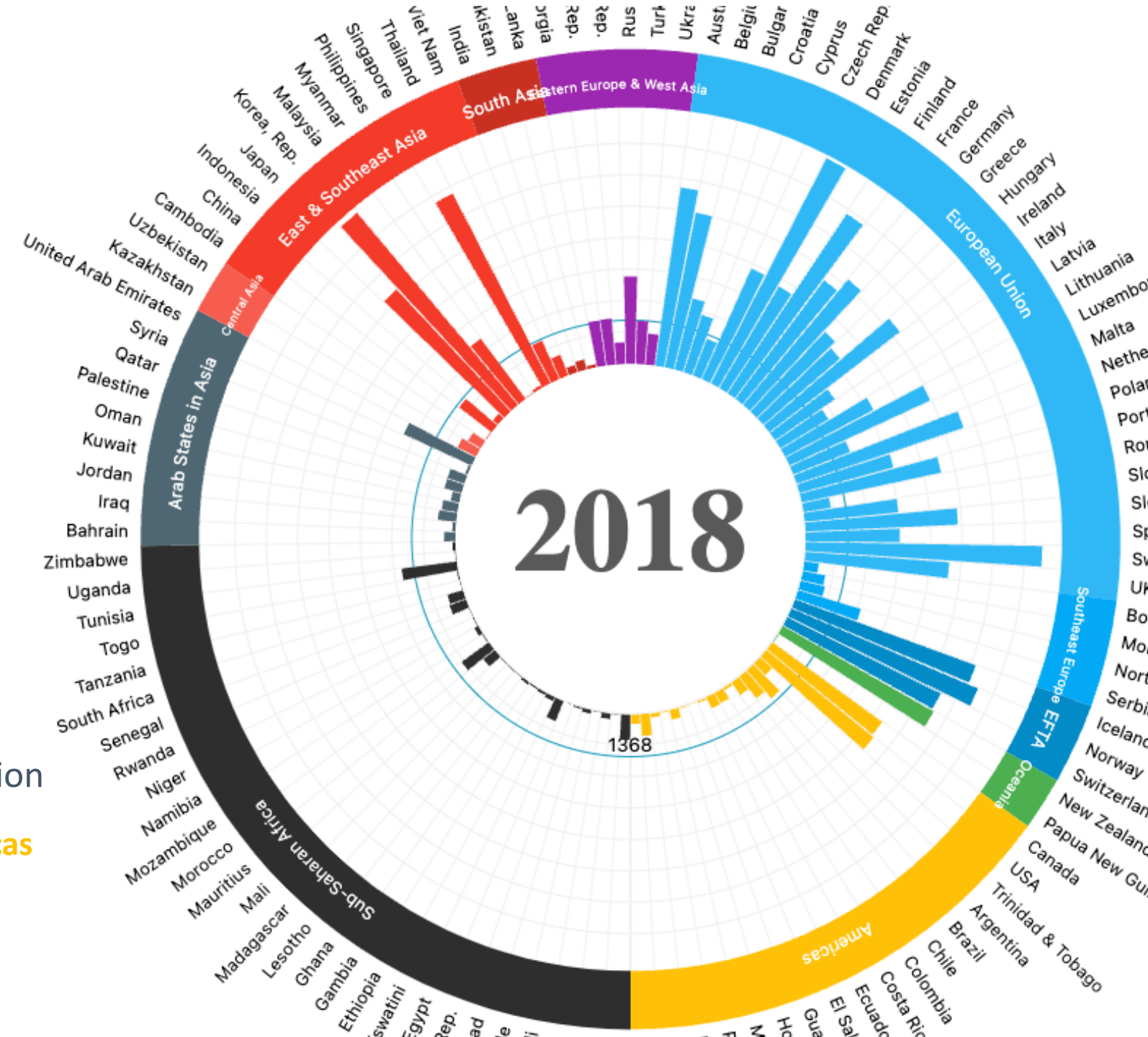
Leveraging Open Science for Sustainable Development:
Building from the UNESCO Recommendation on Open Science

Fereshteh Rafieian
Programme Specialist for Science Policy and Basic Science
UNESCO Jakarta

International Symposium of Category 2 Centres under the Auspices of UNESCO
15 – 17 May 2024, Kuala Lumpur, Malaysia

unesco



Researchers per million inhabitants by region

Asia · **West Asia** · **Europe** · **Caribbean** · **Americas**

Sub-Saharan Africa · **Arab States in Asia**

UNESCO Science Report 2021

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**

Why UNESCO Recommendation on Open Science?

