

Research Data Management (RDM)

Various types of data related to research activities (hereinafter "research data") are stored, shared, and utilized by researchers and in research fields. This will not change in the future. However, many researchers in Japan feel that there is a shortage of personnel, time, and funds for the maintenance, storage, and sharing of research data¹. Meanwhile, academic institutions such as universities are expected to play a role in providing support for proper Research Data Management (RDM) in order to adequately manage and share research data produced with public funds and to pass this on to future generations, as well as to ensure fairness in research².

Let's take a look at an overview of how RDM can be useful for both researchers and academic institutions.

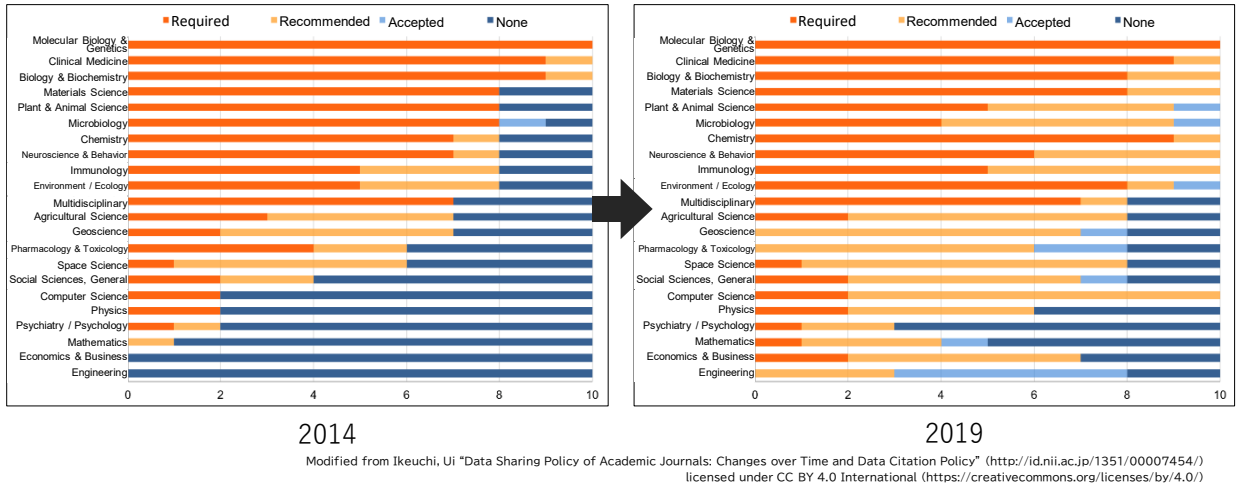
1. Background: From Open Access to Open Science

Public access to research papers (Open Access), which began in the 1990s, is now expanding to the sharing of research results (Open Science) including research data.

Background behind releasing research data

- Obligation to disclose results of publicly funded research
- Ensuring transparency and fairness in research
- Conditions by major overseas publishers for submission of papers
- Emergence of data journals due to changes in publication formats

Data Disclosure Policy³ changes⁴ by academic journals around the world



Japanese policies regarding Open Science

- Guidelines for Data Management Policy Development for the National Research and Development Agency (2018) (tentative translation, 『国立研究開発法人におけるデータポリシー策定のためのガイドライン』)
- Guidelines for the Maintenance and Operation of Research Data Repositories (2019) (tentative translation, 『研究データリポジトリ整備・運用ガイドライン』)
- 6th Science, Technology, and Innovation Basic Plan (2021)
- Basic Approach to the Management and Utilization of Publicly Funded Research Data (2021) (tentative translation, 『公的資金による研究データの管理・利活用に関する基本的な考え方』)
- Integrated Innovation Strategy 2022 (2022)

The term "Open" does not necessarily require full disclosure. Since around 2005, there have been active discussions about strategies and rules for sharing research data which led to the following common understanding regarding its usage.

Open and Closed Strategy

There is data which is not subject to public disclosure and data which needs to be restricted for reasons such as confidentiality and privacy protection. Based on the characteristics of the data, this strategy separates what should be disclosed (Open) and what needs to be protected (Closed).

FAIR Data Principles⁵

Findable, **A**ccessible, **I**nteroperable, **R**eusable.

These are international principles for data sharing and disclosure. In order to disclose research data, metadata and data identifiers need to be added in accordance with global standard formats, it must also use standard communication protocols and conform to standards in the field.

RDM involves researchers themselves storing, managing, and utilizing research data based on the Open and Closed Strategy and the FAIR Data Principles.

