

EOSC POLICY BRIEF



CALL: HORIZON-INFRA-2021-EOSC-01
TOPIC: HORIZON-INFRA-2021-EOSC-01-05
PROJECT: FAIR-IMPACT Expanding FAIR solutions across EOSC
PROJECT WEB SITE: <https://fair-impact.eu/>
GRANT NUMBER: 101057344
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SCOPE OF THE POLICY BRIEF

This policy brief enables EU-funded projects contributing to the advancement of the European Open Science Cloud (EOSC) to report on progress and provide input for further policy analysis and development by the European Commission. This policy brief should be understood as complementary to the other mandatory reporting materials.

Policy background:

The European Open Science Cloud (EOSC) is a flagship EU initiative to deepen Open Science practices across the [European Research Area](#) (ERA). As such it contributes to several actions of the [ERA policy agenda](#) (in particular ERA action 1 & 8). EOSC is also recognised in the [European strategy for data](#) as the data space for science, research and innovation which shall be fully articulated with the other sectoral data spaces defined in the strategy.

Overall progress is steered by the EOSC tripartite governance involving the Union represented by the European Commission, the participating countries represented in the EOSC Steering Board and the research community represented by the EOSC Association. The second phase of development of EOSC (2021-2030) takes place in the context of the EOSC European co-programmed Partnership, which brings together the European Commission and the EOSC Association.

The [EOSC Strategic Research and Innovation Agenda](#) (SRIA) co-developed with the entire EOSC community sets 3 General Objectives (GO), 14 Operational Objectives (OO) and 14 Action Areas (AA).

General Objectives (GO):

1. Open science becomes the ‘new normal’, by ensuring that open science practices and skills are rewarded and taught.
2. Researchers can seamlessly find, access, reuse and combine results, through the definition of common standards and the development of related tools and services.
3. A federated infrastructure under community governance enabling open sharing of scientific results is deployed and sustained.

Operational Objectives (OO):

1. Deliver and operate all the necessary components of the Minimum Viable EOSC to share openly research data, publications, software, tools and services while attracting increasing numbers and categories of users (public and private) (based on a governance structure representative of the various stakeholders and including domain-specific user environments supporting Open Science) by 2025;
2. Make monitoring systems to gather data and evidence on best Open Science practices accessible through EOSC (including the development of a dashboard to monitor the evolving landscape of policies, infrastructures and open resources made accessible via EOSC by 2023);
3. Increasingly mainstream Open Science skills in European research-performing organisations (RPOs) including through the uptake of curricula and training frameworks related to data stewardship through the lifespan of the Partnership;
4. Co-develop domain-specific standards and adopt Open Science practices through the engagement with research communities during the lifespan of the Partnership;
5. Provide the technical components of a FAIR ecosystem for uptake and customisation by the communities by 2023 (including open specifications, standards, schemas, application programming

interfaces (APIs), metadata frameworks supporting FAIR digital objects and their automated processing);

6. Provide the metrics and tools to measure the adoption of the FAIR principles for research artefacts and provide frameworks to help in certifying that repository services enable FAIR in EOSC throughout the lifespan of the Partnership;
7. Co-develop a first generation of a robust pan-European network of infrastructures for software source code (including incentives for the effective documentation and sharing of research software) by 2025;
8. Co-design and adopt a Rewards and Recognition framework for FAIR and open data practices in research during the lifespan of the Partnership.
9. Implement and evolve the EOSC Rules of Participation and onboarding process for EOSC providers and increase the number of service providers and services offered progressively over the course of the Partnership.
10. Deploy and operate an authentication and authorisation infrastructure (AAI) framework to manage user identity and access by 2024;
11. Implement the EOSC persistent identifier (PID) policy and architecture by 2025;
12. Co-develop a minimum metadata framework and provide a common search and access mechanism to EOSC resources across the EOSC federation by 2025;
13. Continuously monitor and promote the increased uptake of core services and EOSC resources, access to EOSC Exchange tools and services and ensure a feedback loop with the users;
14. Define models for availability and costing of services across borders by 2023.

