First Draft of UNESCO Recommendation on Open Science
COMMENTS AND SUGGESTED EDITS

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PREAMBLE

Add "**cultural**" as follows:

> "Recognizing the urgency of addressing complex and interconnected environmental, social, **cultural** and economic challenges"

Add "**fact- and evidence-based**" and "**cultural**"as follows:

> "Acknowledging the vital importance of science, technology and innovation to respond to these challenges by providing **fact- and evidence-based** solutions to satisfy human needs (...) foster sustainable social**, cultural** and economic development"

Replace "bridge" with "**overcome**" as follows:

> "to **overcome** the digital divide and to develop knowledge societies;"

Replace "knowledge-" with "**evidence-**" as follows:

> "enhancing scientific collaboration and science- and **evidence-**based decision making to respond to global emergencies"

Add the following sentence after "making to respond to global emergencies and increase the resilience of societies;":

> "**Acknowledging the urgent need to address the spread of fabricated information through social media and other outlet;**"

Rephrase the following:
"Committed to leaving no one behind with regard to access to science and benefits from scientific progress by ensuring that, for example, when a safe and effective vaccine or treatment for COVID-19 is developed, it is produced rapidly on scale and the data, scientific knowledge and methods needed to produce it are openly available for all countries"
AS FOLLOWS:

> "Committed to leaving no one behind with regard to access to science and **to enjoy the** benefits from scientific progress by ensuring that **any scientific development and**

discovery of strategic interest for humankind, e.g. a safe and effective vaccine or treatment for COVID-19, can be reproduced rapidly on scale and all the relevant data, scientific knowledge and methods are openly available to all;"

Add "as well as those contained in the International Covenant on Economic, Social and Cultural Rights;" as follows:

"Affirming the principles of the Universal Declaration of Human Rights, which state that all people have the right to freely to participate in the cultural life of the community, to enjoy the arts, and to share in scientific advancement and its benefits (Article 27) **as well as those contained in the International Covenant on Economic, Social and Cultural Rights;**"

Add **"improve"** and **"by providing instruments apt to meet"** as follows:

"Recognizing that Open Science originated as a movement to **improve** scientific practice **by providing instruments apt to meet** the changes, challenges, opportunities and risks of the 21st century digital era and to increase the societal impact of science in response to the growing and complex global issues facing humanity;

Rephrase the following:
Further considering that the collaborative and inclusive characteristics of Open Science allow new social actors to be actively involved in scientific production, democratizing knowledge, addressing existing systemic inequalities and enclosures of wealth, knowledge and power and guiding scientific work towards solving problems of social importance;
AS FOLLOWS:

"Further considering that the collaborative and inclusive characteristics of Open Science **will allow** new social actors **active involvement** in scientific production, democratizing knowledge, addressing existing systemic inequalities and enclosures of wealth, knowledge and power and guiding scientific work towards solving problems of **local and global** social importance;"

Rephrase the following:
Acknowledging that greater access to scientific inputs and outputs can improve the effectiveness and productivity of the scientific systems by reducing duplication costs in collecting, creating, transferring and reusing data and scientific material, allowing more research from the same data, and increasing the social impact of science by multiplying opportunities for local, national, regional and global participation in the research process, and opportunities for wider circulation of scientific findings;
AS FOLLOWS:

"Acknowledging that greater access to scientific inputs and outputs can improve the effectiveness and productivity of the scientific systems by reducing duplication costs in collecting, creating, transferring**, reusing** data and scientific material, allowing more research from the same data**, increasing** the **capacity to assess and evaluate the** social impact of science by multiplying opportunities for

local, national, regional and global participation in the research process, and opportunities for wider circulation of scientific findings;"

Add "**different types of**" and "**areas and**" as follows:

"Considering that Open Science should not only foster enhanced sharing of scientific knowledge but also promote inclusion of scholarly knowledge from marginalized groups (such as women, **different types of** minorities, Indigenous scholars, non-Anglophone scholars, scholars from less-advantaged **areas and** countries) and contribute to reducing inequalities in access to scientific development, infrastructures and capabilities among different countries and regions;"