2. Implementing RDM and Benefits for Researchers

RDM is a general term that refers to how the information used or created in a research project is organized, structured, stored, and managed. RDM in academic institutions specifically refers to researchers themselves thinking about and practicing the following⁶.

- Formulation of a data management plan
- Daily handling of information during the course of research
- Long-term data handling after the research

Depending on the research field, there is already a consensus on RDM and checklists for research data that should be stored. However, for young and developing research fields, there will be discussions on whether existing standards for research data storage can be applied to the specific needs of these fields. The first step in RDM is for the researchers themselves to consider what must be stored from the ever-increasing amount of research data, and to think about the storage period, storage location, and storage method for each field and data type⁷.

Research data are diverse and can include research field, level, type, origin and format

- Data level (raw data, processed data, etc.)
- Data type (experimental data, observation data, etc.)
- Data origin (by-product of a project, result of project, etc.)
- Data format (numbers, images, text, etc.)



Decide which data should be stored.
(From the perspective of research fairness and reproducibility as well as reusability)

Benefits for the researcher

While RDM is an important part of responsible research, it also has the following benefits for the researchers themselves as well as fellow researchers.

Benefits of RDM given by leading overseas academic institutions⁸

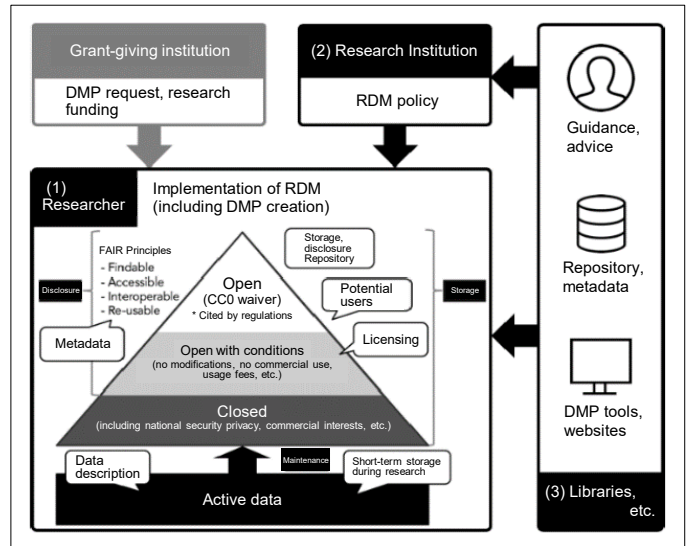
- Increased influence of one's own research
- Reduced data analysis time through proper management
- Long-term (permanent) storage of data, maintenance of data integrity
- Increased competitiveness by satisfying the requirements of funding agencies and obtaining grants
- Promoting new discoveries, effective sharing and reuse
- Support of open access
- Contributing to the utilization of data by the next generation of researchers

In addition, proper RDM also helps academic institutions to identify and enhance their research capabilities, and it has become increasingly common for academic institutions to establish and support the necessary environment⁹.

RDM and Stakeholders¹⁰

- (1) RDM implementation by researchers
- (2) RDM policies by research institutions
- (3) Support for RDM by libraries and other institutions

Translated from Ikeuchi, Ui "Current trend of open science: Research Data Management (RDM) – Goals and strategy" (<http://hdl.handle.net/2241/00154694>)

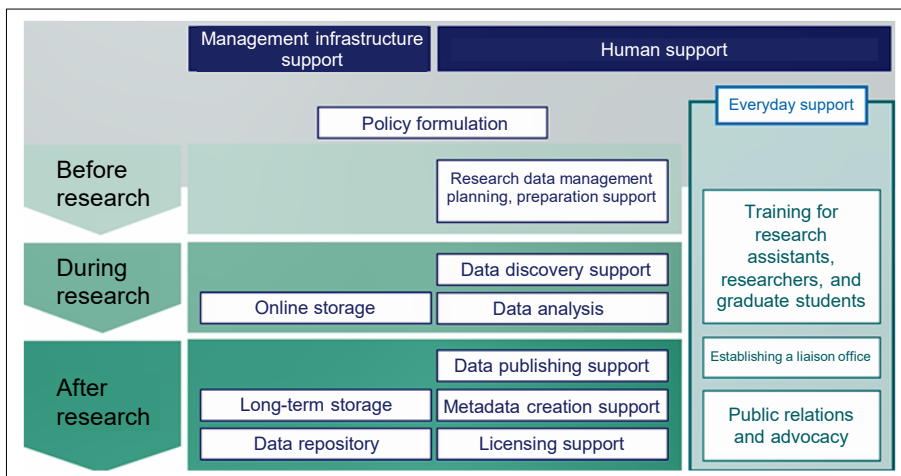


3. RDM support from academic institutions

Researchers will be able to implement RDM in a more beneficial way with the establishment of a support system by academic institutions and related departments.

