
Goals and action plan for the national strategy for data management based on the FAIR principles

- Mandate period II, 2023-2025¹

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Danish e-Infrastructure Consortium
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¹ The mandate for period II was officially extended until ultimo December 2025, by the FAIR reference group on the 19th of February 2024

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1. Introduction

| Terminology/acronym | Description |
|---------------------|---|
| AAAI | Authentication, Authorization, and Accounting Infrastructure |
| CISO | Chief Information Security Officer |
| DeiC | Danish e-Infrastructure Consortium |
| DFF | Independent Research Fund Denmark |
| DM | Data management |
| DMP | Data management plan |
| DNRF | Danish National Research Foundation |
| DOI | Digital Object Identifier |
| ELIXIR | European Life Science Infrastructure |
| EOSC | European Open Science Cloud |
| ERIC | European Research Infrastructure Consortium |
| ESS | European Spallation Source |
| ESRF | European Synchrotron Radiation Facility |
| EU | European Union |
| EUDAT CDI | European Data Infrastructure – Collaborative Data Infrastructure |
| FAIR | Findable, Accessible, Interoperable, Reusable |
| IPR | Intellectual Property Rights |
| NIS2 | Network and Information Security Directive 2 |
| PID | Persistent Identifier |
| TDR | Trusted Data Repository |
| URIS | Committee on Guidelines for International Research and Innovation Collaboration |

As other countries in the EU, Denmark has chosen to adopt the FAIR principles² (**F**indability, **A**ccessibility, **I**nteroperability, and **R**euse) as a framework for managing publicly funded research data (data management). The Ministry of Higher Education and Science, has therefore through the Danish e-Infrastructure Consortium (DeiC), developed a National strategy for data management based on the FAIR principles (*FAIR strategy*)³, which was published in 2021. The strategy applies to publicly funded research data, defined as the outcome of research financed by public funds or research conducted by public institutions, possibly with private funding included.

The FAIR strategy is simultaneously designed to serve as the political implementation of the *Directive on open data and the reuse of public sector information*⁴, which extends the previous EU *Directive on the public sector's information (PSI)*.

As part of the strategy, The Ministry of Higher Education and Science established a reference group with the task of monitoring and coordinating the implementation of the strategy. The reference group was formed in 2021 and had its first mandate period from 2021 to 2022. During the initial mandate period, 5 working groups were formed under the FAIR reference group, focusing on data management policies and researcher support, data management infrastructure, financing, skills, and security. Over 60 experts from

²<https://www.go-fair.org/fair-principles/>

³https://www.deic.dk/sites/default/files/documents/PDF/DK_National%20strategi%20for%20data%20management%20baseret%20p%C3%A5%20FAIR-principper.pdf

⁴<https://eur-lex.europa.eu/legal-content/DA/TXT/PDF/?uri=CELEX:32019L1024>

various academic fields, including representatives from Danish universities, foundations, as well as various public and private organizations, participated in this effort. In December 2022, the FAIR reference Group and the working groups submitted a report⁵ on the focus areas to The Ministry of Higher Education and Science. Subsequently, the mandate of the FAIR reference group was extended for an additional two years. Due to delays, this mandate period has been further extended until ultimo 2025.

The FAIR reference group's remit and terms of reference for this term include the current focus areas:

1. How do different disciplines implement the FAIR principles in research practices? For example, in their specific workflows, tools, etc., possibly drawing inspiration from/in collaboration with international research environments.
2. What policies and motivating/supportive measures exist to support access to and reuse of research data, including the use of Persistent Identifiers (PIDs) for digital research objects (data, software, instruments, publications, etc.)?
3. Describe best practices for data governance and policies/guidelines for overseeing overall data responsibility, even after researchers have left the institution and/or project funding has ceased.
4. What infrastructure is available for the long-term preservation (10+ years) of research data of any kind at the national level, and how is coherence and collaboration ensured between research institutions, DeiC, and the National Archives regarding long-term preservation?
5. How can services for data management planning continue to be developed nationally and internationally, and how can data management plans be made machine-readable, and be used in connection with the submission of research data to the National Archives?
6. Elaborate on how research institutions work with security infrastructure (Authentication, Authorization, and Accounting Infrastructure, AAAI) specifically and especially for sensitive data, with the aim of also making these FAIR.
7. EU programs (e.g., Horizon Europe) require grant recipients to develop data management plans in connection with grant applications. To what extent can national research funding organizations benefit from following this practice?
8. Can the research data that is the basis for published research results, be required to be made available according to the FAIR principles after the projects's completion, at a minimum with metadata and a Persistent Identifier (PID), even when the data is not openly accessible?
9. What costs related to data management can be included in budgets?
10. What competence profiles have research institutions established for the Data Stewardship research support function for researchers? How have research institutions built the data stewardship research support function for researchers?

