

# **OPEN RESEARCH DATA AND METHODS. NATIONAL POLICY AND EXECUTIVE PLAN BY THE HIGHER EDUCATION AND RESEARCH COMMUNITY FOR 2021–2025.**

**POLICY COMPONENT 1: OPEN ACCESS TO RESEARCH DATA**

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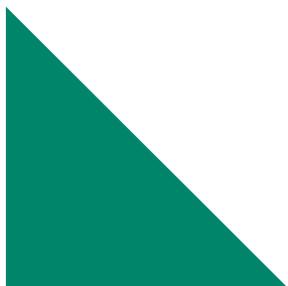
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# **OPEN RESEARCH DATA AND METHODS. NATIONAL POLICY AND EXECUTIVE PLAN BY THE HIGHER EDUCATION AND RESEARCH COMMUNITY FOR 2021– 2025.**

## **POLICY COMPONENT 1: OPEN ACCESS TO RESEARCH DATA**



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# POLICY OBJECTIVE

Research data and methods are as open as possible and as closed as necessary. The data is managed appropriately with the aim of implementing the FAIR principles.<sup>1</sup> Research methods and research data are identified as independent research outputs.

## INTRODUCTION

This policy consists of policy components. The first policy component concerns research data and is completed in the spring of 2021. The policy component on research methods, including code and software, is estimated to be completed in 2022.

On a general level, the openness of research data and methods and good data management improve the possibilities of research verification and promote the appropriate reuse of existing research data and methods<sup>2</sup>. Openness increases global equality, as the research data can be accessed by researchers globally. This in turn promotes the emergence of new innovations. The openness of research data and methods raises significant questions related to research integrity and legislation and involves restrictions, of which researchers and others working in data management must be aware.

To implement equality both on a national and an international level, openness of research data and methods must be promoted in an economically sustainable way. Economically sustainable fostering of openness means that key open science infrastructures are not profit-oriented<sup>3</sup>. In Finland, research data produced with public

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1 The FAIR principles refer to the quality of research data from the viewpoint of further use. The goal of the principles is to make research data Findable, Accessible, Interoperable and Re-usable. See Appendix 1 and <https://www.force11.org/fairprinciples>.

2 The goal of responsible research and innovation is to encourage operators to produce ethically acceptable, sustainable and societally interesting research and innovation outputs. See <https://www.rri-practice.eu/about-rri-practice/what-is-rri/>

3 *First draft of the UNESCO Recommendation on Open Science*, page 5, <https://unesdoc.unesco.org/ark:/48223/pf0000374409.locale=en.page=14>

funding must be open accessible for all.

### **FREEDOM OF RESEARCH AND THE RESPONSIBILITY OF THE RESEARCHER**

This policy is based on national and international policies on open access to research data and methods. Its objective is to support the principles of open science and increase freedom of research as well as researchers' possibilities of distributing and utilising research-based knowledge. It is the researcher's responsibility to carry out research of the best possible quality, which includes responsible management of research data and methods. The repository selected for the research data and methods must be such that it best suits the whole in question and provides service in accordance with the FAIR principles. The purpose of open access is to make the further use of research data and methods as open as possible. The degree of openness can be restricted for justified reasons.

The research community must guarantee the skills, incentives, resources and structures for opening research data and methods (e.g., infrastructures and services) in a way that supports and respects the work and equality of the researchers.