Action Areas (AA) of a technical nature:

1. Identifiers
2. Metadata and ontologies
3. FAIR metrics and certification
4. Authentication / authorisation infrastructure
5. User environments
6. Resource provider environments
7. EOSC Interoperability Framework

Action Areas (AA) related to boundary conditions:

8. Rules of Participation
9. Landscape monitoring
10. Business models
11. Skills and training
12. Rewards and recognition
13. Communication
14. Widening to public and private sectors and going global

More information can be found from:

- https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science/european-open-science-cloud-eosc_en
- <https://digital-strategy.ec.europa.eu/en/policies/open-science-cloud>
- <https://eosc.eu/eosc-about>

FEEDBACK ON PROGRESS AND POLICY RECOMMENDATIONS (MAX 6P)

A. Overview of contributions in relation to the EOSC policy and EOSC SRIA objectives.

FAIR-IMPACT has the ambitious goal of realising an EOSC of FAIR data and services by supporting the implementation of FAIR-enabling practices, tools and services across scientific communities and at national, European and institutional level. The project places its focus on persistent identifiers (WP3), metadata and ontologies (WP4) metrics, guidelines and certification (WP5) and interoperability (WP6) in line with the respective EOSC SRIA action areas. This process of identifying practices, policies, tools and technical specifications to guide a wide spectrum of stakeholders groups starts with real-life use cases integrated in the project's structure across the social sciences and humanities, the photon and neutron sciences, life sciences, and agri-food and environmental sciences. These efforts are supported by wide synchronisation, engagement and communication activities, including open calls for cascading grants and in-kind support to specific stakeholders. The relation between FAIR-IMPACT's contribution and the most relevant Operational Objectives and Action Areas of the EOSC SRIA are mapped as follows:

- AA1 - OO4 - OO5 - OO11: FAIR-IMPACT contributes to Identifiers with a dedicated WP3 "Persistent Identifiers" on Working with PID service providers and infrastructures to meet user needs, align with EOSC policy and maximise uptake.

Key actions: Setting up a coordination mechanism for EOSC PID service providers; Integration of PID practices into FAIR data management; EOSC PID policy alignment & support; PID implementation programme.

Expected results: Shared long-term vision for PID service providers on PID usage in EOSC ; User guidelines on EOSC PID implementation; Guidelines for creating a user tailored EOSC compliant PID policy

Specific FAIR-IMPACT Impact #1: A coherent implementation of PIDs across the EOSC.

- AA2 - OO4 - OO5 -OO12: FAIR-IMPACT contributes to metadata and ontologies with a dedicated WP4 “Metadata and Ontologies” on Greater and more harmonised use of semantic artefacts throughout the EOSC ecosystem, leading to semantic interoperability within and between disciplines.

Key actions: Semantic artefact disciplinary governance; Semantic artefact lifecycle and catalogues; Standard metadata for research software; A framework to create, document and share semantic artefact crosswalks and mappings; FAIR semantic artefacts in use within data repositories.

Expected results: Report on semantic artefact governance models and disciplinary approaches for inclusion within EOSC; Report on FAIR semantic artefact lifecycle from engineering, to sharing and FAIR assessment; Specification of shared metadata description of semantic artefacts and their catalogues including common reference API; Guidelines for recommended metadata standard for research software within EOSC; Guidelines and methodology to create, document and share mappings and crosswalks; Use case driven validation of semantic artefact exploitation within data repositories

Specific Impact #2: Federated research objects in EOSC enabled by better governance of FAIR semantic artefacts and clear, common ways to interact with metadata and ontologies.

- AA3 - OO4 - OO5 - OO6: FAIR-IMPACT contributes to FAIR Metrics & certification with a dedicated WP5 “Metrics, guidelines and certification” on Building on and extending current FAIR metrics, assessment tools and Trustworthy Digital Repository (TDR) requirements to meet the needs of more thematic domains and a wider range of digital research objects.

Key actions: FAIR digital object assessment pilots in a disciplinary context; FAIR metrics for research software; Semantic artefact FAIRness assessment; FAIR data and code in FAIR-enabling TDRs

Expected results: Implementing metrics for automated FAIR digital objects assessment in a disciplinary context; Metrics for automated FAIR software assessment in a disciplinary context; Methodology for semantic artefact assessment; Final recommendations on implementing and exposing FAIR assessments for data and code

Specific Impact #3: Adapted guidelines and frameworks for FAIR data, research software, semantic artefacts. FAIR enabled at Trustworthy Digital Repositories (TDRs) through the functional assessment of repository trustworthiness and data FAIRness.