⁵ <https://zenodo.org/records/7575581>

11. To what extent is there interest in developing and offering the research support function collectively, at the national level? For example, under a central or decentralized national competence center.
12. Is there interest among research institutions in national coordination of educational offerings (not research support) within FAIR research data management? Can a potential national collaboration aim at division of labor, specialization, and joint national offerings of educational programs, such as through a competence center under the auspices of DeiC? This includes education at all levels, from bachelor to further education of scientific staff.
13. How are incentive structures or merit systems currently used nationally or internationally for FAIR data management practices at research institutions?
14. What are the security requirements in connection with storage and sharing of data?
15. In light of research groups' needs to work nationally and internationally with sensitive data, which requires strong and flexible governance, elaborate on the national and international solutions/services that can support this need.
16. Can a better understanding of the various degrees of data sensitivity be provided? This includes not only sensitive personal data, but also agreements, dual-use preprints, IPR, etc., including researchers' own criteria for how the sensitivity of their data can be understood.
17. What criteria for the value (curation) of data and economic models are applied by local, national and international data storage services to assess the preservation rationale, economics, and sustainability thereof?

The FAIR reference group has established 6 working groups, tasked with monitoring their respective focus areas. The topics for the working groups are:

- Policies, tools, and research support for FAIR data management
With special attention to focus areas 1, 2, 3
- Establishing FAIR infrastructure and long-term preservation
With special attention to focus areas 4, 5 and 6
- Financial plan for FAIR data
With special attention to focus areas 7, 8, 9
- Plan for structuring and developing FAIR competencies and knowledge
With special attention to focus areas 10, 11, 12, and 13
- Security aspects of FAIR data collaboration
With special attention to focus areas 14, 15, 16

- Valuation of data
With special attention to focus area 17

Based on the above-mentioned focus areas, the working groups have proposed goals and actions that they consider essential for pursuing the focus areas, addressing the questions, and thus facilitating a successful implementation of the FAIR principles.

In addition, the FAIR reference group has chosen to focus on communication, both as a tool among the members of the working groups and in terms of creating a national framework for easily accessible and understandable information about the FAIR strategy, its implementation, and data management based on the FAIR principles. Communication to users and leaders is considered particularly necessary, as the digitization of research and the national implementation of FAIR principles represent one of the most significant cultural changes the research world has experienced in recent times.

2. The FAIR Reference group's overall timeline and plan for deliverables

| Timeline | Deliverable | Elements |
|----------------|--|--|
| June 2023 | The FAIR reference group is established | <ul style="list-style-type: none"> • Remit/ Terms of reference for the FAIR reference group is approved |
| September 2023 | Working groups are established | <ul style="list-style-type: none"> • Working groups are established and relevant individuals are appointed to the groups • Terms of reference for all working groups are completed |
| March 2024 | Action plan for the goals and deliverables for 2024/25 is submitted to The Agency for Higher Education and Science | <ul style="list-style-type: none"> • Input for the action plan has been received by the working groups • The action plan is completed and submitted to the Agency for Higher Education and Science • Communication efforts have been planned |
| June 2024 | Status meeting with the working groups | <ul style="list-style-type: none"> • Status on collected data and activities • Status on communication with individual universities and other relevant institutions |
| December 2024 | Annual report is submitted to The Agency for Higher Education and Science | <ul style="list-style-type: none"> • Status of the cross national activities received from all working groups • Annual report is completed and sent to The Agency for Higher Education and Science |
| March 2025 | Action plan for the goals and deliverables for 2025 is submitted to The Agency for Higher Education and Science | <ul style="list-style-type: none"> • Input for the action plan has been received by the working groups • The action plan is completed, and submitted to the Agency for Higher Education and Science • Communication efforts have been planned |
| June 2025 | Status meeting with the working groups | <ul style="list-style-type: none"> • Status on collected data and activities • Status on communication with individual universities and other relevant institutions |
| December 2025 | Final report is submitted to The Agency for Higher Education and Science, and recommendations are prepared | <ul style="list-style-type: none"> • Status of cross-national activities received from all working groups. • Report to The Agency for Higher Education and Science is completed and sent. • Recommendations for next steps sent to The Agency for Higher Education and Science. |

3. Goals and actions supporting communication and knowledge exchange about data management and FAIR

Internal and external communication:

Goal 0.1. Communication support is established across the 6 working groups, where members can access information about, for example:

- Policies
- Strategies
- Tools
- Q & A
- Manuals
- International references
- Litterature
- Courses related to FAIR and Data Management
- ...