- Need for an **international policy** and **action framework**
- Need for **a common definition of open science**, **shared set of values and principles**

In **2021**, **193 Member States** adopted **the first international standard-setting instrument on open science** in the form of a **UNESCO Recommendation on Open Science**.

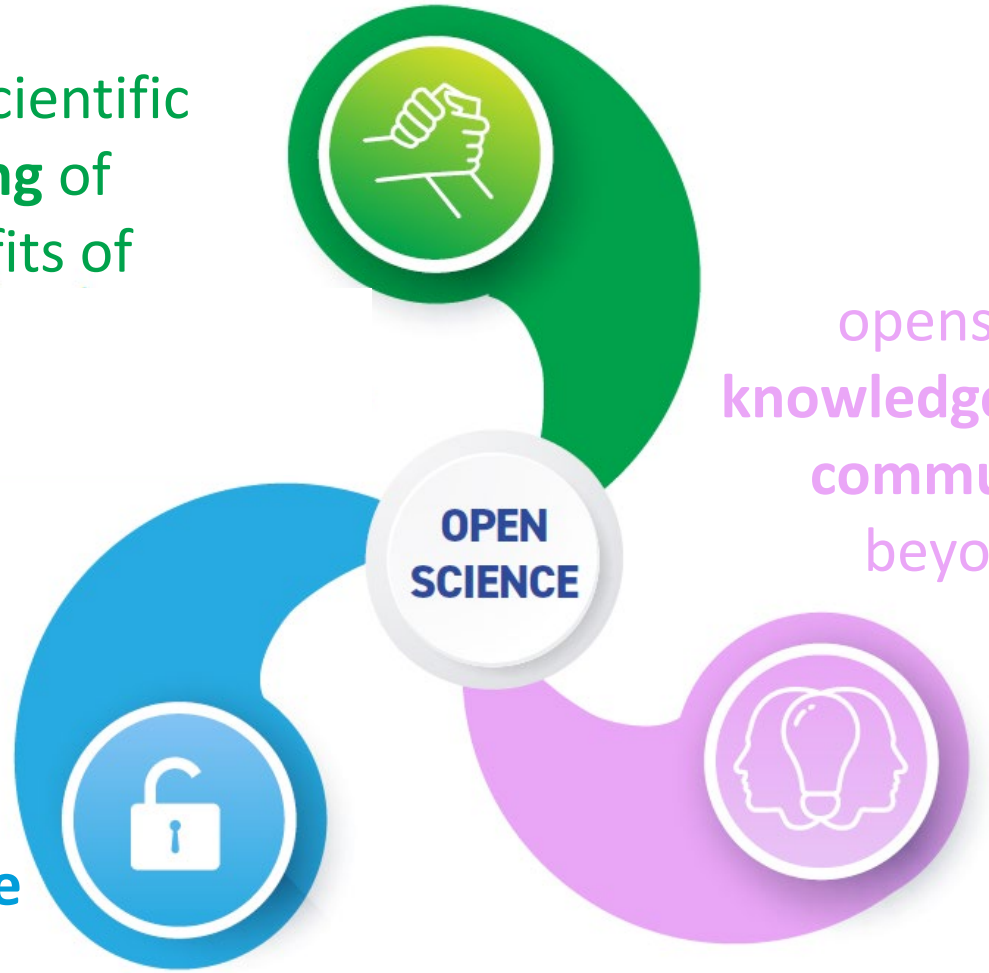
UNESCO Recommendation on Open Science

2021 UNESCO Recommendation on Open Science

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

