

**Multilateral dialogue on principles and values  
in international research & innovation cooperation**

**Concept Note**

**Workshop on Open Science**

**25 April 2023**

***Organised by France, with Argentina, Chile, Mexico, the Netherlands, South Africa, Spain,  
Switzerland, Aurora, YERUN and the European Commission***

The European Commission has initiated a Multilateral Dialogue on Values and Principles for Research and Innovation beginning in July 2022. The aim of this dialogue is to have an open discussion between EU Member States and over thirty important partner countries to develop a common understanding of these principles and values as a reliable basis for international research and innovation cooperation.

The fourth workshop of the series focuses on Open Science. According to the UNESCO Recommendation on Open Science adopted by the general conference 2021, it is defined as “*an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community.*”<sup>1</sup> Given this definition elaborated in a multilateral context, the aim of the workshop is to provide a platform for an open dialogue on distinctions and commonalities in the conceptualisation and application of the principles of Open Science in the different national contexts.

The virtual setting of this three-hour workshop allows all participants to come together irrespective of their geographical location. The outcomes of the workshop on Open Science will be presented at a plenary meeting of the Multilateral Dialogue in June/July 2023.

After an introduction on the objectives of the workshop, the discussion will take place in parallel breakout sessions on four different aspects of open science: (1) equity and inclusiveness, (2) policies for open science without borders, (3) openness degrees, reproducibility and trust, (4) quality, ethics and cultural change.

**1) Equity and inclusiveness: How to ensure that Open Science practices are equitable and inclusive and that no one is left behind? For instance:**

- How can open science strengthen the capacity of the research community to reduce existing and emerging inequities, for example in the conditions and capacity to publish or on the topic of recognition of data sharing?

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<sup>1</sup> <https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en>

- How can Open Science help to make research more multilingual, locally relevant and accessible to larger audiences, in particular to under-represented communities?
- How can Open Science contribute to improve collaboration with other societal actors to ensure the sustainable facilitation of their role in science?

**2) Policies for open science without borders: *How to foster international cooperation in order to provide a global open science and seamless landscape of tools, services, standards and good practices? For instance:***

- How can we promote the sustainable development, funding and governance of research infrastructures, in order to provide a global trusted environment for Open Science?
- What are the best strategies to ensure a scholarly communication ecosystem accessible to all? Which international initiatives concerning academic publishing in open access could be envisaged?
- What obstacles do dominant proprietary models in the marketplace for infrastructure, data or publications services bring for global cooperation on Open Science and developing science as a common good?

**3) Openness, reproducibility and trust: *In times of lack of confidence in science and where some speak of a “reproducibility crisis”, how can open science help to overcome these issues? For instance:***

- What are the most pressing challenges for increasing the trust and reproducibility of research results? How can open science best contribute to enabling them? How can we encourage the publication of negative results, in order to produce more robust meta-analysis?
- Do you agree that research outputs should be open by default (“as open as possible, as closed as necessary”)? There are cases where there is a need to limit the degree of openness of research results: how this should be assessed and who should take the decision?
- Where open data is not possible, for example for privacy reasons, how can data sharing be improved and systematised in a controlled context?

**4) Quality, ethics and cultural change: *How can open access, open/FAIR data, open source, open protocols and other transparent approaches improve quality and ethics in research? How can we initiate a cultural change in order to make open science the default mindset? For instance:***

- How does openness contribute to the quality of the research undertaken?
- What ethical considerations should guide open sharing and re-use of research outcomes and tools? How can sensitive data be shared while complying with such ethical principles?
- Open Science needs skilling, training, rewarding and changing the mindset of all parties engaged in the research process. How can these enablers be embedded in education and training, outreach and evaluation system?
- How can the Coalition for Advancing Research Assessment (CoARA) become a truly international initiative? What are the obstacles to the international reach of CoARA?