Action 0.1: Communication channels are established for the working groups on Microsoft Teams, where members can access information about the above, save agendas, minutes, and other documents, and communicate internally easily and undisturbed.

Goal 0.2: A channel for public publishing of relevant material from the working groups and the FAIR Reference group is established.

Action 0.2: A channel on Zenodo⁶ is created for the FAIR strategy, mandate period 2023-2025.

⁶ <https://about.zenodo.org>

4. Premises of the working groups

This section has been added by the working groups, to provide an overview of the premises that need to be in place for the action plan to be successfully implemented.

- Management support from the FAIR reference group to prioritize this work at the individual universities
- Prioritization and dedicated time from the members of working groups
- Dedicated partners/contacts from all the universities, who have the possibility to prioritize this work
- Coordination of resources among the DM FAIR working groups, so certain individuals/groups at the universities are not overloaded
- The working groups will develop material of guiding/observational nature, while it will be up to the FAIR Reference group to assess the extent to which the universities would fulfill the recommendations, and whether or not to follow up on them.

5. Goals and actions related to focus areas under the FAIR reference group's working group:

A. Policies, tools, and research support for FAIR data management

Working group A has developed proposals for actions that address the FAIR reference group's focus areas 1, 2, and 3.

Focus area 1:

How do different disciplines implement the FAIR principles in research practices? For example, in their specific workflows, tools, etc., possibly drawing inspiration from/in collaboration with international research environments?

Goals:

Examples of discipline-specific workflows and tools from selected academic disciplines within different main subject areas.

Actions:

Selection of academic disciplines and institutions. Based on the motivating and supportive actions identified under focus area 2, we will collect examples of workflows and tools from selected academic disciplines through contact with the institutions. Additionally, we will explore proposals for cross-cutting national coordinating activities, such as workshops, seminars, and knowledge exchange.

Monitoring progress, including a timeline:

The above actions will be carried out after the actions of focus area 2.

Focus area 2:

What policies and motivating/supportive measures exist to support access to and reuse of research data, including the use of Persistent Identifiers (PIDs) for digital research objects (data, software, instruments, publications, etc.)?

Goals:

To compile examples of motivating and supportive initiatives for access and reuse of research data at universities and selected research institutions.

Actions:

- Selection of relevant research institutions. Compilation of data management policies of universities and selected research institutions, and identification of motivating and supportive initiatives.
- Through dialogue with selected researchers and by reviewing feedback from the initial consultations on the FAIR strategy, we will gather examples of understanding and misunderstandings that may hinder the implementation of making data FAIR.
- We will attempt to clarify how GDPR regulations, Guidance on the Disclosure of Personal Data Covered by Section 10, Paragraphs 1 and 2 of the Data Protection Act (2019), and the promotion of FAIR methods may unnecessarily conflict with each other.

Monitoring progress, including a timeline:

Focus area 3:

Describe best practices for data governance and policies/guidelines for overseeing overall data responsibility, even after researchers have left the institution and/or project funding has ceased.

Goals:

Identification of best practices for data governance, and policies to manage the overall responsibility for data.

Actions:

Based on the material collected under focus areas 1 and 2, we will extract examples of best practices for data governance and policies to manage the overall responsibility for data.

Monitoring progress, including a timeline:

To be carried out after the actions of focus area 1 and 2

Deliverables

| Timeline | Deliverable | Elements |
|--|---|---|
| A. Deliverable early march 2024 | Action plan for the goals and deliverables for 2024/25 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| B. Deliverable mid 2024 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2024 and beyond. |
| C. Deliverable end 2024 | Contribution to the annual report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |
| D. Deliverable early march 2025 | Action plan for the goals and deliverables for 2025 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| E. Deliverable mid 2025 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2025. |
| F. Deliverable end of 2025 | Contribution to the final report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |

6. Goals and actions related to focus areas under the FAIR reference group's working group

B. Establishing FAIR infrastructure and long-term preservation

Working Group B has developed proposals for actions addressing the FAIR reference group's focus areas 4, 5, and 6.

Focus area 4:

What infrastructure is available for the long-term preservation (10+ years) of research data of any kind at the national level, and how is coherence and collaboration ensured between research institutions, DeiC, and the National Archives regarding long-term preservation?

