National policy on open research methods & infrastructures

National policy and executive plan by the higher education and research community for 2021–2025

Open Science Coordination in Finland,
Federation of Finnish Learned Societies

Background

Extensive national and international work, e.g.

- UNESCO recommendation on open science (2021)
- CERN open science policy
- EU's Open Science Policy (2019)
- Minimum conditions supporting research reproducibility
- Open Science and its Role in Universities: A Roadmap for Cultural Change (2018); the Association of European Research Universities
- Turning FAIR into Reality: Final report and action plan from the European Commission expert group on FAIR data (2018),
- Six Recommendations for Implementation of FAIR Practice (2020)
- EU regulation on the openness of data, e.g. the Open Data Directive.

Finnish operators actively participate in European and international work, e.g.
- European Open Science Cloud (EOSC)
- Research Data Alliance (RDA)
- International Science Council Committee on Data (CODATA)
- European research infrastructure work
- Finnish research community participates actively in dialogue where it can support the openness of research and contribute to the establishment of practical solutions in national and international cooperation.

<u>Transparency</u> *"I have begun to think that no one ought to publish biometric results, without lodging a well arranged and well bound manuscript copy of all his data, in some place whereit should be accessible, under reasonable restrictions, to those who desire to verify his work."*

Francis Galton (1901), *Biometrika* 1:1, pp. 7-10.

<u>Community</u> What marks out modern science is not the conduct of experiments (alchemists conducted plenty of experiments), but the formation of a *critical community capable of assessing discoveries and replicating results*.

The Invention of Science: A New History of the Scientific Revolution, by David Wootton

Conference on and

Philosophy
Nov 30 - Dec 1 2016

History of Open Science
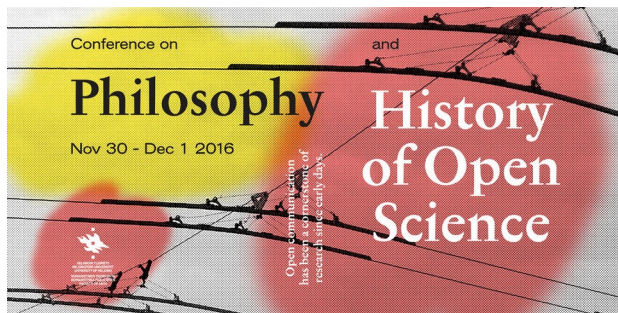
Alchemy & algorithms: perspectives on the philosophy and history of open science

A family of alchemists at work, an engraving by Philip Galle, after a painting by Pieter Bruegel the Elder, published by Hieronymus Cock, c.1558.

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Leo Lahti, Filipe da Silva, Markus Petteri Laine, Viivi Lähteenoja, Mikko Tolonen

