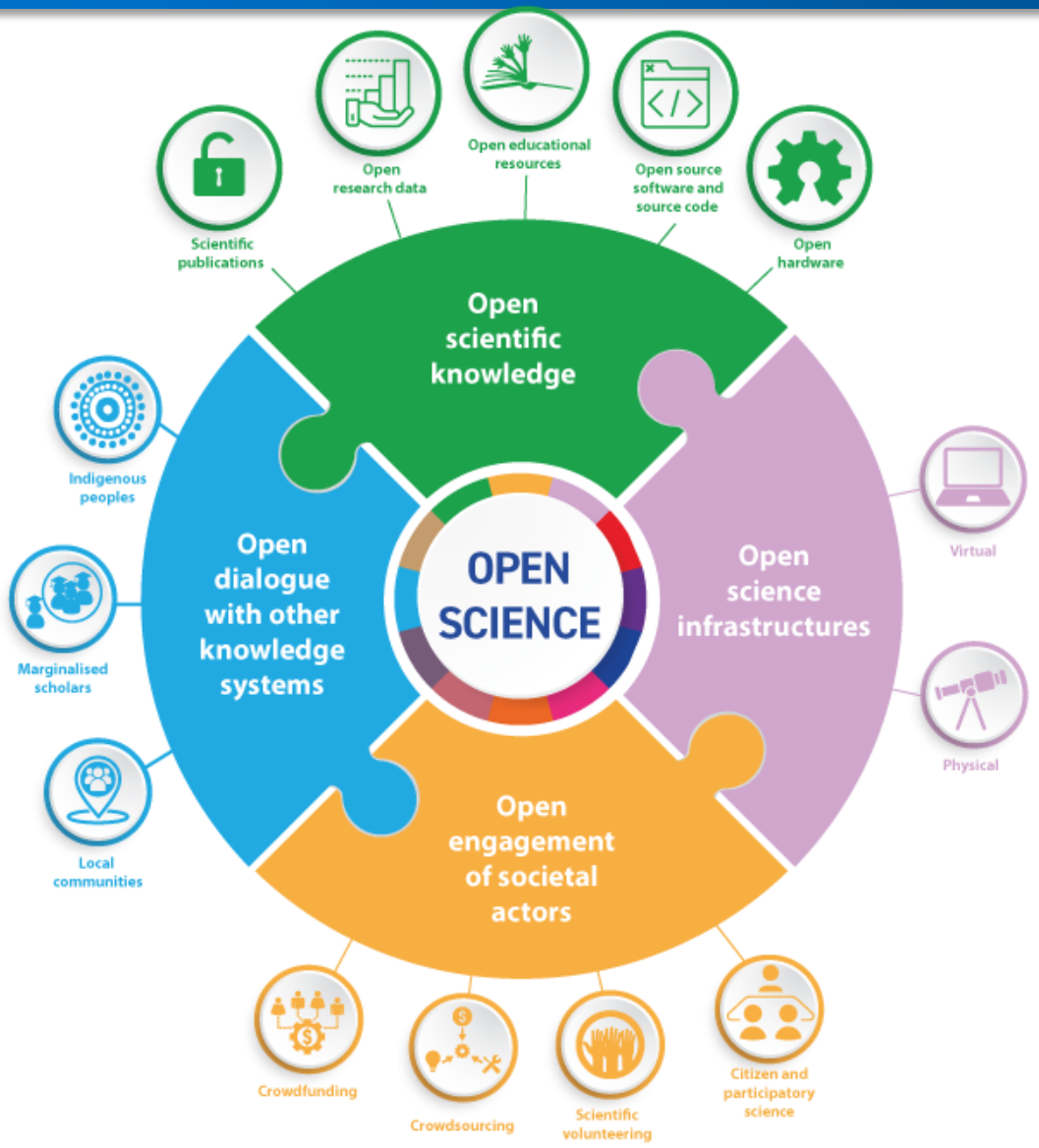
- **Open science policy, or openness transforming overall science policy?**
- **New rules, or transformation in culture?**
- **Harmonization and mainstreaming: Are there new tensions between policies of different sectors, or in the demands placed on scientists?**

  Have we removed the incentives for 'closed' practices?
- **How will policy be implemented?**

  What support is needed and who provides it?

  What does good compliance look like?

  Who checks and how?
- **Who is part of developing, acting on, assessing and adapting policy instruments?**


Open scientific knowledge
Open dialogue with other knowledge systems
Open science infrastructures
Open engagement of societal actors
OPEN SCIENCE
Scientific publications
Open research data
Open educational resources
Open source software and source code
Open hardware
Indigenous peoples
Marginalised scholars
Local communities
Virtual
Physical
Crowdfunding
Crowdsourcing
Scientific volunteering
Citizen and participatory science

