

D8.5: EOSC Stakeholder Engagement Report

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Abstract:

This document reports on the engagement activities undertaken in the EOSCpilot project and highlights good examples of engagement per stakeholder category. Intentional overlaps exist in certain categories, because a need for interconnection and active dialogue between stakeholder categories was identified early on as a significant issue for successful engagement.

This report details the outcomes of the engagement activities throughout the project, following the structure of D8.2 Stakeholder Identification & Engagement Strategy Plan. It provides best practices of engagement by Stakeholder Group, as initially identified and mapped in the first period of the project. The report concludes with a set of recommendations for engagement of the EOSC stakeholder groups after the end of the EOSCpilot project.

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EXECUTIVE SUMMARY

Work Package 8 (WP8) aimed to identify and bring together the major stakeholder groups that could provide input in building the EOsc and would profit from it. The methodology followed — to identify, bring together and deeply engage stakeholders — is described in Deliverable D8.2 “Stakeholder Identification and Engagement Strategy Plan”. Deliverable 8.2 outlined the main stakeholder target categories, the reasons why each category was important to the project, channels and tools to be used, the main messages the project would convey while engaging with each category and KPIs to be met¹.

The methodology WP8 followed was built on existing networks, connections and channels: all of which were identified in the first months of the project using an internal survey. Furthermore, WP8 identified gaps and addressed the challenge of targeting new potential EOsc stakeholder communities. To leverage existing networks and achieve engagement, WP8 worked closely with all other work packages, fostering two-way communication and engagement activities. For the identified stakeholder groups, the project created website pages (see the website homepage², under the headline “*Who can benefit from EOsc?*”).

The initial strategy was revisited half-way through the project. We checked and updated initial KPIs and ensured that the outreach of the project’s activities would be maximised, and the engagement level of the main stakeholder groups would reach the desired levels. The update also took into consideration the extension of the project from 24 to 28 months.

This document reports on the engagement activities and highlights good examples of engagement per stakeholder category. Intentional overlaps exist in certain categories because a need for interconnection and active dialogue between stakeholder categories was identified early on as significant for a successful engagement.

The main questions addressed in terms of engagement were the following:

- Who are the main stakeholder categories that are relevant for and can benefit from EOsc?
- Who are the main actors in each stakeholder category?
- What are the main venues, tools and materials to be used for engagement?
- How can we identify synergies and foster a proactive, collaborative, interdisciplinary and across regions engagement environment?
- What is the main message we want to convey?
- What are the risks and possible reasons for deviation that need to be taken into account?

This deliverable provides the outcomes of our engagement activities throughout the project, following the structure of D8.2 Stakeholder Identification & Engagement Strategy Plan. It provides best practices of engagement by Stakeholder Group, as initially identified and mapped in the first period of the project. The report concludes with a set of recommendations for engagement.

¹ Currently D8.2, the Stakeholder Identification & Engagement Strategy Plan, is a confidential report, only for members of the consortium (including the Commission), and is not publically available.

² <https://www.eoscpilot.eu/>

1. STAKEHOLDER ENGAGEMENT

1.1. Research Infrastructures (RIs)

The European Commission and organizations signing the EOSC Declaration³ have stated that they support the implementation of EOSC as “a federation of existing and planned research data infrastructures, adding a soft overlay to connect them and making them operate as one seamless European research data infrastructure”.

Existing RIs have been an important starting point for engaging communities since they are already organised in an operational structure and use or provide services. They provide several types of services, including data services and expertise. RIs are the base on which the federated EOSC will be built⁴.

How did we engage with RIs?

During the EOSCpilot project, several events, workshops, webinars, questionnaires and discussions were organized in order to engage and consult with European RIs. The 1st EGDF⁵ workshop, organized in conjunction with the 6th ERIC network meeting⁶ (9 May 2017, Helsinki), focused specifically on the needs and expectations of RIs for the EOSC. Two panels represented ERICs and other RIs. Regarding RI expectations on the EOSC, it was broadly agreed that EOSC could make expertise available regarding policy, technical areas and workflows. Many panellists pointed out that interoperability is key for EOSC, across infrastructures, services and data domains. Dr. Sanna Sorvari, *ACTRIS ESFRI, ACTRIS PPP coordinator, Research Manager at Finnish Meteorological Institute* stated that within their community, there is reuse of data, but she had not seen many examples of this. She recommended that the EOSC facilitate interoperability first and called for RIs to have a natural role in the governance of the EOSC as they are not just users but also providers. Many other panellists also underlined this dual role of RIs.

At the EUDAT Conference (22-25 January 2018, Porto), the 4th EGDF Workshop⁷ was organized. This workshop introduced the initial version of the EOSC governance framework and aimed to discuss its main characteristics with stakeholders. Possible limitations, incompleteness and problems were highlighted, resulting in suggestions and feedback to improve the framework. The discussion was followed by a Q&A session using the sli.do⁸ audience interaction tool. According to the internal notes compiled by the working group, ESFRI funding was considered important as in the ESFRI process different stakeholders are present and evaluating. Questions also arose concerning RIs role and independence in the future EOSC, and a lack of incentive to offer services for EOSC.

The Digital Infrastructures for Research (DI4R) conference was organized in Lisbon, Portugal from 9-11 October. The EOSCpilot project had delivered a minimal set of rules following a consultation process with e-Infrastructure and research infrastructure stakeholders. EOSCpilot wanted to review the current state of the discussion regarding these EOSC Rules of Participation, by presenting the work from the EOSCpilot project, the EOSC-hub project and the 2nd High Level Expert Group on EOSC on this important topic.

Via a panel discussion⁹, feedback was collected from the audience and presenters on the current status and direction taken in designing the rules. One discussion topic was the question of how the EOSC can guarantee

³ <https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud>

⁴ “Research infrastructures are facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields. Where relevant, they may be used beyond research, e.g. for education or public services. They include: major scientific equipment (or sets of instruments); knowledge-based resources such as collections, archives or scientific data; e-infrastructures, such as data and computing systems and communication networks; and any other infrastructure of a unique nature essential to achieve excellence in research and innovation. Such infrastructures may be 'single-sited', 'virtual' or 'distributed'.” Horizon 2020 Work Programme 2014-2015 - 4. European Research Infrastructures

⁵ European Governance Development Forum <https://eoscpilot.eu/about/governance-framework>

⁶ https://eoscpilot.eu/sites/default/files/eoscpilot_governance_development_forum_helsinki_9.5.2017.pdf

⁷ <https://eoscpilot.eu/events/4th-egdf-workshop-piloting-governance-framework-european-open-science-cloud>

⁸ <https://www.sli.do/>

⁹ <https://eoscpilot.eu/events/rules-participation-eosc>

the quality and trusted environment of the catalogue of data e-infrastructures in the EOSC portal. Also, a webinar to discuss the EOSC Rules of Participation was organized on 18 September 2018: *Recommendations for a minimal set of Rules of Participation for EOSC*¹⁰.

The International Conference for Research Infrastructures¹¹ (ICRI 2018; 12-14 September, Vienna) provided a forum for strategic discussion on international cooperation for RIs. It highlighted the essential role of global and national RIs, and reflected on their needs, development and operation. Trust-IT Services CEO and 2nd European Open Science Cloud High-Level Expert Group Chair Silvana Muscella spoke about the experiences from the recent Open Consultation of EOSC stakeholders¹².

ENVRI week is a week dedicated to Environmental RIs. In the sixth ENVRI¹³ week (14-18 May 2018, Zandvoort, Netherlands), an EOSCpilot workshop¹⁴ was organized on the topic *EOSCpilot recommendations on Governance and Rules of Participation*. RI representatives were invited to debate and pilot the main characteristics of the draft governance framework for the EOSC and to highlight the items for improvement. The second part of the workshop was dedicated to the topic of Rules of Participation for the EOSC.

EOSCpilot also engaged with RIs in developing its strategy and framework for skills development. Elixir in particular participated in the initial workshop in Amsterdam on 17 May 2017 and continued to provide input and comment for EOSCpilot's work in this area. Communication has been two-way in this and other areas of EOSCpilot. We have drawn on knowledge and practice from the RIs, communicated our conclusions to them and reacted to comment resulting from that communication.

What is the added value of EOSC for the RIs?

During this stakeholder engagement process, many questions were raised by the RIs and many benefits of being involved in the development of, and the future, EOSC were identified.

For the life science domain, the main benefit of EOSC is expertise, according to Elixir Director Dr. Niklas Blomberg. More non-technical expertise is needed, for instance in developing ways to achieve mutual recognition, by simple standards, codes of conduct etc., with a set of shared basic rules. According to him, the EOSC could be useful for this kind of work. (1st EGDF workshop¹⁵, 9 May 2017).

One of the ambitions of EOSC is to "*Easily share metadata between one and another*"¹⁶ Carole Goble UK Head of Node Elixir and Rafael Jimenez Chief Technical Officer of Elixir, stated. "*EOSCpilot has already identified principles on data cataloguing and how data will be exchanged between data catalogues and how they will be exposed to EOSC services.*" The video was recorded at the first EOSC Stakeholder Forum¹⁷, organised by EOSCpilot (28-29 November 2017, The Square, Brussels).

*"EOSC is all about enabling the sharing of technology, resources and data across different disciplines"*¹⁸ says Juan Bicarregui, STFC & EOSCpilot Coordinator in the video *The EOSCpilot project - future goals, collaborations and the EOSC*.

