National Initiatives for Open Science in Europe

FAIR data and principles

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A vision for a European open science cloud: "Give Europe global leadership in the scientific data infrastructure and ensure that European scientists receive the full benefits of data-driven science."

Open Science is the movement to make scientific research (publications, software, data) and its dissemination accessible to all levels of society. Open Science is transparent and accessible knowledge that is shared and developed through collaborative networks.
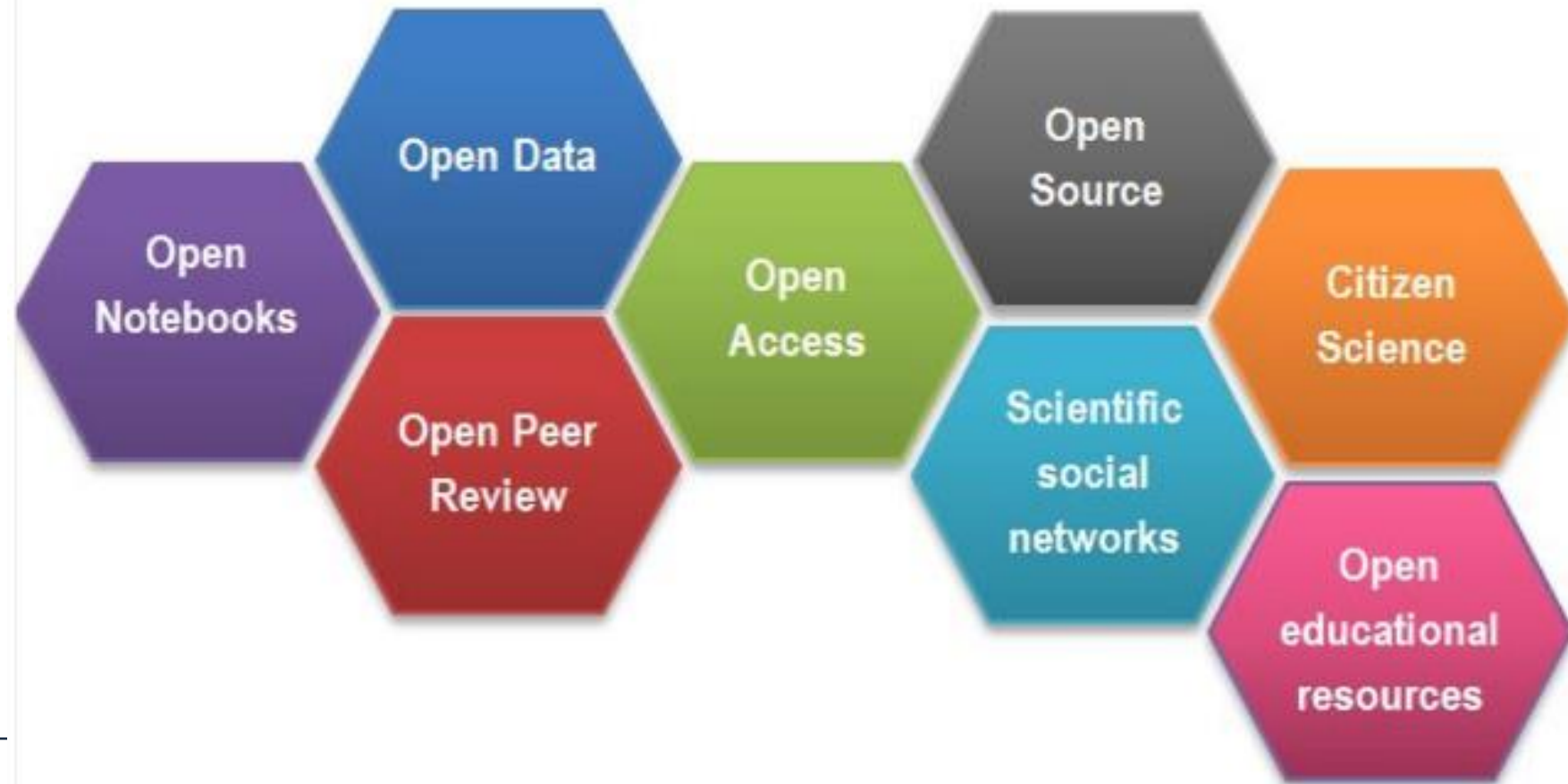
Though the world is awash with vast amount of data significant effort is still needed to find the right dataset(s), make sense of them, and use for a new purpose.

FAIR is a set of principles, not a standard, according to which FAIR research data are the data which can be Findable, Accessible, Interoperable, and Reusable.

Findable

The first step in (re)using data is to find them. Data and metadata should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services, so this is an essential component of the FAIRification process.

Accessible

Once the users find the required data, they need to know how these can be accessed, possibly including authentication and authorisation.

Interoperable

The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

Reusable

The ultimate goal of FAIR is to optimise the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

The increasing production and availability of online resources requires data to be created with longevity in mind. By providing the wider research community with access to scientific data, knowledge discovery is facilitated and research transparency is improved. In light of this, in 2016, 'The FAIR Guiding Principles for scientific data management and stewardship' were published.

