Open Science at Aarhus University

Organisation

Version 2.0

Version control

Version no.	Date	Author	Changes	Status
1.0	2022-02-03	BCD		Draft – rewritten on the basis of extracts from 'Open Science with focus on data management' and with changes agreed with AMP and HEB.
2.0	2022-06-29	BCD	As agreed with Anne-Mette Hvas, a permanent OS coordination committee is no longer to be established.	Draft OS Forum meeting

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Summary

Digitalisation of data and processes has led to new paradigms for important parts of the research lifecycle and to the establishment of cloud solutions, such as the European Open Science Cloud, that provide opportunities for new collaborations and new ways of using data. A number of national and international foundations will implicitly and explicitly demand that research results are made part of a science cloud solution, where legally and ethically justifiable. Ongoing developments towards a data-driven society will also affect the university, as companies will increasingly demand that university graduates have competencies to process and use digital data. Finally, developments in society also mean that there are demands on both communication and citizen engagement to secure support and transparency for university activities. These paradigm shifts form the basis for the Open Science agenda, which works for openness and transparency in publicly funded research, e.g. Open Access, Open Source and citizen engagement.

Organisation and responsibility

Responsibility for coordinating and ensuring a broad range of activities in the field of Open Science is with a newly established **Open Science Forum**, with management-level representation from all faculties, and with participation from key players in the implementation. The Open Science Forum is headed by an Open Science coordinator.

The Open Science coordinator is a coordinating function in relation to activities at AU. In collaboration with other universities, the OS coordinator can ensure that AU plays an active role, e.g. in relation to national and international solutions and strategic considerations – either by participating themselves or by ensuring that relevant employees at AU participate.

The faculties provide an Open Science support infrastructure through which researchers can contact them. Each faculty identifies a person responsible for the area who will be allocated time to participate in joint activities across AU, including representing the faculty in a newly established Data Management Coordination Group.

Ad hoc working groups with Terms of Reference. Initially, a data management **coordination group** has been set up. The group is responsible for monitoring and ensuring adequate technical and support solutions for researchers, ensuring a relevant range of courses for researchers at all levels across the faculties' support structures and ensuring a joint entry (SPOC) for both internal and external researchers to use for enquiries about data management, Open Science and data storage.

Recommendation

It is recommended that the above group be set up and that representatives from the university start a dialogue with the research foundation about calls for projects that test/illustrate/use/support Open Science.

1 Background

Digitalisation of data collection and the surrounding processes has provided new opportunities for research collaborations and forms the basis for the Open Science agenda, aiming at openness, consistency and transparency in all phases of the research process. Standardisation and agreement on protocols for access and metadata provides opportunities for establishing scientific cloud solutions such as the European Open Science Cloud[1] (EOSC), which, among other things, aims at increasing international collaboration, particularly on data.

The EU supports the Open Science agenda and considers access to research results as a strategic component in terms of increased competitiveness for industry in the EU. This will affect researchers at AU, as applications for different EU programmes must include a data management plan that describes plans for publication/sharing of articles and other components of research output in the form of data, methods, and computer codes in accordance with the FAIR principles (Findable, Accessible, Interoperable, Reusable). That data is FAIR means that it can be found and potentially reused by other university researchers as well as developers and researchers in companies. This does not necessarily mean that data is freely available, but it is "As open as possible, as closed as necessary" and its existence is shared. Data management not only ensures that data and relevant process information are collected systematically and continuously so they can be published, it also helps to ensure research integrity[2] through transparency throughout the research process.

The new framework programme, Horizon Europe, has greater focus on other aspects than 'just' data, including ensuring that the research is reproducible and that the responsible conduct of research[3] is ensured. Changes in requirements and expectations are illustrated below in Figure 1.