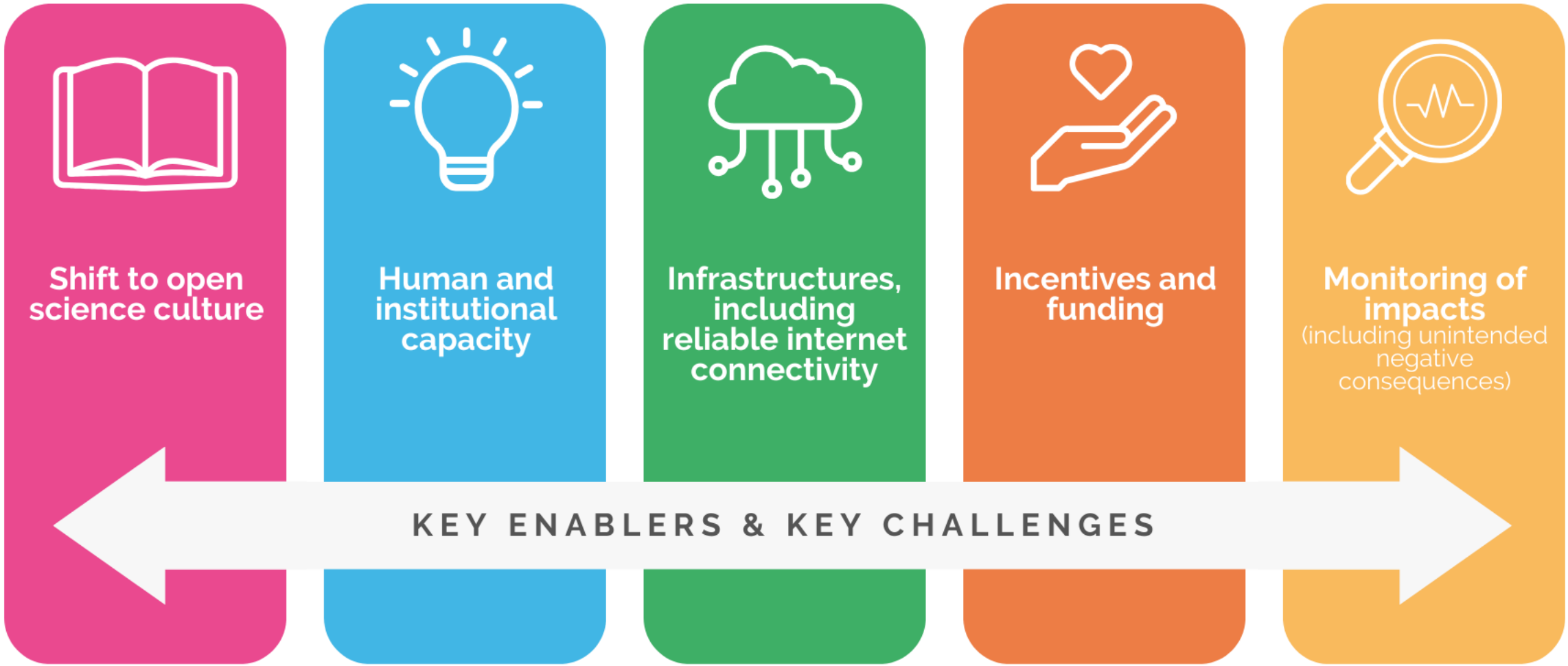
Key achievements in 2022–2024

✓**Impacts on policy development**

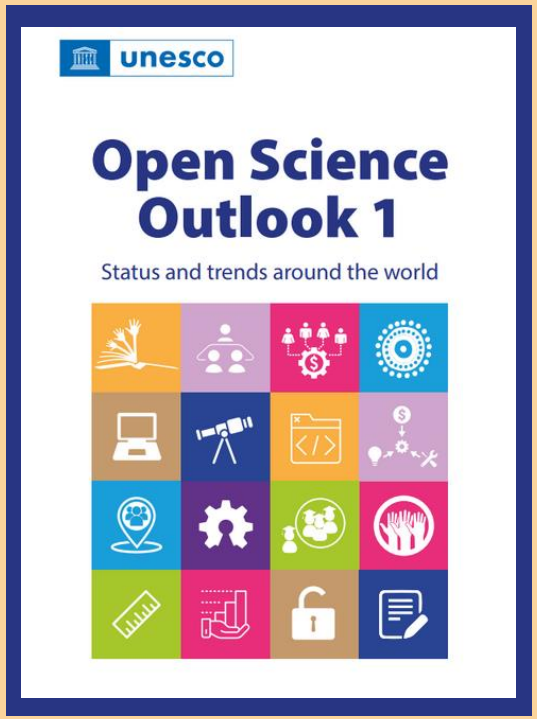
- 11 countries adopted more holistic open science policies/policy instruments since 2021 (Austria, Canada, Colombia, Cyprus, Ireland, Italy, Latvia, Lesotho, Slovenia, South Africa, Ukraine)
- Development at different stages of open science policies/strategies/roadmaps in Africa (Lesotho, South Africa, Ghana, Sierra Leone, Botswana, Cote d'Ivoire, Nigeria, Uganda, Tanzania, Kenya, Mozambique, Somalia, and Namibia)
- Integration of open science principles in STI policies (Ghana, Sierra Leone, Slovenia, Cambodia)
- Development of regional open science strategies: SADC, ECOWAS, EASTECO, ASEAN
  - https://theplosblog.plos.org/2024/04/a-big-win-for-east-africa-with-the-inclusion-of-open-science-in-the-eac-sti-policy/

✓**Strengthened and expanded partnerships and networking**

- UNESCO Open Science Partnership (over 70 members)
- UNESCO Open Science Working Groups (over 1000 experts)


Shift to open science culture
Human and institutional capacity
Infrastructures, including reliable internet connectivity
Incentives and funding
Monitoring of impacts
(including unintended negative consequences)
KEY ENABLERS & KEY CHALLENGES

Join the Global Open Science Movement



Read the Open Science Outlook:

Join the UNESCO Open Science Partnership

Contribute to global open science calls

Engage in the global discussions

Be in touch!

UNESCO Open science website:
https://www.unesco.org/open-science

Contact: openscience@unesco.org

unesco