We need a new social contract, supported by legal and technological infrastructure to make digital resources available in a responsible manner.
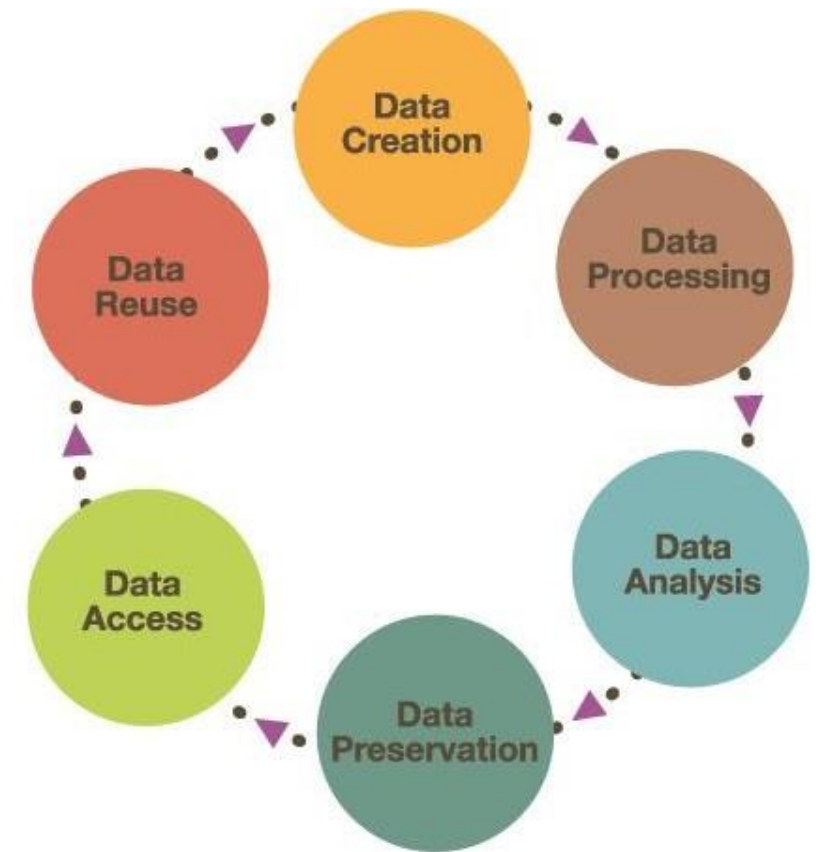

F indable A ccessible I nteroperable R eusable
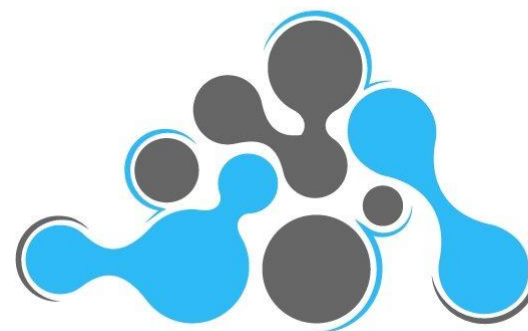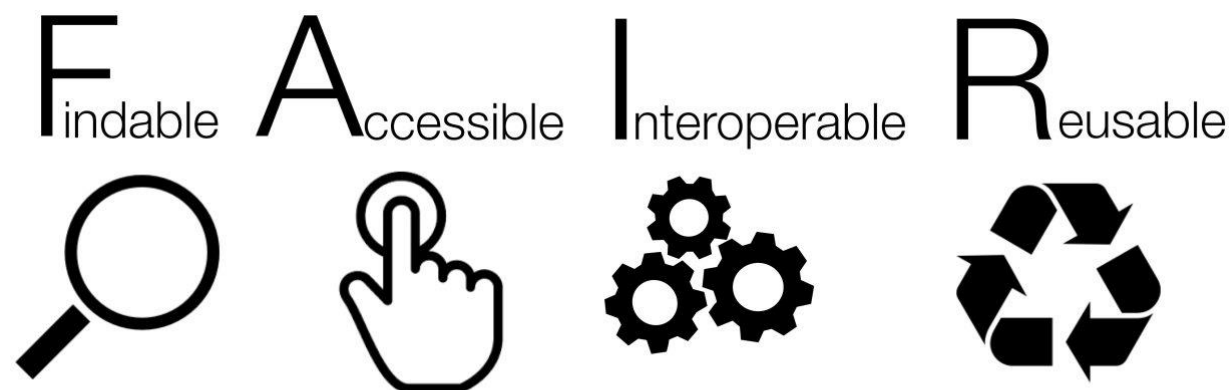
EOSC pilot

The European Open Science Cloud for Research Pilot Project

What aspects to consider when looking for the right tool?

❑ Research data life cycle

❑ Disciplines

❑ The possibilities and expectations of the given institution

❑ Funder and journal expectations

Picture: https://blogs.ntu.edu.sg/lib-datamanagement/data-lifecycle/

Human Machine collaboration is crucial to the future success in the field of research.