### **Further reading:**

- [Unesco Recommendation on Open Science \(2021\)](#)
- Council Recommendations on a [Pact for Research and Innovation in Europe \(2021\)](#)
- Council Conclusions (2021): Future Governance of the European Research Area– [Policy Agenda 2022-2024.](#)
- [Council Conclusions on principles and values in international R&I cooperation \(2022\)](#)
  
- *Council Conclusions on Research Assessment and Implementation of Open Science.*  
<https://www.consilium.europa.eu/en/press/press-releases/2022/06/10/council-provides-political-orientations-on-international-cooperation-open-science-and-european-missions/>
  
- Bilder G, Lin J, Neylon C. The Principles of Open Scholarly Infrastructure..  
<https://doi.org/10.24343/C34W2H>
  
- Goldacre B, DeVito NJ, Heneghan C, et al. Compliance with requirement to report results on the EU Clinical Trials Register: cohort study and web resource. *BMJ*. 2018;362:k3218.  
doi:[10.1136/bmj.k3218](https://doi.org/10.1136/bmj.k3218)
  
- Citation data are now open, but that's far from enough. *Nature*. 2022;609(7927):441-441.  
doi:[10.1038/d41586-022-02915-1](https://doi.org/10.1038/d41586-022-02915-1)
  
- Morka A. The Perils of Being Invisible - Collective Funding Models for Open Science Infrastructure. Presented at: September 21, 2021. doi:[10.5281/zenodo.5548375](https://doi.org/10.5281/zenodo.5548375)
  
- *Intelligent open science: viral genomic data sharing during the COVID-19 pandemic.* 69  
<https://www.gov.uk/government/publications/intelligent-open-science-viral-genomic-data-sharing-during-the-covid-19-pandemic> (2022).

## Agenda

### Workshop on Open Science

Multilateral dialogue on principles and values in international research & innovation cooperation

25 April 2023, 13:00-15:40 (CET) via Webex

13:00-13:05	<b>Opening and welcome</b> <ul style="list-style-type: none"><li>• Martin Penny, Head of Unit, DG R&amp;I/F1, International Cooperation Unit, European Commission</li></ul>
13:05-13:10	<b>Context – The multilateral dialogue on values and principles in international R&amp;I cooperation:</b> <ul style="list-style-type: none"><li>• Axel Leisenberg, Policy Officer, International Dimension of the European Research Area, France</li></ul>
13:10-13:30	<b>Introduction of the Workshop:</b> <ul style="list-style-type: none"><li>• Marin Dacos, Coordinator for Open Science, Director-General for Research and Innovation and Director General for Higher Education and Professional Integration, Ministry of Higher Education and Research, France: Global Positions on Open Science</li><li>• Javier Lopez Albacete, Policy Officer, Open Science, DG R&amp;I, European Commission</li></ul>
13:30-15:00	<b>Two parallel breakout sessions (40 mins + back to plenary for 5-10 mins break in order to click a link to join second breakout room, 40 mins)</b>  <ol style="list-style-type: none"><li>1. <b>Equity and inclusiveness</b></li><li>2. <b>Policies for open science without borders</b></li><li>3. <b>Openness, reproducibility and trust</b></li><li>4. <b>Quality, ethics and cultural change</b></li></ol>
15:00-15:25	<b>Plenary report by rapporteurs of the break-out sessions</b>
15:25-15:35	<b>Wrap-up and follow-up by moderators</b> <ul style="list-style-type: none"><li>• Marin Dacos, Coordinator for Open Science, Director-General for Research and Innovation and Director General for Higher Education and Professional Integration, Ministry of Higher Education and Research, France</li><li>• Javier Lopez Albacete, Policy Officer, Open Science, DG R&amp;I, European Commission</li></ul>
15:35-15:40	<b>Closing statement</b> <ul style="list-style-type: none"><li>• Sébastien Chevalier, Director, Coordination of Higher Education and Research Strategies, Ministry for Higher Education and Research, France</li></ul>

# Summary Report

## Workshop on Open Science

### 25 April 2023

On 25 April, the workshop on Open Science took place and it was the fourth of a series of workshops, supporting the European Commission's Multilateral Dialogue on Values and Principles for Research and Innovation (R&I). The event attracted around 110 participants from over 40 countries and several European and international associations, networks, and consortia such as the International Science Council (ISC), UNESCO and the Euro-BioImaging Bio-Hub (EMBL) took part in the Dialogue.

The main take-home messages for each of the four breakout sessions, discussing the different aspects of open science, are presented below.

#### **Equity and inclusiveness**

- Publication fees produce strong inequities. Bibliodiversity and diamond open access could help reduce these inequities.
- Capacity building is essential. There is a lack of funding to help researchers store their data.
- Policy makers should engage with (young) researchers when developing open science policies.