### **INTERNATIONAL CONTEXT**

This policy has been drawn up utilising the extensive national and international work that has been and is done towards promoting the openness of research data. Good summaries of this work are, among others, the plan drawn up by the Association of European Research Universities, *Open Science and its Role in Universities: A Roadmap for Cultural Change* (2018), and the final report published by the European Commission, *Turning FAIR into Reality. Final report and action plan from the European Commission expert group on FAIR data* (2018)<sup>4</sup>. The operat-

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4 Ayris, Paul; López de San Román, Alea; Maes, Katrien; Labastida, Ignasi: *Open Science and its Role in Universities: A Roadmap for Cultural Change*. League of European Research Universities, 2018. <https://www.leru.org/publications/open-science-and-its-role-in-universities-a-roadmap-for-cultural-change>; *Turning FAIR into Reality. Final report and action plan from the European Commission expert group on FAIR data*. Directorate-General for Research and Innovation, European Commission, 2018. doi.org/10.2777/1524. See also Lawrence, Rebecca; Mendez, Eva: *Progress on open science: Towards a shared research knowledge system. Final report of the open science policy platform*. Directorate-General for

ing environment is further shaped by current and future EU regulation on the openness of data, e.g. the Open Data Directive.

Scholarly publishers require authors of research publications to provide open access to their data and methods. Scholarly publishers also allow or require authors to save their research data or methods in repositories that can be closed, open or behind paywalls<sup>5,6</sup>.

Funders require the opening of research data and methods, which is closely connected to good research data management. An example of this is Science Europe's guideline *Practical Guide to the International Alignment of Research Data Management*<sup>7</sup>.

By ensuring that the Finnish policy reflects the international development, the Finnish research community participates in the creation of common international practices in this swiftly growing and developing area. Finnish operators actively participate in European and international work, e.g. in the European Open Science Cloud (EOSC) and Research Data Alliance (RDA) communities. The Finnish research community participates in a dialogue where it can obtain good practices and contribute to the creation of workable solutions.

## RISKS AND THREATS

This policy includes identified risks. The opening of research data and methods is based on good data management. However, implementation of responsible conduct of research and good research data management requires resources and economic incentives targeted towards research organisations during the entire lifecycle of the research data and methods. To make resources available for the entire lifecycle, organisations in different roles should commit to the maintenance of

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Research and Innovation, European Commission, 2020.  
doi.org/10.2777/00139

5 Springer Nature: "Data Availability Statements". <https://www.springernature.com/gp/authors/research-data-policy/data-availability-statements/12330880>

6 *First draft of the UNESCO Recommendation on Open Science*, <https://unesdoc.unesco.org/ark:/48223/pf0000374409.locale=en.page=10>

7 Science Europe: *Practical Guide to the International Alignment of Research Data Management*, 2018. [https://www.scienceeurope.org/media/jezkhnoo/se\\_rdm\\_practical\\_guide\\_final.pdf](https://www.scienceeurope.org/media/jezkhnoo/se_rdm_practical_guide_final.pdf)

resources. Investment in services, meanwhile, promotes more efficient resource utilisation and creates savings.

Researchers are concerned about opening sensitive and confidential research data (e.g. personal information) and methods. For this reason, different degrees of openness and the researcher's right to primary use should be considered. In some cases, it is enough to open the metadata. Opening research data and methods brings up juridical (e.g. contractual) questions as well as the legal protection of researchers in relation to research data and methods.

Research funding organisations and scholarly publishers increasingly require open research data and methods. From the viewpoint of funding applicants, the risk is that research funding declines or is claimed back if research data cannot be opened. Reasons for not opening research data and methods include lack of skills, services and infrastructures. Legislative, ethical and contractual restrictions can also prevent openness.

## STRUCTURE AND BACKGROUND OF THE POLICY

This policy has been drawn up by the Finnish research community. The progress of the work has been the responsibility of a working group assembled by the expert group on open data at the Open Science Coordination (the Federation of Finnish Learned Societies). The work has been directed by the National Open Science and Research Steering Group. The policy supports the *Declaration for Open Science and Research 2020–2025*.

This policy on open access to research data and methods consists of strategic principles common to the entire policy and two policy components in which objectives and actions are set out for each area. The strategic principles describe general preconditions for the pursuit of open access to research data and methods. They formulate principles that are important for the research community and must be adhered to when implementing openness. The objectives listed in the policy components comprise more time-bound, specific and measurable objectives for openness. The objectives are accompanied by concrete actions required for their achievement. The changing international environment affects the objectives and the related actions more quickly than the principles.