The internationally agreed definition of open science

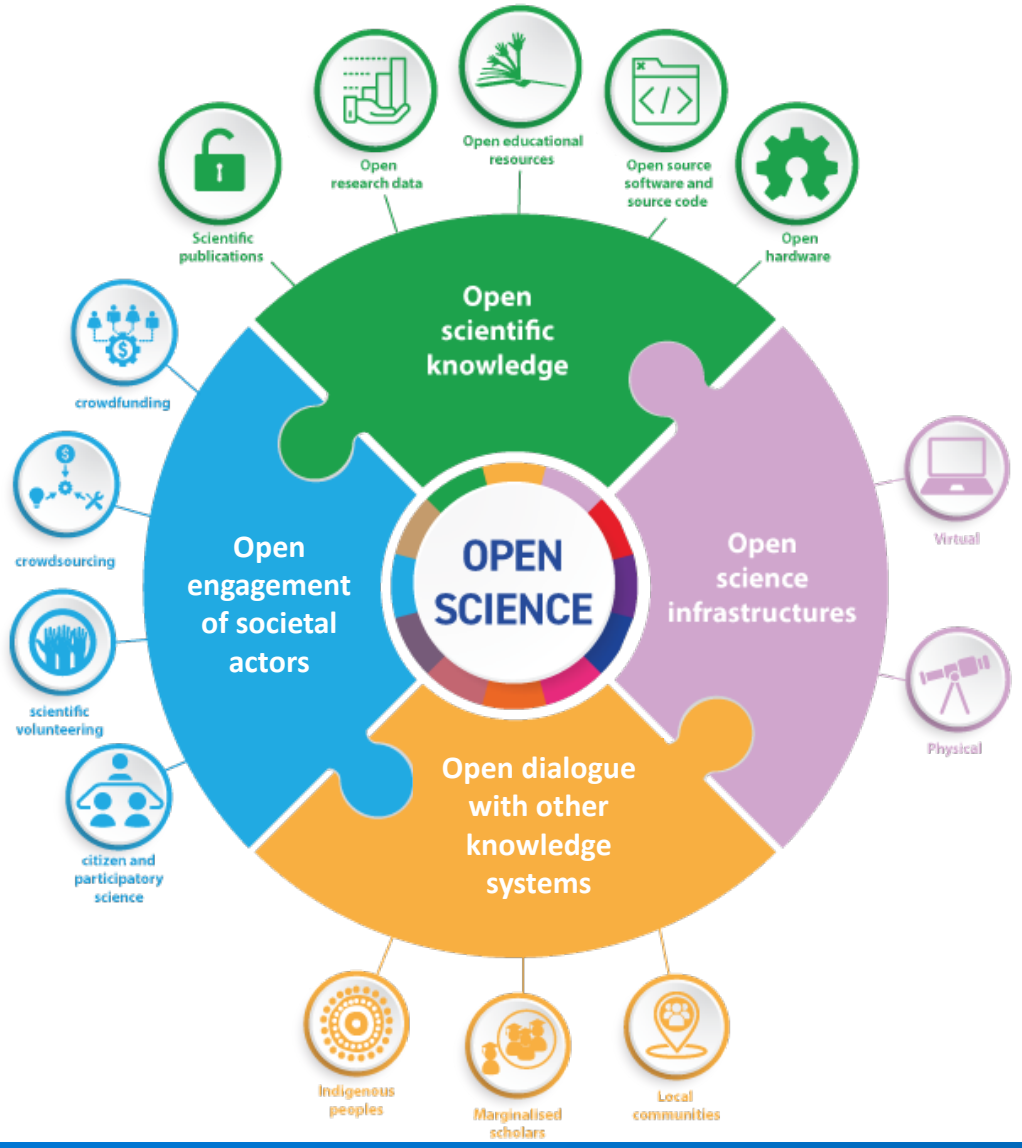
Open science increases scientific **collaborations and sharing** of information for the benefits of science and society.



opens the **processes of scientific knowledge creation, evaluation, and communication to societal actors** beyond the traditional scientific community.

makes multilingual scientific knowledge **openly available, accessible and reusable** for everyone.

