ANNEX

GUIDELINES FOR THE PREPARATION OF THE REPORTS FROM MEMBER STATES ON THE IMPLEMENTATION OF THE 2021 RECOMMENDATION ON OPEN SCIENCE

I. INTRODUCTION

These Guidelines are intended to assist Member States in the preparation of the reports on the implementation of the 2021 Recommendation on Open Science (hereinafter referred to as "the 2021 Recommendation") that was adopted by the 41st session of the General Conference of UNESCO on 23 November 2021.

The 2021 Recommendation proposes seven areas of action: (i) promoting a common understanding of open science, associated benefits and challenges, as well as diverse paths to open science; (ii) developing an enabling policy environment for open science; (iii) investing in open science infrastructures and services; (iv) investing in human resources, training, education, digital literacy and capacity building for open science; (v) fostering a culture of open science and aligning incentives for open science; (vi) promoting innovative approaches for open science at different stages of the scientific process; (vii) promoting international and multi-stakeholder cooperation in the context of open science and with view to reducing digital, technological and knowledge gaps.

For the purpose of the 2021 Recommendation, open science 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. It comprises all scientific disciplines and aspects of scholarly practices, including basic and applied sciences, natural and social sciences and the humanities, and it builds on the following key pillars: open scientific knowledge, open science infrastructures, science communication, open engagement of societal actors and open dialogue with other knowledge systems.

Pursuant to Articles 15 and 16.1 of the Rules of Procedure concerning recommendations to Member States and international conventions covered by the terms of Article IV, paragraph 4, of the UNESCO Constitution, the Director-General of UNESCO has invited Member States by the Circular Letter (CL/4381) to submit the 2021 Recommendation to their competent authorities within a period of one year from the close of the session of the General Conference at which it was adopted, i.e. before 24 November 2022.

Furthermore, under Article VIII of UNESCO's Constitution, Member States are required to submit a report on the action taken upon the conventions and recommendations adopted by the General Conference.

II. WHAT ARE THE AIMS OF THIS CONSULTATION?

This global consultation aims to assist Member States in: (1) mapping policies, mechanisms and actions related to open science and all its key pillars, against the objectives of this Recommendation; (2) collecting and disseminating progress and good practices on open science; (3) identifying challenges and opportunities faced by Member States in the implementation of the Recommendation, so as to identify specific capacity-building needs.

III. HOW TO FILL IN THE QUESTIONNAIRE?

The following questionnaire, which was developed with inputs from UNESCO working group on open science monitoring framework, aims to guide and assist Member States with their reporting on the progress made in the implementation of the 2021 Recommendation. It aims to collect information on the extent to which Member States have integrated the core values and guiding principles of open

science that are defined in the 2021 Recommendation, in their national science, technology and innovation systems. Responses to this questionnaire will be considered as the official national report of each Member State.

Prior to completing the questionnaire, Member States are encouraged to organize the necessary consultations within and outside the concerned ministries and institutions, including with authorities and bodies responsible for science, technology and innovation, and consult relevant actors concerned with open science, including the scientific community, professional associations, civil society, indigenous and traditional knowledge holders, private sector partners and National Commissions for UNESCO.

In the preparation of their reports, Member States are also encouraged to consult the UNESCO Open Science Toolkit and the first edition of the *UNESCO Open Science Outlook* (published December 2023) containing a collection of information and communication materials relevant to the implementation of the 2021 Recommendation on Open Science. These resources are available online at https://www.unesco.org/en/open-science/toolkit and https://unesdoc.unesco.org/ark:/48223/pf0000387324.

Member States are requested to designate a contact person responsible for information sharing and cooperation with UNESCO in relation to reporting on the 2021 Recommendation.

Member States are encouraged to submit the questionnaire (in English or French) in one of the following ways:

(i) Online (preferred): the consolidated questionnaire (one per Member State) can be completed and submitted online.

(ii) Email: the questionnaire can be completed electronically and sent to: openscience@unesco.org

The responses to the questionnaire, if sent by email, should not exceed 15 pages, excluding annexes and is to be submitted to UNESCO in electronic form only (standard .doc, .pdf or .rtf format).