Research process & life cycle
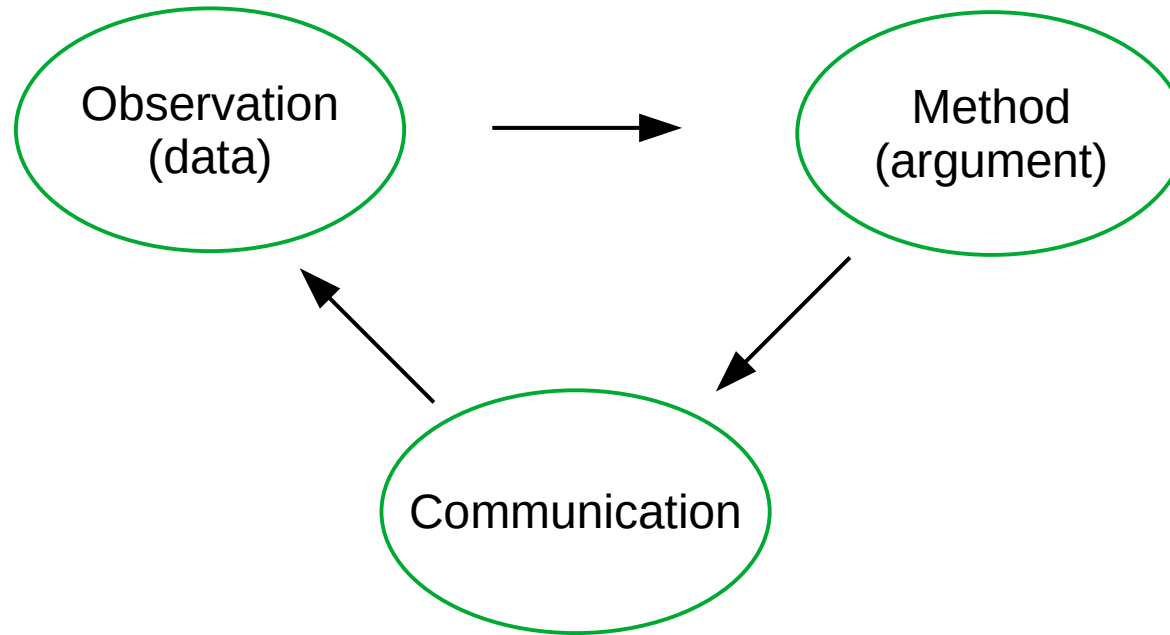
*"as open as possible,
as closed as necessary"*
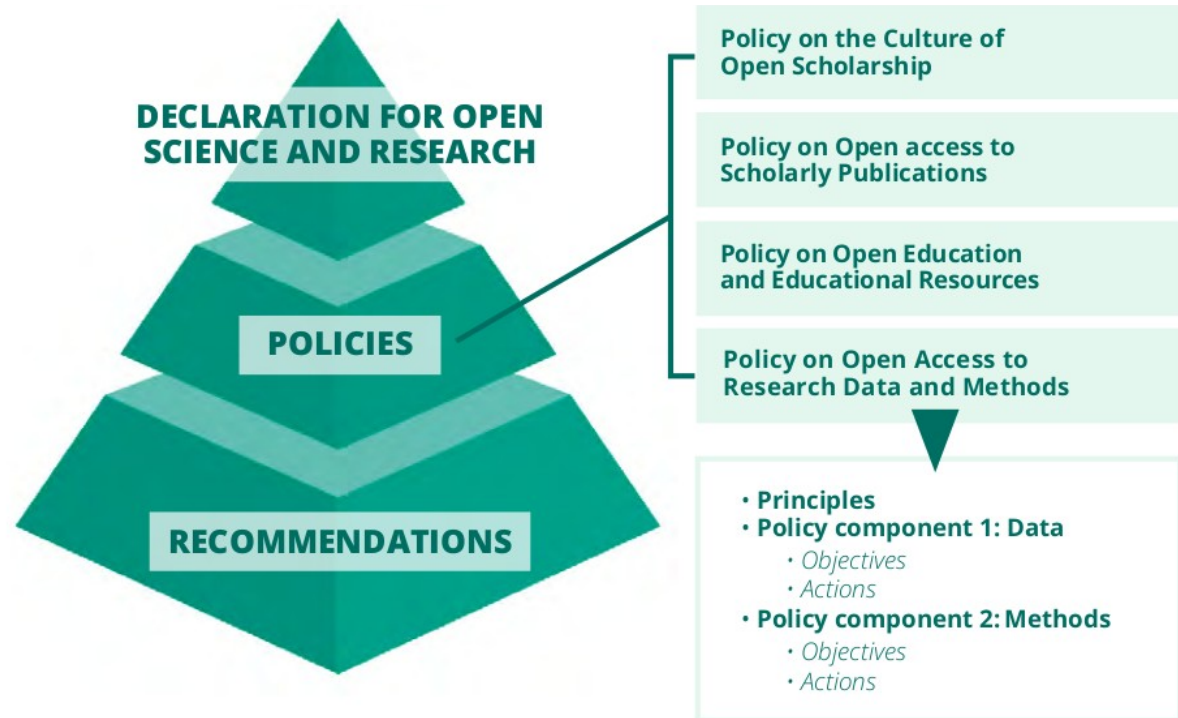
National policy work for open science and research

Strategic principles in national policy work
- Responsible openness
- Access to sustainable infra & services
- Researcher merit & careers

Implementation
→ Entire Finnish research community
→ Support: policies, guidelines, services, resources
→ Coordination monitors implementation & development

Guiding principle:
"as open as possible as closed as necessary"

DECLARATION FOR OPEN SCIENCE AND RESEARCH

POLICIES

RECOMMENDATIONS

Policy on the Culture of Open Scholarship

Policy on Open access to Scholarly Publications

Policy on Open Education and Educational Resources

Policy on Open Access to Research Data and Methods

- Principles
- Policy component 1: Data
  - *Objectives*
  - *Actions*
- Policy component 2: Methods
  - *Objectives*
  - *Actions*