Four key Pillars of open science



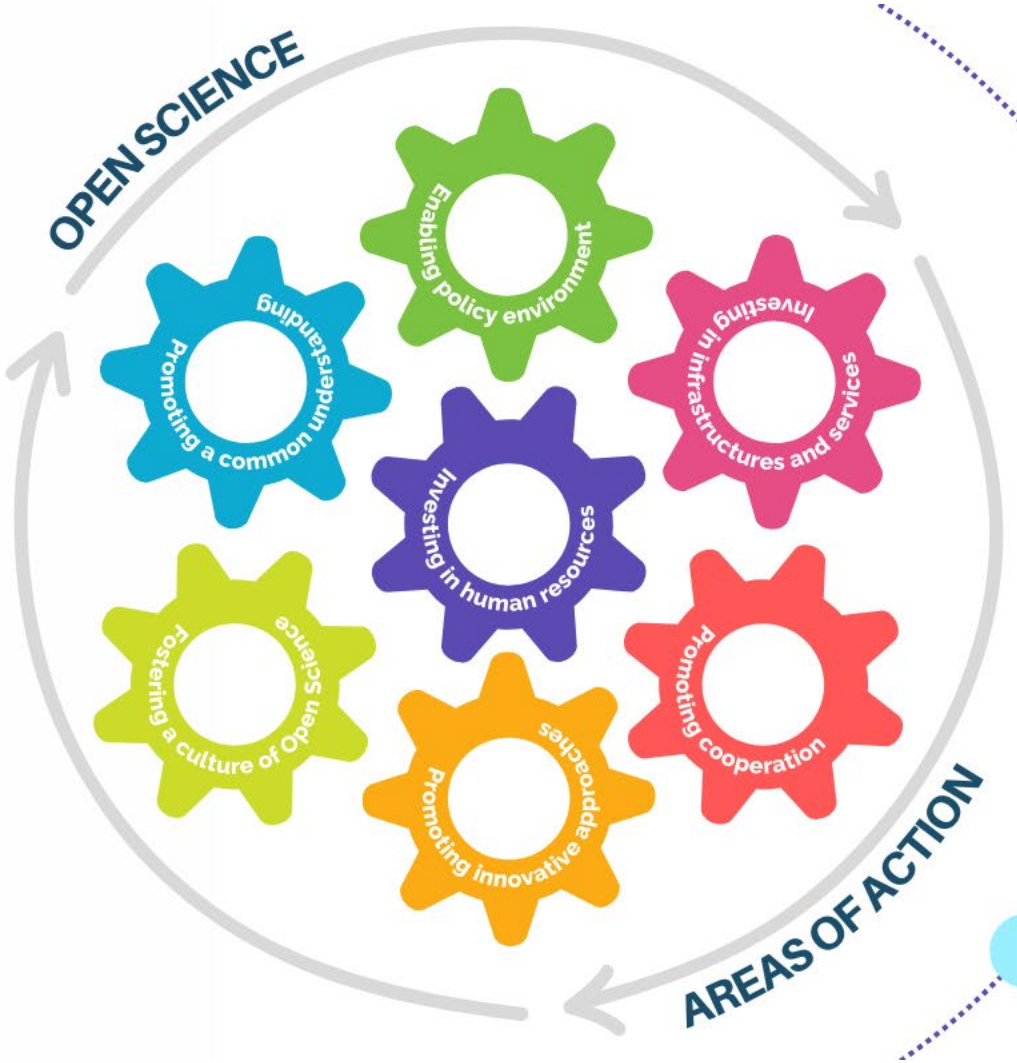
Open Scientific Knowledge: scientific publications, research data, software, source code, hardware and educational resources available in the public domain or under copyright with open license

Open Science infrastructures: scientific equipment or sets of instruments, knowledge-based resources such as collections, repositories, archives and scientific data, open computational and digital infrastructures

Open engagement of societal actors: collaboration between scientists and societal actors beyond the scientific community, opening up practices and tools that are part of the research cycle by making the scientific process more inclusive and accessible to the broader inquiring society