Goals:

Working group B aims to identify any potential existing national-level infrastructures for long-term preservation. To understand the implications of long-term preservation, the group intends to gather inspiration from European Research Infrastructures (ERICs). The group aims to propose recommendations on how to continuously estimate the necessary capacity for the long-term preservation of Danish research data, and how to best scale the infrastructure accordingly. Lastly the group aims to gather information from other relevant parties, on long-term preservation, to propose ways to enhance synergy and partnership among research institutions, DeiC and the National Archives, including actions to support this.

Actions:

1. Describe and list existing national level infrastructures that provide long-term preservation for all types of research data. How long do they preserve data? Is it possible to get a digital object identifier (DOI) on specific data sets?
2. Gather inspiration from European Research Infrastructures (ERICs) including the European Spallation Source (ESS), European Life Science Infrastructure (ELIXIR), European Data Infrastructure (EUDAT), European Synchrotron Radiation Facility (ESRF), and others to understand implications of long-term preservation and describe best practices.
3. Gather information on DeiC's long-term preservation strategy⁷, and any European Open Science Cloud (EOSC) reports on long term preservation, to summarize best practices.
4. Facilitate a workshop (with the central topic being action no. 2 and 3) with The National Archives and other relevant parties, regarding synergy between research institutions, The National Archives, and DeiC. Outcomes of the workshop will be described and published on Zenodo.

Monitoring progress, including a timeline:

The group will start with actions one and two.

Action number three involves external stakeholders, and completion of this action is therefore estimated for late 2024, or early 2025. Action no. 4 will take place during 2025.

⁷ The long-term preservation strategy for DeiC is expected to be completed in the second half of 2024.

Focus area 5:

How can services for data management planning continue to be developed nationally and internationally, be made machine-readable, and be used in connection with the submission of research data to the National Archives?

Goals:

Recommend improvements for research data management plan services and their integration with the process of submitting research data to the National Archives.

Actions:

1. Are there services other than DeiC DMP in use in Denmark?
2. Determine the progress of use of data management plan (DMP) services (for instance on machine-actionability and technical interoperability) in Europe and in Denmark and outline recommendations on the basis of this.
3. Bring these discussions to light at the workshop with relevant stakeholders and the National Archives (action 4 under focus area 4)

Monitoring progress, including a timeline:

It is estimated that actions 1 and 2 will be concluded in 2024. Action number three is part of the last action under focus area 4.

Focus area 6:

Elaborate on how research institutions work with security infrastructure (Authentication, Authorization, and Accounting Infrastructure, AAAI) specifically and especially for sensitive data, with the aim of also making these FAIR.

Goals:

Determine what is needed to establish the necessary trust in the infrastructures and governance processes that are used to protect sensitive data and manage access to these once they have been entered into a trusted data repository (TDR). Investigate how sensitive data can be made FAIR, including how to combine the publication of metadata about sensitive data with the need to limit and manage access to the sensitive data.

Actions:

- Gather information about how access to sensitive data is currently governed and how this relates to granting access in the context of handling research data in accordance with the FAIR principles.
- Identify strategies that ensure that sensitive data can also be made more FAIR, by looking mainly at EOSC deliverables.
- Examine what is required for an infrastructure to support the governance after a dataset has been published with restricted access.
- Gather information regarding existing solutions within academia and industry to monitor and audit data access.

Monitoring progress, including a timeline:

The outcome of the actions under focus area 6 will be summarized during 2025.

Deliverables

| Timeline | Deliverable | Elements |
|--|---|---|
| A. Deliverable early march 2024 | Action plan for the goals and deliverables for 2024/25 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| B. Deliverable mid 2024 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2024 and beyond. |
| C. Deliverable end 2024 | Contribution to the annual report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |
| D. Deliverable early march 2025 | Action plan for the goals and deliverables for 2025 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| E. Deliverable mid 2025 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2025. |
| F. Deliverable end of 2025 | Contribution to the final report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |

7. Goals and actions related to focus areas under the FAIR reference group's working group:

C. Financial plan for FAIR data

Working Group C has developed proposals for actions addressing the FAIR reference group's focus areas 7, 8, and 9.

Focus area 7:

EU programs (e.g., Horizon Europe) require grant recipients to develop data management plans in connection with applications. To what extent can national research funding organizations benefit from following this practice?

Goals:

To map out best practices for data management plans across various research disciplines, as well as to identify types of expenses and expenditure levels for data management in specific projects. Additionally, the group will examine current practices regarding requirements for DMPs (Data Management Plans) from Danish funding agencies and Horizon Europe, and in the long term, assess the possibilities for consistency in requirements and procedures across Danish funding agencies regarding DMPs.

