European Commission

Opinion paper on Monitoring Open Science

By the EOSC Steering Board expert group (E03756)

Independent
Expert
Report

Research and Innovation

Opinion paper on Monitoring Open Science

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EUROPEAN COMMISSION

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By the EOSC Steering Board expert group (E03756)

2022 Directorate-General for Research and Innovation EN

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OPINION PAPER BY THE EOSC STEERING BOARD EXPERT GROUP (E03756) ON MONITORING OPEN SCIENCE

Version 1.2 updated 2022-10-24[1]

The EOSC Steering Board expert group [2]*(EOSC-SB) has initiated an overarching analysis of the main disruptive concepts and practices connected to the construction and future operation of the EOSC.* The foreseen benefits of EOSC for European research and innovation require transformative practices in several domains covering from FAIR-by-design data collection technologies to FAIR data and service exploitation skills. The Specific issues were chosen by the Steering Board based on the perceived urgency/priority. Those are addressed individually in Opinion Papers drafted by the Policy sub-group, elaborated by the board, and communicated at tripartite level together with the Statement 'EOSC: the Transverse European Data Space for Science, Research and Innovation'*[3] *to become a living reference for the definition of EOSC policies at European, national, and institutional level.*

1. The purpose of monitoring policies and investments of relevance to Open Science is to support and accelerate the deployment of Open Science practices in Europe

The Competitiveness Council of November 2021[4] placed the development of Open Science and the European Open Science Cloud (EOSC) as part of the European Research Area (ERA) Policy Agenda for 2022–2024. For the ERA priority on deepening a truly functioning internal market for knowledge the first policy action is to 'enable the open sharing of knowledge and reuse of research outputs, including through the development of the EOSC'.[5] This policy action targets three outcomes:

- Deploy Open Science principles and identify Open Science best practices;

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1 Contact point fort this paper by the EOSC Steering Board Expert Group is RTD-EOSC@ec.europa.eu

2 Register of Commission expert groups and other similar entities (europa.eu)

3 EOSC: the Transverse European Data Space for Science, Research and Innovation – STATEMENT, https://doi.org/10.2777/140927

4 https://op.europa.eu/en/publication-detail/-/publication/1a0df8ff-5313-11ec-91ac-01aa75ed71a1/language-en/format-PDF/source-265970827

5 https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_era-policy-agenda-2021.pdf

- Deploy the core components and services of EOSC and federate existing data infrastructures in Europe; and

- Establish a monitoring mechanism to collect data and benchmark investments, policies, digital research outputs, open science skills and infrastructure capacities related to EOSC.

The EOSC Steering Board expert group (EOSC-SB) is committed to support coordination of and synergies with European and national policies and investments in EOSC and to help monitoring the overall EOSC strategic development and implementation.[6] In line with the third outcome above, the Board is monitoring activities on international, national/regional, and institutional level, including to provide advice on developing and implementing policies, and monitoring the benefits of Member States (MS) and the countries associated to the Horizon Europe Framework Programme (AC) policies to the EOSC. Reaching this targeted outcome requires a significant amount of work from all parties involved including the MS/AC, and the wider research community.

The EOSC Strategic Research and Innovation Agend)a[7] adopted in 2021 and its Multiannual Roadmap have defined the general framework for future research, development, and innovation activities in relation to the EOSC. The general objectives are to (i) ensure that Open Science practices and skills are rewarded and taught, becoming the 'new normal', (ii) enable the definition of standards and the development of tools and services, to allow researchers to find, access, reuse, and combine results, and (iii) establish a sustainable and federated infrastructure enabling open sharing of scientific results. In this context, the EOSC tripartite Governance[8] has concluded in its first main event (December 2021) on the urgency to deploy a single joint capacity[9] to monitor the uptake of Open Science and to collect data on the contributions to the EOSC ecosystem. Such a monitoring system should cover aspects relevant to the contributions by the three parties representing the three levels of EOSC implementation: European, national, and institutional. It shall provide the baselines, trends, and best practices to showcase and support the expansion of the EOSC ecosystem including how the uptake of Open Science practices is being rewarded in Europe. The following objectives and recommendations target the priorities for the short term (2022–2024). Medium (2025–2027) and longer (2028–2030) term objectives and recommendations will be addressed by the EOSC-SB later.

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6 https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?do=groupDetail.groupDetail&groupID=3756&NewSearch=1&NewSearch=1

7 https://www.eosc.eu/sria

8 https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science/european-open-science-cloud-eosc_en#eosc-tripartite-governance

9 The *single joint capacity* is a strategy to converge or coordinate and accommodate the needs of several Open Science monitoring initiatives and surveys.

2. Short term objectives

The MS/AC of the EOSC-SB expert group will undertake all efforts necessary to achieve the following monitoring objectives in the period 2022–2024 and continue to actively support the overall objective of making Open Science the new normal by 2030. By 2024

1) one joint capacity shall be established and sustained to monitor progress towards Open Science as the new normal by 2030 and that this monitoring capacity shall be used as a monitoring aggregator to cover trends in Open Science policies, practices, and impact across Europe.

2) the technical analysis tool[10] of this monitoring capacity shall help identify gaps between policies and practices to determine priority areas of mutual learning and support complementary actions at European, national, and institutional levels for advancing the development and deployment of Open Science policies and investments.