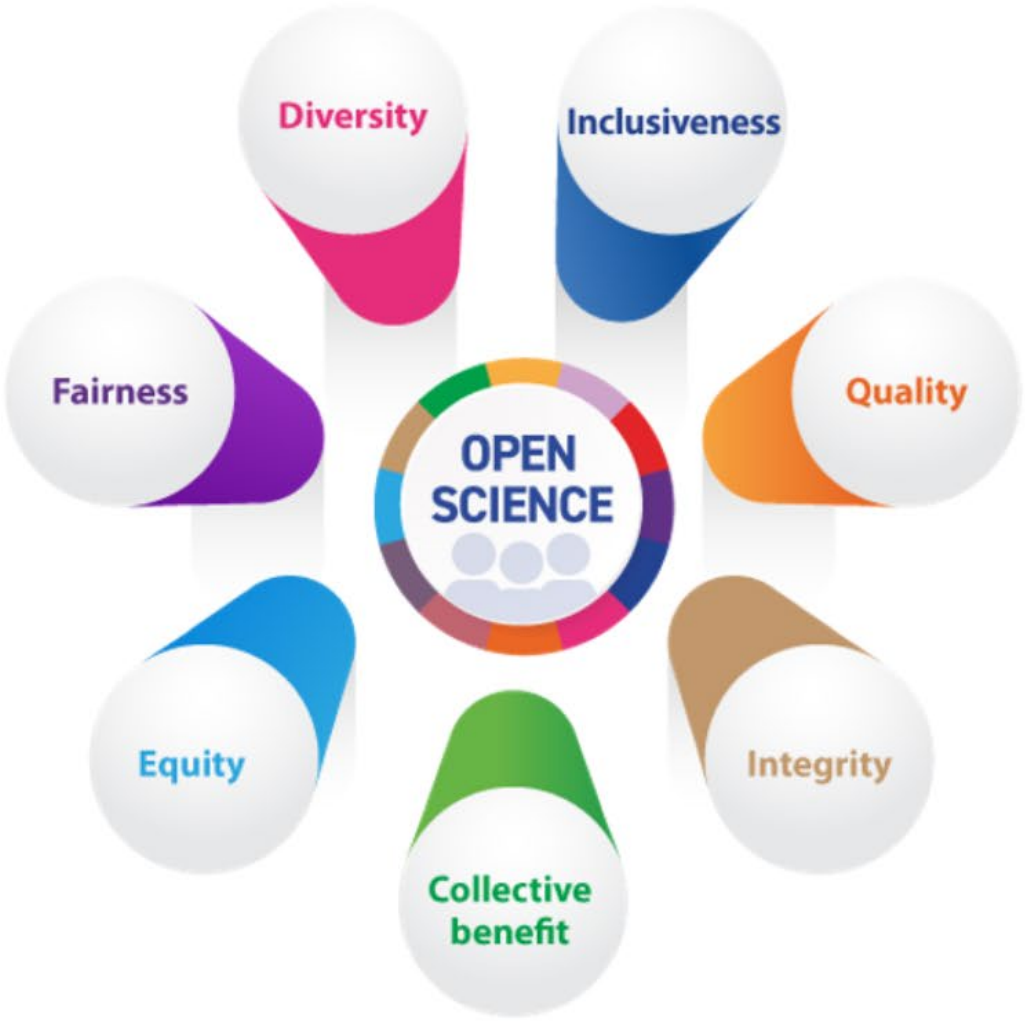
Open dialogue with other knowledge systems: recognition of richness and complementarities between diverse epistemologies, including indigenous knowledge systems

Areas of action for opening science at different levels



- 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.

Shared values of open science



Open science requires **a shift in the culture of science** guided by the **common values**