Following the second "*Considering*" (page 3), add:

"***Cognizant* that Open Science alone may not be sufficient to bridge the gap between societies with different socio-economic advantages, and that additional active measures will be needed to ensure that the shared scientific knowledge will be allowed to flourish in all countries;**"

Add "**ir**" as follows:

"3. Also recommends that Member States bring the Recommendation to the attention of the**ir** authorities"

I. AIM AND OBJECTIVES OF THE RECOMMENDATION

1. Replace "regardless of" with "**overcoming**" and add "**language"** as follows:
   "Universal access to scientific knowledge, **overcoming language,** geography.."

2. Replace "all" with "**both inputs and**" as follows:
   "providing access to **both inputs and** outputs of research"

3. Replace "and" with "**as well as"** and add "**known and"** as follows:
   "national Open Science policies **as well as** legal frameworks need to be developed by all nations to ensure that scientific knowledge, data and expertise are universally and openly accessible and their benefits universally and equitably **known and** shared"

4. Replace "developing" with "l**ow and medium income**" and add ", **linguistic**" as follows:
   "other Open Science actors in **low and medium income** countries, and contributes to reducing the digital, technological**, linguistic** and knowledge divides"

5. Add "**societal,**" as follows:
   "..Open Science transition at individual, **societal,** institutional, national, regional and international levels."

6. Modify as follows (**changes in bold**):

"(i) promoting a common understanding of Open Science and **foster the** diverse paths to **it**;
(ii) developing an**d** enabling **a** policy environment for Open Science **that also takes into consideration how the private sector can contribute and benefit from it;**
(iii) **prospecting investments in devoted infrastructures and capacity building for** Open Science;
(iv) **enhancing incentives for embracing Open Science by aligning and updating the scientific reward system;**
(v) **promoting the** transform**ation of** scientific culture **towards** Open Science;
(vi) promoting innovative approaches for Open Science at different stages of the scientific process;
(vii)   promoting international **and cross-disciplinary** cooperation on Open Science.

I.   DEFINITION OF OPEN SCIENCE

7.   Replace "**objective**" with "**rational**" as follows:
"..by means of the **rational** study of observed phenomena.."

8.   Add "**at all stages**" as follows:
"..sharing of information **at all stages** for the benefits.."

9. Eliminate "and unrestricted use of", add "**Depending on the specific Open Access license chosen by the author(s)**", add "**in general**", replace "make" with "**likewise produce**", add a comma "**,**", eliminate "academic", add "**any**", add "**t-for-**", add "**protecting and promoting the**", replace "that seeks to enable" with "**through ensuring**", add "**of open science material produced around the world**", add "**of open science material produced around the world**", as follows:
"Open Access: Open access generally involves users being able to gain full and immediate access to scientific outputs including scientific publications, data, software, source code and protocols, produced in all parts of the world, free of charge to the user and re-usable. **Depending on the specific Open Access license chosen by the author(s),** users are **in general** granted free, irrevocable, worldwide rights to access, copy, retain, use, distribute, transmit and display the work publicly and to **likewise produce** and distribute derivative works, in any medium for any responsible purpose. In the case of scientific publications, the publication and all related scientific outputs (e.g. original scientific research results, raw data and metadata, software,   including source code, source materials, digital representations of pictorial and graphical materials and scholarly multimedia material), should be deposited, upon publication, in at least one online repository, using suitable technical standards, that is supported and maintained by an institution, scholarly society, government agency, or **any** other well-established not-for-profit organization devoted to protecting and promoting the common good **through**

ensuring open access, unrestricted distribution, interoperability, and long-term archiving **of open science material produced around the world."**

Replace "only, at most, to the good practice of" with "**to**", add "of the original source", add "**,**", "**both**" as follows:

"(ii) Open Data: data that can be freely used, reused and redistributed by anyone, subject **to** acknowledgement, attribution**,** and citation **of the original source**. To ensure the openness of data, it is necessary that data and databases, as appropriate, are clearly described as 'in the public domain', assigned a public domain waiver, or an open license. Data should be available in **both** a human- and …"

Add "**Free Software implies the users' freedom to run, copy, distribute, study, change and improve the software free of charge;**" replace "upon request" with "**through publicly accessible repositories**", add "repaired", add "free software and" as follows:

"(iii) **Free Software implies the users' freedom to run, copy, distribute, study, change and improve the software free of charge;** Open Source/Software and Open Hardware: open (...) The source code must be included in the software release or made available **through publicly accessible repositories** and the chosen (...) created**, repaired** and distributed by anyone (...) In the case of **free software and** both.."

Add "and **physical**", add "**, including biorepositories,**", replace "n" with "**t-for-**", replace "all public" with "**anybody**" as follows:

"(iv) Open Science Infrastructures: digital **and physical** infrastructures that (...). Open Science platforms and repositories**, including biorepositories,** are (...) Open Science infrastructures should be no**t-for-**profit and they should guarantee permanent and unrestricted access to **anybody**"

Replace "in" with "**at**" as follows:

"(v) (...)whole research process and insights **at** every stage."

Add "**(or copyleft)**" as follows:

"(vi) (...) an open license **(or copyleft)**,"

Add "**trans-national**", eliminate "**and**", add "**, and traditions**" as follows:

"(vii) In the perspective of developing a collective **trans-national** intelligence (...) values, world-views**, and traditions** of policymakers.."

Eliminate ", respect for knowledge sovereignty and governance,", add "language", add "To guarantee such rights, Indigenous peoples and local communities must be thoroughly informed, in their own language, about the possible uses and distribution of their knowledge including the

direct and indirect beneficiaries being them public and/or private organizations, collective and individual entities. Changes on uses and beneficiaries of knowledge should be clarified in written agreements; Indigenous people and local communities are recognized the right to retrieve from the agreements at any time." as follows:

> "(viii) (...) norms and standards and the recognition (...) **Openness to all Scholarly Knowledge and Inquiry** in line with principles of non-discrimination established by international human rights law, including income, gender, age, race, **language,** ethnicity, migratory status, disability, and geographic location. **To guarantee such rights, Indigenous peoples and local communities must be thoroughly informed, in their own language, about the possible uses and distribution of their knowledge including the direct and indirect beneficiaries being them public and/or private organizations, collective and individual entities. Changes on uses and beneficiaries of knowledge should be clarified in written agreements; Indigenous people and local communities are recognized the right to retrieve from the agreements at any time.**"

10. Add "**serious threats to**" as follows:
> "Proportionate access restrictions are justifiable on the basis of **serious threats to** national security.."

11. Replace "robustly described" with "thoroughly documented" as follows:

> "(i) access to **thoroughly documented** data"

Replace "and the reuse and combination of data and software, including source code, and" with "**, data and software (including source code), which can be reused, improved and expanded**," add "**and private**" as follows:

> "(ii) maximizing access to scientific knowledge, **data and software (including source code), which can be reused, improved and expanded**, thereby (...) good achieved through public **and private** investment"

12. Add "**career stage**", add "**cultural or**", replace "at the center of Open Science activities;" with "individually responsible to adhere to Open Science" as follows:

> "(i) Researchers, regardless of their nationality, ethnicity, gender, discipline, career stage and cultural or socio-economic background, who are individually responsible to adhere to Open Science;"

Add "**Senior researcher, Group**", add "**, Directors, Board Members, Members of hiring commissions and in general anyone in higher positions**" as follows:

> "(ii) **Senior researcher, Group** Leaders, Directors, **Board Members, Members of hiring commissions and in general anyone in higher positions** at research institutions.."