#### **Policies for open science without borders**

- Infrastructures are key to promote collaboration, where publicly funded infrastructures will play a critical role.
- Research assessments policies should be aligned to reduce the risks of heterogeneity and lack of cooperation.
- Many initiatives have been set up and continue to arise. Now is the time to consolidate, join forces and develop standards.

#### **Openness degrees, reproducibility, and trust**

- A reform of research assessment is needed. Negative results are also extremely valuable for the advancement of scientific research. The evaluation system needs to credit researchers for publishing these results. Hence, a coordinated cultural change is needed.
- Many experts think that open data will lead to better quality of research data. As there is evidence that mandatory open data policies is increasing, error correction is also lacking. Openness seems not to be enough.
- With regards to the harmony between openness and knowledge security, a multilevel decision system should decide which knowledge may be shared.

#### **Quality, ethics, and cultural change**

- Besides calling for open science, we need to value it too.
- Training and skills are missing and efforts in this direction are needed.
- To build evidence-based open science policies, research on open science is needed.

The outcomes of the workshop on open science will be presented at the Second High-level meeting of the Multilateral Dialogue on June 28, 2023, in Brussels.

The next virtual workshop, on research excellence, will take place on June 1, 2023.

# Final Report

## Workshop on Open Science

### 25 April 2023

#### Introduction

In July 2022, the European Commission launched a Multilateral Dialogue on Values and Principles for Research and Innovation (R&I) with the aim to work towards a common understanding of principles and values that underpin international R&I cooperation. On 25 April 2023 the fourth workshop under this dialogue took place and focussed on Open Science. It was co-organised by France, Argentina, Chile, Mexico, the Netherlands, South Africa, Spain, Switzerland, Aurora, YERUN, with the European Commission and aimed at an open discussion on distinctions and commonalities in the conceptualisation and application of the principles of Open Science in the different national contexts. The event attracted 126 participants from 42 countries and several European and international associations, networks, and consortia such as the International Science Council and UNESCO.

Open Science, according to the UNESCO Recommendation on Open Science as adopted by the general conference 2021, is defined as “an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community”<sup>2</sup>.

Open Science has become increasingly important for many reasons: notably contributing to improving research quality and impact, fostering innovation, promoting trust and public engagement, and addressing global challenges<sup>3</sup>. Discussions on the principles of Open Science are important to align policies, practices, and initiatives at the national and international levels, and facilitate the sharing of good practices and experiences. This can help overcome barriers to the implementation of Open Science, such as cultural differences, legal frameworks, funding structures, and technical challenges.

#### Agenda

During the three-hour workshop, the delegates discussed four key aspects of Open Science:

- 1. Equity and inclusiveness:** How to ensure that Open Science practices are equitable and inclusive and that no one is left behind?
- 2. Policies for Open Science without borders:** How to foster international cooperation to provide a global Open Science and seamless landscape of tools, services, standards, and good practices?
- 3. Openness degrees, reproducibility, and trust:** How can Open Science help to overcome issues in times of lack of confidence in science and where some speak of a “reproducibility crisis”?
- 4. Quality, ethics, and cultural change:** How can open access, open/FAIR<sup>4</sup> data, open source, open protocols, and other transparent approaches improve quality and ethics in research? How can a cultural change to make Open Science the default mindset be initiated?

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<sup>2</sup> UNESCO (2021). *UNESCO Recommendation on Open Science*. [Link](#). (05/05/2023)

<sup>3</sup> See also Pascal Lamy et al. (2017). LAB – FAB – APP. [Link](#). (05/05/2023)

<sup>4</sup> FAIR stands for Findable, Accessible, Interoperable and Reusable. [Link](#) (30/05/2-23)

After the opening remarks by **Martin Penny, DG R&I, European Commission**, and an introduction of the objectives of the workshop, the above topics were discussed in four parallel breakout sessions, following the Chatham House Rule<sup>5</sup> to encourage open discussion. The delegates attended two breakout sessions, discussing two different topics.