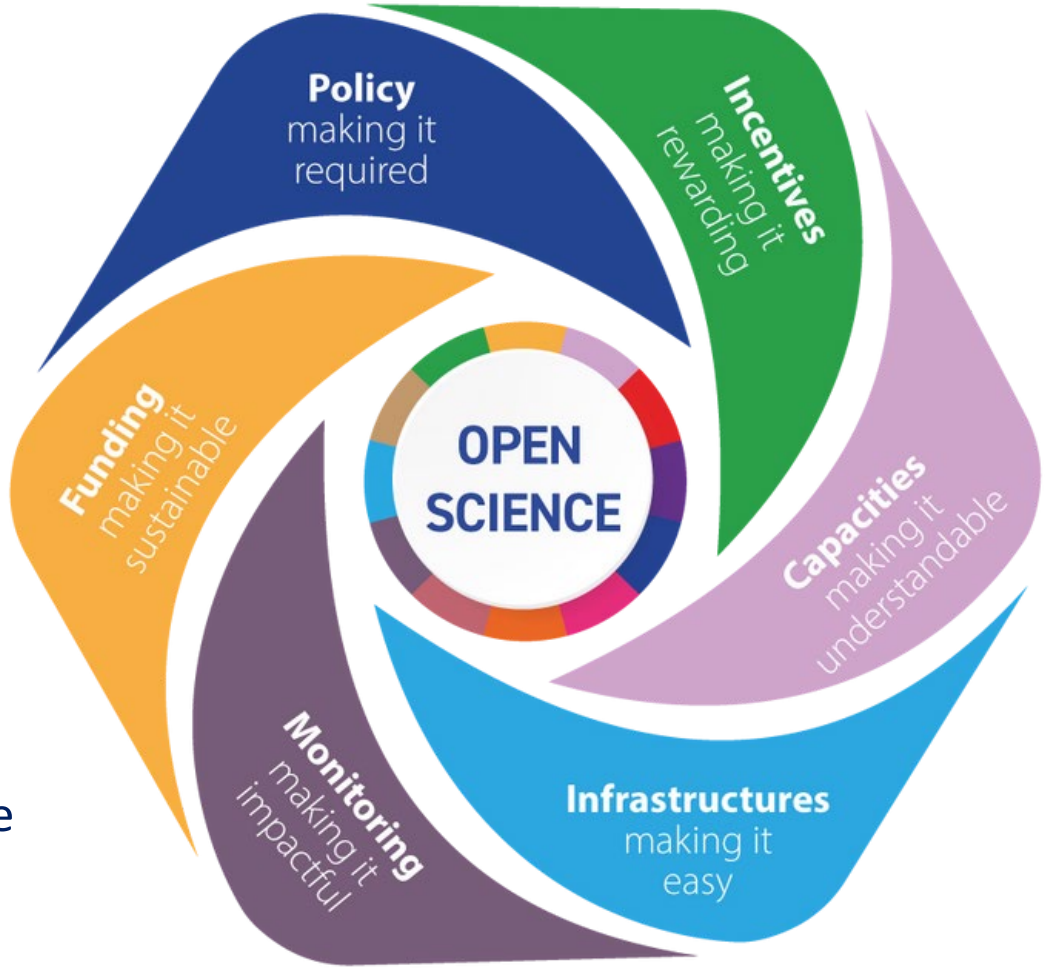
COMPETITION	»»	COOPERATION
SCIENCE AS A PRODUCT	»»	SCIENCE AS A PROCESS
SCIENCE FOR A SELECTED FEW	»»	SCIENCE FOR ALL

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

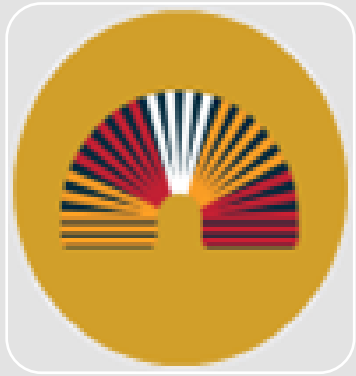


Guiding principles of open science

Transparency, scrutiny, critique and reproducibility: to reinforce the rigor of scientific results, enhance the positive impact of science on society and increase society's ability to solve complex interconnected problems.

Equality of opportunities: to ensure that all scientists and those with an interest in science have equal opportunity to access, contribute to and benefit from science, regardless of origin or circumstance.

Responsibility, respect and accountability: to be responsible for and aware of public accountability, potential conflicts of interest, intellectual integrity and the possible social or ecological consequences of research activities.