Community-led working paper for TDRs and interactions with relevant EOSC TF/responses to papers

- AA7 - OO4 - OO5: FAIR-IMPACT contributes to EOSC Interoperability Framework with a dedicated WP6 “Interoperability: on Designing and promoting interoperability mechanisms across domains and institutions and foster global alignment of FAIR frameworks.

Key actions: Semantic and Technical core interoperability across domains; Legal and Organisational interoperability; Interoperability within the EOSC ecosystem

Expected results: Guidelines for the usage of components for technical and semantic interoperability in cross-domain use cases; Core metadata schema for legal interoperability; MoU and Service Level Agreement templates for data interoperability; Cross-domain recommendations and feedback for the EOSC Interoperability Framework

Specific Impact #4: Increased data accessibility for researchers and other European data users and stakeholders.

- AA8 - AA9 - AA13 - OO3 - OO9 - OO13: FAIR-IMPACT contributes with a series of coordination and support activities, structures and mechanisms:

Technical Bridging Team (TBT): The TBT is a body in charge of coordinating technical alignment between FAIR-IMPACT, FAIRCORE4EOSC and the EOSC-A, as well as taking into account relevant technical developments in relevant initiatives and projects.

FAIR Implementation Team (FIT): The FIT is a FAIR-IMPACT body bringing together the WP leaders and integrated use-case partners to ensure a joined-up approach in engagement activities, including the support actions via cascading grants and in-kind support.

FAIR Implementation Framework (FIF): Viable tools, approaches and solutions that can support FAIR implementation are collected in the FIF following a landscape analysis, which is crucial for the delivery of in-kind support to research performing organisations (RPOs), repositories and data service providers, and national level initiatives. The framework will also be openly available to support adoption by a wider range of stakeholders across Europe and globally.

Synchronisation Force (SF): The SF ensures that a dialogue is maintained for collaboration and harmonisation with various projects, initiatives, and actors in both EOSC and FAIR ecosystems to reduce redundancy and ensure that solutions are more widely promoted and sustainable and can be transferred to the relevant EOSC Partnership and current and future EOSC stakeholders. The questions and recommendations discussed in the Synchronisation Workshops are informed by, among other important documentation, the EOSC SRIA objectives.

EOSC FAIR Champions: FAIR-IMPACT is using a community-led approach and engages with stakeholder communities for the adoption of the FAIR principles. In this context, a group of ambassadors has been selected via an open call. The EOSC FAIR Champions support and advocate for adoption of the project results, while they are also involved in national roadshows in their countries.

Specific FAIR-IMPACT Impact #5: Active, engaged and informed research communities supporting the implementation of an operational, open and FAIR EOSC ecosystem through increased uptake and adoption at cross-domain and pan-European level.

Specific FAIR-IMPACT Impact #6: Clear and functioning mechanisms for supporting the governance, coordination, and collaboration activities carried out by the EOSC Partnership.

B. Key contributions subject to wider dissemination by the European Commission.

FAIR-IMPACT marked the end of its first year on May 31st 2023. Some indicative key contributions of the project that are ready for wider dissemination amongst the EOSC community and are related to the EOSC Strategic Objectives are listed below. An exhaustive list of FAIR-IMPACT's public outputs is available on the project's website (<https://fair-impact.eu/>) and on the Zenodo community (<https://zenodo.org/communities/fair-impact/>).

Engagement:

Davidson, Joy, Pittonet, Sara, Boerman, Sandra, Brinkman, Loek, Jonquet, Clement, Kalaitzi, Vasso, Kechagioglou, Xenii, L'Hours, Herve, Marjamaa-Mankinen, Liisa, Mathers, Benjamin, Meneses, Rita, Nordling, Josefine, O'Connor, Ryan, & Gonzalez-Beltran, Alejandra. (2023). D2.1 Targeted landscape analysis report (V1.0 DRAFT NOT YET APPROVED BY THE EUROPEAN COMMISSION). Zenodo. <https://doi.org/10.5281/zenodo.7581670>