Policy on open research data & methods

Responsible research series 4:2023

5ᵗʰ volume

AUTHOR: Open Science Coordination in Finland, Federation of Finnish Learned Societies

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RESPONSIBBLE RESEARCH SERIES 4:2023

OPEN RESEARCH DATA AND METHODS. NATIONAL POLICY AND EXECUTIVE PLAN BY THE HIGHER EDUCATION AND RESEARCH COMMUNITY FOR 2021–2025.
Policy components 1 (Open access to research data) and 2 (Open access to research methods and infrastructures)

- Drawn up by the Finnish research community / work groups 2019-2023 (30+ members from various organizations)

- Builds on national and international work and dialogue; public commenting round

- Coordinated by National Coordination for Open Science and Research (Federation of Finnish Learned Societies)

- Covers all fields of higher education and research

- Broader societal implications

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Why open?

Element of *research quality and impact* across the *full life cycle* of research, and opportunity to advance global inclusivity in research

Quality

- transparency
- verifiability
- trustworthiness
- integrity
- credibility
- reproducibility
- translatability into new uses

Impact

- accessibility & broad dissemination
- reuse
- speed
- efficiency
- emergence of new innovations
- establishing priority
- receive timely feedback
- community

→ *freedom* of research & *responsibility* of the researcher

The influence of hidden researcher decisions in applied microeconomics

Nick Huntington-Klein ✉, Andreu Arenas, Emily Beam, Marco Bertoni, Jeffrey R. Bloem, Pralhad Burli, Naibin Chen, Paul Grieco, Godwin Ekpe, Todd Pugatch, Martin Saavedra, Yaniv Stopnitzky

Researchers make hundreds of decisions about data collection, preparation, and analysis in their research. We use a many-analysts approach to measure the extent and impact of these decisions. Two published causal empirical results are replicated by seven replicators each. We find large differences in data preparation and analysis decisions, many of which would not likely be reported in a publication. No two replicators reported the same sample size. Statistical significance varied across replications, and for one of the studies the effect's sign varied as well. The standard deviation of estimates across replications was 3–4 times the mean reported standard error.
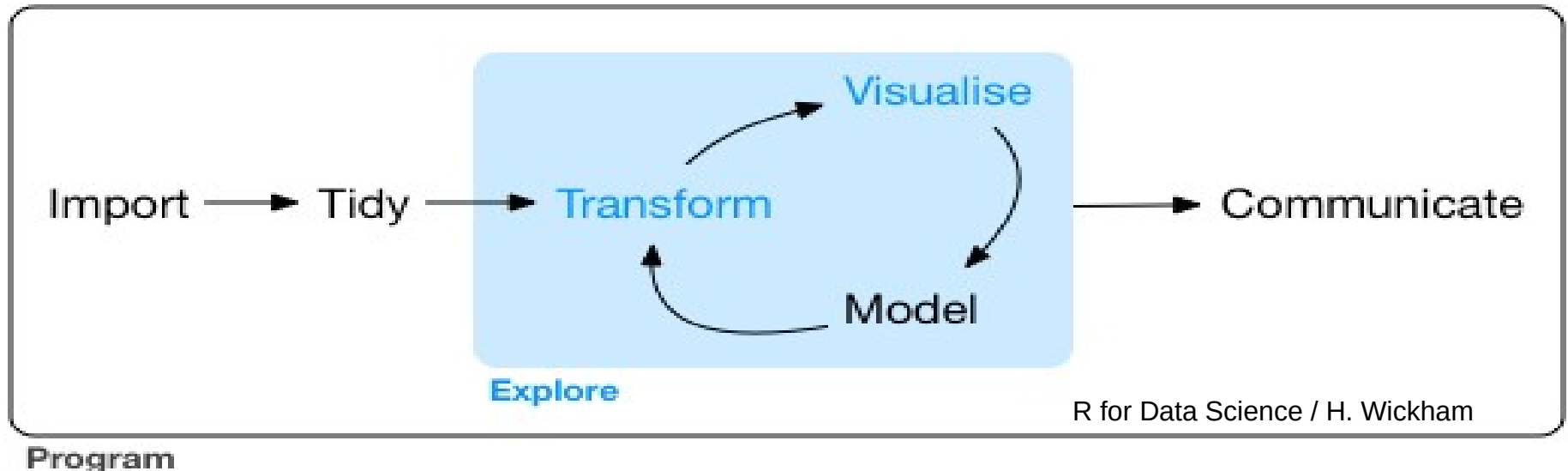
Why not open?