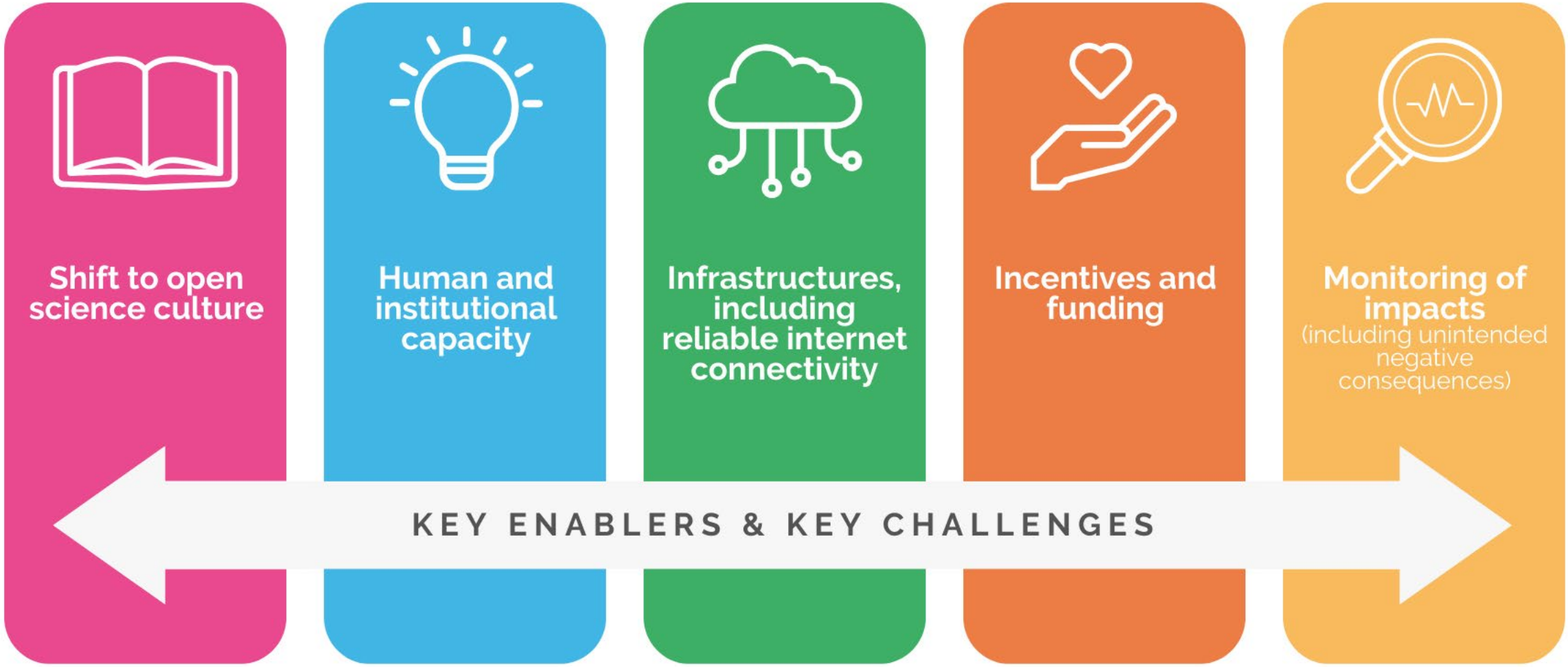


Flexibility: to acknowledge that there is no one-size-fits-all way to practice open science and to encourage different pathways to practicing it while upholding the core values.

Collaboration, participation and inclusion: for scientific collaborations to transcend the boundaries of geography, language, and resources, and include knowledge from marginalized groups to solve social problems.

Sustainability: to be as efficient and impactful as possible by building on long-term practices, services, infrastructures and funding models to ensure participation of scientists from less-privileged countries or institutions.