3) the underlying data for monitoring shall be made available as open as possible (as aggregated as necessary) as defined by the data contributors for further examination and reuse including through the ERA Monitoring Mechanism.

4) the monitoring shall empower policymakers with intelligence that can advance their implementation of open science and EOSC and align respective policies to improve the production and sharing of FAIR[11] research output and support coordination and synergies with EU and other national policies and investments of EOSC relevance.

3. Recommendations for developing and monitoring policies and investments

1) The following Open Science and EOSC-relevant policies are recommended to be deployed by 2024 by each Member State and Associated Country at national and institutional levels. For the degree of policy implementation on national and institutional (Research Funding Organisations and Research Performing Organisations) levels targets are indicated based on the EOSC-SB survey 2021 and the work of the sub-group National contributions to EOSC. Reaching these targets is recommended for ensuring the appropriate baseline and allow for advancing towards Open Science as the new normal by 2030 in the medium (2025–2027) and longer term (2028–2030).

[10] EOSC Observatory is a policy intelligence tool to collect, analyse, and visualize information relevant to the implementation of the EOSC. https://eoscobservatory.eosc-portal.eu/home

[11] https://www.nature.com/articles/sdata201618

Indicators and implementation target by 2024	*Implementation target on national or sub-national[12] level*	*Institutional level*		*Share of countries having best practice use cases on Open Science*
		Share of the country's RFOs[13]	*Share of the country's RPOs[14]*	
Policy on Open Access to publications - on mandatory OA to publications - on immediate OA to publications	100% of MS/AC >75% of MS/AC >50% of MS/AC	100% 75% 50%	100% 75% 50%	100% 75% >30%
Policy on open data	100% of MS/AC	100%	50%	>30%
Policy on data management	100% of MS/AC	100%	75%	100%
Policy on FAIR data	100% of MS/AC	100%	100%	>30%
Policy on open source software	100% of MS/AC	50%	25%	100%
Policy on offering services through EOSC	25 % of MS/AC	25%	25%	25%
Policy on connecting repositories to EOSC	100% of MS/AC	50 %	25%	100%
Policy on data stewardship	>50% of MS/AC	50%	25%	>30%
Policy on long-term data preservation	Tbd	Tbd	Tbd	tbd
Policy on skills and training for Open Science	100% of MS/AC	50%	50%	100%
Policy on incentives and rewards for Open Science	100% of MS/AC	75%	50%	100%
Policy on Citizen Science	100% of MS/AC	50 %	25%	100%

[12] For example, sovereign federal states in a country.

[13] Research Funding Organisations (RFO) is here understood as an institution with significant responsibility for managing public research funding, i.e., which has a responsibility and authority to launch calls for proposals and provide funding for performing scientific research.

[14] Research Performing Organisations (RPO) is here understood as an academic institution receiving public funding for performing scientific research.

2) Information on planned and implemented policies and investments will be collected, analysed, and visualised with a policy intelligence tool for monitoring[15]. MS/AC are encouraged to explain in more detail relevant challenges and solutions from their respective national efforts on developing and deploying the policies, as well as improvements on the comparability of data and perception of the underlying concepts.

3) The EOSC-SB country delegates are invited to:
   a. *discuss* the policy development and deployment in existing national coordination structures/networks of EOSC relevance, and in national EOSC tripartite events, and consolidate and communicate resulting national views to the EOSC-SB;
   b. *communicate* best practices on how to develop and deploy national/institutional policies to the EOSC-SB and facilitate mutual learning while pursuing synergies and alignment of policies;
   c. *validate* and vouch for the country's data, shared via the policy intelligence tool for monitoring.
   d. *develop and refine* science policies at national and institutional levels with the policy intelligence obtained via the policy intelligence tool.

4) In the period 2023–2024 the EOSC-SB shall regularly evaluate the level of progress, effectiveness and efficiency towards the above objectives and recommendations and consider the potential to refine them in view of the ERA policy agenda beyond 2024.

***** The ambition of the European Open Science Cloud (EOSC) is to provide European researchers, innovators, companies and citizens with **a federated and open multi-disciplinary environment** where they can publish, find and reuse data, tools and services for research, innovation and educational purposes. EOSC is not a single monolithic organisation or resource provider but is rather a federation built out of many independent organisations and resource providers as in a system of systems approach. As such, **it ensures the independence and autonomy** of resource providers. (SRIA V1.0, June 2021, Chapter 6).

[15] The data collected via EOSC-SB Members and Observers are currently collected, analysed, and visualised with the EOSC Observatory. The EOSC Observatory policy intelligence tool is available at https://eoscobservatory.eosc-portal.eu/home

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The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

The EOSC Steering Board expert group (E03756) has developed opinion reflections on selected high-level policy issues. The outcome of these reflections have been formulated as opinion papers on ‘EOSC and data literacy’, ‘EOSC and the commercial partners’, ‘FAIR data sovereignty in EOSC’, and ‘Monitoring Open Science’. The papers include objectives and recommendations for the period 2022 to 2024. A selection of key elements from these opinions are highlighted in a joint statement by the expert group called ‘EOSC: the Transverse European Data Space for Science, Research and Innovation’. All four papers have collected input from private experts, governmental experts, and the European Commission, and were finally adopted via written procedure in November 2022.

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