## Opening and welcome

**Axel Leisenberg, Policy Officer EU-International Cooperation in Higher Education, French Ministry of Higher Education and Research** briefly outlined the overall process of the Multilateral Dialogue on Values and Principles of International R&I Cooperation. He emphasised that science makes an important contribution to tackling major societal challenges that are faced globally. In this context, it is important to support and aid the willingness of researchers to engage internationally and across disciplines. Additionally, it needs to be ensured that researchers can work and collaborate freely in an environment based on principles and values shared by all actors. The essence of the Multilateral Dialogue, and specifically the workshop on Open Science, was to explore this.

**Marin Dacos, National Open Science Coordinator at the French Ministry of Higher Education and Research**, then introduced the topic of discussion: Open Science. Open Science is a very broad and inclusive concept, referring not only to open access of publications, but also open access to methodologies, materials, and results. The journey on Open Science started around 40 years ago and today we find ourselves in the implementation phase, in which the implementation of public policies is rising.

Marin Dacos emphasized that Open Science is not only needed because (1) research that is funded with public money should be publicly available, (2) it is expected that Open Science fosters better quality research, and (3) because Open Science is more accessible to society. Further reasons to implement Open Science include higher impact of research, economic efficiency, reproducibility, heuristics, ethics, integrity, and transparency.

Some examples were shared that show the progress that is made with regards to the transition towards Open Science, such as the fact that open access research outputs are read more and receive more citations, the appearance and development of many national Open Science plans and the establishment of the Council for National Open Science Coordination (CoNOSC).

However, Marin Dacos also highlighted some challenges ahead of us:

- The Article Processing Charges (APC) costs have doubled and continue to rise without being commensurate with publication services.
- The COVID-19 pandemic has shown that even a global pandemic is not sufficient to radically modify scientific practices.
- There remains to be a tendency to only publish positive (and not negative) results.
- The current research assessment systems do not consider sufficiently and systematically the diversity of research outputs and research-related activities of researchers. Reforming the evaluation systems is needed to support the transition towards Open Science among other objectives including maximising quality and impacts.

Marin Dacos concluded that we are currently facing a big gap between promises and reality. We find ourselves at the early stages of the transition towards Open Science as the default for conducting research, where international cooperation will be the key to success in this transition.

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<sup>5</sup> Chatham House (n.d.) *Chatham House Rule*. [Link](#). (05/05/2023)

The presentation by Marin Dacos was followed by the perspectives on Open Science from the European Commission (EC), **Javier Lopez Albacete, European Commission, Directorate-General for R&I, Open Science Unit**. Openness and transparency are key principles and the starting points for EU policies. Open Science is a priority for the EC.

Javier Lopez Albacete stressed that research is in transition. On the one hand, increasingly complex scientific problems and societal challenges arise require research cooperation and teamwork at international level. On the other hand, digitalisation is ongoing, which makes science more data intensive and data driven; it continuously offers new tools and methodologies. The EC Open Science paradigm offers an opportunity and is a guiding principle to steer these transitions. However, science is a global endeavour and the transition towards Open Science requires multilateral action including many different actors.

## Parallel breakout sessions on focus areas

This chapter summarises the main points of discussion for each of the four topics that were discussed in parallel breakout sessions. **Annex 1** presents the participating countries and organisations.

### 1. Equity and inclusiveness

- How to ensure that Open Science practices are equitable and inclusive and that no one is left behind?

The discussion focussed on several topics:

**IT and infrastructures.** For equitable and inclusive Open Science, access to internet and other infrastructures, as well as IT support, is essential. Lack of financial capacity notably for storing data can also lead to inequalities.

**Skills and competences.** Participants indicated that it is key to ensure appropriate skills. Specifically, for IT skills participants noticed inequality rising between richer and poorer countries. Individuals with strong IT skills need to be attracted and retained in academic research, which can be challenging considering in particular salary considerations. Research also requires specialised profiles and competences like librarians and other profiles involved in Open Science practices.

**Multilingualism.** Multilingualism is an enabler of Open Science but should be considered carefully. Some disciplines need other languages to be able to meaningfully carry out their research activities. Multilingualism can be useful when engaging with society since researchers may need to use less technical language in order to increase engagement and the societal impact of their research. Embracing technology such as translators and language processors enable multilingualism and increase the accessibility of research. Researchers should not be prevented from conducting research in their mother tongues, where relevant and appropriate.