The vocabulary used in the policy (see appendix 1) supports the readability and sufficient comprehensi-

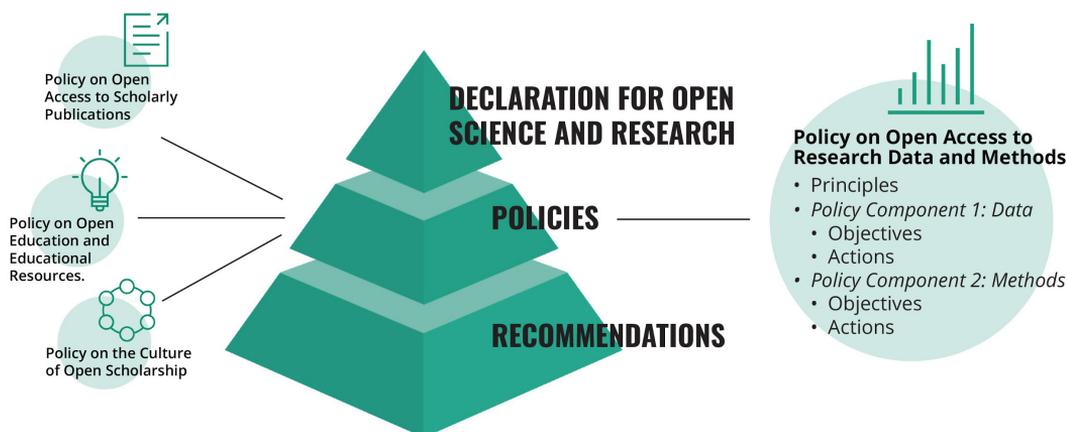
bility of the document. The vocabulary of open science differs across fields of science, and the terms and their translations vary greatly in legislation. The terms are defined in different ways in different contexts. Due to the differences between fields of science, it is difficult to create a comprehensive vocabulary.

## IMPLEMENTATION AND MONITORING

The implementation of the policy on open access to research data and methods is the responsibility of the entire Finnish research community, and the policy will come into effect gradually. The policy component on open access to research data is completed in spring 2021, and the policy component on research methods in spring 2022. The entire policy, including policy components, will be reviewed no later than 2025.

The monitoring of the implementation of the policy is the responsibility of the Open Science Coordination at the Federation of Finnish Learned Societies. It is the Coordination's responsibility to support and promote continuous discussion in order to reach the objectives and to keep the policy up to date. The monitoring mechanisms for the openness of research data and methods will be part of the national open science monitoring programme that is being developed.

Picture 1. The policy in relation to other national open science documents.



# STRATEGIC PRINCIPLES

## **PRINCIPLE 1: RESEARCH DATA AND METHODS SHALL BE MANAGED, OPENED AND USED RESPONSIBLY AND APPROPRIATELY.**

Ensuring and monitoring implementation:

- A) Baseline: Responsible management of research data and methods is the most important prerequisite for openness. The research community has identified deficiencies in its practices.
- B) Continuous monitoring will be carried out as part of the national monitoring of open science and research.

## **PRINCIPLE 2: RESEARCHERS HAVE ACCESS TO INFRASTRUCTURES AND SERVICES THAT ENABLE RESPONSIBLE DATA MANAGEMENT, AND THESE ARE DEVELOPED FURTHER IN AN ECONOMICALLY SUSTAINABLE WAY, TAKING INTO ACCOUNT THE RESEARCHERS' NEEDS.**

Ensuring and monitoring implementation:

- A) Baseline review: During 2021, the Open Science Coordination will, in cooperation with the research organisations and service providers, specify a minimum level of research data management infrastructures and services.
- B) Continuous monitoring: No later than 2022, the Open Science Coordination will draw up an evaluation template<sup>8</sup> for future use in organisations as an evaluation tool in regular self-evaluation. Continuous monitoring will be carried out as part of the national monitoring of open science and research.