[1] https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/open-science/european-open-science-cloud-eosc_en

[2] In the instruction: "Management and storage of research data within all fields must be carried out in accordance with the current rules in order to ensure transparent and credible research"

[3] See https://openscience.eu/Open-Science-in-Horizon-Europe, for an overview of mandatory requirements in Horizon Europe. Two examples are: " Responsible management of research data and metadata of all research outputs (publications, data, software, algorithms, protocols, models, workflows ...) in line with the FAIR Principles" and "Measures to ensure reproducibility of research outputs - under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights"

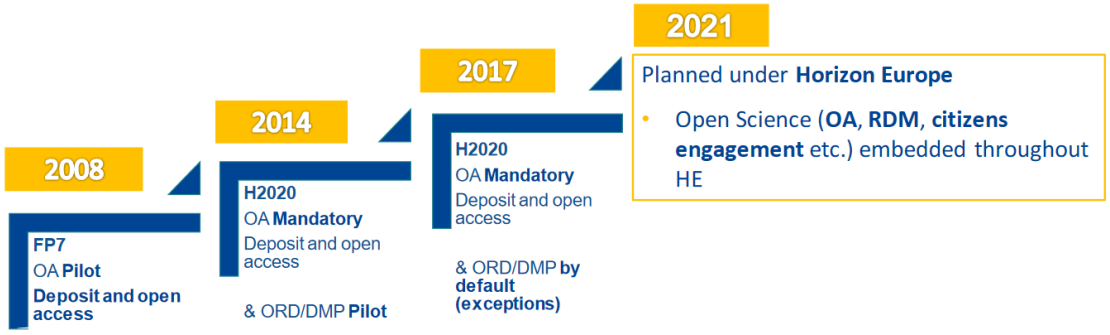

Figure 1 Development in requirements for openness in the EU. From https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2020-10-09/3_exploitation-ipr-open_science_en.pdf

Several foundations and government agencies and institutions not only have requirements for processing of data, but generally for how research is conducted. These are manifested in requirements for considering and supporting all or parts of the Open Science agenda. What exactly the Open Science agenda covers depends on how you look at it[4] and includes a democratic school where knowledge is to be made available to everyone, a pragmatic school with focus on the process of creating knowledge, an infrastructure school with focus on technical platforms, a public school with focus on citizen engagement and a measurement school that looks at the development of alternative goals for scientific production. The recommended approach at AU will be a mix between the so-called pragmatic school and the infrastructure school, which is based on the two assumptions that a) research and recognition are most effective when researchers work together and b) the effectiveness of the research process depends on the tools and services available.

Several special interest organisations, including LERU in *Open Science and its role in universities: a roadmap for cultural change*[5], have worked with the consequences and implementation of the eight pillars identified by the EU[6]:

- Open Data: FAIR (Findable, Accessible, Interoperable and Re-usable data) and open data sharing should become the default for the results of EU-funded scientific research.
- European Open Science Cloud (EOSC): a 'federated ecosystem of research data infrastructures' will allow the scientific community to share and process publicly funded research results and data across borders and scientific domains.
- New Generation Metrics: New indicators must be developed to complement the conventional indicators for research quality and impact, so as to do justice to open science practices.
- Future of scholarly communication: all peer-reviewed scientific publications should be freely accessible, and the early sharing of different kinds of research outputs should be encouraged.

[4] Fecher B., Friesike S. (2014) Open Science: One Term, Five Schools of Thought. In: Bartling S., Friesike S. (eds) Opening Science. Springer, Cham. https://doi.org/10.1007/978-3-319-00026-8_2

[5] https://www.leru.org/publications/open-science-and-its-role-in-universities-a-roadmap-for-cultural-change

[6] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjXqZzOguT1AhVcIMUKHdcjBjsQFnoECBIQAQ&url=https%3A%2F%2Fec.europa.eu%2Finfo%2Fsites%2Fdefault%2Ffiles%2Fresearch_and_innovation%2Fknowledge_publications_tools_and_data%2Fdocuments%2Fec_rtd_factsheet-open-science_2019.pdf&usg=AOvVaw2baIMOA-7s9xNdmuXW7HvG

- Rewards: research career evaluation systems should fully acknowledge open science activities.
- Research integrity: all publicly funded research in the EU should adhere to commonly agreed standards of research integrity.
- Education and skills: all scientists in Europe should have the necessary skills and support to apply open science research routines and practices.
- Citizen science: the general public should be able to make significant contributions and be recognised as valid European science knowledge producers.