Mejias, Gabriela, Cousijn, Helena, Marjamaa-Mankinen, Liisa, van Lieshout, Natascha, Tatum, Clifford, & Lambert, Simon. (2023). M3.1 - Joint value proposition by relevant PID providers. Zenodo. <https://doi.org/10.5281/zenodo.7798215>

Gruenpeter, Morane, Granger, Sabrina, Monteil, Alain, Chue Hong, Neil, Breitmoser, Elena, Antonioletti, Mario, Garijo, Daniel, González Guardia, Esteban, Gonzalez Beltran, Alejandra, Goble, Carole, Soiland-

Reyes, Stian, Juty, Nick, & Mejias, Gabriela. (2023). D4.4 - Guidelines for recommended metadata standard for research software within EOSC (V1.0 DRAFT NOT YET APPROVED BY EUROPEAN COMMISSION). Zenodo. <https://doi.org/10.5281/zenodo.8097537>

L'Hours, Hervé, Recker, Jonas, Mathers, Benjamin Jacob, Verburg, Maaïke, & Huber, Robert. (2022, June 20). Trust Standards, Support and FAIR Enabling Trustworthy Repositories. IASSIST 2022 (IASSIST22), Gothenburg, Sweden. Zenodo. <https://doi.org/10.5281/zenodo.6669742>

Clare, Helen, Davidson, Joy, & Lazzeri, Emma. (2022, November 3). Awareness rising on Open Science, EOSC and FAIR Principles. EOSC National tripartite event Georgia, Tbilisi, Georgia. Zenodo. <https://doi.org/10.5281/zenodo.7276050>

Ingrid Dillo, Jessica Parland von Essen, & Sara Pittonet Gaiarin. (2022). Sustainable implementation of PIDs and data citation in EOSC (1.0). 1st International Conference of FAIR Digital Objects (FDOs) (FDO2022), Leiden, The Netherlands. Zenodo. <https://doi.org/10.5281/zenodo.7318441>

Gruenpeter, Morane. (2023, March 24). An overview of the metadata landscape & descriptive metadata curation. Research Data Alliance - Plenary 20th (co-located event) (RDA P20), Gothenburg, Sweden. Zenodo. <https://doi.org/10.5281/zenodo.7771642>

Chue Hong, Neil. (2023, March 24). An overview of FAIR4RS and existing tools to assess FAIRness of software. Zenodo. <https://doi.org/10.5281/zenodo.7805608>

Maaïke Verburg, Robert Huber, Clement Jonquet, & Daniel Garijo. (2023). FAIR-IMPACT project response to "FAIR Assessment Tools: Towards an "Apples to Apples" Comparisons" (1.0). Zenodo. <https://doi.org/10.5281/zenodo.7848102>

Maaïke Verburg, Mike Priddy, Robert Huber, Clement Jonquet, Neil Chue Hong, Daniel Garijo, Xenia Kechagioglou, Joy Davidson, Ingrid Dillo, & Vasso Kalaitzi. (2023). FAIR-IMPACT project response to "Community-driven governance of FAIRness assessment: an open issue, an open discussion" (1.0). Zenodo. <https://doi.org/10.5281/zenodo.7848127>

Gruenpeter, Morane. (2023, May 23). Developing Guidelines for Metadata Collection and Curation for Research Software. Zenodo. <https://doi.org/10.5281/zenodo.7962734>

Gruenpeter, Morane. (2023, May 23). Software as a first class output in the scholarly ecosystem. Zenodo. <https://doi.org/10.5281/zenodo.7964043>

Publications:

Zwölf, C.M., Moreau, N. Assessment of the FAIRness of the Virtual Atomic and Molecular Data Centre following the Research Data Alliance evaluation framework. Eur. Phys. J. D 77, 70 (2023). <https://doi.org/10.1140/epjd/s10053-023-00649-x>

Soiland-Reyes S, Castro LJ, Garijo D, Portier M, Goble C, Groth P (2022) Updating Linked Data practices for FAIR Digital Object principles. Research Ideas and Outcomes 8: e94501. <https://doi.org/10.3897/rio.8.e94501>