Actions:

1. Mapping of best practices for DMP's within 2-3 selected main areas/research disciplines, based on both EU and national contexts. This action will be carried out in collaboration with working group A, through methods such as surveys or interviews.
2. Gathering experiences with data management expenses and budgets from selected projects within both the EU and the Independent Research Fund Denmark (DFF) portfolios
3. Examine the number of funding agencies that currently require data management plans, and the timing of such requirements in the application process.
4. If possible, knowledge exchange with and/or study visit to the Netherlands, as they are considered to be advanced in the implementation of data management plans, compared to Denmark.

Monitoring progress, including a timeline:

The group will start with the first 4 actions, which need to be clarified by the end of 2024 or the first half of 2025.

Focus area 8:

Can the research data underlying published research results, be required to be made available according to FAIR principles after the project's completion, at a minimum with metadata and a Persistent Identifier (PID), even when the data is not openly accessible?

Goals:

To map current and future possibilities for assigning PIDs and sharing of metadata for sensitive datasets, as well as any challenges and barriers associated herewith.

Actions:

1. Presentation of plans for DeiC Dataverse/DeiC storage and its capabilities regarding registration and full/partial sharing of sensitive data and associated metadata (DeiC)
2. Mapping current and future possibilities and technical solutions in collaboration with working group B
3. Mapping significant technical, legal, economic or cultural barriers for the sharing of metadata for sensitive datasets

Monitoring progress, including a timeline:

The group will start with focus areas 7 and 9, and therefore, it is assessed that the timeline for actions related to focus area 8 can span both 2024 and 2025 – particularly point 3. Points 1 and 2 can be clarified during 2024, in collaboration with working group B.

Focus area 9:

What costs related to data management can be included in budgets?

Goals:

To clarify when and how expenses for data management are considered covered by general categories such as overhead or indirect additions to a project, and when they can be included as itemized expenses in a grant application budget.

Uniformity across funding agencies is sought as much as possible, taking into account that current practices vary among the agencies (*e.g., Overhead at The Danish National Research Foundation (DNRF) versus new indirect additions to a project at 5 private foundations*).

Actions:

1. To map which data management related expenses are considered covered by the new indirect additions to projects at the Novo Nordisk Foundation, Villum Foundation, Carlsberg Foundation, Velux Foundation, Lundbeck Foundation and Leo Foundation
2. Identification of types of expenses considered covered by overhead at institutions such as DNRF, Innovation fund Denmark and DFF as well as other governmental fund providers.

The actions above will be based on the categories of the data management strategy (1, 2A, 2B, and 3), from working group C's previously prepared table of data management-related expenses, and the agreement on indirect additions to projects.

Monitoring progress, including a timeline:

The above actions will be clarified before any meeting with funding agencies; therefore, they will be prioritized alongside focus area 7 and completed by the end of 2024 or the first half of 2025.

Concluding initiative

The group will convene a meeting with both public and private funding agencies after the completion of actions under the focus areas 7 and 9. It is estimated that this meeting will take place during 2025.

Deliverables

| Timeline | Deliverable | Elements |
|--|---|---|
| A. Deliverable early march 2024 | Action plan for the goals and deliverables for 2024/25 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| B. Deliverable mid 2024 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2024 and beyond. |
| C. Deliverable end 2024 | Contribution to the annual report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |
| D. Deliverable early march 2025 | Action plan for the goals and deliverables for 2025 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| E. Deliverable mid 2025 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2025. |
| F. Deliverable end of 2025 | Contribution to the final report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |

8. Goals and actions related to focus areas under the FAIR reference group's working group:

D. Plan for structuring and developing FAIR competencies and knowledge

Working Group D has developed proposals for actions addressing FAIR Follow-up Group's focus areas 10, 11, 12, and 13. The Group has clustered the focus areas and related actions into three topics: (1) Data Stewardship, (2) National Competence Center, and (3) Recognition and Reward of FAIR Data Management. All members of the Working Group were encouraged to contribute to at least one topic. The work of the subgroups is expected to span over two years, 2024 and 2025.

(D1) Data Stewardship

Focus area 10:

What competence profiles have research institutions established for the Data Stewardship research support function for researchers? How have research institutions built the Data Stewardship research support function for researchers?

Goals:

- Mapping the organizational Data Stewardship landscape in Denmark
- Mapping the Data Stewardship competence landscape in Denmark

Actions:

- Investigate how research institutions have set up the local Data Stewardship research support function,
- Investigate what competence profiles research institutions have formulated for the local Data Stewardship research support function,
- Investigate how Danish universities have designed Data Stewardship education programs.

