THE EUROPEAN OPEN SCIENCE CLOUD AS A CORNERSTONE OF A "FIFTH FREEDOM" IN RESEARCH AND INNOVATION

Position paper of the EOSC Steering Board, the EOSC expert group of the European Commission, on the future Framework Programme10

EOSC is a cornerstone of the EU's research and digital policies, a European strategic asset for a more productive and efficient research and innovation ecosystem, driving innovation, economic growth, and competitiveness. To unlock its full potential, EOSC requires a comprehensive approach, including dedicated funding, training, and upskilling, as well as effective governance and inclusivity measures. As a key component of the European Research Area, EOSC is poised to drive European excellence and growth, and its integration into FP10 is crucial to achieving this vision in the spirit of pursuing the establishment of EOSC as a common good for research. [1]

EOSC's Mission and Vision

The European Open Science Cloud (EOSC) is a major initiative to create a space for researchers in Europe across borders and disciplines to share, access and make use of research data and scientific tools and dedicated services for their exploitation. It contributes to developing a web of high-quality scientific data based on the FAIR principles[2], setting the standard for excellence in research data management and fostering a culture of open science across Europe and beyond. It aims to contribute to the **development of a 'Knowledge Commons' as a key pillar of a "fifth freedom" in Europe on research, innovation, knowledge, and education[3]**.

By harmonising and scaling research data sharing across Europe's research infrastructures and scientific data providers, **EOSC is the enabler for the adoption of Artificial Intelligence in science and a strategic asset in enhancing Europe's digital sovereignty in research and innovation [4]**. This vision aligns closely with **the Competitiveness Compass**[5] presented by the Commission on 29 January 2025, which identifies **innovation-led productivity** and **AI leadership as key imperatives for Europe's economic and technological future.** EOSC embodies these principles by fostering a European 'Knowledge Commons' and providing the essential infrastructure for FAIR data and AI-powered research across disciplines and borders. Integrating EOSC into FP10 is therefore not just a research policy priority, but **a strategic move to reinforce Europe's global competitiveness in science and technology.**

The development of EOSC brings together stakeholders from science and policy development at European, national and institutional levels to ensure coordination and responsiveness to the needs of research communities.

EOSC is being implemented as a Federation of data and related services as provided by researchers, research institutions, research infrastructures and data, data-service and data-analytics providers across Europe. The EOSC Federation lays the foundation of an overarching collaborative and shared infrastructure, leveraging the principle of economies of scale to drive

---

[1] EOSC-SB Policy Paper 2025: The European Science Cloud as a common good
[2] Findable, Accessible, Interoperable, and Reusable
[3] Enrico Letta, 'Much more than a market – Speed, Security, Solidarity', April 2024
[4] EOSC-SB Policy Paper 2022: Opinion paper on FAIR data sovereignty in EOSC
[5] A competitive compass for the EU: 10017eb1-4722-4333-add2-e0ed18105a34_en

efficiency and effectiveness. It aims to **offer to researchers a secure and trusted virtual environment, ensuring high standards of compliance, security, and trustworthiness, in line with relevant European regulations concerning data and digital infrastructures.**

The European Research Area and the Global Dimension

The **EOSC Steering Board (EOSC SB) is committed to integrating EOSC in the European Research Area (ERA)**, enabling researchers and innovators from across Europe to access, use and contribute to its resources. **This is in line with the EU's strategic goals, aiming at developing an open, competitive, secure and innovative European Research Area.** It is also committed to strengthening the global dimension of EOSC, enabling collaboration and cooperation with international partners and contributing to global standards and initiatives.

To maximize the impact of EOSC on the EU's research and innovation, particularly in enhancing Europe's competitiveness, the **EOSC Steering Board advocates for the establishment of a dedicated, self-standing research framework programme**.

Structural and financial support for EOSC in FP10

To achieve its objectives, EOSC requires a comprehensive approach that includes funding, training, and upskilling. **The EOSC Steering Board recommends that FP10 provides dedicated support for the development and operation of the EOSC Federation as a European Knowledge Commons,** which will provide access to publicly funded research, data sets, and other research outputs. This will require co-funding and co-financing mechanisms.

Effective governance is crucial to the success of EOSC. Therefore, it is essential to establish a robust governance framework that brings together researchers, Member States, Associated Countries, the EOSC Association, the European Union, and all other stakeholders in a collaborative and inclusive manner. To unlock the full potential of EOSC for research and development, **the EOSC Steering Board expects FP10 to provide the necessary instruments and legislative frameworks that will enable the sustainable growth and seamless operation of EOSC** within a stable and effective governance structure and with low administrative burdens.

Inclusivity and Training

The EOSC Steering Board also emphasizes the importance of **inclusivity**, ensuring that all researchers and innovators throughout Europe, regardless of their background or location, can access and contribute to EOSC. This includes **providing training and upskilling opportunities**, as well as promoting the use of EOSC resources and services. **Financial means to allow for an equitable development of the EOSC Federation** including regional support measures, such as directed support for Widening countries and exploitation of the EU structural funds, **are highly recommended**.

Integration across FP10

The **European Commission should integrate EOSC as a foundational element of FP10 for the management and utilisation of research data and other outputs, mainstreaming its principles and practices across all research funding calls** to ensure a cohesive, sustainable, and impactful ecosystem that drives European excellence and competitiveness.