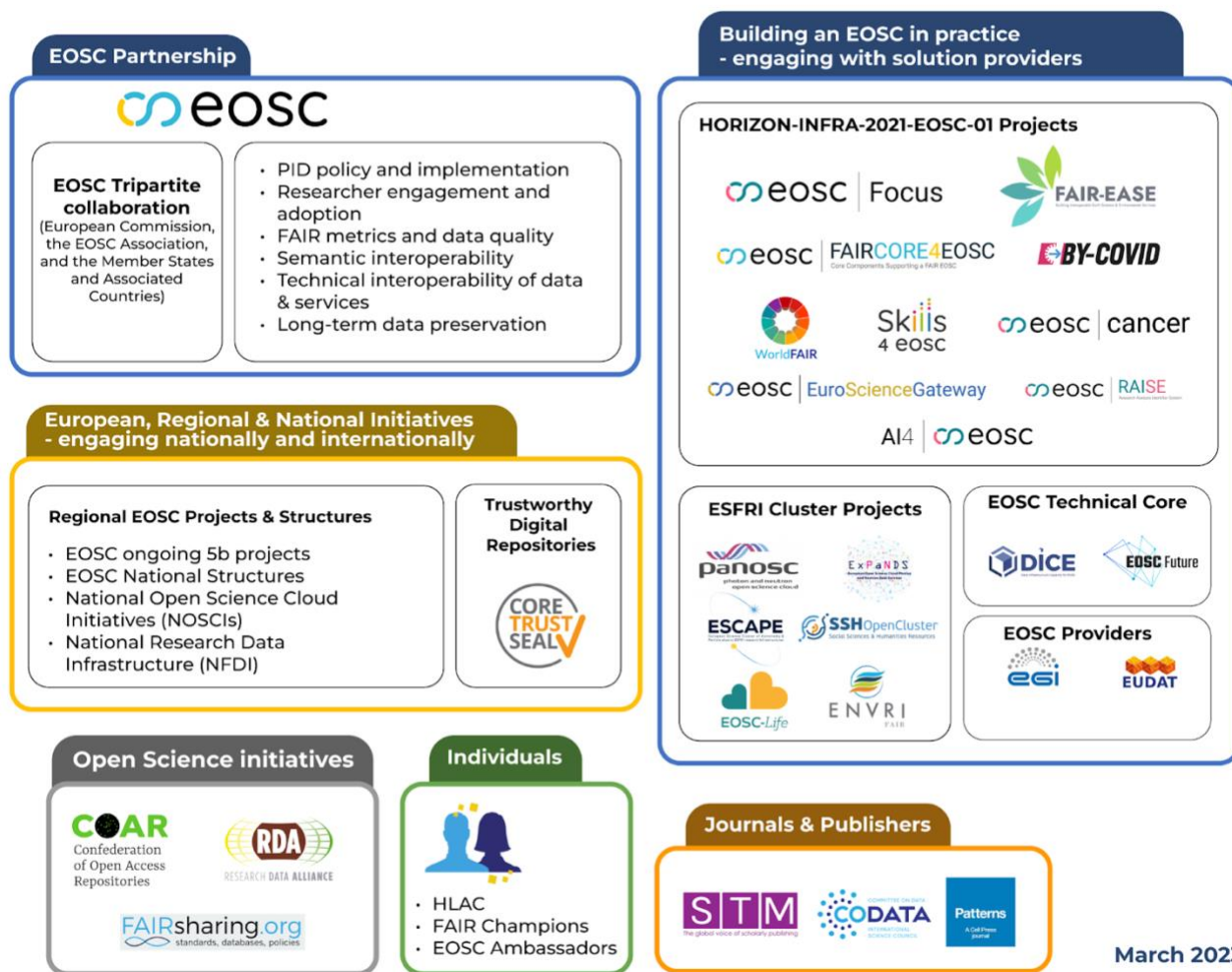
Philipp Conzett, Ingrid Dillo, Françoise Genova, Natalie Harrower, Vasso Kalaitzi, Mari Kleemola, Amela Kurta, Pedro Principe, Olivier Rouchon, Hannes Thiemann, & Maaïke Verburg. (2022). Towards a European network of FAIR-enabling Trustworthy Digital Repositories (TDRs) - A Working Paper (v2.0). Zenodo. <https://doi.org/10.5281/zenodo.7034315>

C. Synergies with other stakeholders.

FAIR-IMPACT actively engages a wide range of EOSC stakeholders at European, national and institutional levels. The ecosystem of stakeholders that FAIR-IMPACT navigates is depicted in the figure

below.