Add "scientific or" as follows:

> "(iii) members of **scientific** or professional societies.."

Add "**and staff of international scientific journals**" as follows:

> "(vii) Publishers, editors **and staff of international scientific journals** and leaders"

Add "**and consider the contributions to Open Science as relevant factors when evaluating projects for funding assignment;**" as follows:

> "(ix) Research funders who provide the necessary resources for the broad range of Open Science practices **and consider the contributions to Open Science as relevant factors when evaluating projects for funding assignment;**"

Add "**Communication experts, influencers, users**" as follows:

> "(xi) **Communication experts, influencers, u**sers.."

14. Add "**in principles**" and "**respecting the ownership options set by those involved in the production of open science**" as follows:

> "The open approach does not **in principle** contradict (...) tangible economic benefits **respecting the ownership options set by those involved in the production of open science**."

III. OPEN SCIENCE CORE VALUES AND GUIDING PRINCIPLES

15. Add "**participation and**" as follows:

> "the principles of **participation and** openness"

Eliminate "and", add "**and least developed**", add "**, language or**", as follows:

> "ii) "developed, and developing **and least developed** countries (...) ethnicity, language or socio-economic circumstances;"

Add "**, promoting scientific exchange**" as follows:

> "sources of knowledge, **promoting scientific exchange** and.."

16. Replace "reality" with "**observable phenomena**" and "skepticism" with "**fallibilism**" as follows:

> (a) "..tested against **observable phenomena**, logic and the scrutiny of scientific peers. It is important to reaffirm, for a globally interdependent world, with new technologies, the epistemological **fallibilism**, which is.."

Add "**language**" and "**cultural and socio-economic background**" as follows:

(b) "Equal opportunities and access: all researchers and societal actors regardless of country of origin, gender, **language,** field of research, funding basis, **cultural and socio-economic background** or career stage.."

Add "**, groups**", replace "n" with "**t-for-**" as follows:

"(f) less privileged institutions**, groups** and countries. Open Science infrastructures should be no**t-for-**profit.."

IV. AREAS OF ACTION

Replace "extraction" with "**involve exploitation**", replace "by technologically and economically more advanced countries" with "**to the detriment of technologically and economically less advanced countries**" as follows:

"(b) Open Science are shared and reciprocal, and do not **involve exploitation** (...) data and knowledge **to the detriment of technologically and economically less advanced countries;"**

Replace "Encouraging" with "**Demanding**", replace "within publicly funded research practices with "**in research projects receiving public funding to the extent allowed by the currently available Open Science infrastructures;**" as follows:

"(c) **Demanding** Open Science practices **in research projects receiving public funding to the extent allowed by the currently available Open Science infrastructures;**"

Add "**Reaching out to and**" as follows:

"(f) **Reaching out to and e**ngaging the private sector in the discussion about the ways in which.."

19. Eliminate "s", as follows:

"institutional and national level"

Replace "Developing" with "**Develop**", eliminate "ing" as follows:

(a) "Develop and implement national"

Replace "Ensuring" with "**Ensure**", eliminate "to", add "**, including the promotion of adequate reward systems for researchers adhering to Open Science practices;**", as follows:

(b) "Ensur**e** that public research-performing institutions, particularly those in receipt of public funds, to implement policies and strategies for Open Science**, including the promotion of adequate reward systems for researchers adhering to Open Science practices;**"

Replace "Promoting" with "**Promote**", eliminate "**,**", as follows:

Replace "Including" with "**Include**" as follows:

(f) "Include citizen and participatory"

Eliminate "ing" and "ing", as follows:

(g) "Design models that allow co-production of knowledge with heterogeneous actors and establish guidelines"

Eliminate "ing" as follows:

(h) "Support the development"

Eliminate "ing", replace "engaging" with "engage", add "**or corporations**", as follows:

(i) Foster equitable public-private partnerships for Open Science and engage the private sector (...) part of any commercial organizations **or corporations**;