A panel discussion on Governance¹⁹ was organized at the 2nd Stakeholders Forum (21 November 2018, Vienna). The main message of the panel was the importance of stakeholder engagement. RIs should be strongly involved and easily connected to universities. The earlier that researchers are considered in the building and shaping of the EOSC the better. RIs, ESFRIs, ERICs are expected to play a central role in EOSC where cross-use of RI best practices is demonstrated - an outcome to be closely monitored by Funding

¹⁰ <https://eoscipilot.eu/events/eosc-governance-development-forum-webinar-%E2%80%93-18th-september-2018>

¹¹ <https://www.icri2018.at/>

¹² <https://eoscipilot.eu/events/international-conference-research-infrastructures-2018-icri-2018>

¹³ <http://www.envriplus.eu/2018/03/07/6th-envri-week/>

¹⁴ <https://eoscipilot.eu/events/envri-week%C2%B4s-eoscipilot-workshop>

¹⁵ https://eoscipilot.eu/sites/default/files/eoscipilot_governance_development_forum_helsinki_9.5.2017.pdf

¹⁶ <https://www.youtube.com/watch?v=2Y8U-lwWlZA>

¹⁷ <https://eoscipilot.eu/eosc-stakeholder-forum-shaping-future-eosc>

¹⁸ <https://www.youtube.com/watch?v=gxEKulBbXCQ>

¹⁹ <https://eoscipilot.eu/news/governance-identifying-understanding-its-importance>

Agencies. Close cooperation with other RIs and e-Infrastructures within the EOSC will increase the capability of RIs to combine and integrate data and resources in a common environment.

What was the profit from engaging with this stakeholder group?

RIs generate and handle very significant data volumes. Effective data preservation and open access for sharing and re-use are a fundamental element of RIs and Horizon 2020 actions. Still the fragmented research data landscape causes challenges for researchers. It is important to hold detailed discussions with RIs when shaping the EOSC, and to simulate a multidisciplinary collaboration between RIs in order to increase the organizational synergies and interoperability of data and tools. Connecting ESFRI infrastructures through Cluster projects²⁰ has helped addressing the situation. This activity has helped the connection of the RIs identified in the ESFRI Roadmap²¹ to the EOSC. Also, the engagement of the EOSCpilot project activities has provided RIs with networking opportunities and possibilities to share ideas and build the capabilities on the set-up of the EOSC.

1.2. E-Infrastructures, VREs or other pertinent H2020 projects

E-Infrastructures, VREs and other pertinent H2020 projects were identified early on as stakeholders of equal importance to RIs, both for the scope of the EOSCpilot project and the EOSC in general. Collaboration with this stakeholder category brings, among other, interdisciplinary approaches in science. In order to guarantee the success of the project in supporting the first phase in the development of the EOSC, and to lay the foundations for further activities in this direction, project participants focused on the following activities related to this specific stakeholder category:

- Connecting with main actors
- Uncovering synergies
- Leveraging existing connections, established infrastructures and services
- Participating in existing networks and/or establishing the environment for fostering new ones where needed

In order to achieve this, an initial landscape analysis took place. This analysis showed that the EOSCpilot project partners, third parties and science demonstrators were already involved in projects and initiatives relevant to EOSCpilot or have established relationships and networks. The aim of the activities listed above was to achieve a high level of collaboration, alignment of actions and goals, in order to maximize uptake by all concerned stakeholders and hence impact.

How did we engage with e-Infrastructures, VREs and other pertinent H2020 projects?

Apart from direct and informal communication channels used, EOSCpilot regularly collaborated with these stakeholders. A few successful examples include the following:

- Open Science Fair 2017 - project partners co-organised and participated in the workshop *National and European e-Infrastructure cooperation for Open Science*²². Organised by EGI, GEANT and OpenAIRE, the workshop aimed to provide “an opportunity for cross-pollination on issues ranging from open scholarship to technical service provision, training, community engagement and support” for OpenAIRE NOADs, EGI NGIs, GEANT NRENs and other national e-Infrastructure representatives, in the context of coordinating EOSC related activities.
- 2nd ASTERICS – OBELICS Workshop²³ - This event (held in Barcelona in 2017) addressed connections between the ESFRI projects and the implementation of EOSC for data interoperability.

²⁰ <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/infraesc-04-2018>

²¹ <https://www.esfri.eu/roadmap-2018>

²² <http://www.opensciencefair.eu/workshops/parallel-day-3-1/national-e-infrastructure-coordination-for-open-science>

²³ <https://indico.astron.nl/conferenceDisplay.py?confId=87>

- 2017 EOSC Stakeholders Forum - A collaborative soap-box session on Service Providers, RIs, e-Infrastructures²⁴ was organised. Together these stakeholders discussed their vision for EOSC, including requirements to consider when federating different structures and a roadmap for adopting EOSC services.

Further engagement activities in the first period of the project took place during the DI4R 2017 (*How to make EOSC services FAIR? Experience and challenges*²⁵ and *Cross e-infrastructure of training/technical support*²⁶), the EGI Conference 2017 and INDIGO Summit 2017, TNC17 and the Elixir Europe Conference.

In the second period of the project, engagement activities with this stakeholder category intensified as the work of the project evolved. Sessions involving e-Infrastructures, VREs, other H2020 projects (and involving other stakeholder categories) included:

- Piloting EOSC governance framework²⁷, “aiming at introducing the initial version of the governance framework, to discuss its main characteristics, highlighting possible limitations, incompleteness and problems, collecting suggestions and feedback in order to improve it toward its final implementation”. Furthermore, the EOSC as a ‘skills commons’ providing FAIR training for FAIR data stewardship²⁸, promoted dialogue between those with a cross-disciplinary skills remit and those with a more domain-specific focus and stimulated discussion to describe the project’s approach to stewardship competences and training approaches, during the EUDAT Conference in Porto.
- During the SRCE e-Infrastructure conference in Zagreb, a session on EOSCpilot recommendations on Governance and Rules of Participation²⁹ during the ENVRI week 2018 and a workshop on Recommendations on Governance and Rules of Participation³⁰ at the European HPC Summit Week 2018.
- An EOSCpilot workshop³¹ took place at e-IRG workshop. The first part was on the HPC ecosystem including presentations about HPC-related issues. The second looked at the status of the EOSC, including the EC Implementation Roadmap, major EOSC projects, related data initiatives and national views.
- The workshop “EOSC in Practice”³² took place at ePlan to discuss developments on EOSC with relevant projects and initiatives (EOSC-hub³³, National Platform Open Science³⁴ and FAIR³⁵).
- During the 2nd Stakeholders Forum³⁶, building on the results around the EOSC Governance Model and Architecture and the Rules of Participation, the project directly engaged with e-Infrastructures, VREs and relevant H2020 Projects, and especially in the sessions “The European Open Science Cloud - From vision to implementation” and “A community-empowered EOSC³⁷”.

Further engagement opportunities were exploited at DI4R2018, RDA Berlin, Elixir All Hands, EDSF Release 3 Design and ICT2018.

²⁴ <https://eoscpilot.eu/content/service-providers-research-infrastructures-e-infrastructures-1>

²⁵ <https://indico.egi.eu/indico/event/3455/session/32/?slotId=0#20171201>

²⁶ <https://indico.egi.eu/indico/event/3455/session/8/?slotId=0#20171130>

²⁷ <https://eudat.eu/piloting-eosc-governance-framework>

²⁸ https://eudat.eu/eosc_as_a_skills_commons_providing_fair_training_for_fair_data_stewardship

²⁹ <https://eoscpilot.eu/events/envri-week%C2%B4s-eoscpilot-workshop>

³⁰ <https://eoscpilot.eu/events/eoscpilot-workshop-recommendations-governance-and-rules-participation>

³¹ <https://eoscpilot.eu/events/eoscpilot-e-irg-workshop-14-15-may-2018>

³² <https://escience-platform.nl/2018/08/20/workshop-eosc-in-progress/>

³³ <https://www.eosc-hub.eu/>

³⁴ <https://www.openscience.nl/>

³⁵ <https://www.nature.com/articles/sdata201618>

³⁶ <https://eoscpilot.eu/events/second-eosc-stakeholders-forum>

³⁷ <https://www.eoscpilot.eu/sites/default/files/eoscpilot-sf2-intro-and-wrap-up.pdf>

What was the profit from engaging with this stakeholder group?

Engaging with e-Infrastructures, VREs and other pertinent H2020 projects was structural for both EOSCpilot and this specific stakeholder group. The synergies identified, interconnections and dialogue have been essential in building the EOSC and in setting the ground for further developments, structure, services and governance, for the EOSC to fulfil its purpose and be sustainable. A few examples from this interaction:

- “What the GO FAIR implementation will do, will contribute to the EOSC³⁸”, Barend Mons, GO FAIR.
- “RDA is the neutral forum where EOSC related initiatives can collaborate, to gather feedback and also tackle specific data challenges in the international environment³⁹”, Sara Garavelli, RDA Europe 4.
- “The mission of EOSC hub is to create an access point which brings together the demand side, researchers and innovators, and the supply side, major national providers, data software and e-infrastructures for research⁴⁰”, Tiziana Ferrari, EOSC-hub.
- “OpenAIRE Advance is a trusted infrastructure for the EOSC⁴¹”, Natalia Manola, OpenAIRE.
- “eInfraCentral was funded with a mission to ensure that as many users across Europe and beyond can find access and discover services provided by e-Infrastructure service providers⁴²”, Jelena Angelis, Jorge Sanchez, eInfraCentral.

1.3. Service Providers (Academic/Commercial)

Service providers, both academic and commercial, were recognised as key actors for the EOSCpilot project, especially in relation to the sustainability of the EOSC. In order for EOSCpilot, and ultimately the entire EOSC programme⁴³, to address the full-research lifecycle, including data gathering, management, analysis, sharing and discovery as well as to advance research in the open science context, the EOSCpilot project needs to engage with all relevant service providers, on a national and European level. Compared to other stakeholder groups, the engagement challenge for this group is their diversity, ranging from small to large and from commercial to non-profit and public services at many organisational levels.