Monitoring progress, including a timeline:

- 2024: Data collection and exploratory analysis of the collected data
 - Milestone M1.1 (June 2024): Description of data collection methods, detailed timeline of data collection and data analysis in 2024
 - Milestone M1.2 (October 2024): Status on data collection and analysis, plan, and timeline for 2025
 - Milestone M1.3 (November 2024): Overview of progress and main results in a report to the FAIR reference group
- 2025: Additional data collection (if relevant), community feedback, workshop, and dissemination (final report)

(D2) National Competence Center

Focus area 11:

To what extent is there interest in developing and offering the research support function collectively at the national level? For example, under a central or decentralized national competence center.

Focus area 12:

Is there interest among research institutions in national coordination of educational offerings (not research support) in FAIR research data management? Can a potential national collaboration aim at division of labor,

specialization, and joint national offerings of educational programs, such as through a competence center under the auspices of DeiC? This includes education at all levels, from bachelor to further education of scientific staff.

Goals:

- Presentation of organizational models of a National Competence Center for FAIR Data Management,
- Presentation of potential services of a National Competence Center for FAIR Data Management,
- Overview of institutional needs and interests in relation to creating a National Competence Center for FAIR Data Management in Denmark,
- Overview of institutional needs and interests regarding national coordination of FAIR Data Management education and training in Denmark.

Actions:

- Describe how existing National Competence Centers for FAIR Data Management are organized,
- Describe what kind of services existing National Competence Centers for FAIR Data Management offer,
- Investigate whether the Danish research institutions would be interested in creating a National Competence Center for FAIR Data Management,
- Investigate whether the Danish research institutions would be interested in coordinating FAIR Data Management education and training.

Monitoring progress, including a timeline:

- 2024: Data collection and exploratory analysis of the collected data
 - Milestone M2.1 (June 2024): Description of data collection methods, detailed timeline of data collection and data analysis in 2024
 - Milestone M2.2 (October 2024): Status on data collection and analysis, plan, and timeline for 2025
 - Milestone M2.3 (November 2024): Overview of progress and main results in a report to the FAIR reference group
- 2025: Additional data collection (if relevant), community feedback, workshop, and dissemination (final report)

(D3) Recognition and Reward of FAIR Data Management

Focus area 13:

How are incentive structures or merit systems currently used nationally or internationally for FAIR data management practices at research institutions?

Goals:

- Overview of national or international recommendations on how to reward FAIR Data Management practices,
- Mapping current incentive structures for FAIR Data Management practices at Danish universities,
- Mapping current incentive structures for FAIR Data Management practices at international universities.

Actions:

- Create an overview of relevant national and/or international recommendations on how to reward FAIR Data Management practices,
- Investigate how incentive structures are currently used at Danish research institutions to reward FAIR Data Management practices,
- Investigate how incentive structures are currently used at international research institutions to reward FAIR Data Management practices.

Monitoring progress, including a timeline:

- 2024: Data collection and exploratory analysis of the collected data
 - Milestone M3.1 (June 2024): Description of data collection methods, detailed timeline of data collection and data analysis in 2024
 - Milestone M3.2 (October 2024): Status on data collection and analysis, plan, and timeline for 2025
 - Milestone M3.3 (November 2024): Overview of progress and main results in a report to the FAIR reference group
- 2025: Additional data collection (if relevant), community feedback, workshop, and dissemination (final report)

Deliverables

| Timeline | Deliverable | Elements |
|--|---|---|
| A. Deliverable early march 2024 | Action plan for the goals and deliverables for 2024/25 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| B. Deliverable mid 2024 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2024 and beyond. |
| C. Deliverable end 2024 | Contribution to the annual report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |
| D. Deliverable early march 2025 | Action plan for the goals and deliverables for 2025 is submitted | <ul style="list-style-type: none"> Identify goals, actions, and prioritize the focus areas of the working group. |
| E. Deliverable mid 2025 | Status meeting with the FAIR reference group | <ul style="list-style-type: none"> Status on collected data and activities. Follow-up on the action plan and plans for additional efforts in 2025. |
| F. Deliverable end of 2025 | Contribution to the final report | <ul style="list-style-type: none"> Status of the cross-national activities outlined in the working group's terms of reference. |

9. Goals and actions related to focus areas under the FAIR reference group's working group:

E. Security aspects of FAIR data collaboration

Working Group E has developed proposals for actions addressing the FAIR reference group's focus areas 14, 15, and 16. (The working group has renumbered the action areas from the remit, so that 14 is now 15, 15 is now 16, and 16 is now 14).