- Roles of academic institutions¹¹
 - Clarify the purpose of introducing RDM
 - Consider, establish, and operate the RDM system
 - Develop and provide a digital platform for RDM
 - Promote awareness and use of the RDM system
- Roles of related departments (in Kyoto University, the Institute for Information Management and Communication, libraries, etc.)¹²
 - Research support staff collaborate and provide the necessary support so that research data produced by researchers can be managed appropriately.
 - RDM support includes human support and support for providing management infrastructure such as storage.

Examples of RDM support at each stage of research



Modified from JPCOAR "Educational Materials: Design and Implementation of Research Data Management Services" (<https://id.nii.ac.jp/1458/00000107/>) licensed under CC BY 3.0 unported (<https://creativecommons.org/licenses/by/3.0/>)

4. RDM initiatives at Kyoto University

Working Group for Research Data Management and Open Access Promotion

Providing support, publicity, and research related to research data management

Institute for Information Management and Communication

Operation of Object Storage Service (trial period) , etc.

Kyoto University Library Network

Promotion of Open Access

KURENAI can incorporate data that form the basis of papers, etc.

Providing information on the research data disclosure support webpage

Supporting your future research

Kyoto University established **the Kyoto University Policy on Research Data Management and Sharing** on March 19, 2020. This policy outlines the guiding principles for the management, storage, and disclosure of research data. Proper RDM in accordance with this policy is important for the researchers themselves to conduct better research in the future and to protect future research at Kyoto University.

<https://www.kyoto-u.ac.jp/en/research/research-policy/rdm>
(Kyoto University Home> Research& Collaborate> Policies> Policy on Research Data Management and Sharing)

KURENAI now allows you to register evidence data which serve as the basis for papers, etc.! Kyoto University has also started to build a framework for RDM support.



Inquiries

RDM Overview	Support for Research Data Management and Sharing rdm-support [at] mail2.adm.kyoto-u.ac.jp https://rdm.kyoto-u.ac.jp	
Disclosing research data	Repository Section, Kyoto University Library rs660 [at] mail2.adm.kyoto-u.ac.jp https://www.kulib.kyoto-u.ac.jp/researchdata/1380691?lang=en	

References:

- 1) According to a questionnaire on research data management conducted among Japanese researchers, 50.8% of data publication methods are through individual or laboratory websites. In addition, about 80% of the researchers answered that the human resources, time, and funds for data maintenance and publication are insufficient or somewhat insufficient.
Ikeuchi, Ui et al. "A Survey on Open Research Data and Open Access 2018" <http://doi.org/10.15108/rm268>
- 2) Academic eXchange for Information Environment and Strategy. "Recommendations for Research Data Management in Academic Institutions" <https://axies.jp/report/publications/proposal/>
- 3) The Data Sharing Policy is a description of data sharing included in each journal's submission guidelines and guidelines for authors. It may also include conditions for peer review and publication.
Ikeuchi, Ui "A review of journal policies for sharing research data across disciplines" <http://hdl.handle.net/2241/120086>
- 4) Ikeuchi, Ui "Data Sharing Policy of Academic Journals: Changes over Time and Data Citation Policy" (tentative translation)
<http://id.nii.ac.jp/1351/00007454/>
- 5) FAIR Principles <https://www.go-fair.org/fair-principles/>
- 6) JPCOAR "RDM Training Tools" Chapter 1 (tentative translation) <http://id.nii.ac.jp/1458/00000023/>
- 7) Miyata, Rei "Which Research Data Should Be Preserved: Survey Report by Jisc, UK" (tentative translation) <http://current.ndl.go.jp/e2162>
- 8) The advantages that research data management brings to researchers, as stated by overseas academic institutions, are similar in content.
University of Oxford "Benefits of research data management" <http://researchdata.ox.ac.uk/home/introduction-to-rdm/>
Massachusetts Institute of Technology "Why manage & share your data?" <https://libraries.mit.edu/data-management/plan/why/>
UC San Diego "Why does having a Data Management strategy matter?" <https://library.ucsd.edu/lpw-staging/research-and-collections/data-curation/data-management/index.html>
- 9) Same as 2)
- 10) Ikeuchi, Ui "Current trend of open science: Research Data Management (RDM) – Goals and strategy"
<http://hdl.handle.net/2241/00154694>
- 11) Same as 2)
- 12) JPCOAR "Educational Materials: Design and Implementation of Research Data Management Services" (tentative translation)
<http://id.nii.ac.jp/1458/00000107/>