Recommendations for the development and implementation of EOSC in FP10

EOSC as the overarching FAIR data and services initiative for FP10

- The **EU should develop a comprehensive strategy for EOSC as a key capacity-building initiative on high-quality FAIR research data and related services**, cutting across and reinforcing all parts of FP10.
- The development of the EOSC Federation as a Federation of Nodes includes provisioning capabilities that enable the functioning of the Federation, enrolling Nodes representing thematic, institutional or national communities and onboarding diverse services across the research community. Pooling and integrating FAIR datasets and related services from existing highly specialised as well as horizontal research and data infrastructures and scientific service providers has technical and functional implications that must be addressed with dedicated measures in FP10, stimulating co-creation.
- **FP10 should enable research communities to join existing Nodes or set up new ones**, with interoperability across data and services as a foundational building block.
- **FP10 should support collaborative research to develop and deploy AI tools as EOSC services**, along with the necessary access to computing. It should support **research and development of FAIR-by-design tools and services, uptake of AI by the research communities**, aiming to boost the productivity and quality of FAIR-assessed datasets and enable effective training of AI algorithms.
- **FP10 should provide proportionate assistance and facilitate cross-border collaboration opportunities to smaller or less-resourced EU Member States and associated countries**, enabling their infrastructures to contribute equitably to the EOSC Federation. To foster broader participation, **FP10 should include targeted actions that engage smaller communities and Widening countries**, both as users and providers of data, software, and specific services, such as training instruments.
- **FP10 should support the uptake of EOSC in different fields** as well as upskilling in the (re)use of FAIR data and in developing and utilising AI applications in research, based on co-creation and co-funding.

Recommendations on financial support

The EOSC EU Node

- The EOSC EU Node is the first operational European-level node of the EOSC Federation, currently managed by the European Commission. It includes services that support multi-disciplinary and multi-national research, and it provides 'federating capabilities' that enable the interconnection of the Nodes within the EOSC Federation, following the 'system of systems' architectural principle.
- The federating capabilities, currently provided by the EU Node, should be gradually enhanced, upgraded and provided across multiple Nodes. Distributed throughout the nodes, they will allow for scaling at European level, reducing currently fragmented solutions and representing a key asset of the EOSC Federation for the benefit of all EOSC

stakeholders. **FP10 should contribute to their sustained support, to ensure a stable, long -term operation of the EOSC Federation.**

- To ensure operational continuity and flexibility, **the services of the EOSC EU Node should be managed by a legal entity** (or a consortium) at least for the duration of FP10.

The EOSC Nodes

- The success of EOSC will hinge on establishing effective links between the Nodes that will make up the EOSC Federation. Each Node should have its own funding model and self-sustaining approach and identify use-cases of broad impact on the research and innovation communities.

- To maintain EOSC as an equitable ecosystem and ensure inclusivity, **FP10 should include targeted support for use-cases** of clear interest to the research community that require resources beyond what each node can self-sustain, including inclusivity measures for smaller or less resourced communities or countries. Similarly, **targeted support for onboarding services of Research Infrastructures and service providers**, will be important over the next years. **FP10 should support mitigating the risks of excludability and limited access to (high performance) computing and other infrastructure resources** (memory, storage, network).

Continuous support of R&I of EOSC in FP10

- Research and innovation actions to further develop EOSC as well as coordinated support actions in FP10 are necessary to support operational and strategic implementation of EOSC and to keep technological developments up to date. FP10 should include **calls for funding R&I projects in areas directly relevant to EOSC.**

- **EOSC-related research calls in FP10 should exploit synergies**, particularly those supporting research infrastructures and research service providers that project their activities in EOSC. On the other hand, EOSC-related calls should enable the participation from research infrastructures and research consortia to ensure that the development of FAIR and AI-enabled services address current scientific needs.

- **FP10 shall provide for co-funding mechanisms for EOSC** to ensure its sustainable development and a balanced and appropriately targeted financing based on contributions by MS/AC and the EC.

The EOSC Federation governance model

- The current **EOSC Tripartite governance** is suitable to catch the key aspects of EOSC: openness, links to research community and to national initiatives, ensuring inclusivity and overall sustainability.

- **FP10 shall promote the implementation of a suitable governance for EOSC**, with effective decision making that is transparent to all parties and receptive to new tools, standards and approaches on open science and FAIR data management developed by the research community.

Connecting EOSC with other key European research and digital initiatives

- The **FP10 strategy should leverage connections and collaborations between various initiatives** to establish a strong ecosystem, including the European Open Science Cloud (EOSC) Federation, other Common European Data Spaces, EuroHPC (European High-

Performance Computing), AI-Factories and AI gigafactories, research infrastructures alongside relevant EU policy and legislative frameworks, such as the Data Governance Act and the AI Act. By doing so, FP10 can create a cohesive and supportive environment that fosters innovation, collaboration, and progress across these different areas.

Targeted funding for skills and competences for EOSC

- **FP10 should support the development of research data management and Open Science skills and competences** and effectively utilizing the EOSC data and services with innovative co-funding measures.
- **FP10 should support capacity building in smaller or less-resourced EU Member States**, including training initiatives on advanced data science, Artificial Intelligence tools for research, and Open Science practices, so that they can fully develop competitive skills and co-creation capabilities for contributing to the EOSC-Federation and for exploiting its services and resources.