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<sup>8</sup> Rans, J and Whyte, A. (2017). *Using RISE, the Research Infrastructure Self-Evaluation Framework*. Digital Curation Centre, Edinburgh. [www.dcc.ac.uk/resources/how-guides](http://www.dcc.ac.uk/resources/how-guides)

**PRINCIPLE 3: THE RESEARCHER'S MERITS IN THE PROMOTION OF GOOD DATA MANAGEMENT, WORK RELATED TO RESEARCH DATA AND METHODS, AND THE APPROPRIATE OPENING OF RESEARCH DATA AND METHODS ARE VALUED AND CAN SUPPORT THE RESEARCHER'S CAREER.**

Ensuring and monitoring implementation:

- A) Baseline: No later than 2022, the Open Science Coordination will draw up a recommendation on good practices, i.e. how the promotion of good data management, work related to research data, and the opening of research data shall be considered in the researcher's work, and how these merits will be evaluated.
- B) Continuous monitoring will be carried out as part of the national monitoring of open science and research.

# POLICY COMPONENT: OPEN ACCESS TO RESEARCH DATA

This national policy component is the Finnish research community's<sup>9</sup> shared guideline for the advancement of open access to research data. The policy component does not include research methods as these will, in accordance with the policy structure, be discussed in a separate policy component.

The policy component on open access to research data primarily concerns research data that has been produced or used as part of a research or development process as of 1 July 2021 and

- where the researcher is working in or is affiliated with a Finnish research organisation and/or working with funding by a Finnish research funding organisation

or

- where the research or development project involving the compilation or use of the research data takes place in a Finnish research organisation and/or is funded by a Finnish research funding organisation.

The objectives below do not take a position on how organisations decide matters, which means that research organisations are tasked with planning according to their own starting points.

## OBJECTIVES AND ACTIONS

**Objective 1: No later than 2023, data management plans have been drawn up as part of quality management for all starting research and development projects, taking into account the needs of different fields of science and the lifecycle of the research data.**

Actions required to achieve the objective:

- No later than 2022, higher education institutions

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9 The Research community is defined according to the Declaration for Open Science and Research 2020–2025 (2020, 5). <https://doi.org/10.23847/isbn.9789525995237>

will offer instructions, practices and training in the field of data management planning for students, researchers and other personnel.

- No later than 2023, research organisations will include creation and maintenance of data management plans in their research and service processes at each stage of the data lifecycle.
- No later than 2024, higher education institutions will ensure that thesis supervisors are able to evaluate and comment on data management plans as part of their supervisory work.
- No later than 2022, research organisations support research planning so as to ensure preparedness for sufficient resourcing and costs of data management and its support.
- Higher education institutions include data management training in their curricula for basic and further education when curricula are updated.
- No later than 2024, research organisations have developed monitoring to ensure implementation of good and responsible data management practices.
- No later than 2022, research organisations have regularly updated data policies.

**Objective 2: No later than 2022, research organisations apply operating models with which all rights, terms and licenses related to the use of research data can be clearly agreed between all participants in research work.**

Actions required to achieve the objective:

- During 2021, the Open Science Coordination will produce a report on the legal questions related to open science. Recommendations on the content of agreements will be created in co-operation with the Finnish research community.
- In 2021, research organisations have basic principles concerning the agreements on the rights and responsibilities related to research data. Advice and guidance are available for special cases.
- In 2021, research funding organisations and research organisations will instruct researchers either to

appropriately license research data to be opened or to guarantee the societal impact of the research outputs through commercialisation.

- In 2021, research funding organisations and research organisations will instruct researchers on licensing according to the requirements of legislation on the reuse of research data produced with public funding.
- In 2021, research organisations will offer education and/or training and advice on rights related to research data and open science licenses.