Key challenges for implementation – Key priorities for action



UNESCO's Role

- Raise awareness and providing guidance for the implementation of the Recommendation
- Forum for exchange of ideas, good practices, lessons learned
- Strengthening and expanding networking and collaboration
- Monitoring open science status, trends, and impacts (Global and Natinal)

UNESCO OPEN SCIENCE · TOOLKIT

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**

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

OPEN INDEXES OF OPEN SCIENCE RESOURCES

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

https://www.unesco.org/en/open-science/toolkit

A snap shot of open science from around the world

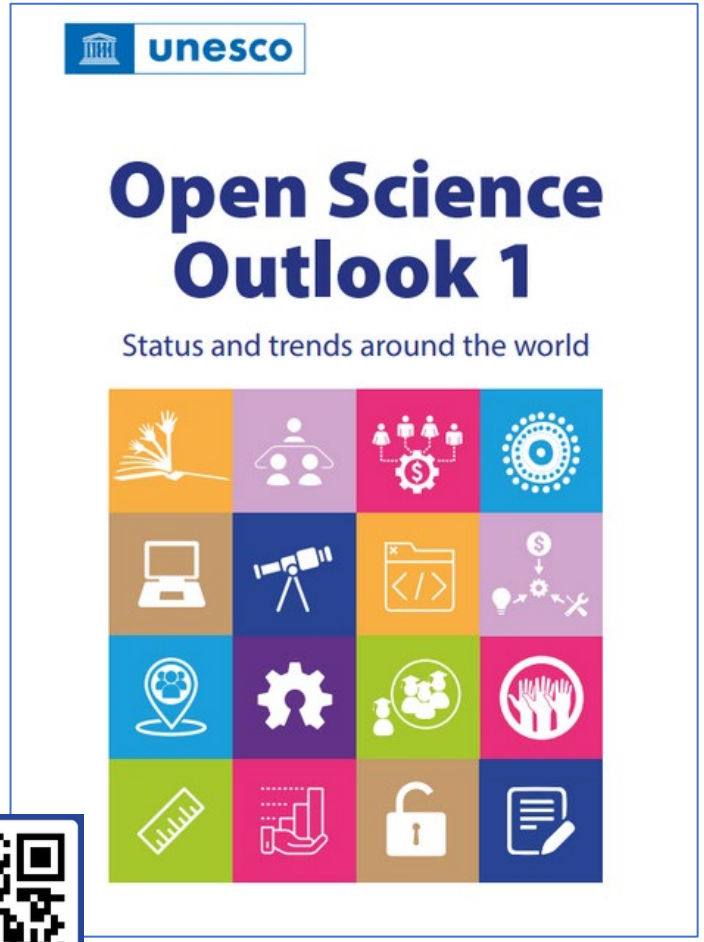
For open science to reach its full potential, it must be a truly global and equitable phenomenon.

`

Open science is growing—but unevenly.

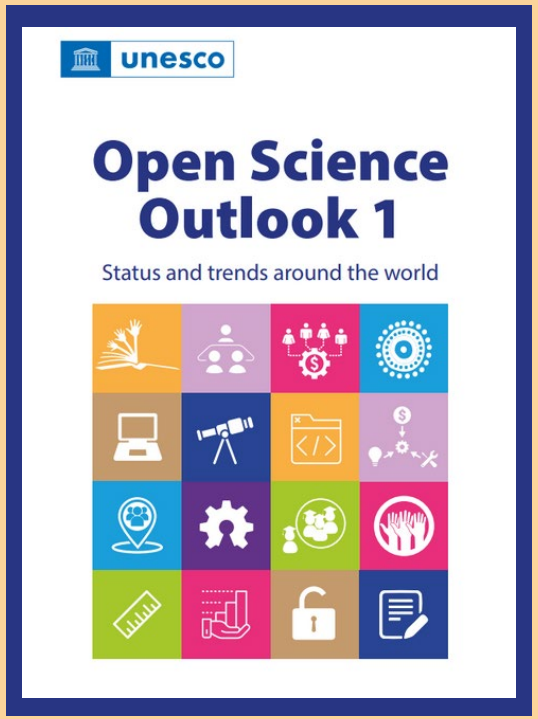
Obstacles remain, linked to existing inequities. There are:
- differences among pillars of open science.
- differences among disciplines.
- differences across contexts.

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



unesco

Join the Global Open Science Movement



Read the Open Science Outlook:

Join the Open Science Working Groups

Engage in the national and global discussions

Be in touch!

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

Contact: openscience@unesco.org

unesco