AU should consider these areas, and the roll-out of Open Science at AU should therefore take place through a number of measures to ensure that initiatives are taken on an ongoing basis, and overall this should ensure that all eight pillars are addressed. The result will be that researchers at AU receive the relevant support and have access to relevant tools to support collaboration and knowledge production within all branches of research.

An organisation that can and will ensure this has been proposed below.

2 Organisation

Roll-out of Open Science can be described in relation to three dimensions: Policy, Infrastructure and Research. The political dimension ensures that relevant policies and strategies are drawn up, that these are implemented, including financed, and that there is a correlation between activities and policies. The infrastructure dimension ensures that the necessary capability and capacity are in place and that they support the researchers' needs. Finally, the research dimension ensure achievement of the result "that AU delivers in accordance with the OS agenda".

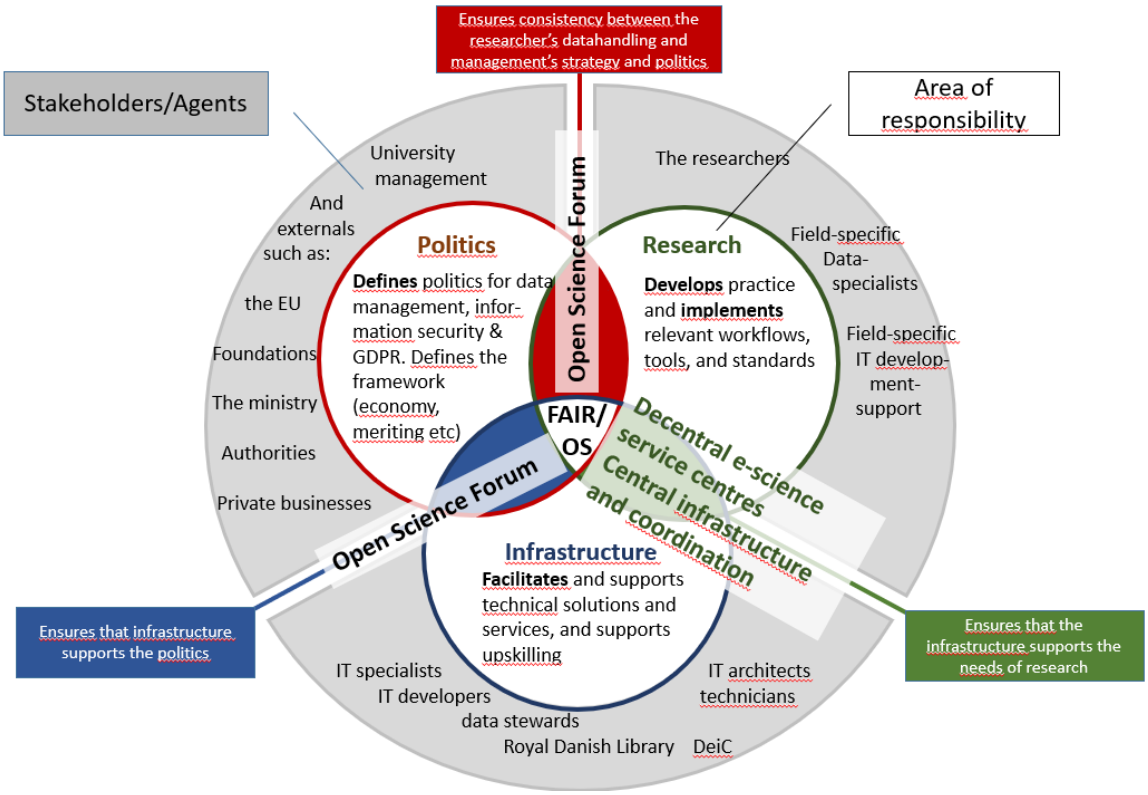

Figure 2 Illustration based on Dutch figure[7] of the three main areas in relation to the implementation of the strategy: The figure shows the scope of the proposed OS Forum and the e-Science service centres at the faculties as well as central coordination in the interfaces between Policy, Infrastructure and Research.