eosc | FAIR-IMPACT Target Stakeholders



March 2023

Through its conception, FAIR-IMPACT has been linked to the project that is now FAIRCORE4EOSC. The two are considered as sister-projects and are connected through various mechanisms: organising the project kick-off meetings in collaboration and as back-to-back events, holding regular bi-weekly meetings of the coordinators and project managers, having set up a collaboration plan, organising shared events whenever possible, inviting each other to relevant project meetings, and having a shared working space. Most importantly, The Technical Bridging Team of FAIR-IMPACT facilitates technical coordination and gathers the relevant work package and task leads for cross-project interaction in monthly online meetings, ensuring an open and continuous dialogue for relevant input and feedback.

FAIR-IMPACT is also engaging with other projects and initiatives from the EOSC and FAIR ecosystems via its coordination mechanisms and it is setting up collaborations with a number of them, such as SKILLS4EOSC, FAIR-EASE, EOSC4Cancer, BY-COVID, WorldFAIR and AI4EOSC.

The project has established an open dialogue with the EOSC Association and the EOSC Focus project. It actively participates in the EOSC projects concertation meetings, the EOSC Forum and contributes to relevant activities and outputs (e.g. feedback provided for the Vademecum and the macro-roadmap).

Furthermore, FAIR-IMPACT regularly interacts with relevant EOSC Task Forces through the participation within task forces by project members, the publication of responses to outputs, and the planning of activities to discuss feedback, as well as by inviting the Task Forces to its series of Synchronisation Force workshops. Indicatively, representatives of 9 EOSC Task Forces participated in the first Synchronisation Force (2022 edition).

FAIR-IMPACT interacts with research infrastructures through their participation in its consortium (e.g. CEESDA ERIC), the aforementioned engagement activities, and participation in relevant major events, such

as the RDA Plenaries and in collaboration with relevant initiatives, such as the RDA Working Groups on Brokering Framework and Machine Actionable Data Management Plans (maDMP).

The project also interacts with the communities involved in the development of the other data spaces of the European Data strategy and especially by setting up collaborations and fostering interoperability with the European Data Spaces for the future validation of core interoperability components through metadata mechanisms across scientific disciplines.

Finally, FAIR-IMPACT is supported by a High Level Advisory Committee (HLAC) in which 8 international experts were onboarded in January 2023 to support the project on strategy to increase its effectiveness and impact. Next to the HLAC, a group of 12 EOSC FAIR Champions were selected via an open call to act as ambassadors for FAIR, engage their communities, and advocate for adoption of the project results. The EOSC FAIR Champions are also involved in facilitating national roadshows in their country, and will contribute to the development of FAIR implementation stories.

D. EOSC challenges and lessons learnt of a policy nature.

FAIR-IMPACT addresses the topic HORIZON-INFRA-2021-EOSC-01-05: Enabling discovery and interoperability of federated research objects across scientific communities, and has officially started in June 2022. The advancement of the EOSC Association structures, mechanisms and work, followed the FAIR-IMPACT proposal submission. Given the fact that FAIR-IMPACT is a coordination and support action deploying a wide range of engagement activities and alignment mechanisms, the project has identified and communicated to the EOSC Association and the EOSC Focus project the risk of duplication of effort in certain areas. By being transparent and through FAIR-IMPACT's participation in various relevant activities, such as the EOSC projects concertation meetings, such risks of duplication of effort are being monitored. At the same time, these collaborations fostered by the European Commission and the EOSC Association are appreciated, in order for this complicated landscape of EOSC project developments to be navigated, and for relevant projects to be aware of potential synergies and collaboration opportunities. The FAIR-IMPACT Synchronisation Force and Technical Bridging Team are definitely two coordination mechanisms that can actively contribute to this respect through their activities and outputs. At the same time, FAIR-IMPACT is actively engaging with the relevant EOSC Task Forces by responding to outputs while also taking them into consideration for the project's activities and outputs. A potential risk, however, would materialise if the EOSC Task Forces experience a delay in delivering their outputs according to the set timeline.