How did we engage with Service Providers with an Academic or Commercial profile?

Service providers, mostly academic, were extensively informed about EOSC and the establishment of the EOSC services at the joint EGI Conference 2017 and INDIGO Summit 2017⁴⁴. EOSC was the subject of the Opening Plenary Session of this 4-day event and many different services (e.g. IaaS, PaaS, SaaS, AAI, service catalogues) were discussed in workshop and training sessions.

During the Open Science Fair (September 2017), EOSC project partners co-organised and participated in a workshop, *National and European e-Infrastructure cooperation for Open Science*⁴⁵. This workshop (organised by EGI, GEANT and OpenAIRE) included several sessions with a clear focus on service providers such as:

“Organising high quality research data management services for open science⁴⁶” (Workshop)

“Open science as a service: tools for research communities⁴⁷” (Workshop)

³⁸ <https://www.youtube.com/watch?v=rtArAZU53ss>

³⁹ <https://www.youtube.com/watch?v=qCXmwsuh0P4>

⁴⁰ <https://www.youtube.com/watch?v=mgc54JPBV-c>

⁴¹ <https://www.youtube.com/watch?v=Cwi8WEYKJY>

⁴² <https://www.youtube.com/watch?v=LWf8HKm2T8Q>

⁴³ [Prompting an EOSC in Practice - Final report and recommendations of the Commission 2nd High Level Expert Group on the European Open Science Cloud \(EOSC\)](#), DOI: 10.2777/112658

⁴⁴ <https://indico.egi.eu/indico/event/3249/>

⁴⁵ <http://www.opensciencefair.eu/workshops/parallel-day-3-1/national-e-infrastructure-coordination-for-open-science>

⁴⁶ <https://www.opensciencefair.eu/workshops/organising-high-quality-research-data-management-services>

⁴⁷ <https://www.opensciencefair.eu/workshops/parallel-day-2-1/open-science-as-a-service-tools-for-research-communities>

Most service providers involved in the Open Science Fair event had an academic profile.

A collaborative soap-box session on Service Providers, Research infrastructures, e-Infrastructures⁴⁸ was organised during the first EOSC Stakeholders Forum, bringing together several stakeholder categories to discuss their vision for the EOSC and the roadmap for adopting EOSC services.

Further service provider engagement activities in the first year of the EOSCpilot project took place during the DI4R 2017⁴⁹ meeting, especially in the session: *How to make EOSC services FAIR? Experience and challenges*⁵⁰.

Engagement between EOSCpilot and the service-providing EUDAT community was evident at the EUDAT 2018 Conference, *Putting the EOSC vision into practice*⁵¹. A myriad of services was addressed in the different workshops and plenary sessions, with many focusing on the EUDAT Collaborative Data Infrastructure (CDI). A special session was dedicated to collaboration with SMEs and commercial stakeholders.

An EOSCpilot workshop⁵² took place at a 2018 e-IRG⁵³ workshop, divided in two parts. One part addressed HPC services and HPC service providers. The other focused on the development of the EOSC including data and technical services at both the European and national level.

An important event for engaging and exchanging thoughts with service providers was the workshop *Future Open Science Services for Scientific Communities*⁵⁴ (October 2017), organised by EOSCpilot and the German OpenAIRE node. This workshop particularly focused on real researchers' needs when it comes to the services provided by EOSC.

A significant event to interact with service providers and (potential) EOSC services users was the workshop *Users meet the service providers: a discussion on needs and opportunities to define the EOSC service roadmap*⁵⁵, embedded in the programme of the second EOSCpilot Stakeholders Forum (November 2018). This extensive workshop had a strong academic signature but also service providing SMEs were represented.

Regarding engagement with commercial service providers, the workshop *Sustaining the European Science Cloud - Some pragmatic examples of Business model innovations on potential EOSC-related usage*⁵⁶ was very relevant. This workshop, also embedded in the programme of the second EOSCpilot Stakeholders Forum (November 2018), focused on ways to bring industry, academia and the public sector together, in order to work together on interoperable infrastructures and ensure that the best possible services are offered to their respective constituencies.

What was the profit from engaging with this stakeholder group?

The EOSCpilot established direct relationships with the providers of services, a crucial element of the EOSC infrastructure. Thanks to the efforts of EOSCpilot especially in cooperation with EOSC-hub, a considerable number of both academic as well as commercial service providers have now offered their services through the online EOSC catalogue⁵⁷.

What is the added value of EOSC for this stakeholder?

The EOSC, and especially the EOSC service catalogue, will become a major display window for services relevant to the European scientific and science related communities. For both academic and commercial

⁴⁸ <https://eoscipilot.eu/content/service-providers-research-infrastructures-e-infrastructures-1>

⁴⁹ Digital Infrastructures for Research

⁵⁰ <https://indico.egi.eu/indico/event/3455/session/32/?slotId=0#20171201>

⁵¹ <https://eudat.eu/events/conferences/eudat-conference-putting-the-eosc-vision-into-practice>

⁵² <https://eoscipilot.eu/events/eoscipilot-e-irg-workshop-14-15-may-2018>

⁵³ e-Infrastructure Reflection Group

⁵⁴ <https://eoscipilot.eu/future-open-science-services-scientific-communities-agenda>

⁵⁵ <https://www.eoscipilot.eu/content/users-meet-service-providers-discussion-needs-and-opportunities-define-eosc-service-roadmap#overlay-context=taxonomy/term/16>

⁵⁶ <https://www.eoscipilot.eu/content/sustaining-european-science-cloud-some-pragmatic-examples-business-model-innovations>

⁵⁷ <https://catalogue.eosc-portal.eu/browseCategories>

service providers, the EOsc will create an important platform or marketplace to exhibit, demonstrate and promote their services, across disciplinary and national borders.

Since the number of services offered through the EOsc catalogue will likely grow rapidly, it is important that users of the services have access to proper filtering, sorting, selecting and annotation tools. This will help them find services which best match their needs.

1.4. Research Funding Bodies

Research funders were identified early in the project as stakeholders which can support cultural change through institutional policies and mandates. Research funders are thus one of the most important actors to influence and support the EOsc. As such, they were involved in discussions with the European Commission's High-Level Expert Group in 2016 with a view to contribute to the initial recommendations on the realisation of the EOsc.

The project targeted Research Funding Bodies as intermediaries because they become enablers of Open Science and can affect change using mandates and institutional policies, as well as rules, regulations and practices in their calls for funding, setting the ground early on before the respective activities. For this reason, engaging research funders in the discussion, and raising awareness for the EOsc and Open Science in general was very important for the project. Research funders can act as multipliers.

The landscape that was explored comprised of both national and international funding bodies from the public and the private sector. National research funding bodies, operating on governmental budgets or as third sector bodies, were especially targeted as influencers of how open science and funded research relate to each other.

How did we engage with Research Funding Bodies?

Existing connections were leveraged in order to unite research funders with other intermediaries and stakeholder groups. This happened in many ways, including dedicated sessions such as:

- *Intermediaries, Research communities and Libraries*⁵⁸ a breakout session during the EOsc Stakeholder Forum 2017, aiming to engage participants by letting them interact as much as possible with each other.
- *Piloting EOsc governance framework*⁵⁹: a co-located event at the EUDAT 2018 Conference in Porto⁶⁰, aiming to engage participants in contributing to the design of the EOsc governance, in terms of model, principles of engagement of the stakeholders and business model.
- *Research Institutions And Libraries And The Role Of Funders In The European Open Science Cloud*⁶¹: a pre-conference workshop before the LIBER Annual Conference 2018 in Lille, France. The goal was to engage with funding bodies, research libraries, institutions and research-producing organisations at large, to raise awareness of the EOsc amongst these stakeholders and to provide opportunities for them to talk with each other on how to promote alignment across local policies and workflows and EOsc policies, workflows and services.
- Drafting policy recommendations that also target research funders, as well as supporting documents, such as the Report for EOscpilot Project: Mapping of WP3 Draft Recommendations to the Landscape:

⁵⁸ <https://eoscpilot.eu/content/intermediaries-research-communities-libraries>

⁵⁹ <https://eudat.eu/piloting-eosc-governance-framework>

⁶⁰ <https://eudat.eu/eudat-conference-2018-programme>

⁶¹ <https://eoscpilot.eu/events/eoscpilot-workshop-research-institutions-and-libraries-and-role-funders-european-open-science>

a brief discussion of some contemporary data policy recommendation sets⁶² and a Report about EOSCpilot WP3 Ethics Survey⁶³, but also the Draft⁶⁴ and Final Policy Recommendations⁶⁵.

What was the profit from engaging with this stakeholder group?

Research funders can affect change using their institutional policies and mandates. Being in line, engaging in dialogue and building an alliance with funders, supports the vision of EOSC, providing a framework that maximizes the value and impact of research outputs and raises awareness at the same time. They can support policy cultural change, while funding both infrastructures and individual researchers:

“At Wellcome we are trying to incentivise our researchers to share research outputs and on the other hand discussing the chances for incentives with other research funders⁶⁶”, David Carr, Wellcome Trust.

“[Research funders] are helping are refine, improve and validate the draft recommendations produced by the project⁶⁷”, Dale Robertson, Jisc.

What is the added value of EOSC for this stakeholder?

The message that EOSCpilot conveyed to research funders was focused on the fact that the EOSC would seriously affect the way they allocate their resources. By actively participating in shaping the EOSC, they had an opportunity to be a key player in shaping the future landscape of research in Europe.