**Article Processing Charges.** Article Processing Charges (APC) can generate inequalities and stratification effects globally. Participants agreed that diamond open access publishing models should be developed, as well as models for affordability and fair pricing academic publishing. It was concluded that global discussions are essential.

**Research assessment.** Present research assessment systems focus on publication in academic journals (deemed prestigious) and do not sufficiently promote teamwork, knowledge sharing, and diversity of research outputs and tasks. It was agreed that equity and inclusiveness benefit from changing the research assessment systems to recognise the diversity of contributions, reflect inclusivity and engagement with society, consider the impacts of research on local communities, and include the



gender dimension, among other things. Improved incentives would also better recognise the contributions of early-career researchers and help attract junior researchers. Participants emphasises the importance to engage globally in research assessment improvements, notably with the Coalition for Advancing Research Assessment (CoARA).

**Indigenous knowledge.** There is a need to be more open to indigenous knowledge. There exist, however, some limits and sensitivities that should be considered, such as the need for indigenous groups to maintain 'sovereignty' or control over their own unique data. Dialogue is important to enable indigenous populations to follow Open Science approaches that work for their needs and priorities. This can be addressed with the CARE principles for indigenous data governance.

**Impact assessment.** Impact assessments can be conducted to ensure that Equality, Diversity, and Inclusion (EDI) are considered by design, when developing new policies, notably for Open Science, and before launching research programmes.

**Systemic biases.** There exist systemic biases that need to be overcome. At micro level there is not enough ethnic diversity in R&I, and at macro level the Global South is not heard. To tackle this, participants suggested to introduce more ethnic diversity in evaluation panels for a better inclusion of the Global South perspective.

**Relevance of research.** Participants stressed the need to ensure that research questions are relevant not just for 'Western' countries, but globally. Citizen engagement practices may contribute to ensuring relevance, but not necessarily for the global level, unless citizen science is conducted globally, for example genetic or medical studies initiated by and performed with PatientsLikeMe<sup>6</sup>.

**Engagement with non-scientific communities.** Open Science strengthens the engagement with and trust from the communities outside of the scientific world. Engagement is enabled by digital platforms and local libraries. Thus, alliances between academic press and libraries are important in relation to this engagement. Participants stressed the need to structure incentives.

#### **Key takeaways<sup>7</sup>:**

- A systemic perspective with regard to strengthening capacities is important for open science to be inclusive.
- Community-driven publications are key in ensuring equitable and inclusive open science, so diamond open access is favoured in this regard.
- Involving intermediaries and training for a mid- to long-term cultural change are key to strengthening capacities.
- Internet access should not be forgotten as a challenge with regard to participating in open science.
- Technology can be a solution with regard to multilingualism and accessibility.
- Open science is important in building trust within non-scientific communities.
- Policies should better consider equality and diversity elements.
- Be more open to indigenous knowledge, implement care principles.
- Mitigating the impact of the evolutions towards Open Science on early career researchers.
- There is a need for a reform of the research assessment, considering inclusiveness. The current systems do not promote sufficiently teamwork, knowledge sharing, and diversity of research outputs and tasks.

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<sup>6</sup> [Link](#) (31/05/2023)

<sup>7</sup> These key takeaways include issues that were discussed that are not explicitly included in the summary of the meeting.

## 2. Policies for Open Science without borders

- How to foster international cooperation to provide a global Open Science and seamless landscape of tools, services, standards, and good practices?

The discussion focussed on the following key aspects:

**Infrastructures to promote collaboration.** A lesson from history is that science is a way to build bridges. It is of extreme importance not to have borders in relation to Open Science, to implement research exchange and international collaboration. Participants agreed that sharing of infrastructures can be used to promote collaboration. Different models for such collaboration were discussed.

One possibility would be to develop, and support shared, single-site infrastructures that serve the scientific community across countries, including those that do not have the capacity to develop their own. This would facilitate the practices of Open Science globally and would provide access to a broader and more diverse body of knowledge produced in different parts of the world.

However, participants also expressed the need to be sensitive to the fact that needs and priorities may be different in different countries and regions; when infrastructures become centralised, then sometimes that means that the priorities of developing countries fall to the bottom of the list. Alternatively, supporting the development of local infrastructures, while ensuring their interconnection and interoperability across borders, could be another viable model for international cooperation.