Specific premise for working group E

Currently, a lot of work is being done in the area of security at the various universities, including in compliance with the URIS guidelines. Therefore, there may be considerations to take into account here, such as timing of data collection for this work. Additionally, this action plan must also have a certain degree of flexibility regarding changes, as this working group may be presented with new information continuously during this work.

Scope:

The following section is not exhaustive but is simply a dynamic bullet list that helps describe the scope within which this working group operates.

- The scope of this work only concerns FAIR data. This means data that adheres to the FAIR principles. We focus on stable/well-described datasets and not datasets that are under development – for example, where researchers are in a smaller, local environment collaborating.

The intention is not to establish a separate governance for the security area but rather how the security area "feeds into" the governance work carried out in the other working groups, particularly working group A, which is tasked with describing best practices for data governance and policies/guidelines for managing the overall responsibility for data.

Focus Area 14 – data sensitivity

Can a better understanding of the various degrees of data sensitivity be provided? This includes not only personal sensitivity but also agreements, dual-use preprints, IPR, etc., including researchers' own criteria for how the sensitivity of their data can be understood.

Goals:

A concluding article that explores whether a broadly accepted understanding of the concept of data sensitivity – particularly data sensitivity with examples within specific research areas – can be established among Danish universities. If this proves not to be possible, an attempt will be made to formulate a set of advisory guidelines that can serve as a tool to achieve a better understanding of data sensitivity in a research context.

Actions:

- Mapping the current understanding of data sensitivity at different universities. For example, by collecting data classifications and initiating dialogue with one or more research areas from the various universities. This way, the working group will gain insight into the current status.
- Processing the above collected information to see if any overarching sub-conclusions can be drawn, such as: Where do the data classifications look similar? Where do they differ? And so on.

- Hosting a workshop for selected stakeholders (e.g., CISO forum and selected researchers).
- Based on the workshop, the working group will draft an article about the workshop, including whether there is any form of agreement or common understanding.

Monitoring progress, including a timeline:

Data collection and mapping will be attempted to be covered in 2024, while the workshop and concluding article will take place in 2025.

Focus Area 15 - relevant security requirements

What are the security requirements in connection with storage and sharing of data?

Goals:

To map the current security requirements applicable to the storage and sharing of data at research institutions in Denmark. Subsequently, we will assess whether there is a gap between these and prevailing/recognized recommendations regarding security requirements, including whether there is a need for imposing requirements and/or recommendations for additional measures (in the short and long term).

Actions:

- Gather and process relevant data to map how research institutions establish their level(s) of security/security requirements for storage and sharing of data; Including which sources have been used to define the institution's security requirements.
- Develop an overview of national and international sources that can be used to determine a security level for storage and sharing of data (e.g., URIS, NIS2, Data Governance Act, etc.).
- Assessment of whether existing requirements are sufficient. This will result in a report to the FAIR Reference group.
- The working group will prepare a description for the annual report on where Danish research institutions stand in relation to selected security recommendations. This description may possibly be disclosed at the source level (e.g., x research institution has used y source).

Monitoring progress, including a timeline:

Data collection and compilation of sources will be conducted in 2024. Processing of the collected data from point 1, as well as the final description for the annual report, will take place in 2025. An update on this work can be provided by the end of 2024.

Focus Area 16 – approved solutions/services

In light of research groups' needs to work nationally and internationally with sensitive data, which requires strong and flexible governance, elaborate on the national and international solutions/services that can support this need.

Goals:

To map which national and international solutions/services can support the need to work with sensitive data (both nationally and internationally) in a secure way. For this purpose, experiences from focus area 14 and 15 are expected to be included.

Actions:

- The working group will investigate (possibly through a questionnaire or via selected contacts) which technical solutions are being/ have been used for sharing sensitive data in various research environments today.

- Examine if there are challenges in sharing sensitive data, especially internationally, and what precautions are taken.
- Investigate whether, in relation to the work under working group A, there is a need for additional recommendations for governance related to security.
- Engage in dialogue with security authorities regarding suggestions for requirements that should be imposed on services handling sensitive data, including what options are available for the development of positive/negative lists. Knowledge gained from focus area 14 and 15 will be incorporated into this dialogue.

Monitoring progress, including a timeline:

Some data collection may possibly take place in 2024 regarding the current situation, but otherwise, this focus area will be addressed in conjunction with focus areas 14 and 15, which is why the majority of this focus area (#16) will be addressed in 2025.