1.5. National, regional and local government agencies

The landscape for national, regional and local government agencies is diverse, yet crucial for engagement within EOSCpilot. For these kinds of agencies, the possibilities EOSC will offer, concerning open data and open science, will become increasingly relevant and important. For this stakeholder group, EOSC services will allow for reduced costs when finding, handling and processing data. The EOSC will promote the standardisation of data and procedures and therefore allow for better collaboration at the European level, especially between national, regional and local governmental bodies. Open access to data and research as a mechanism to support policy and decision-making is another goal that will inevitably become more important as EOSC develops beyond the pilot stage. This increased transparency will be relevant for government agencies at all geographical levels.

How did we engage with national, regional and local government agencies?

Direct and structural interaction proved to be difficult. A clear overview of the landscape of this category of stakeholders was simply not available. Especially local and regional agencies are difficult to trace, certainly when it concerns the whole of Europe. Major engagement efforts were therefore focused on national government agencies. From the national level EOSC information would then possibly trickle-down to regional and local agencies.

Engagement with national, regional and local government agencies was often established through the activities of several EOSCpilot work packages, in cooperation with national agencies putting a great interest in the establishment and development of EOSC. An example was the establishment of the EOSCpilot Governance Development Forum⁶⁸ to enable all stakeholders to contribute to the development of the EOSC governance framework. A series of webinars and thematic workshops was organised by this EOSCpilot work package to facilitate regular interaction, and to inform and update stakeholders on the developments of the

⁶² https://zenodo.org/record/2536582#.Xlu_vSJKiM8

⁶³ https://zenodo.org/record/1999132#.Xlu_1yJKiM9

⁶⁴ <https://eoscipilot.eu/content/d33-draft-policy-recommendations>

⁶⁵ <https://eoscipilot.eu/content/d36-final-policy-recommendations>

⁶⁶ <https://www.youtube.com/watch?v=dp4QGwF4ocl&t=1s>

⁶⁷ <https://www.youtube.com/watch?v=jNcNCcXFPuA>

⁶⁸ <https://eoscipilot.eu/about/governance-framework>

EOsc governance. Around 9-11% of registered webinar attendees represented governmental institutions. In the workshops organised by the EOscpilot Governance Development Forum, there was a relative high number of national government representatives.

Illustrative cases of interaction and engagement were the two EOsc stakeholder events in respectively Brussels (November 2017) and Vienna (November 2018). At these meetings several participants were representing National Research Councils, Ministries and Ministerial Departments, (thematic) Federal Institutes or Agencies and (thematic) National Research Institutes. The number of these representatives was relatively low and they were mostly in the “observational” mode, i.e. probing the movement of EOsc in its early development.

In several member states participation and co-operation in EOscpilot by national governmental agency representatives had a visible impact on national measures. For example, the Ministry of Education and Culture in Finland did implement a research and development infrastructure development program⁶⁹ with national research and innovation actors for the period 2017–2021. This development program will, among other things, update the computing environment supporting national research and education services.

Clearly in some cases a cluster of scientific organisations involved in EOsc, like in Amsterdam, where EOsc leading organisations like EGI and SURF are settled, does seem to inspire local agencies to embrace the EOsc approach. In 2018 the Amsterdam Economic Board⁷⁰ launched the Amsterdam Data Exchange (AMDEX), an initiative that resembles a local EOsc implementation. The documentation⁷¹ underpinning the Amsterdam Data Exchange clearly refers to EOsc as an example and source of inspiration.

Another approach that was practised was the approach of European Agencies that are built around a distributed network of national, and sometimes regional, agencies. A good example of such a network is the European Environment Agency (EEA), that is using the European environment information and observation network (Eionet) to assemble data on Europe’s environment. The national focal points (NFPs) within Eionet are typically based in national environment agencies or environment ministries. Organisations such as the EEA were mainly included in EOscpilot promotion activities around the two EOsc stakeholder events.

What was the profit from engaging with this stakeholder group?

EOscpilot established direct relationships with end-users of the EOsc technical and data services. EOscpilot worked on understanding their needs and tried to understand the best ways to communicate the EOsc.

What is the added value of EOsc for this stakeholder?

The involvement of national, regional and local government agencies is beneficial for the stakeholder group itself, as it may provide more awareness of the possibilities provided by EOsc in terms of access to services and on how they may utilise these services nationally, regionally and even local. Clearly, with the EOsc infrastructure still in its infancy, and with most agencies in this stakeholder group having applied and formal tasks, the cooperation has to grow significantly in the near future.

1.6. Learned societies, research communities, scientific and professional associations

Learned societies, research communities, scientific and professional associations represent the primary end users of the services provided by the EOsc, as envisaged in the EOsc implementation roadmap. Feedback from their users can shape its features and requirements.

How did we engage with Learned societies, research communities, scientific and professional associations?

⁶⁹ <https://minedu.fi/dl2021>

⁷⁰ <https://www.amsterdameconomicboard.com/en>

⁷¹ https://towardsamdex.org/wp-content/uploads/2018/12/AMdEX_report_English.pdf

“The EOsc helps my Science Demonstrators to provide more powerful tools to the research communities we are serving⁷²”, Roberto Scopigno, PI of VisualMedia, at the EOscpilot All Hands Meeting in Pisa, 8-9 March 2018.

Two main workshops took place. The first, *Future Open Science Services for Scientific Communities⁷³*, explored the general expectations of the EOsc. Representatives of various research communities engaged with participants to present the state of the play of the activities in EOscpilot, especially those linked to training. Together they discussed how to fill in eventual gaps. The second, *Users meet the service providers: a discussion on needs and opportunities to define the EOsc service roadmap⁷⁴*, took place after the publication of the EOsc Implementation Roadmap and its strong focus on services. It discussed priorities to define the EOsc services roadmap from the research communities’ perspective.

Interviews with representatives of research communities were conducted in 2017 as preparation for the first workshop for scientific communities. The text of the interviews is published as an annex of D8.2.

At the Open Science Conference 2018, a poster⁷⁵ focusing on the dialogue between libraries and research communities to participate in building the EOsc was presented. It raised considerable interest. At DI4R2018, a presentation⁷⁶ on the EOscpilot Science Demonstrators as a demonstration of the EOsc in practice showcased the leading idea behind having pilot projects using the services in a federated way and the results achieved.

On the Science Demonstrators’ side, considerable effort was put into engaging with research communities existing inside the project. Besides liaising directly with the Principal Investigators to understand (and possibly fulfil) their communication needs, a success story⁷⁷ was published and Science Demonstrators were encouraged to share their activity progress outside the consortium⁷⁸. Factsheets were prepared for each Science Demonstrator, presenting details on the research project, main achievements or difficulties and other information. The factsheets were distributed at the second EOsc Stakeholder Forum.

Video interviews with representatives of the Scientific Demonstrators were also recorded with support from LIBER.

What was the profit from engaging with this stakeholder group?

The EOscpilot established direct relationships with the end-users, working on understanding their needs and trying to fill in the communication gaps.

What is the added value of EOsc for this stakeholder?

“The EOsc helped in improving the portability of code we developed in our science demonstrator and we greatly benefitted from the scalable distributed support from e-infrastructures provider⁷⁹”, Hanno Holties, system engineer for ASTRON Radio Observatory.

The EOsc is a game changer in the way researchers and scientists work and perform their research activities. Also, the launch of the EOsc Portal opens new possibilities in this respect. However, the uncertain timeline might affect the uptake of the EOsc among these communities.

⁷² <https://eoscipilot.eu/content/closer-look-visualmedia-science-demonstrator-eoscipilot>

⁷³ <https://eoscipilot.eu/future-open-science-services-scientific-communities-agenda>

⁷⁴ <https://www.eoscipilot.eu/content/users-meet-service-providers-discussion-needs-and-opportunities-define-eosc-service-roadmap#overlay-context=taxonomy/term/16>

⁷⁵ <https://www.open-science-conference.eu/archive/open-science-conference-2018/call/>

⁷⁶ <https://indico.egi.eu/indico/event/3973/session/52/contribution/98>

⁷⁷ <https://eoscipilot.eu/textcrowd-success-story>

⁷⁸ <https://eoscipilot.eu/news/visual-media-service-back-again-and-extended>

⁷⁹ <https://eoscipilot.eu/content/astron-radio-observatory>

1.7. Research Producing Organisations/Academic Institutions and Research Libraries

This group is of great significance for the EOSC and the project. They serve as pivotal intermediary stakeholder group that brings in the voice of the end-user base from the bottom-up. The importance of reaching this group was highlighted in the project proposal, and specific tasks were planned to link and engage with various organisations, initiatives, associations, communities and individuals on many levels and across disciplines.

Based on the internal survey, this stakeholder category scored 50% higher compared to other stakeholder categories in its relevance as a target group for EOSCpilot work packages. Activities were led by Gottingen University and LIBER, the Association of European Research Libraries.

Because of their essential role, we used many tactics to encourage collaboration and community building. The stakeholder gained insight on the EOSC's governance and services. The project gained knowledge which contributed to its structure and content and helping to address challenges that occurred throughout the project's work packages.

Various engagement channels, communication tools and venues were used by the project partners, including private and direct contacts, newsletters and participation in the EOSC Stakeholder Fora and interviews.

How did we engage with Research Producing Organisations, Academic Institutions and Research Libraries?

EOSCpilot attended several relevant third-party events. A few highlights:

"We need a strong commitment for Open Science⁸⁰", Elena Giglia, Librarian, Head of the Open Access and online publishing office, Torino at the Open Science Fair 2017 in Athens, Greece.