**Objective 3: No later than 2022, research data produced in starting research and development projects have been documented so that the documentation supports the opening, re-use, findability, interoperability and accessibility of research data.**

Actions required to achieve the objective:

- No later than 2022, research organisations support researchers in the production of metadata through support services and incentives.
- No later than 2022, research organisations will offer training and support as well as tools for documentation of research data to various target groups, taking into account the skills development of the target groups, the needs of various fields of science, and the lifecycle of the research.
- In 2021, research organisations support research planning so that research projects are able to prepare for the documentation costs of research data.
- No later than 2022, the working group for open science and research monitoring will specify indicators for open science.
- No later than 2023, research organisations will utilise suitable indicators with which they monitor their progress in good data management as part of the quality system.

**Objective 4: No later than 2022, a storage solution, infrastructure, and services have been created for research data. These are appropriate for good data management and take into account the lifecycle of research data.**

Actions required to achieve the objective:

- In 2021, Finnish research organisations will review the existing services as part of the national architecture work. The organisations will, on their part, initiate necessary development measures and promote the use of national and international services.
- No later than 2022, research organisations, in co-operation with national and international operators, will produce and provide instructions and sufficient support services for researchers and research groups in order to enable data storage and publication in accordance with the principles of good data management.
- The research community will ensure that the key open research data infrastructures are not profit-oriented.<sup>10</sup>

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<sup>10</sup> First draft of the UNESCO Recommendation on Open Science, <https://unesdoc.unesco.org/ark:/48223/pf0000374409.locale=en.page=10>

**Objective 5: No later than 2022, research organisations apply an operating model according to which expertise and multi-professional cooperation is utilised for the development of training, skills, and required data management services.**

The operating model cannot be restricted to the research data to be opened. Good data management requires the management of the entire lifecycle, regardless of the end result.

Actions required to achieve the objective:

- The research community develops the structures and content for skills and services in national and international cooperation.
- In 2021, research organisations will offer, independently or in co-operation, training in good data management according to the needs of their community for researchers, teachers, supervisors and support personnel at all career stages.
- No later than 2023, research organisations will describe required expert roles in co-operation on a national level and create possible career paths for them.
- Higher education institutions will develop expert training as part of their course selection for students.

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# APPENDIX 1: GLOSSARY

**Research data** is a resource used by a researcher or a research group during a research process, i.e. the basic data of scientific or artistic research, in digital, analogue or physical form. Research data has been collected, observed, measured or created to confirm hypotheses and verify results.

**Metadata** refers to data describing the context, content and structure, management and/or processing and compilation of research data.<sup>11</sup>

**Research data openness:** For the purposes of this policy, research data openness, refers to the findability, accessibility, usability and shareability of research data for other researchers. Open access to research data requires good and responsible data management. Reuse of research data is supported through licenses<sup>12</sup>, or its use may require an appropriate research permit.

The responsible processing of research data that contains personal information or is sensitive or confidential requires the researcher to comply with both legislation and good practices in research integrity. In such cases, however, it is often possible to open the metadata of the research data and to provide other researchers with the opportunity to access the data through a separate agreement on the transfer.

**Good and responsible research data management:** For the purposes of this policy, *good management* means that research data and the related metadata has been “created, saved and organised so that the research data remains usable and reliable, and that data security and privacy are ensured throughout the lifecycle of the research data”.<sup>13</sup> In addition, good research data management in the very context of open science means that the principle of “as open as possible, as closed as necessary”, the FAIR principles and the principle of responsibility are taken into account at all stages of the research process. **Good research data management is a necessary prerequisite for open access.** Evaluation of good research data management is based on the following viewpoints:

1. According to the principle “*as open as possible, as closed as necessary*”<sup>14</sup>, data that can be opened for access and reuse must be opened. Correspondingly, data which cannot be opened and shared must be protected and safely stored. It is ultimately the researcher’s responsibility to deter-