Deliverables

| Timeline | Deliverable | Elements |
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10. Goals and actions related to focus areas under the FAIR reference group's working group:

F. Valuation of data

Working Group F has developed proposals for actions addressing the FAIR reference group's focus area 17.

Focus area 17:

What criteria for the value (curation) of data and economic models are applied by local, national, and international data storage services to assess the preservation rationale, economics, and sustainability thereof?

Aim:

Access to research data promotes transparency, reproducibility, and the advancement of knowledge across research disciplines. Additionally, research data can play a crucial role in evidence-based decision-making, policy formulation, and innovative solutions to societal challenges. In other words, research data can have value for society, and valuable data should be safeguarded.

However, what determines the value of data is not uniformly defined and depends on the viewpoints of individual stakeholders. In working group F, we aim to develop a framework for the assessment of the value of data, by interviewing various stakeholders in Denmark representing universities, data repositories and archives, funders, and the ministry, and by investigating similar initiatives abroad. This framework can be useful for the development of stakeholder strategies, policies and guidelines governing the management of research data.

Goals:

- A framework within which to work with the value of data from the viewpoint of the main stakeholders.
- A summary of the current policies for and work with data value at universities, etc.
- A discussion of the national state of valuation of data including knowledge gained from international initiatives.
- Recommendations for further coordinating work.
- Recommendations for specific national initiatives.
- Tentative plan for 2025

Sections of the status report

- Introduction and interpretation of Focus Area 17
- Summary of existing policies and work with data valuation in the Danish research community based on policies and interviews.
- Discussion on valuation of data in Denmark.
- Recommendations for further work.
- Tentative plan for 2025

Actions:

1. Preparation and publishing of action plan. Completed by the end of March.

2. Gathering information from Danish universities and other sources. Begins in April and ends in September.
 - a. Summary of the policies of the universities and sector research institutions related to or near data and data valorization.
 - b. Identify key individuals at the eight universities and The Royal Danish Library and The Danish National Archives.
 - c. Identify other relevant organizations.
 - d. Development of an interview protocol based on the framework for value of data.
 - e. Interviews of the key individuals
3. Coordination with the relevant working groups under the Reference Group. Begins in August, ends in October.
 - a. This is set up by the chairperson in collaboration with the five other working groups and the chairperson of the FAIR reference group. The format can be several meetings between relevant parties or a larger workshop between all working groups.
4. Desk research and gathering of knowledge about international initiatives. This can possibly be combined with one or more presentations from external parties. From April to October.
5. Ensure the continuation of the work in the previous work under the reference group: <https://doi.org/10.5281/zenodo.7575581>.
6. Compilation of the collected information in October.
7. Discussion written by the working group based on the group's previous discussions and gathering of information and knowledge in October.
8. Publication of status report for the work in 2024 due November.

**Monitoring progress, including a timeline:
Steering and control**

- Checklist of the eight universities with
 - identified policy
 - Identified contact person/key person
 - Performed interview
- Number of international initiatives identified and studied
- Continuous follow-up and adjustment of timeline
- Reporting at the almost bimonthly meetings of the chairs of the working groups

Timeline

- 1 Middle of March
 - a. action plan delivered (this document).
- 2 End of April
 - a. Description of work method and detailed plan for the work
 - b. summary of existing policies
 - c. request to the FAIR reference group to point out a key person from each university, who has knowledge and ability to participate in an interview by email, meeting, or video meeting.
 - d. identified organizations outside Danish Universities, which can be contacted for an interview.
- 3 End of May
 - a. Interview protocol prepared.

- b. Possible personal contacts to the eight universities identified.
 - c. Possible personal contacts to organizations outside of Danish Universities identified.
 - d. Invitations to interviews sent.
 - e. Planning of cooperation and coordination between the other working groups initiated.
- 4 End of September
- a. All interviews are completed and transcribed
- 5 End of October
- a. Coordination between working groups has been completed.
 - b. desk study and collection of knowledge on international initiatives completed. This can possibly be combined with one or more presentations from external parties.
 - c. compilation of the collected interviews and existing policies
 - d. perspective taking in draft.
- 6 End of November
- a. perspective taking and recommendations prepared.
 - b. Submission of status report for 2024.

Deliverables

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11. Concluding notes

The FAIR Reference group and working groups acknowledge that there is overlap in the activities and will work towards effective coordination among the working groups and their focus areas. It is also recognized that the same topics can be addressed from different perspectives. Effective coordination among the chairpersons of the working groups will ensure that the focus areas are well covered from various perspectives, while avoiding too much repetition, and leaving room for potential synergies.