It was noted that the creation of a global federation of infrastructures for knowledge sharing would require strong coordination efforts.

**Alignment of policies and practices.** Participants observed a strong appetite for global cooperation on Open Science. Now is the time to agree on standards and requirements for policies on Open Science. More dialogue in Europe and outside of Europe is needed to allow more alignment between policies and practices.

Participants acknowledged that a 'national push' to find aligned solutions for Open Science issues in all countries is needed to avoid discrepancies or imbalances between countries. On top of that, conversations on the topic, such as this dialogue, are needed, as whatever is happening outside of the country, will have an impact at national level.

Specifically, policies for advancing the research assessment reform are needed, as these would be a key enabler for the implementation of Open Science. Moreover, legal, and administrative barriers and the lack of a clear and agreed common legal framework for sharing and reusing research outputs, including aspects of intellectual property rights and copyright, are currently a barrier to global cooperation on Open Science, and therefore should be explored.

**Consolidation.** Over the past 30 years, and specifically in the last decade, we have seen many initiatives on Open Science arise. Participants acknowledged that now is the time to consolidate and standardise the different pillars on Open Science. Dialogues on approaches to Open Science and on the long-term sustainability of Open Science, are critical at all levels: global, European, regional, and national.

### Key takeaways:

- Sharing of infrastructures can be used to promote collaboration.
- Policies for advancing the research assessment reform are needed. These would be a key enabler for the implementation of open science.

- Dialogues on approaches to open science, like this one, are critical at all levels (global, EU, regional, national).
- There are many initiatives on open science. Now is the time to consolidate and standardise the different pillars of open science.
- There is a strong appetite for global cooperation on open science. Now we should agree on standards and requirements for policies on open science.
- Differences in legal and administrative frameworks in different countries and regions are currently a barrier to international cooperation, and therefore, should be further explored.
- Community-led practices provide clear guidance on how to increase the adoption of open science.
- Publicly funded initiatives should have a strong role in shaping new ways of scholarly communication.
- The issue of costs and long-term sustainability was signalled as a critical barrier for which more dialogue and clarity is needed.

### 3. Openness degrees, reproducibility, and trust

- In times of lack of confidence in science and where some speak of a “reproducibility crisis”, how can open science help to overcome these issues? The discussion touched upon the following key topics:

**Openness.** The broadness of Open Science was emphasised. Participants recognised that there exist different perspectives on Open Science and openness (public vs. private vs. society) but agreed that these discussions on these differences are healthy and desired. Historically, the different initiatives towards a more open research system have focused on the financial and time barriers providing access as early as possible to publications at no cost for end-users. In addition, the legal barriers were addressed for users and increasingly for authors (maintaining ownership, rights retention). But barriers to access and to the reuse of knowledge are broader than just economic or legal ones. The lack of awareness, skills and technical means are also important limiting factors. Participants agreed that incentives will play a major role towards openness being the default practice (“open as the default”) and can be related to tenure or promotion. Ideally this will all work towards building trust.

**Integrity of research.** Research integrity is always important. Participants expressed concerns that as the geopolitical situation has changed, the issues around trusted research become far more prominent. Peer review must remain the central gatekeeper to ensure quality research is maintained. Opening the whole research process, including peer review, can contribute to increasing trust in research.

**Data quality.** When the United States started incorporating data management processes into proposals, they noted that scientists started to think about data management and sharing earlier on in their research projects. Furthermore, regarding different types of data collected, there should be standards, and researchers, as well as students, should be informed on what the metadata standards are. Lastly, participants agreed that data quality checks would be nice to have, but also argued that checking the quality of data requires funding.

**Rewards and recognition.** Proper management of the data takes a lot of time from the researchers. Participants recognised that giving credits for the management and sharing of data would be helpful. IT support from professionals is needed. However, those professionals are likely to work for the private sector as salaries are much more attractive compared to the academic sector.

**Equality.** With regard to equality, the point was raised that Open Science requires financial investments. There is fear that Open Science will not be available to researchers and institutes in countries that are not able to afford their own infrastructures.

