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# Invest in Open Infrastructure: Community Response to UNESCO global call for best practices in open science

This response is compiled from [the discussion notes](#) from our community workshop on 8 June 2022.

This document includes the text (pages 1-7) that would go into the response form, but also a [separate discussion summary](#) (page 8 - the end) that would be deposited on Zenodo as a supplementary document to our UNESCO submission.

This is a copy of the [English form for submission](#).

**Yellow highlights** below signal chosen options to single-/multiple-choice questions.

## Part I: Contact Details

1. Name: Emmy Tsang
2. Position: Engagement Lead
3. Name of institution/Affiliation: Invest in Open Infrastructure
4. Country: United States
5. Contact e-mail: emmy@investinopen.org
6. Alternative e-mail:

## Part II: Description of Best Practice in Open Science

1. Title of the best practice:  
Community-sourced best practices for investing in and contributing to open infrastructure
2. Language(s) of the best practice:
  - Arabic
  - Chinese
  - **English**
  - French
  - Russian

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- Spanish
- Multilingual
- Other...

3. Scope of the best practice:

- Individual
- Institutional
- National
- Regional
- International
- Other... applicable across all levels

4. Responsible institution:

- Academia
- Research Institute
- University
- Scientific Organization
- Data Organization/Repository
- Publisher
- Civil society organization
- Library
- Funding agency
- United Nations entity
- Government
- Private institution
- Other... all institutions interested in investing in and contributing to open science infrastructure and services.

5. Area(s) of action covered by the best practice as per the UNESCO Recommendation on Open Science:

- (Multiple choices are possible. to guide your answer, please refer to section IV of the UNESCO Recommendation on Open Science (p. 20) available here)
- Promoting a common understanding of open science, associated benefits and challenges, as well as diverse paths to open science
- Developing an enabling policy environment for open science
- Investing in open science infrastructures and services
- Investing in human resources, training, education, digital literacy and capacity building for open science
- Fostering a culture of open science and aligning incentives for open science
- Promoting innovative approaches for open science at different stages of the scientific process
- Promoting international and multi-stakeholder cooperation in the context of open science and with a view to reducing digital, technological and knowledge

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gaps

6. Which element (s) of open science does the best practice include:

**Scientific Knowledge - (multiple choices are possible)**

- Open Scientific Knowledge
- Open Scientific Publications (Open Access)
- Open Research Data
- Open Educational Resources
- Open Source Software and Source Code
- Open Hardware

**Open Science Infrastructures - (multiple choices are possible)**

- Virtual Open Science Infrastructures
- Physical Open Science Infrastructures

**Open Engagement of Societal Actors - (multiple choices are possible)**

- Crowdfunding
- Crowdsourcing
- Scientific Volunteering
- Citizen and Participatory Science

**Open dialogue with other knowledge systems - (multiple choices are possible)**

- Indigenous Peoples
- Marginalized Scholars
- Local Communities

7. Open science actor(s) implementing the best practice  
(multiple choices are possible)

- Researchers
- Scientists and Scholars
- Leaders at Research Institutions
- Educators
- Academia
- Students and Young Researchers Organizations
- Information Specialists
- Librarians
- Communities
- Indigenous Knowledge Holders
- Civil Society Organizations
- Computer Scientists
- Software Developers
- Coders
- Creatives

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- Innovators
- Engineers
- Citizen Scientists
- Legal Scholars
- Legislators
- Magistrates and Civil Servants
- Publishers
- Editors
- Members of Professional Societies
- Technical Staff
- Research Funders
- Philanthropists
- Policymakers
- Learned Societies
- Practitioners from Professional Fields
- Representative of the Science, Technology and Innovation-related Private Sector
- Other Open science actor(s) implementing the best practice

8. Open science actor(s) benefiting from the best practice:  
(multiple choices are possible)

- Researchers
- Scientists and Scholars
- Leaders at Research Institutions
- Educators
- Academia
- Students and Young Researchers Organizations
- Information Specialists
- Librarians
- Communities
- Indigenous Knowledge Holders
- Civil Society Organizations
- Computer Scientists
- Software Developers
- Coders
- Creatives
- Innovators
- Engineers
- Citizen Scientists
- Legal Scholars
- Legislators
- Magistrates and Civil Servants
- Publishers

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- Editors
- Members of Professional Societies
- Technical Staff
- Research Funders
- Philanthropists
- Policymakers
- Learned Societies
- Practitioners from Professional Fields
- Representative of the Science, Technology and Innovation-related Private Sector

- Other Open science actor(s) benefiting from the best practice  
(multiple choices are possible)

9. Types of collaboration(s) promoted by the best practice:

- Multidisciplinary
- Multistakeholder
- Inter-institutional
- National
- Regional
- International
- Other:

10. Description of the best practice:

Provide a description of the open science best practice, addressing, as much as possible, the following questions: What are the key activities/components of the practice? What problems/issues/challenges does it address? What are the changes that resulted from the practice? How does the practice benefit to the research community and/or broader society? (max 300 words)

As stated in the recommendations, open science infrastructure and services should be owned and governed by the community. This requires investments in community engagement and building, and includes efforts focused on: building contributor pathways; providing attributions, support and rewards for contributors; and cultivating a sense of co-ownership. It is vital that technical, social, and economic barriers to contributions are lowered– this includes welcoming non-technical knowledge.

We've also seen success where funders and institutions invest in the maintenance of open infrastructure, capacity building, and the creation of long-term paid positions specifically dedicated to open science and infrastructure. The sustainability and empowerment of existing communities should be prioritized, allowing them time to make permanent and more profound changes.

Sustainable investment in open infrastructure requires partnerships between public

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and private sectors. These partnerships are often challenging to build as they require an alignment of funders', policymakers', technocrats', and institutions' visions and needs. In engaging with diverse partners, stakeholders should modify language accordingly, in order to be as welcoming and inclusive as possible towards affected populations. Strategic commercial partnerships should be encouraged, as long as specific standards and rules around open market bidding, open-source development, common interest, data ethics, and interoperable tools are provided. Instead of cutting ties with commercial partners, we should influence them towards improved transparency.

Open infrastructure thrives when there's a broader cultural change towards openness. It is therefore crucial for individuals to invest in this change, by recognizing their powers within communities and how this power can be used for change.

11. Replicability/scaling up of the best practice:

(Is it feasible that this practice can be used and/or scaled up in other institutions, countries, regions?)

- Yes
- No

If yes, please provide brief details (max 100 words)

These practices are gathered from multiple open infrastructure services. The community workshop we've run to collect this input is a way to facilitate idea and knowledge exchange between institutions, countries, and regions, thereby allowing the practice to be adapted and used by others.

12. Cost of the best practice (max 50 words)

It is difficult to quantify the exact costs of the practices here, but community- and partnership-building and maintenance rely on human resources, which in turn deserve adequate investment.

13. Evaluation/Assessment/Measure of the impact of the best practice:

What is the preliminary impact of this open science best practice? How was the practice evaluated? What indicators were used to evaluate the impact of the practice? (max 200 words)

We believe that these practices detailed will improve the viability and sustainability of open science infrastructure and services in the short and long term. They will also help build a more resilient, diverse community of contributors to open infrastructure.

The best practices above are community-sourced from a workshop that we ran,

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where we asked participants to reflect on their own experiences contributing to/investing in open infrastructure: what they've enjoyed about and learned from those experiences, and what is lacking. The qualitative evidence we've collected (see [website link for more](#)) represents a way to demonstrate and evaluate the impact of these practices on a broad range of infrastructure services.

14. Website/Link to more information about the practice:  
[Put the link to the Zenodo document below.]