A newly established **Open Science Forum (OS Forum)** is responsible for developing strategic policies. The OS Forum is responsible for ensuring that the necessary policies are prepared, that operational targets are formulated, and that the necessary financial framework is in place to ensure consistency between implementation of the strategic goals and the resources made available.

Proposed composition of the Open Science Forum:

- Open Science coordinator
- Vice-deans for Research
- Deputy director for AU Research

Deputy director for AU University Library at the Royal Danish Library

In addition, relevant competencies may be invited, such as

- Deputy director for IT
- GDPR lawyer or DPO
- Head of information security

[7] Staiger, C., Jetten, M., Böhmer, J., Slouwerhof, I., Van der Geest, M., Van Gelder, C.W.G., Scholtens, S. (2019). Data stewards function landscape and its stakeholders. https://doi.org/10.5281/zenodo.3243909

Ensuring that the necessary support infrastructure is available is primarily the responsibility of the faculties, each of which, as a minimum, is expected to establish an **e-Science service centre**, for researchers to contact with tasks such as access to secure storage locations, advice in relation to publication, advice on the use of e-lab books, reporting to the Danish National Archives or help with analyses. The e-Science service centres will be adapted to the typical needs and expectations of faculty researchers. The composition of support staff at the faculties will therefore vary from faculty to faculty and reflect the different needs in relation to security, data volume, analysis needs, FAIR publication and other parameters that determine whether there is a general need for legal, IT-development, IT-operation, data management or data steward assistance. The faculties are also expected to point to these service centres as where the faculty's researchers primarily go for help.

Zooming in on roles and comparing with what already exists at AU provides a more nuanced picture. Stakeholders include:

- Members of the GDPR network (GDPR, legal advice)
- Research consultants and the Research Support Office (help with applications)
- TTO (contracts)
- Data managers at certain faculties (practical guidance, subject-specific consultancy)
- Members in various centres who spend parts of their time maintaining data (practical guidance, subject-specific consultancy)
- IT personnel, including information security officers (solutions) and IT Support at the faculties (support, practical help to establish solutions)
- The Royal Danish Library (help with data management plans, general help regarding data management)

A **Single Point of Contact, SPOC**, will be established and operated to secure a place for researchers to go with questions relating to all parts of Open Science. Researchers' enquiries to the SPOC will be handled by the e-Science service centre established under the faculties, or the Royal Danish Library, or by centrally located staff (AU Research) who are specialists in areas such as contracts, EU applications or law. Researchers can also contact the faculty support centres directly, who can then contact the central SPOC if the question is outside their area of competence. The SPOC will serve as AU's point of contact for external enquiries. Specifically, the SPOC will act as the Front Office in relation to DeiC. The person working at the SPOC will also deal with the secretariat function in relation to the HPC Forum, the OS Forum and the Data Management Coordination Group. A process officer will be appointed for the SPOC to be responsible for ensuring that questions are forwarded to the right people and that external enquiries are answered or forwarded. The process officer will also deal with the secretariat function in relation to the Data Management Coordination Group and the HPC Forum.

The OS Forum can set up working groups to address political and strategic aspects in relation to Open Science. The groups will make sure that knowledge is collected and shared across the university to ensure consistency of solutions where relevant and that experience benefits all researchers at AU.

One goal is that the organisation is perceived as simple, transparent, and supportive in relation to researchers' needs.

Figure 3 below shows a proposed organisation.