Besides supporting data reuse by individual scholars, the FAIR Principles put specific emphasis on enhancing the ability of machines to automatically find and use the data. The Principles highlight the fact that within the current digital ecosystem, humans increasingly depend on computational support so as to be able to deal with the increasing volume, complexity, and creation speed of data.

A common misconception among researchers is that FAIR data equals Open data. No, FAIR data does not have to be Open, as they can be shared under restrictions and still be FAIR.

Findable Accessible Interoperable Reusable
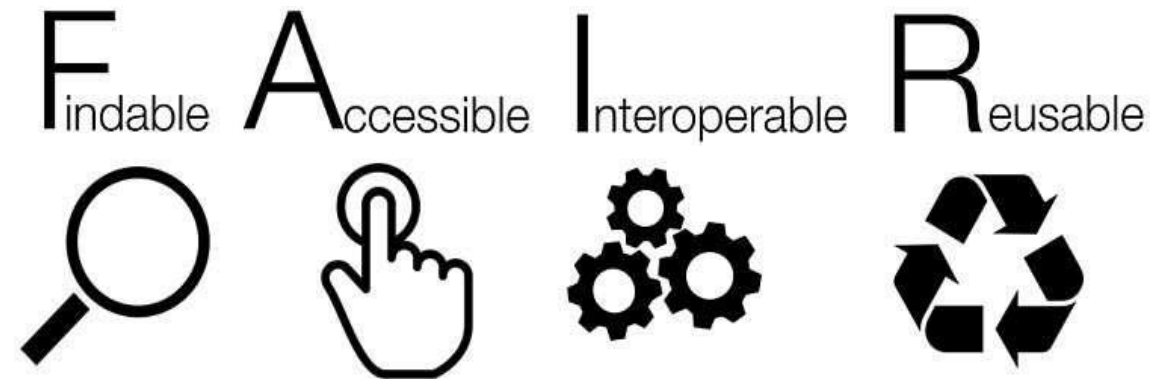
FAIR aims to enhance social and economic outcomes by facilitating the discovery and reuse of digital resources through key requirements:

- unique identifiers to distinguish and retrieve all forms of digital content and knowledge
- high quality meta(data) to enhance discovery of relevant digital resources
- use of common vocabularies to facilitate query and statistical analysis
- establishment of community standards to reduce the effort in data reuse
- provide adequate context to enable reproducibility
- registered in appropriate repositories to fulfill a promise to future content seekers
- simpler terms of use to clarify expectations and intensify innovation
- social and technological commitments to make data ready for intelligent applications

Why should a researcher go FAIR?

- Makes it easier for to use your own data for a new purpose
- Makes it easier for other people to find, use and *cite* your data, and for them to understand what you expect in return,
- Makes it easier/possible for people to verify your work
- Ensure that the data are available in the future, especially as you may not want the responsibility

How to make your data FAIR?

Turning FAIR principles into practice can vary for different disciplines, however the following guidelines can generally apply:

- Make your data findable by ensuring it has a persistent identifier, rich metadata, and is searchable and discoverable online.
- Make your data accessible by ensuring it can be retrieved online, using standardised protocols and by putting restrictions in place if necessary.
- Make your data interoperable by using common formats and standards, and by making use of controlled vocabularies.
- Make your data reusable by ensuring it is well-documented, and by having clear machine-readable licence and provenance information on how the data was formed.
- Use new innovative research approaches and tools.

EOSC AND FAIR

The European Open Science Cloud (EOSC) will strive to ensure that European scientists will be able to take advantage of the full benefits of data-driven science, by offering an environment with free, open services for data storage, management, analysis and re-use across disciplines.

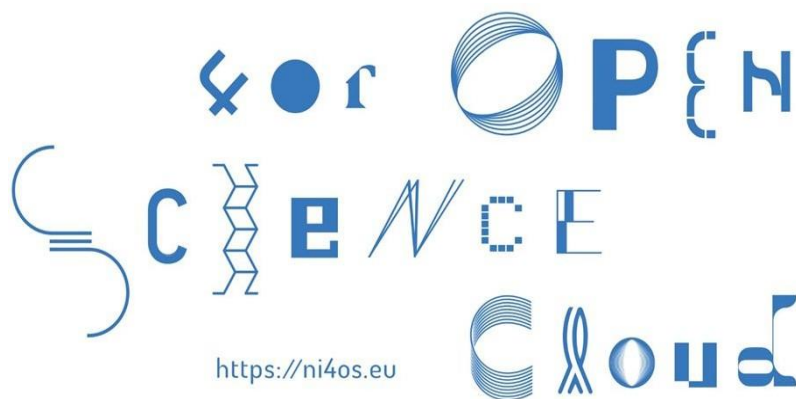It will provide a platform for European research, including a web of FAIR research data and services.

Benefits of FAIR

Making research data FAIR has manifold benefits for researchers, research communities, research infrastructure facilities and research organisations. FAIR data:
- help to gain maximum potential from data, and overall maximum impact from research, increase visibility and citations
- improve the reproducibility and reliability of research
- help in staying aligned with international standards and approaches
- engage in new partnerships with researchers, business, policy and broader communities
- enable new research questions to be answered

Thank you for your attention!

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