The reports will be made available on UNESCO's website in order to facilitate the exchange of information relating to the promotion and implementation of this Recommendation.

IV. DRAFT QUESTIONNAIRE

A. GENERAL INFORMATION ABOUT THE RESPONDANT:

- Country*:
- Organization(s) or entity(ies) responsible for the preparation of the report*:

  Name:

  Website:

  Email address*:

  Phone number*:

  Please describe the role/mandate of your organization:

- Officially designated contact person(s) who completed this survey:

  Full name*:

  Position*:

Email address*:

- Full Name(s) of designated official(s) certifying the report:
- Brief description of the consultation process established for the preparation of the report:
- Other organization(s) or entity(ies) (including non-governmental) consulted for completing this survey:

  Name of the organization*:

  Website*:

  Email address*

  Sector: ○ Public ○ Private ○ Civil Society ○ Other

B. Questionnaire for Member States' reporting on the implementation of the 2021 Recommendation

1. PROMOTING A COMMON UNDERSTANDING OF OPEN SCIENCE, ASSOCIATED BENEFITS, AND CHALLENGES, AS WELL AS DIVERSE PATHS TO OPEN SCIENCE

1.1 Has the 2021 Recommendation been promoted and/or shared with appropriate ministries and institutions as well as affiliated organizations in your country?

YES / NO

If yes, please indicate which ministries and/or national authorities/entities have been involved in the promotion of the 2021 Recommendation.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

1.2 Is the 2021 Recommendation on Open Science available in the national language(s) of your country?

YES / NO

If yes, which language(s)?

1.3 Have there been awareness raising activities on open science, including all its key elements[i], associated benefits and challenges, organized or foreseen to be organized by the end of 2025 in your country by national authorities or entities? *(ref.: (i) 16.f, 16.g, 16.h)*

YES / NO

If yes, please provide details on the activities organized or foreseen and links as relevant.

1.4 Have specific actions been undertaken or are planned to be undertaken by end of 2025 in your country to incorporate the values and principles of open science[ii], in publicly funded research? *(ref.: (i) 16.a, 16.b, 16.c, 16.d, 16.e, 16.h)*

YES / NO

If yes, please indicate the actions that are taken to incorporate the specific values and principles. For each case, please provide details and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so?

2. DEVELOPING AN ENABLING POLICY ENVIRONMENT FOR OPEN SCIENCE

2.1 Does your country have a national policy[iii], strategy or plan of action on science, technology and innovation (STI)?

YES / NO

If yes

- please attach/upload a machine-readable PDF file of the policy and provide the following information: *Title of the policy, the authority in charge of development of the policy, entities involved and the process of development, year of adoption, year of last update, key areas/sections of the policy, and links to the webpage if available.*
- does it include any of the following open science elements:
  - open access to scientific knowledge
  - open science infrastructure
  - open engagement of societal actors
  - open dialogue with other knowledge systems

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

2.2 In your country, is there a policy, or a set of policies and/or legal framework(s)[iv] at the national level that address open science or any of its key elements in line with the definition, values and principles outlined in the 2021 Recommendation on Open Science? *(ref.: (i) 16.a, 16.b, 16.c, 16.d, 16.e, 16.h)*

YES / PARTLY /NO

If yes or partly, please attach/upload machine-readable PDF file(s) of the policy(ies) and provide the following information for each: *Title of the policy or legal instrument, the authority in charge of development of the policy, entities involved and the process of development, year of adoption, year of last update, key areas/sections of the policy, elements of open science that are addressed, and links to the webpage(s) if available.*

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to develop such policies.

2.3 In your country, are there specific policy instruments[v] that aim to promote open science?

YES/ UNDER DEVELOPMENT/NO

If yes or under development, please provide details and links as relevant, including for each instrument: *Title of the instrument, its objective, the authority in charge, allocated budget, elements of open science included.*

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to develop such policy instruments.

2.4 In your country, is there a national implementation plan, strategy, policy or a roadmap for implementation of open science at the national level in line with the 2021 Recommendation? *(ref.: (ii) 17.a, 17.b, 17.c, 17.f, 17.h)*

YES / UNDER DEVELOPMENT /NO

If yes or under development, please provide details and links as relevant, including the name of ministries and national authorities/entities, as well as affiliated organizations that are involved in the development and implementation of the plan, strategy or the roadmap.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to develop such policy instruments.