**Global federated research infrastructure.** The aspiration is to have a global federated research data infrastructure. Sharing of viral data during the pandemic has shown that if infrastructure, people, and expertise are available, one can share data, contribute to research and be part of the solution. Such a global federated infrastructure should enable opportunities to work across different sectors, for example where collaborations between public health and research are critical. It seems that there is a need for an elevated discussion about what a global federated infrastructure looks like. Sharing infrastructure needs to be done much more effectively and purposefully.

**Transnational repositories.** With regard to repositories at the national level, participants mentioned that inspiration could be drawn from international initiatives, such as the European Open Science Cloud (EOSC), where research infrastructures came together to address these issues<sup>8</sup>. It is important for the research community engage in these initiatives to increase their visibility, which can help in recognition and alignment of practices. It was mentioned that repositories are an important way (although not the only one) to make publications, data, and other research outputs openly available and FAIR. It is crucial to think about which type of repository is best suited at different levels (field, country, university, etc.) and for different research objects (publications, data, software etc.). In addition, findability and sustainability of the materials are also key. The perfect repository should be user-friendly, connected to other international commons for Open Science and equipped with a standardized quality certification, like for instance a CoreTrustSeal badge. EuroBioImaging is an example of a transnational repository. It is working on making these links and pushing for more incentives for sharing data, tools, and results, aims at populating these tools more, as well as on the implementation and actual use.

**Key takeaways:**

- Research assessment reform is needed and should be coordinated at global level. Negative results too are extremely valuable for scientific research to advance. The evaluation system needs to credit researchers for publishing these results. A coordinated cultural change is needed.
- Participants agreed on the principle as open as possible and as closed as necessary. To decide on the level of openness there needs to be a multilevel system in place. Funders have an important role and can request for clarity on data sharing already in the process of evaluating research proposals.
- Policies that are developed and implemented do not always have the effect that was expected. There is a strong need for research on research itself.
- It is difficult to determine the quality of data, as it is a very diverse research output. Repositories can help in managing sensitive data and are a trust house. Training for researchers on managing (sensitive) data is needed and helps to create awareness.
- Credits and unique identifiers should be provided to promote sharing of research outputs.
- Strengthen the connection with researchers, encourage researchers to use repositories, and find champions that will guide and encourage their communities.
- There is a call for inclusiveness, and early-career researchers should be engaged.

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<sup>8</sup> EOSC is a federation of national and international research infrastructures and e-infrastructure and described as a 'web of FAIR data and services'. [Link](#) (31/05/2023)

#### 4. Quality, ethics, and cultural change

- How can open access, open/FAIR data, open source, open protocols, and other transparent approaches improve quality and ethics in research? How can we initiate a cultural change to make Open Science the default mindset?

The discussion focussed on the following main aspects:

**Value Open Science.** Participants agreed that advancing in Open Science is highly linked to how researchers and research are assessed. Crucial in continuing progress in relation to Open Science is incentivising and rewarding Open Science practices. Research communities remain the central actors to define research excellence. Research funding organisations can help assess research excellence by means of guidelines.

**Cultural change.** The barriers to Open Science practices are not that high, although there can be bias of unequal opportunities to participate in Open Science. In this sense, it was agreed by participants that Open Science operates as an incentive to reward the whole research process and not just the research results.

Participants insisted on the global approach that characterises science, and on the fact that openness is an invitation to quality. Open Science is about giving back science to the researchers and to the society that pays for it.

Cultural change comes with making the quality features of Open Science more visible, acting as incentives for this cultural shift. Moreover, Open Science champions can play an important role in promoting and facilitating cultural change in relation to Open Science.

Another aspect to the cultural change is found in institutional practices; participants suggested gradual introduction of Open Science practices to get the research community on board and make Open Science part of the education system from undergraduate level upwards.

**Training and skills.** Besides incentivising researchers, participants emphasised that it is important to empower researchers by providing the tools and opportunities that they need in terms of training. The researchers do not have sole responsibility for Open Science and there is a strong need for support roles.

Participants stressed the importance of permanent public intervention for training and funding to achieve the goals of Open Science. Furthermore, the need for more education about Open Science was underlined, as well as the need to integrate Open Science in communications and education about ethics and integrity in research.