Bottlenecks:

- cultural
- technical
- financial
- continuous, iterative processual nature of methods development and application

What do we mean by *research method*?

"Organized and documented approach, for managing research resources and carrying out research in order to obtain research results." (Finnish science vocabulary)

Experimental

Quantitative — **Mixed** — **Qualitative**

Theoretical
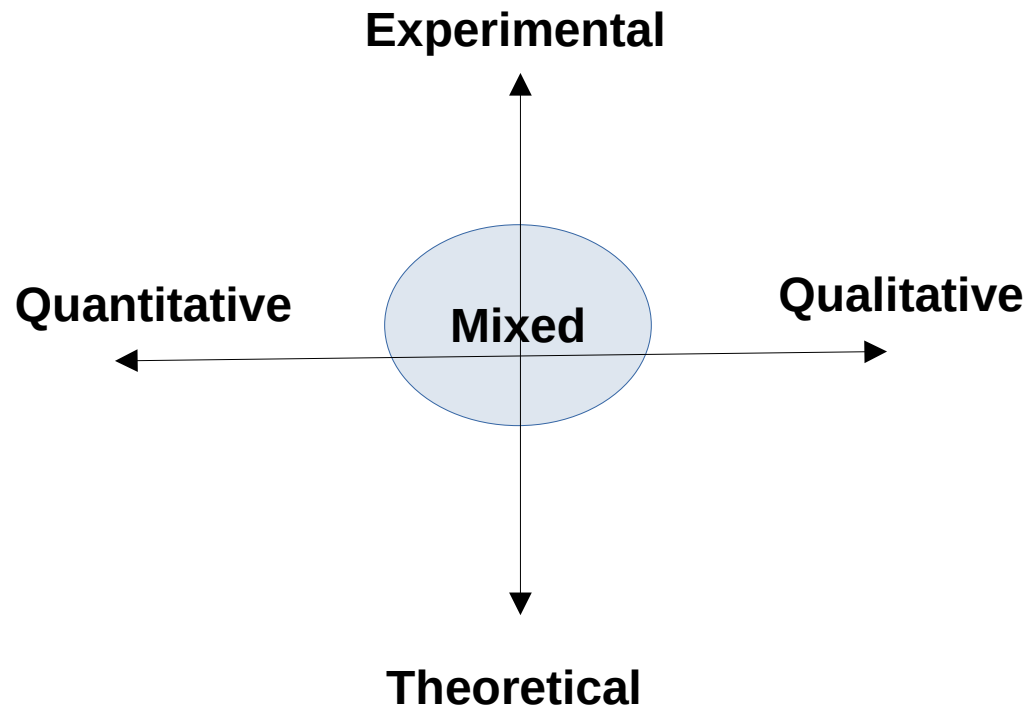
Description, protocol

Reasoning, argumentation

Qualitative model

Quantitative model

Quantitative test

Research diary or notebook

Questionnaire

Algorithm, script, workflow

Software

Infrastructures (virtual, physical) have an enabling role

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Open data / method / infrastructure?

Research process, maturity & life cycle

- Full workflow vs. individual methods
- Early & broad openness
- Limitations explicitly justified

Degree & type of openness

- Draft sketch → reproducible workflow → FAIR
- Transparent → Reproducible → Reusable → Interoperable
- FAIR principles

Culture and norms

- Research method as a *process*
- Standards in different fields
- IPR & research ethics

Open infrastructures

- Non-profit oriented
- Minimal costs for research
- Access can be regulated
- Open management & access policies