2.5 In your country, are there policies and/or strategies that promote open science in line with the 2021 Recommendation at **institutional** level, including in the context of research-performing institutions, universities, scientific unions and associations and learned societies? *(ref.: (ii) 17.d, 17.e, 17.g)*

YES /UNDER DEVELOPMENT/ NO

If yes, please provide more information, including the number of policies, name of the institute(s) that has/have developed the policy(s) and elements of open science**Error! Bookmark not defined.** included in the policy (please consider policies and strategies addressing all elements of open science, including citizen and participatory science, or co-production of knowledge with multiple actors).

2.6 In your country, are there specific funding mechanisms[vi] for open science at the national level? *(ref.: (ii) 17.j, (iii) 18.j, (iv) 19.c)*

YES / UNDER DEVELOPMENT / NO

If yes or under development, please provide details and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to develop such funding mechanisms.

2.7 In your country, have open science practices[vii] been integrated in existing research funding mechanisms?

YES /NO

If yes, please provide details and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

2.8 Have efforts been made or are foreseen to be undertaken by end of 2025 in your country to foster equitable public-private partnerships on open science in line with the 2021 Recommendation? *(ref.: (ii) 17.i)*

YES / NO

If yes, please provide details and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

2.9 Is there a national monitoring framework for open science in your country? Or are there specific indicators on open science included in the national monitoring and evaluation framework for STI policy *(ref.: (ii) 17.j, 23.c)*

YES / UNDER DEVELOPMENT / NO

If yes or under development, please provide details and links as relevant.

3. INVESTING IN OPEN SCIENCE INFRASTRUCTURES AND SERVICES

3.1 What is the latest official data for your country's percentage of national gross domestic product (GDP) dedicated to research and development expenditure? Please also indicate the year of publication of this data, and to which year(s) it refers. *(ref.: (iii) 18.a)*

3.2 What is the latest official data for the percentage of your country's population that have access to reliable internet and bandwidth? Please also indicate the year of publication of this data, and to which year(s) it refers. *(ref.: (iii) 18.b)*

3.3 Are there national research and education networks (NRENs)[viii] active in the country? *(ref.: (iii) 18.c)*

YES / NO

If yes, please provide more information and links as relevant, and indicate to which open science actors in your country those networks are accessible.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to establish them.

3.4 Are there national or institutional open science infrastructures[ix] in your country? *(ref.: (iii) 18.d, 18.e, 18.k, 18.l, 18.m)*

YES / UNDER DEVELOPMENT / NO

If yes or under development, please indicate which type(s) of infrastructure:

- federated information technology infrastructure for open science, including high-performance computing, cloud computing and data storage.
- community managed infrastructures, protocols and standards, for example those that support bibliodiversity and engagement with society
- platforms for exchanges and co-creation of knowledge between scientists and society
- community-based monitoring and information systems to complement national, regional and global data and information systems.

For each infrastructure, please provide links as relevant and more information with regard to their compliance with the 2021 Recommendation on Open Science in terms of inclusivity, accessibility, interoperability, community governance, FAIR (Findable, Accessible, Interoperable, and Reusable) and CARE (Collective Benefit, Authority to Control, Responsibility and Ethics) principles. Please indicate if the infrastructure is non-commercial.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

3.5 Does your country host or fund any federated regional or international information technology infrastructure for open science? *(ref.: (iii) 18.e, 18.f)*

YES / NO

If yes, please provide links as relevant and more information, including the name of the infrastructure, date of establishment, language, target groups and beneficiaries, governance/community agreements, scope (e.g. research areas, elements of open science, stage of research, accessibility to all the relevant users in the region or internationally).

If no, are the existing open science infrastructures at regional and international levels accessible to all the relevant open science actors from your country?

YES / NO

3.6 Is your country involved in any North-South, North-South-South and South-South collaborations to optimize infrastructure use and joint strategies for shared, multinational, regional and national open science platforms? *(ref.: (iii) 18.g)*

YES / NO

If yes, please provide links as relevant and more information, including the name of the infrastructure, date of establishment, language, target groups and beneficiaries, governance/community agreements, scope (e.g. research areas, elements of open sciencei, stage of research, accessibility to all the relevant users in the region or internationally).