#### **Key takeaways:**

- There is an understanding that we are all in the same position, facing similar challenges. There is a need for global cooperation on these challenges, specifically on how to define research excellence.
- There is a need for a cultural change, in terms of the evaluation process as well as in the way outputs of research are considered.
- Another aspect to the cultural change is found in institutional practices: open science practices could be brought in on a gradual basis and make open science part of the education system from undergraduate level upwards.
- There is a need for open science champions, to promote open science.
- Researchers need to understand that they do not need to do everything, and there is a strong need for support roles.

- It is useful to develop a social concept on open science. As today open science is more a promise than a practice, we need to show the benefits of practicing open science.
- A new framework for data sharing is needed, including discussion on privacy and how to include it in assessments.
- Permanent public intervention for training and funding to achieve the goals of open science.

## Closing

### Summary and wrap-up by moderators

**Marin Dacos** shared his views on the main conclusions of the breakout sessions and formulated four main take-home messages that emerged from each of the sessions:

#### **Equity and inclusiveness**

- Publication fees produce strong inequities. Bibliodiversity<sup>9</sup> and diamond open access could help reduce these inequities.
- Capacity building is essential. There is a lack of funding to support researchers in preparing their data.
- Policy makers should engage (early-career) researchers when developing Open Science policies.

#### **Policies for open science without borders**

- Infrastructures are key to promote collaboration, where publicly funded infrastructure will play a critical role.
- Policies for reforming research assessments should be aligned to reduce the risks of fragmentation and contradictions between different systems, which could jeopardize international mobility and cooperation.
- Many initiatives have been set up and continue to arise. Now is the time to consolidate, join forces and develop standards.

#### **Openness degrees, reproducibility, and trust**

- A reform of research assessment is needed. Negative results are extremely valuable for scientific research to advance. The evaluation system needs to credit researchers for publishing these results. Hereto, a coordinated cultural change is needed.
- Many think that open data will lead to better quality of research outputs. Though evidence that mandatory open data policies increase error correction is lacking. Openness seems not to be enough.
- With regards to the harmony between openness and knowledge security, a multilevel decision system should decide which knowledge may be shared and how.

#### **Quality, ethics, and cultural change**

- Besides calling for Open Science, we need to value it too.
- Training and skills are lacking and efforts in this direction are needed for science and society.
- To build evidence-based Open Science policies, research on Open Science is needed.

This wrap-up was followed by **Javier Lopez Albacete** who shared his summary of the workshop, general conclusions, and points of discussions:

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<sup>9</sup> This stands for diversity in scholarly communications. [Link](#) (31/05/2023)

- The multilateral dialogue indicated that further discussion on this topic is needed. All essentially agreed on the ambitions, the attitude, and the value of Open Science as a desirable concept, but many challenges are faced when implementing Open Science practices.
- A precondition for advancement of Open Science is to keep building trust and multilateral understanding. Additionally, some boundary conditions are crucial as guiding principles for future progress, including ensuring equity, inclusiveness, and public access.
- Some topics and aspects of Open Science were identified as needing more discussion for successful implementation of Open Science, such as interoperability and sustainability of research infrastructures, development of research assessment systems and incentives that support Open Science, as well as the need for more research to clarify what works and what does not.
- It is important to monitor the progress on Open Science closely and highlight successes and its effectiveness. The added value of Open Science should be demonstrated. In relation to this, international cooperation and discussions are encouraged.

### Closing statement

**Sebastien Chevalier**, Director, Coordination of Higher Education and Research Strategies, French Ministry for Higher Education and Research closed the workshop.

The next workshop on Research Excellence is scheduled for June 1, 2023.

## **ANNEX 1**

### **LIST OF PARTICIPATING COUNTRIES AND STAKEHOLDER ORGANISATIONS**

Albania	Slovak Republic
Algeria	Slovenia
Argentina	South Africa
Armenia	Spain
Australia	Sweden
Austria	Switzerland
Belgium	Tunisia
Brazil	Türkiye
Canada	United Kingdom
Chile	United States of America
China	
Czech Republic	Aurora Universities Network
Denmark	International Science Council
Estonia	European Molecular Biology Laboratory
France	Science Europe
Georgia	The Guild of European Research-Intensive Universities
Germany	UNESCO
Greece	YERUN
Hungary	
Iceland	European Commission
Ireland	
Italy	
Japan	
Jordan	
Latvia	
Lithuania	
Luxembourg	
Malta	
Netherlands	
New Zealand	
Portugal	
Serbia	