

## Exploration Series with Researchers “Visions, requirements and needs for Future Research Environments”: Synthesis of the Takeaway Messages

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The EOSC initiative aims at supporting more than 1.7 million researchers and boosting (interdisciplinary) research in Europe. To understand better what the research community needs, the [EOSC Secretariat](#) partner [TU Wien](#) is organizing a series of [workshops](#) and an [exploration series](#).

In order to address research communities in a structured way, TU Wien invited top-level researchers such as members of the Marie Curie Alumni Association, ERC grantees and Nobel Laureates to participate in an exploration series to inquire about visions, requirements and needs for (future) research environments. A [full report](#) was published on 17 December 2020. Key findings include:

Topics such as sustainability of research environments, publication systems and (research) support services were discussed in connection with [Re-assessing Research Environments](#). Actions required include:

- The EOSC as part of a global (future) research environment needs to be aware of its stakeholders’ needs. Thus, it is crucial to accompany the development of research environments (incl. the provision of services) by ongoing dialogue that involves research communities, and other stakeholders
- As (scientific) challenges extend across borders, science needs to be considered a global effort. At times the global/international profile of research and (administrative) cultures of institutions on a local level seem to be disconnected. Helpdesks or ways of bringing together people to share experiences and best practices are first steps to improve local situations
- The mobility of researchers and research staff should be encouraged and supported on a broader scale by funding, e.g. via mobility grants to create a global network of researching
- Enable/enhance team science by e.g. rewarding specific communities, or teams that have created meaningful insights and increased knowledge
- In order to support the sustainability of research environments long-term plans for financing research should be developed enabling fair distribution of resources at European level
- Start initiatives to change publication systems in order to increase benefits for society and knowledge
- Offer (micro-) services such as services related to public archiving, knowledge management systems, standardized lab record keeping, domain-specific search engines, and the integration of multiple existing platforms would be very desirable to support research

Discussions surrounding **Data** covered the trustworthiness of data, big data, open data as well as FAIR data. Actions required include:

- The trustworthiness of data has to be ensured by all means. Services to help with checking and verifying data quality need to be offered. Such services include<sup>1</sup>:
  - Services to enable the automatic recording of provenance metadata for data, computation, and processes
  - Services for data capturing
  - Services to track provenance
  - Services for secured and monitored data visiting
  - Services for data quality validation processes
- EOSC should support infrastructures that come with a low entrance barrier and ease the access to massive scale processing services and cloud-based compute platforms and libraries

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<sup>1</sup> Services to help with checking and verifying data quality were also identified in the context of all other activities. The workshop and online-session report describing these services in detail can be downloaded here: <https://zenodo.org/record/3701194#.X0rDASgzaUl>, <https://zenodo.org/record/3693914#.X0rDC8gzaUk> and <https://zenodo.org/record/4015121#.X1deLHkzaUk>

- The bigger and more complex data gets, the more crucial it is that people have competences in reading data, evaluating data, classifying information correctly, or assessing whether data is suitable for addressing a specific task. Thus, data literacy basics should be anchored in curricula early on and form an integral part of EOSC training at all levels of education
- EOSC is a good model for fostering Open Science. As such, it needs services to promote and enable Open Science
- Opening Data can be extremely cost-intensive and time-consuming. Thus, EOSC should offer services that help lower the effort required to open data (e.g. open data repositories)
- Applying FAIR principles to data is central for making research (funding) more efficient and sustainable as redundancies can be avoided. EOSC should therefore offer services to assist in making data FAIR as well as Guidelines and Trainings to increase the number of researchers who know how to make data FAIR and how to annotate data properly

Focusing on **Interdisciplinary Research** led to the discussion of themes such as opportunities and challenges that come with interdisciplinarity. Actions required include:

- Interdisciplinarity allows research problems to be tackled from different perspectives. Thus, in order to develop ideas and find viable approaches, possibly solutions, to problems it is crucial that academics have a dialogue not only with colleagues, but also with governmental and non-governmental institutions and the public
- Crossing disciplinary boundaries leads to problems due to communication and language barriers. EOSC should help to get rid of such barriers by providing advanced translation services not only to translate from one language to another but also to translate scientific concepts of one discipline to other disciplines, to governments, to the public, or across different levels of expertise and career stages
- The focus on interdisciplinarity for the sake of interdisciplinarity does not support cutting-edge research. Interdisciplinary research tends to be successful whenever research topics and questions emerge that cannot be tackled by one discipline alone. EOSC should offer services that identify and collect research questions and topics that are interdisciplinary in nature

The findings will feed directly into the work of the **EOSC governance bodies** and **Working Groups** (WGs), thus provide input crucial for the development of the EOSC. In addition, the report as well as the takeaway messages will be further distributed among stakeholders like members of university networks, funding bodies and various research communities.

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