4. INVESTING IN HUMAN RESOURCES, TRAINING, EDUCATION, DIGITAL LITERACY AND CAPACITY BUILDING FOR OPEN SCIENCE

4.1 Has systematic capacity building on open science taken place in higher education and/or research performing institutions in your country? *(ref.: (iv) 19.a, 19.c)*

YES / NO

If yes, please indicate if those capacity building initiatives are formal or informal and provide more information and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

4.2 Have capacity building programmes for policy makers on how to integrate core values and principles of open science in STI policies and strategies taken place in your country?

YES / NO

If yes, please provide more information and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

4.3 Has a framework of open science competencies been incorporated into higher education research skills curricula in your country, or is it foreseen by the end of 2025? *(ref.: (iv) 19.b)*

YES / NO

If yes, please provide more information and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

4.4 Are open educational resources [x] as defined in the 2019 Recommendation on Open Educational Resources, used as an instrument for open science capacity building in your country in line with the 2019 Recommendation mentioned above? *(ref.: (iv) 19.d)*

YES/ PARTLY/ NO

4.5 Have there been any initiatives in your country to support science communication in line with open science value and principles with a view to the dissemination of scientific knowledge to researchers of different disciplines, decision-makers and the public at large? *(ref.: (iv) 19.e)*

YES / NO

If yes, please provide more information and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

5. FOSTERING A CULTURE OF OPEN SCIENCE AND ALIGNING INCENTIVES FOR OPEN SCIENCE

5.1 Have there been any initiatives at the national or institutional level, e.g. by universities and/or research performing institutions, to review the existing research assessment and evaluation processes in order to align them with open science principles and values or are they foreseen by the end of 2025? *(ref.: (v) 20.b, 20c, 20i)*

YES / NO

If yes, please provide more information and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

5.2 Have specific clauses that recognize open science practices, including sharing, collaborating and engaging with other researchers and societal actors beyond the scientific community, or dialogue with other knowledge systems, been incorporated in the career evaluation and progression systems or are foreseen by the end of 2025? *(ref.: (v) 20.a, 20.c, 20.d)*

YES / NO

If yes, please provide details and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

5.3 Have there been any initiatives in your country to recognize and reward open science practices or are they foreseen by the end of 2025? *(ref.: (v) 20.a, 20.b, 20.c, 20.e, 20.f, 20.g, 20h)*

YES / NO

If yes, for each initiative, please provide more information, including on the stakeholders[xi] that are involved or lead the initiative, and links as relevant.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

5.4 Have there been any unintended negative consequences[xii] of open science practices reported in your country? (ref.: (v) 20)

YES / NO

If yes, please provide more information and specify if there is a strategy or plan to preventing and mitigating such consequences.

6. PROMOTING INNOVATIVE APPROACHES FOR OPEN SCIENCE AT DIFFERENT STAGES OF THE SCIENTIFIC PROCESS

6.1 Have there been any initiatives at the national or institutional level that promote innovative, participatory methodological or procedural changes at different stages of the research cycle to increase the openness of the entire scientific process? *(ref.: (vi) 21)*

YES, at the national level.

YES, at the institutional level.

YES, at both national and institutional levels.

NO

If yes, please indicate which of the recommended actions they address and provide more information and links as relevant:

- promotion of pre-prints
- exploration of open peer-review practices
- valuing and sharing of negative scientific results and associated data
- participatory methods that value inputs from societal actors, e.g. citizen science, crowdsourcing scientific projects
- development of participatory strategies for identifying the needs of marginalized communities and highlighting socially relevant issues to be incorporated into research agendas.
- promoting open innovation practices.
- Others (with a box to add text)

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

7. PROMOTING INTERNATIONAL AND MULTI-STAKEHOLDER COOPERATION IN THE CONTEXT OF OPEN SCIENCE AND WITH VIEW TO REDUCING DIGITAL, TECHNOLOGICAL AND KNOWLEDGE GAPS

7.1 How is your country promoting and facilitating international scientific collaborations on open science as outlined in the 2021 Recommendation on Open Science? *(ref.: (vii) 22.a)*