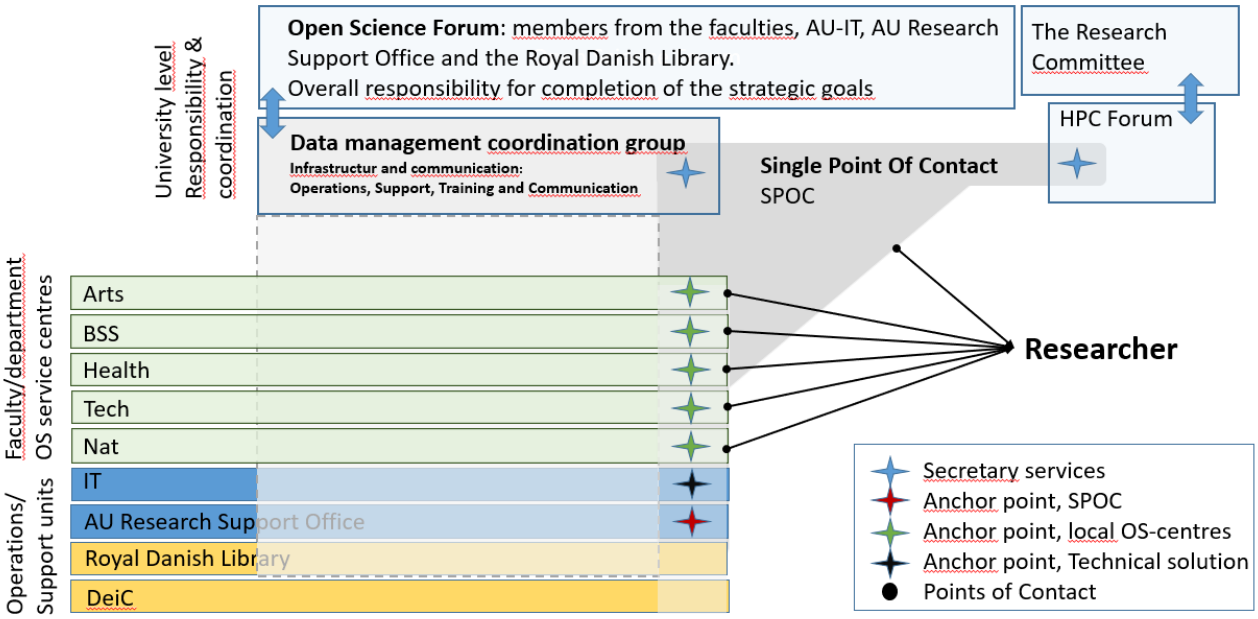

Figure 3 Proposed organisation in which organisational units in blue refer to the central organisation, green to the decentralised (faculty-level) organisation, yellow to organisations outside AU, and finally grey indicates hybrid. The figure also shows where activities are anchored and the front colour shows where activities are primarily carried out...

The above organisation focuses on supporting researchers. It would be relevant to include support for students. However, this is assessed to currently fall outside of the scope of this memo.

3 Activities

The OS Forum is responsible for ensuring general progress in the Open Science agenda by continuously identifying relevant focus areas, and for ensuring that the necessary finances to undertake this work are established.

The OS Forum will draw up an annual report for the senior management team with a status of initiatives launched and expected new initiatives, with possible sources of funding and input for possible strategic investments.

For 2022-2023, focus is expected to be on data management and data publishing in the broadest sense, i.e. not only regarding data, but also code, protocols and other relevant results from the research process.

Therefore, a data management coordination group will be set up. This is described in the document “Open Science at AU: Data Management”.

4 Recommendations

Implementation will be an iterative process, and it is important to continuously evaluate whether the initiatives launched are working and whether others are missing. Work with data management is generally closely linked to implementation of a technical platform to support storage and publication of data. A joint storage system is expected to be operational in Q3 2022.

It is recommended to:

- establish an Open Science forum with representation from the faculties at management level
- establish a data management coordination group with representatives from the faculties who represent the local organisation
- establish OS centres at the faculties. Each faculty is to identify a person responsible for the area with time allocated to participate in joint activities across AU
- establish a “Single Point of Contact” that can receive and forward enquiries

Starting a dialogue with the research foundation about calls for projects that test/illustrate/use/support Open Science is further recommended.