E. Link to other EU policy priorities (beyond EOSC).

FAIR-IMPACT contributes to SDG8 Decent Work and Economic Growth and SDG9 Industry, Innovation and Infrastructure by working towards achieving its specific impacts. The project also partially contributes to SDG5 Gender equality, SDG10 Reduced inequalities and SDG17 International cooperation. Open Science and the FAIR principles are at the core of the project. All open calls for support on behalf of the project follow open and transparent procedures with regards to participation, selection and evaluation, adhering to the limitations set by the European Commission.

FAIR-IMPACT also contributes to achieving the UNESCO Recommendations on Open Science with regards to investing in Open Science infrastructures and services, developing and enabling policy environment for Open Science and promoting international cooperation on Open Science.

The FAIR-IMPACT contribution to achieving the UNESCO Recommendations on Open Science and Sustainable Development Goals is established and represented visually in the following

figur

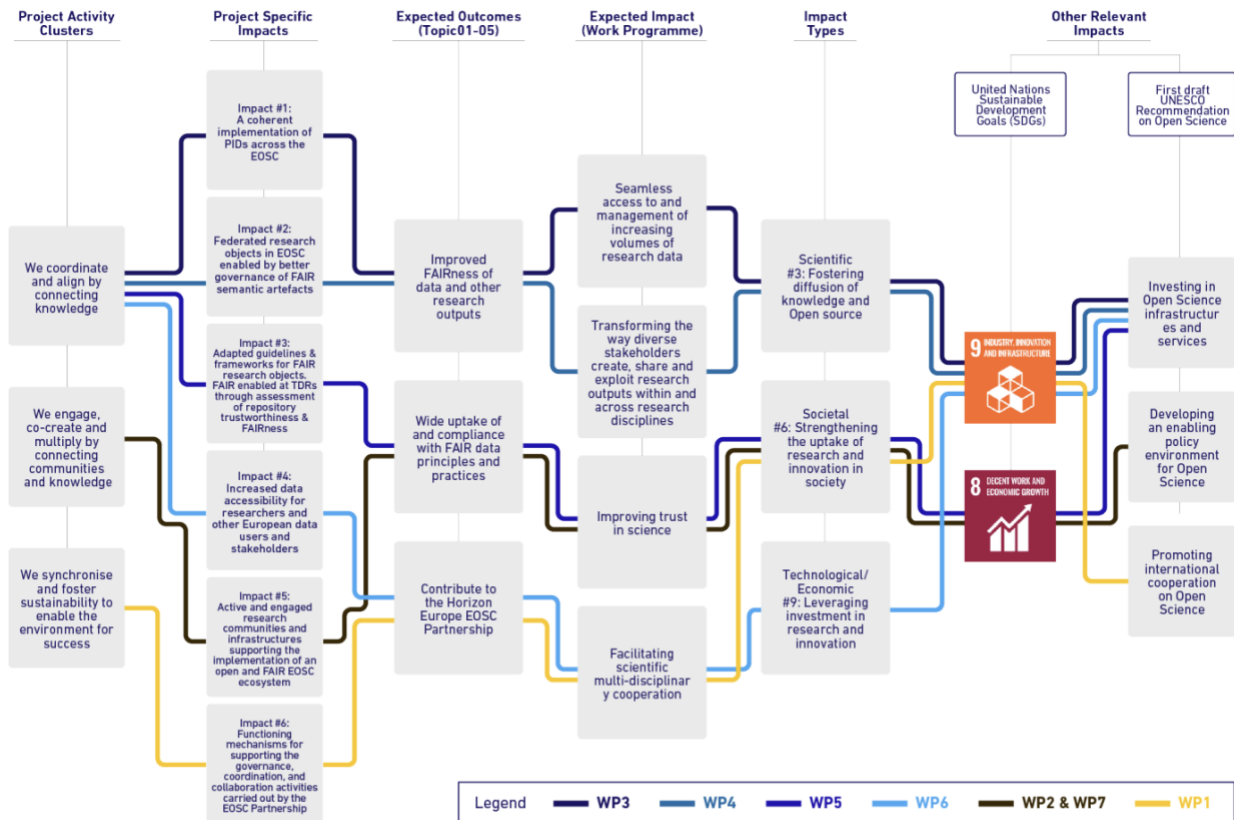


Figure 5: FAIR-IMPACT Key Impact Pathways (left to right)