11 [https://tieteentermipankki.fi/wiki/Nimitys:tutkimusaineiston\\_metadata](https://tieteentermipankki.fi/wiki/Nimitys:tutkimusaineiston_metadata)

12 Ball, A. (2014). “How to License Research Data”. DCC How-to Guides. Edinburgh: Digital Curation Centre. <http://www.dcc.ac.uk/resources/how-guides>

13 *Data Management Guidelines*. Tampere: Finnish Social Science Data Archive. <https://www.fsd.tuni.fi/en/services/data-management-guidelines/>. urn:nbn:fi:fsd:V-201504200001. (Retrieved 11 Jan 2021)

14 European Commission, DG Research & Innovation (2016). Guidelines on Fair Data Management in Horizon 2020. [https://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/oa\\_pilot/h2020-hi-oa-data-mgt\\_en.pdf](https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf).

mine which group the research data falls into. Refraining from opening data always requires justification.

2. The FAIR principles<sup>15</sup> refer to the quality of research data from the viewpoint of its further use. The principles aim to make research data
  - **F**indable
  - **A**ccessible
  - **I**nteroperable
  - **R**eusable.

Research data and metadata complying with the FAIR principles are semantically interoperable, i.e. they must be structured, described, tagged and licensed well enough, as well as stored safely, to be findable and machine readable. In most areas, it is not yet possible to create data that is fully compliant with the FAIR principles due to lack of skills and services or due to the nature of the data.

3. For the purposes of this policy, responsible data management refers to:
  - knowledge of and compliance with the principles of the field of research
  - knowledge of and compliance with the principles of research integrity
  - knowledge of and compliance with legislation
  - knowledge of and compliance with the principles of data security and privacy

Responsible research data management is a prerequisite for all forms of data openness. Responsible data management requires that the data and metadata are managed in a way that is compliant with data security, privacy and research integrity. Responsible data management and the possibility for opening research data it entails are part of responsible conduct of research.

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15 <https://www.force11.org/fairprinciples>

# APPENDIX 2: TIMELINE FOR ACTIONS 2021–2025

## 2021

- **The Open Science Coordination** will produce a report on the legal questions related to open science. Thereafter, **the research community** will create recommendations for agreement content, which means that the **research organisations** will have basic principles governing agreement on rights and responsibilities related to research data (licensing, commercialisation and transfer of rights).
- **Research organisations** will offer, independently or in co-operation, training in good data management according to the needs of their community, as well as advice and guidance.
- **Research organisations** support the planning of research so that research projects are able to prepare for the costs of materials and documentation.
- **The research community** will launch a review of the services of national and international research organisations as part of national architecture work.

## 2022

- **Research organisations** have regularly updated data policies.
- **Research organisations** offer instructions, practices and training in data management planning according to the needs of their community, using multi-professional co-operation.
- **Research organisations** support researchers in the production of metadata through support services and incentives, taking into account the opening, further use, findability, interoperability and accessibility of research data.
- **The working group on open science and research monitoring** at the Open Science Coordination specifies indicators for open science.
- **Research organisations**, in co-operation with national and international operators, produce and offer instructions and sufficient support services for the researchers and research groups in order to enable data storage and publication in accordance with the principles of good data management.

## 2023

- **Research organisations** include the creation and maintenance of data management plans in their research and service processes at each stage of the data lifecycle.
- **Research organisations** utilise suitable indicators with which they monitor their progress in good data management as part of a quality system.
- **Research organisations** will describe the required expert roles in national co-operation and create possible career paths for expert roles.

## 2024

- **Higher education institutions** ensure that thesis supervisors are able to evaluate and comment on data management plans as part of their supervisory work.
- **Research organisations have developed** monitoring to ensure the implementation of good and responsible data management practices.

# APPENDIX 3: POLICY WORKING GROUP

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