Eliminate "ing" and "ing", as follows:

(j) "Design and implement funding and investment"

20. Add "**The establishing a dedicated international fund to support low and middle income countries in meeting the above mentioned suggested target;**" as follows:

(a)   National science technology and innovation systems, with at least 1% of national gross domestic product (GDP) dedicated to research and development expenditure.
   (i)The establishing a dedicated international fund to support low and middle income countries in meeting the above mentioned suggested target;

Add "**national**" and "**, also with the private sector,**" as follows:

(c) "National research and education networks (NRENs) and their functionality, encouraging **national,** regional and international collaboration**, also with the private sector,** to ensure.."

Add "**computational capacity**,", and "**and access to them. It is crucial to assess the degree of alignment of existing digital infrastructure with the computing, storage and transmission needs of researchers within and across universities.**" as follows:

(d) Computing   facilities, **computational capacity,** and digital public infrastructure supporting Open Science in order to ensure the long-term preservation, stewardship, and community control of research products **and access to them. It is crucial to assess the degree of alignment of existing digital infrastructure with the computing, storage and transmission needs of researchers within and across universities.**

Add "**long-term**" and "**access by and**" as follows:

"(e) high performance computing and long-term data storage where needed, and robust, open and community managed infrastructures, protocols and standards to support biblio diversity and **access by, and** engagement with, society."

Add "**(also in different languages)**" as follows:

(h) "analyzing linked articles **(also in different languages)** and data"

Add "**and repositories**" as follows:

(j) "platforms **and repositories** for exchanges"

21. Add "**, awareness raising, outreach**" and "**linguistic**" as follows:

"Open Science requires investment in capacity building**, awareness raising, outreach** and human capital. (...) gender, **linguistic,** geographical and.."

Add "**, awareness raising, outreach**" as follows:

(a) "Providing systematic and continuous capacity building**, awareness raising, outreach** on Open Science concepts,"

Change 21 (b) as follows:

(b) "Enabling Open Science also requires advanced and professional data stewards who manage and curate data and ensure that the data are FAIR and looked after by trusted institutions or services; **Investing in and promoting advanced education and the professionalization of roles in data science and data stewardship. To take advantage of the opportunities offered by Open Science, research projects, research institutions and civil society initiatives need to call on advanced data science skills including analysis, statistics, machine learning (ML) / artificial intelligence (AI), visualization and the ability to write code and use algorithms with scientific and ethical responsibility**."

22. Replace "award" with "**reward**", replace "perquisite" with "**prerequisite**", replace "propriety" with "**property**" as follows:

"career evaluation and **reward** systems (...) Open Science practices is a **prerequisite** for transition (...) loss of intellectual **property**"

Add "**both public and private,**" as follows:

(a) Combining efforts of many different actors, including research funders, **both public and private,** universities,

Add "**individual, cultural and socio-economic**" as follows:

(b) "to understanding and solving **individual, cultural and socio-economic** problems."

24. Add "**both public and private,**" as follows:

"among all relevant actors, **both public and private,** whether.."

Add "**language**" as follows:

(b) "geography, gender, **language,** ethnicity"

Add "**through Open Science Champions,**" as follows:

(e) "and adoption of a set of OpenScience Goals, **through Open Science Champions,**"

25. Add "**, that should not exclude the private sector**" as follows:

"qualitative approaches, as appropriate**, that should not exclude the private sector**."

Add "**design and**", eliminate "ing" as follows:

(a) "**design and** deploy appropriate research "

Eliminate "ing" and "ing", add "**e**", as follows:

"(b) collect and disseminat**e** progress,"

Eliminate "ing", add "participation" as follows:

(c) "develop strategies (...) increased **participation,** transparency, and accountability"

Modify 25(d) as follows:

(d) design and deploy mechanisms to ensure the protection and promotion of human rights at any stage of Open Science,with particular attention to gender, language, ethnicity or socio-economic distribution of the benefits of Open Science.