"It's very important for different stakeholders working together⁸¹", Gintarė Tautkevičienė, Head of the Information Services Department at Kaunas University of Technology on participating in EOSCpilot workshops and the multi-stakeholder interaction.

An introduction to Open Science by Valentino Cavalli⁸², Open Science Officer for LIBER at the Open Access Week in Belgium in 2017.

A dedicated session for Intermediaries, Research communities and Libraries⁸³ took place during the EOSC Stakeholder Forum 2017. It engaged participants by letting them interact as much as possible with each other.

"How Research Institutions and Libraries Can Help Deliver The European Open Science Cloud?⁸⁴" was an EOSC stakeholder event during the IDCC Conference (February 2018, Barcelona). It targeted research libraries, academic institutions and other research-performing organisations – the key intermediaries between researchers and service providers. We had very positive reactions⁸⁵ from workshop participants on how important it is to *"cooperate more, to work together and find valuable resources"* and *"using rewards as a means to engage to culture change"*. The participants vividly discussed the speakers' presentations on data stewardship, FAIR data and rewards. Speakers also shared views on how research libraries and institutions

⁸⁰ <https://www.youtube.com/watch?v=7n83ydfLUwk>

⁸¹ <https://www.youtube.com/watch?v=5cOmAjKNAPo>

⁸² <https://openaccess.be/2017/08/24/open-in-order-to-advance-science/>

⁸³ <https://eoscpilot.eu/content/intermediaries-research-communities-libraries>

⁸⁴ <https://eoscpilot.eu/events/how-research-institutions-and-libraries-can-help-deliver-european-open-science-cloud>

⁸⁵ <https://www.youtube.com/watch?v=r9bSRfZcLw0>

are connecting as intermediaries in EOSC⁸⁶ and *how they can contribute to the EOSC policies and best practices*⁸⁷, sharing case studies and key messages.

This workshop was followed by an event on *Research Institutions And Libraries and The Role Of Funders In The European Open Science Cloud*⁸⁸ (July 2018, LIBER Annual Conference⁸⁹, Lille). Funding bodies, research libraries, institutions and research-producing organisations attended the workshop to learn about the EOSC. Together they discussed how to promote alignment across local policies and workflows and EOSC policies, workflows and services. Speakers provided insight on the *incentives and mechanisms working towards an Open Science environment*⁹⁰ and how researchers need to be attracted at research and institutional levels, *maximizing the value of research outputs*⁹¹, as well as the *EOSCpilot policy recommendations*⁹² working towards this goal and reducing barriers in the implementation of EOSC. Further engagement with this community took place via co-organised webinars in 2019, promoting the project's findings and outputs in areas such as skills, ethics and governance⁹³.

The workshops led an informal working group produced a report on a *Vision for Open Science*⁹⁴ in 2018: a report elaborating on the **incentives, mandates and roles** these actors can play to change the status quo. It sets a vision in which open science is the norm, and all funding bodies as well as institutions and researchers recognise the benefit of open science and embed best open science practice into their processes.

What was the profit from engaging with this stakeholder group?

EOSCpilot managed to uncover the role of these communities as intermediaries that can involve the end-users in shaping EOSC. Their contribution was both essential and structural. It provided the opportunity for the project to discuss the skills and training in Open Science and the EOSC ecosystem, by directly linking with these communities. Over 60 people attended a webinar⁹⁵ in December 2018, co-organised by EOSCpilot and LIBER's Working Group on Digital Skills for Library Staff and Researchers⁹⁶. This added to the understanding of how they fit in the EOSC, and how to train research support staff and librarians to support researchers with an improved knowledge of the EOSC landscape.

Furthermore, this stakeholder group had the opportunity to:

- Facilitate and support the development of sustainable access to high-quality data and services for researchers;
- Gain access to new federated services and interoperable data. This in turns helps their researchers to make research results visible, reproducible and re-usable to support awareness-raising about the value of research data in open science and innovation, improve the organisation's data stewardship skills and capacity and learn new approaches to support their recognition;
- Benefit from a unified vision for open research data and services and actively contribute to shaping the EOSC's development.

⁸⁶ <https://www.youtube.com/watch?v=Z698B9JYLam>

⁸⁷ <https://www.youtube.com/watch?v=6XieFTWloBg>

⁸⁸ <https://eoscipilot.eu/events/eoscipilot-workshop-research-institutions-and-libraries-and-role-funders-european-open-science>

⁸⁹ <https://libereurope.eu/events/liber-2018-lille-annual-conference/>

⁹⁰ <https://www.youtube.com/watch?v=vxyl8IWuDU>

⁹¹ <https://www.youtube.com/watch?v=dp4QGwF4ocl>

⁹² <https://www.youtube.com/watch?v=jNcNccXFPuA>

⁹³ <https://www.youtube.com/watch?v=ArIYY3r1QJg>

⁹⁴ <https://zenodo.org/record/1491303#.XlulHyJKiM->

⁹⁵ <https://libereurope.eu/blog/2018/11/27/eoscipilot-liber-webinar-skills-and-training-in-open-science-and-the-eosc-ecosystem/>

⁹⁶ <https://libereurope.eu/strategy/digital-skills-services/digitalskills/>

What is the added value of EOsc for this stakeholder category?

Engaging in dialogue with Research Producing Organisations, Academic Institutions and Research Libraries had been important for the project, validating its outputs, but also for this specific stakeholder category, which had the ground to make statements, identify training needs and actually have an active role in shaping the EOsc.

1.8. Enterprises (Industry as providers or consumers, SMEs, Start-ups, etc)

The EOscpilot project aimed to engage industry in the process of building the EOsc. As a first step, relevant players were identified at European level. A survey was circulated to the whole consortium and science demonstrators to identify stakeholders with which project partners had contact. The survey results were used to outline the enterprise landscape.

Extensive desk research followed. Information was gathered and analysed from multiple sources, resulting in an Industry List of more than 280 key players in Europe's cloud computing industry. Many sources were used^{97 98} including members' lists of organizations and associations dedicated to build a community of providers and end-users of cloud-based solutions. The desk research covered 30 countries (EU28, Switzerland & Norway).

The following table shows an extract of the database with some examples of Belgian, Cypriot and Danish enterprises. The database has been structured taking into consideration the categorisation of the target group, as described above.

EOscpilot Industry List				
Organisation	Organisation Type	Website	Email	Country
Accel	Infrastructure as a Service (IaaS)	https://www.accel.be/	contact@accel.be	Belgium
aspex	Infrastructure as a Service (IaaS)	https://www.aspex.be/en/	info@aspex.be	Belgium
Babelway	Platform as a Service (PaaS)	http://www.babelway.com/	info@babelway.com	Belgium
cegeka	Software as a Service (SaaS)	https://www.cegeka.com/en	form	Belgium
Cloudalize	Software as a Service (SaaS)	https://www.cloudalize.com/	info@cloudalize.com	Belgium

⁹⁷ <https://techcrunch.com/?gucounter=1>

⁹⁸ <https://www.themetisfiles.com/>

ERRIN	Platform as a Service (PaaS)	http://www.errin.eu/	communication@errin.eu	Belgium
ASBIS	Platform as a Service (PaaS)	http://www.asbis.com.cy/	info@asbis.com.cy	Cyprus
CL8	Infrastructure as a Service (IaaS)	http://cl8.com/	info@cl8.com	Cyprus
DG Soft	Software as a Service (SaaS)	http://dgsoft.com.cy/dgsoft-en/	info@dgsoft.com.cy	Cyprus
ajour	Software as a Service (SaaS)	http://ajourpos.com/	Hello@ajour.dk	Denmark
any.cloud	Infrastructure as a Service (IaaS)	http://anycloud.dk/dk/	salg@anycloud.dk	Denmark
Hostnordic	Infrastructure as a Service (IaaS)	https://www.hostnordic.dk/	sales@hostnordic.com	Denmark
hubbroker	Software as a Service (SaaS)	http://www.hubbroker.com/	kontakt@hubbroker.com	Denmark
ibistic	Software as a Service (SaaS)	https://ibistic.com/#en/	marketing@ibistic.com	Denmark
inventio.it	Infrastructure as a Service (IaaS)	https://www.inventio.it/	info@inventio.it	Denmark
Labster	Software as a Service (SaaS)	https://www.labster.com/	info@labster.com	Denmark

Table 1: EOSCPilot Industry List

Industry Stakeholder workshops

Two workshops were co-located with larger events aimed at the industry engagement, specifically aimed at SMEs and start-ups both as service providers and data consumers.

The first one was held at the Open Science Fair 2017⁹⁹ in Athens. The Open Science FAIR workshop themed “EOSC meets enterprises’ needs” provided very useful insights in terms of how industry, academia and the public sector could be activated in order to achieve the policy objectives of the EOSC. During the workshop, speakers presented their perspective on what the industry thinks about EOSCpilot and what their expectations are. Participants had the opportunity to discuss with them and exchange ideas.

⁹⁹ <http://www.opensciencefair.eu/>

The main conclusions were:

- Customers should be at the centre of any collaboration between industry and academia;
- Frictions in the flow of data - legally, technically and organizationally - must be reduced;
- Data flow must be complemented with trust between collaborating parties. Again, technical, organizational and legal structures must be deployed in order to facilitate the cultivation of such trust;
- Specific fora and open innovation platforms must be established in order to facilitate collaboration between industry and academia. Existing initiatives grounded on different forms of smart specialization need to be further expanded and replicated in order to ensure the maximum production of value across different industrial areas;
- Data and digital skills are a precondition for the production of value and the support of open science policies for academia and the industry;
- Financial tools that blend academia with industry need to be developed in order to provide open science services with the necessary means to scale up and compete at a global scale;
- Comprehensive Intellectual Property schemes need to be developed so that open science and industrial (particularly patent) policies may be reconciled with patent and IP exploitation policies.