REPRODUCIBLE — SAME DATA, SAME ANALYSIS

REPLICABLE — DIFFERENT DATA, SAME ANALYSIS

Scriberia
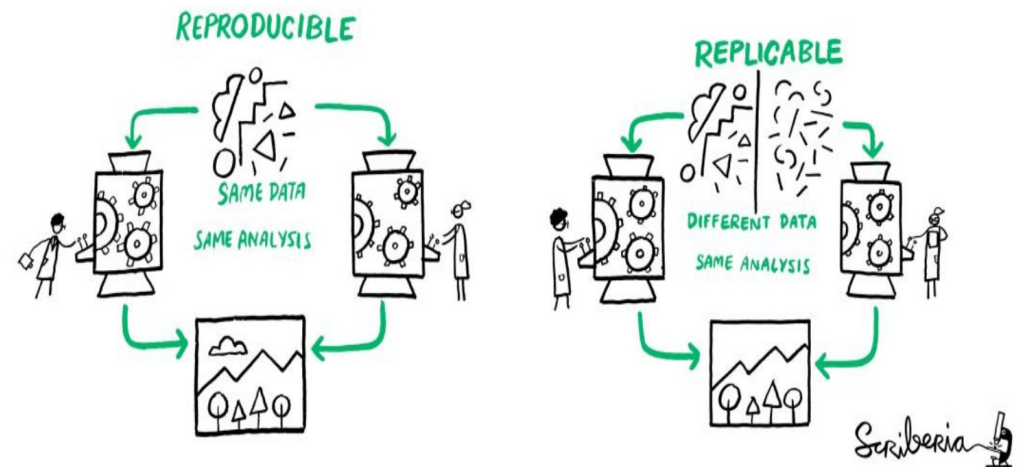
Objectives & actions

General principles:
- Responsible management of research resources
- Access to appropriate services
- Responsible research evaluation

Specific recommendations for key stakeholders: researchers, organizations, funders, publishers

Monitoring: Open Science Coordination at the Federation of Finnish Learned Societies, as part of the national open science monitoring programme.

O1
Research quality & impact

O2
Support services & infrastructure

O3
Rights, terms & conditions

OBJECTIVES	ACTIONS

1 Open research methods and infrastructures are recognised as key components of research quality and impact

- 2023 Creation of indicators initiated
- Assessment of need for discipline specific recommendations
- 2024 Dialogue on strategy for strengthening the documentation, citations and acknowledgement of research methods and infrastructures
- Research funding organisations plan to better support objectives of this policy in evaluation

2 Research organisations and infrastructure providers support open research methods

- 2023 Research methods and related policies, services, infra-structures and skills included in national OS architecture
- Review of status of research infrastructures and services for open research methods
- 2024 DMP consortium supports this policy
- 2025 Research organisations provide support and recommendations for training and services for students, researchers, and other staff
- Organisations describe expert roles in open methods and infrastructures

3 Rights and terms related to research methods and infrastructures are clearly agreed on between all participants in research work

- 2023 Creation of recommendations and guidelines for documenting the rights, terms and licenses
- 2024 Discussions with the Finnish National Board on Research Integrity (TENK) on guidelines
- 2025 National guidelines to advance clear agreements on rights and responsibilities

2023 **2024** **2025** **2026**

Incentives?

- Research evaluation

- Career paths

- Support services (financial, technical, other)

- Improved citation practices

Organisations should encourage adoption and promotion of open practices in all fields of research; technical support and resources, recognition and incentives.

Julkisuuslain tulkinta ja uudistaminen

	Päätös	1 (31)
VALTIONEUVOSTON OIKEUSKANSLERI	21.12.2021	OKV/461/70/2020, OKV/458/70/2020 OKV/461/70/2020-OKV-5

3.1.3 Avointa dataa ja tiedettä koskevia säännöksiä ja suosituksia

Perustuslain 12 §:ään perustuvien julkisuuslain 19 ja 20 §:ien tulkinnassa tärkeitä ovat avointa dataa koskevat Euroopan unionin säädökset. Lisäksi tulkinnassa merkittäviä ovat kansainväliset ja kotimaiset avointa tiedettä sekä avointa tietoa koskevat suositukset (soft law).

Avoimesta datasta ja julkisen sektorin hallussa olevien tietojen uudelleenkäytöstä säädetään Euroopan parlamentin ja neuvoston direktiivissä (EU) 2019/1024 (jäljempänä avoimen datan direktiivi). Direktiivi on tullut saattaa jäsenvaltioissa voimaan 17.7.2021. Direktiivi on säädetty jo vuonna 2019 ja sen sisältö ja periaatteet on ollut perusteltua ottaa huomioon kansallisen julkisuus- ja muun lainsäädännön tulkinnassa samoin kuin hallinnollisissa käytännöissä soveltuvin osin jo ennen direktiivin voimaansaattamispäivää ja sen jälkeen täysimääräisesti.

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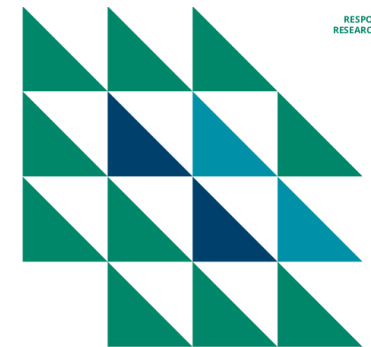
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