7.2 Does your country have a strategy or a plan for stimulating cross-border multi-stakeholder collaboration on open science, including with regards to exchange of best practices, capacity building and metrics for open science? *(ref.: (vii) 22.b, 22.e, 22.f)*

YES / NO

If yes, please provide links as relevant and more information.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

7.3 Is your country involved in any discussion on the establishment of regional and international funding mechanisms for open science? (ref.: https://unesdoc.unesco.org/ark:/48223/pf0000379949/PDF/379949eng.pdf.multi.nameddest=20/p.nameddest=20/.page=21)

YES / NO

If yes, please provide links as relevant and more information.

If no, please, if possible, briefly explain the reason and the difficulties or obstacles in this area and indicate if there are plans to do so.

8. GENERAL CONSIDERATIONS

8.1 Are there any specific external causes that may impede the implementation of the 2021 UNESCO Recommendation on Open Science in your country?

YES/NO

If yes, please provide more information.

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[i] Please refer to the elements of open science defined in the 2021 Recommendation, namely : open scientific knowledge (including open access to scientific publications, research data, open educational resources, open-source software and code, open hardware), open science infrastructures, open engagement of societal actors and open dialogue with other knowledge systems.

[ii] The 2021 Recommendation outlines a set of shared values of open science stemming from the rights-based, ethical, epistemological, economic, legal, political, social, multi-stakeholder and technological implications of opening science to society and broadening the principles of openness to the whole cycle of scientific research. It also provides a set of guiding principles, as a framework for enabling conditions and practices, which uphold the values of open science and can realize the ideals of open science.
Please see the values of open science, namely quality and integrity, collective benefit, equity and fairness, and diversity and inclusiveness.
Please see the guiding principles for open science ,namely transparency, scrutiny, critique and reproducibility; equality of opportunities; responsibility, respect and accountability; collaboration, participation and inclusion; flexibility and sustainability.

[iii] National STI policy is most commonly a governmental document developed by governing bodies leading the STI policy design and implementation in a given country, which formulates objectives and guides actions and decision-making processes in the area of STI on the national level.

[iv] These can include specific national policies, sets of guidelines, rules, regulations, laws, principles, or directions to govern open science practices.

[v] Policy instruments include programmes, methods and mechanisms of technical and operational nature, required to solve the issues set by the policy, with focus on the target beneficiaries, resources, indicators, and set of goals for delivering products (short term), results (medium-term), and impacts (long term).

[vi] A funding mechanism refers to a policy instrument or process through which financial resources are allocated or provided for a specific purpose. Some examples are block funding, research grants, support for technological poles and centres of excellence, support for science parks and innovation centres, Infrastructure grants (for research facilities, labs, instruments), communication and outreach funds, innovation funds, loans and tax credits scholarships, studentships, fellowships, trust funds, sectoral funds.

[vii] Examples can include sharing open scientific knowledge (publications, research data, educational resources, software and hardware) with other scientists and with the public, sharing or using open infrastructures, collaboration with other researchers, with national and local societal actors such as policy makers, or sectors such as industry, agriculture, and health, and collaboration and open dialogue with indigenous peoples and local communities.

[viii] A national research and education network (NREN) is a specialised internet service provider dedicated to supporting the needs of the research and education communities within a country.

[ix] Some examples of open science infrastructures include major shared scientific equipment or sets of instruments, open computational and data manipulation service infrastructures that enable collaborative and multidisciplinary data analysis, open science platforms and repositories for publications, research data and source codes, archives, open bibliometrics and scientometrics systems for assessing and analysing scientific domains, open laboratories, software forges and virtual research environments, open innovation testbeds, incubators, science museums, science parks and infrastructure for non-digital materials.

[x] Open Educational Resources are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others (2019 Recommendation on Open Educational Resources)

[xi] For example, research funders, universities, research institutions, learned societies, scientific publishers and journal editorial boards.

[xii] For example, predatory behaviours, data migration, exploitation and privatization of research data, increased costs for scientists and high article processing charges associated with certain business models in scientific publishing that may be causes of inequality for the scientific communities around the world and, in some cases, the loss of intellectual property and knowledge.