The second workshop “Sustaining the European Science Cloud: Some pragmatic examples of Business model innovations on potential EOSC-related usage” took place at the 2nd Stakeholders Forum (October 2018, Vienna). The panel discussion centred on exploring the relationship of Open Science with the Industry, the benefits of Open Science from an industrial perspective, the development of the EOSC and the strategy and goals of the EOSC.

The workshop captured the spirit of how “business model innovations could work through EOSC-related usage”: insights both timely and critical at this stage of the launch of the EOSC implementation roadmap. It leaned towards the need of guidance and support from funding agencies and Member State intervention.



Figure 1: Industry Workshop Panel chaired by David Pringle

In Photo (from left to right): Shaun Cairns, Jurry De la Mar, Cristina Duma, Jan Korbelt, Federica Rosetta, George Nolis and Fabrizio Gagliardi.

The panel had equal representation of Industry and Research ecosystems. It came to the following conclusions:

- Open Science can create fruitful new relationships between Academia and Industry, if the EOsc fosters the establishment of commons, if data becomes more openly available, and if more specific policy actions allow people with smart ideas to leverage data which are open and use them to create something innovative;
- Data need to be not only available but also understandable;
- Future needs and standardization of services included in EOsc will incentivize the industry;
- Inclusion of paid services in EOsc could benefit the industry. Open Data doesn't mean that everyone is getting it for free;
- Community engagement with the creation of rewards and incentives system is essential for the EOsc Success;
- EOsc Charging Strategy is a tough subject. Voucher System or Cloud credit/coin model for more flexible requirements should both be implemented in different kinds of data, services or users. The value of the data should also be taken into consideration;
- There is a risk of overregulation of the EOsc. Business is very agile. The EOsc should not overplan. It can better leave things open and discuss with the industry.

An additional working session was co-organised with the support of Fraunhofer-Institut für Software- und Systemtechnik ISST¹⁰⁰ (September 2018) to address larger enterprises active in the Industrial Data Space initiative (IDS). The workshop was collocated with one of the planned events by the Industrial Data Space user association in order to maximize the attendance and feedback. The main goal of the workshop was to enhance the visibility of the EOsc at European enterprises with a need for data analysis services. A Survey was shared among the IDS members in order to have their perspective on the requirements and expectations for the European Open Science Cloud.

The survey (see Annex A) aimed to indicate and evaluate the interest in a scientific data cloud infrastructure to face the major challenges on the social and technical level. Members of the IDS were interviewed about essential platform requirements as well as their data consuming and sharing attitude.

1.9. General Public

In this section, we outline the various ways in which EOscpilot engaged the general public.

Dedicated web page

The EOscpilot project created a page on its website to help people understand what the EOsc is and how they could benefit from it and be involved with it.

¹⁰⁰ <https://www.isst.fraunhofer.de/>

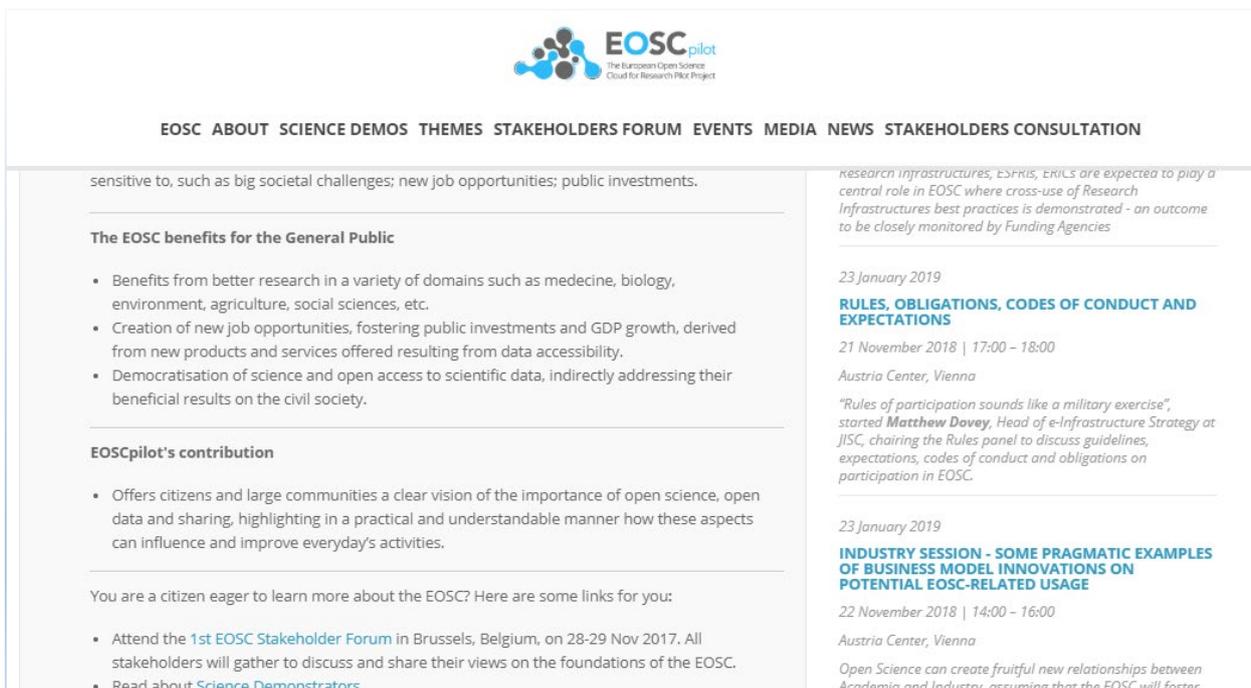


Figure 2: EOSCpilot website page example

Communications activities

Simple, jargon-free social media posts were published to explain to people the importance of EOSC and how it could benefit them.

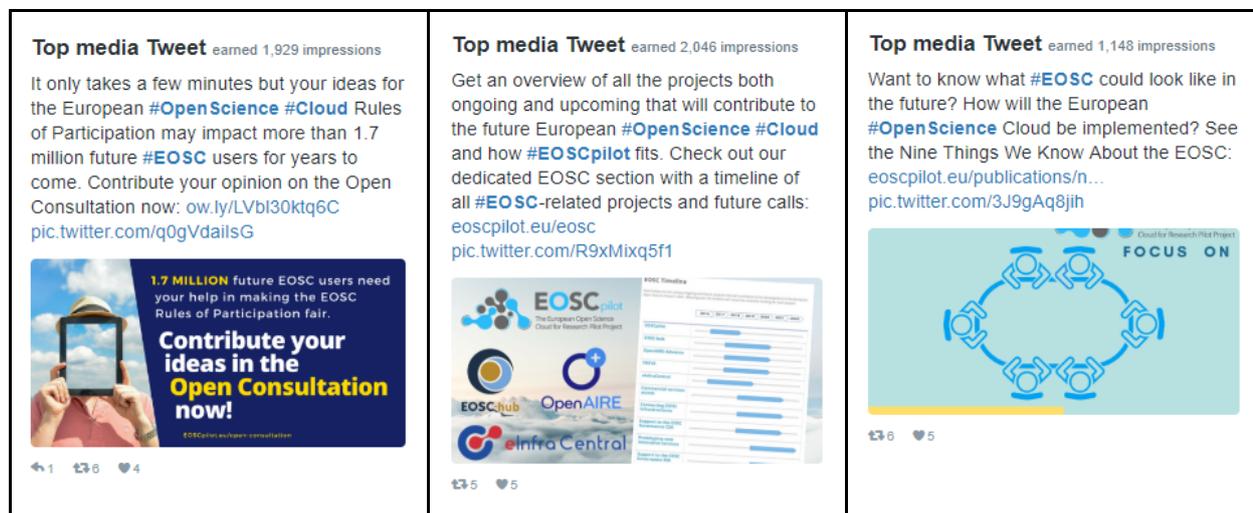


Figure 3: Top Media Tweet examples

This earned the EOSCpilot social media accounts followers that were outside the normal research community but still interested in open science and technology topics, as well as mass media outlets. Below are some examples:

- <https://twitter.com/LandSense>
- <https://twitter.com/FlorinZubascu>
- <https://twitter.com/TechNativeWire>
- <https://twitter.com/job01111>
- <https://twitter.com/R0bKnappen>

- <https://twitter.com/cdtiwari>
- <https://twitter.com/DigitalMetr>
- https://twitter.com/ste_par
- <https://twitter.com/dg1sek>
- https://twitter.com/ola_tarkowska
- <https://twitter.com/BlakeChastee>

EOSCpilot also has a YouTube account with a high-level introductory video on EOSCpilot's role in the EOSC shown to the channel's visitors¹⁰¹:

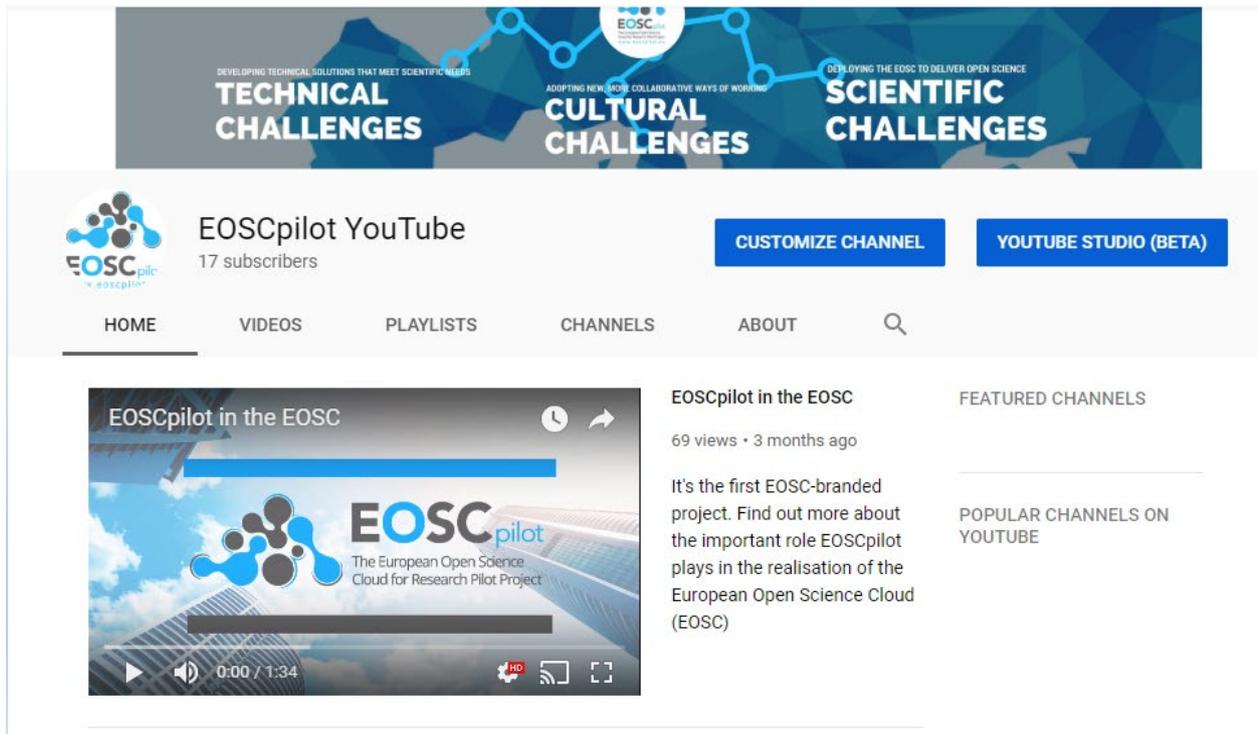


Figure 4: EOSCpilot YouTube Channel

¹⁰¹ <https://www.youtube.com/watch?v=rL54THppyHc>

2. CROSS-STAKEHOLDER ENGAGEMENT ACTIVITIES

2.1. EOSC Stakeholders Forum

The Stakeholders Fora in 2017 and 2018 were flagship stakeholder engagement activities for EOSCPilot.

On both occasions, the fora brought together different stakeholder groups and ensured cross-stakeholder engagement through carefully designed sessions that aimed to generate multi-disciplinary and diverse discussions.

Aside from the plenaries that generally brought different stakeholders together, the Soap Box Sessions, as well as the workshop session for Scientific Communities during the 2018 installation of the EOSC Stakeholders Forum, cut through stakeholder groupings and brought them together based on shared interests in these topics. The Soap Box Sessions were dedicated to (1) Service Providers, RIs, e-Infrastructures, (2) Intermediaries, Research Communities and Libraries, and (3) Governments, Funders and Industry, and Cross Disciplinary Pan European Research Sessions from the 2017 EOSC Stakeholders Forum as well as “EOSC Action Lines”-oriented sessions for (1) Policy, (2) Skills, (3) FAIR Data, (4) Governance, (5) Rules of Participation, and (6) Interoperability.

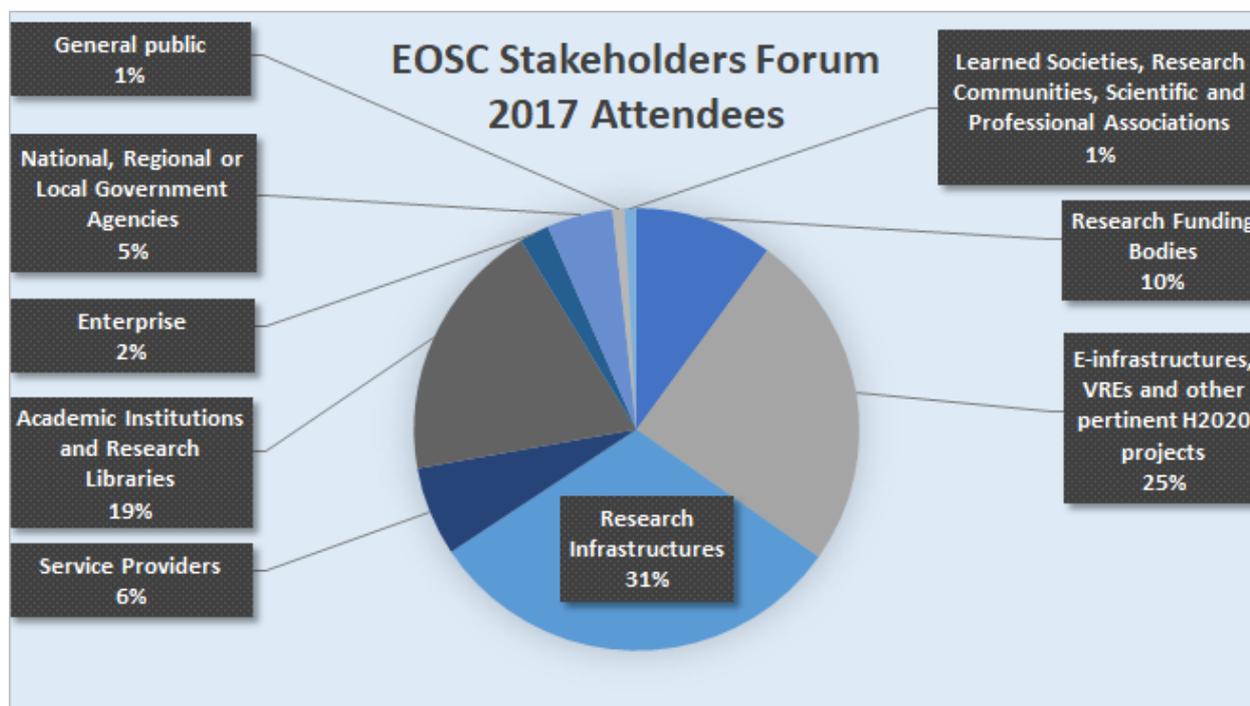


Figure 5: Graph of EOSC Stakeholders Forum 2017 Attendees

All stakeholder groups were represented by the 264 participants in 2017 (as seen in the chart above).

This event was also collocated with the Digital Infrastructures for Research 2017 (DI4R 2017) that also brought EOSCPilot stakeholders in contact with the attendees of the DI4R that were mostly service providers and users of research infrastructures from the European scientific community.

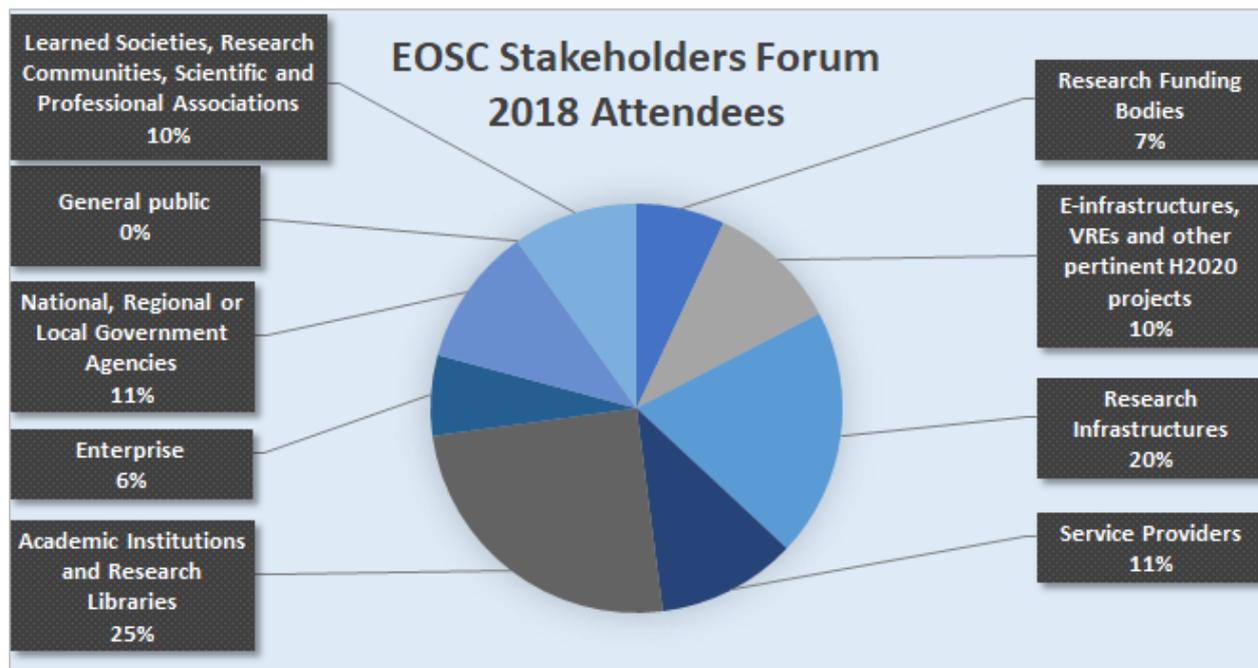


Figure 6: Graph of EOSC Stakeholders Forum 2018 Attendees

The 2018 EOSC Stakeholders Forum was attended by 201 people from all stakeholders, aside from the general public. The event was organised alongside the EOSC Launch, giving it significant visibility.

The cross-stakeholder engagement worked well during the workshop, bringing together research communities and service providers, when representatives of digital infrastructures, research projects and communities (the long-tail of science and service providers) met to discuss the state of play in federating resources and services to enable multi-disciplinary science and transnational access. The discussion revolved around the need for trusted services where the EOSC should demonstrate direct user benefit, added value and return of effort.

3. RECOMMENDATIONS

From our experience in engaging EOsc-relevant stakeholders, we have identified important aspects for all collaboration and highlighted the importance of engaging each stakeholder group. Other EOsc-related projects can use these recommendations to further their engagement work.

3.1. General Recommendations

Survey, survey, survey. Short questionnaires are an effective way to quickly gather a large amount of critical information. Consortium partners can be surveyed, for example, to identify existing contacts between project partners and key industry stakeholders. The resulting information can be used to map the stakeholder landscape. Surveys with specific groups of stakeholders (such as those which EOscpilot carried out with business representatives) can be used to better understand overall expectations and needs.

Interviews for detailed feedback. Like surveys, individual interviews with key stakeholders can provide valuable guidance. Gathering this kind of feedback is essential if EOsc-related projects are to clearly understand the strengths, weaknesses and gaps which needed to be targeted. Individual interviews have another benefit: they establish a close dialogue between the EOsc and its users. By creating this connection early on, projects have a way to monitor attitudes and needs related to the EOsc as they emerge.

Take the conversation further. Good engagement creates conversations and long-lasting connections. EOsc projects can extend their main activities (such as workshops) by connecting participants after the fact. For example, EOscpilot asked delegates in our library-focused workshops to join an informal working group, which then translated the workshop discussions into a “*Vision for Open Science*”. Thanks to this collaboration, the conclusions of our workshops reached a far larger audience beyond those present on the day. Those involved also felt a sense of ownership in the outputs which would have been absent had we merely communicated project findings to them. This is important as this stakeholder category represents an EOsc intermediary/end user group, so their input is critical when building components of EOsc.

See your strategy as a living document. EOscpilot revisited its engagement strategy at the midway point of the project, in order to update the final KPIs and to check for new ways to maximise the project’s activities and reach.

Consider reaching large stakeholder groups by targeting top players. Some stakeholder groups - such as government agencies - are extremely large and contain players at many levels (local, regional, national). This makes direct and structural interaction difficult, especially within the limited resources of a project. We therefore recommend focusing on the biggest players (in this case national agencies), which can then feed information down to the local level. Another approach can be to focus on European agencies, which are built around a distributed network of national and (sometimes) regional agencies.

3.2. Stakeholder Groups to Target & Why

Research Infrastructures - By holding detailed discussions with RIs, and by stimulating a multidisciplinary collaboration between RIs, we can increase the organizational synergies and interoperability of data and tools. RIs also benefit from this engagement through increased networking opportunities, and possibilities to share ideas and build the capabilities on the set-up of the EOsc.

e-Infrastructures, VREs and other pertinent H2020 projects - They offer essential feedback for building the EOsc, and in setting the ground for further developments, structure, services and governance. This in turn will help the EOsc to fulfil its purpose and be sustainable.

Service Providers (Academic/Commercial) - They are a crucial element of the EOSC infrastructure. By engaging with this group, as we did in EOSCpilot, the number of services providers offering services through the online EOSC catalogue increased considerably.

Research Funding Bodies - Ensuring that the institutional policies and mandates of Research funders are in line with the EOSC maximises the value and impact of research outputs and raises awareness. Research funders can also support cultural change through their policies. They are motivated to engage with the EOSC because it will have a major effect on future resource allocation, and by participating now they can actively shape Europe's future research landscape.

National, Regional & Local Government Agencies - They are a way to establish direct relationships with the end-users of the EOSC technical and data services. For the agencies themselves, engaging with the EOSC may provide more awareness of the possibilities provided by the EOSC in terms of how to access and use services. Cooperation with this stakeholder group is in a relatively early stage compared with other groups, leaving plenty of room for growth.

Learned societies, research communities, scientific and professional associations - By making connections with this group, EOSC related projects can establish direct communication with the end-users of the EOSC, leading to a better understanding of their needs and an effective two-way dialogue.

Research Producing Organisations, Academic Institutions and Research Libraries - Engaging with this group provides an opportunity to discuss skills and training in Open Science and the EOSC ecosystem. By learning more about the EOSC, research support staff and librarians can identify training needs and learn how to better support researchers. In addition, they can have an active role in shaping the EOSC.

Enterprises – The needs of industry are unique compared to other stakeholders, in terms of the type of guidance, services and data they expect. By attending industry events, their valuable perspectives can be gathered.

General Public – By creating website pages and social media posts aimed at a general audience, EOSC-related projects can reach people who are not part of the standard research community but who nonetheless are interested in topics such as Open Science. This includes mass media outlets.

ANNEX A.

Survey shared among the IDS members in order to have their perspective on the requirements and expectations for the European Open Science Cloud.





1 General Information

1. Which type is your organization?

company RTO other: _____

2. In which domain is your organization active?

3. In which field/area of your organization are you active (e.g. IT strategy, purchasing, management board, ...)?

4. What is your role/position?

5. Country of your organization/the headquarter of your organization:

6. Country of the subsidiary you are working for (if applicable):

7. Annual turn-over (if at hand):

8. Number of employees (if at hand):

2 Data Consumer

Definition: Data consumer make use of scientific data stored in the EOSC by data providers.

2.1 Requirements on Scientific Data

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9. Does your organization require scientific data in any field/area?

yes no

If no, please continue with question no. 12.

10. How relevant are scientific data for you? Please specify (e.g. purpose, impact on business success, ...):

11. From which domain(s) do you require scientific data? Please fill in table below.

- a. Which period is relevant for those?
- b. In which frequency?
- c. In which quality (e.g. completeness, proof of origin, accuracy, ...)? Please specify if applicable.

a. Domain	b. Period	c. Frequency	d. Quality
_____	<input type="checkbox"/> n/a <input type="checkbox"/> up to one year <input type="checkbox"/> up to 3 years <input type="checkbox"/> up to 10 years or older	<input type="checkbox"/> constantly <input type="checkbox"/> once <input type="checkbox"/> periodically: _____ per day/week/ month/year	_____
_____	<input type="checkbox"/> n/a <input type="checkbox"/> up to one year <input type="checkbox"/> up to 3 years <input type="checkbox"/> up to 10 years or older	<input type="checkbox"/> constantly <input type="checkbox"/> once <input type="checkbox"/> periodically: _____ per day/week/ month/year	_____
_____	<input type="checkbox"/> n/a <input type="checkbox"/> up to one year <input type="checkbox"/> up to 3 years <input type="checkbox"/> up to 10 years or older	<input type="checkbox"/> constantly <input type="checkbox"/> once <input type="checkbox"/> periodically: _____ per day/week/ month/year	_____

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12. How should scientific data (even if your organization currently does not require any scientific data) be searchable (e.g. Google-like search engine, AppStore-like catalogue, linked data, ...)? What are relevant parameters for you?

2.2 Requirements on Technical Infrastructure

13. What are favored interfaces to receive scientific data (e.g. downloadable files, JSON objects, ODBC interface, chart on screen, ...)?

14. What are favored file formats to receive scientific data?

15. Are there any other requirements for integrating scientific data? If applicable, please specify:

The EOSC will be able to provide cloud-based computing services, which allow you to receive the results, not just the (raw) input data. Considering that the scientific community might benefit from your approach and results...

16. ...in how far would you agree to share the algorithms you apply to scientific data in the EOSC (e.g. not at all, OK if my organization remains anonymous, no restrictions, ...)?

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17. ...in how far would you agree to share the results from your computation in the EOSC?

18. Are you willing to pay for scientific data if necessary? Please specify why/why not:

3 Data Provider

19. Is your organization providing or considering providing scientific data to the public?

Yes. Please comment on the type of data: _____

No

20. What is or would be the motivation for providing scientific data (e.g. acceptance in scientific community, revenue, attraction of talents, attraction of business partners, ...)?

21. What are your requirements regarding the terms of use for your data and their enforcement?

22. What are your requirements on the interface?

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4 Contribution of the Industrial Data Space

23. In how far could the Industrial Data Space complement the idea of an EOSC?

24. Do you see any benefits for the EOSC if the Industrial Data Space connects to it?

25. Do you see any benefits for the Industrial Data Space if it would give access to the EOSC?

5 General Remarks

26. Do you have any other comments, recommendations or requirements?

27. If you would like to receive further news on the EOSC, please fill in your e-mail address:

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GLOSSARY

Term	Explanation
EOsc	European Open Science Cloud
EC	European Commission
Open Science	The movement to make scientific research, data and dissemination accessible to all levels of an inquiring society, amateur or professional.
Science Demonstrators	High-profile pilots that integrate services and infrastructures to show the usefulness of the EOsc Services and will drive the further development of EOsc.
Project partners	The EOscpilot project partners
H2020	Horizon 2020 is a EU Research and Innovation programme with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.
Open Innovation	According to EC, the basic premise of Open Innovation is to introduce more actors in the innovation process so that knowledge can circulate more freely and be transformed into products and services that create new markets, fostering a stronger culture of entrepreneurship.
Digital Single Market strategy	According to EC, the Digital Single Market strategy aims to open up digital opportunities for people and business and enhance Europe's position as a world leader in the digital economy.
Research Infrastructures	Research infrastructures (RIs) are facilities, resources and services used by the science community to conduct research and foster innovation.
VREs	Virtual Research Environments
SMEs	Small and medium-sized enterprises
OSPP	Open Science Policy Platform
RDA	Research Data Alliance