



Cross-cutting Topics Workshop Report

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Introduction

Germany's recently established National Research Data Infrastructure (NFDI) sets out to build a networked structure that offers research data management services across all scientific communities. To achieve this, NFDI is organized in consortia that act on their own initiative. Each consortium represents one or several research communities. A number of cross-cutting topics has been identified. Cross-cutting topics are those technical, terminological, organizational prerequisites that need to be consensually established across more than one domain to implement services, that can be seamlessly accessed and/or have the potential to create synergies between consortia.

In the spirit of the declarations signed by a total of 34 consortia candidates during their proposal process (c.f. 'Berlin Declaration'¹; 'Leipzig-Berlin-Declaration'²), the NFDI Directorate as the NFDI's coordinating body, has set out to support processing of cross-cutting topics. To generate an initial systematic and consensual understanding of specific cross-cutting topics a strategy workshop took place on 26 August 2020. The participants were the nine consortia from the first of three funding rounds for NFDI³. The methods of the workshop involved lively discussions along pre-structured content as well as an online survey. The main goals of the workshop were i) to create a shared and deeper understanding of each cross-cutting topic and the actual number of topics that need addressing, ii) to clarify the intended participation of consortia for each cross-cutting topic, iii) to identify consortia willing to coordinate the further development of each cross-cutting topic, and, iv) to identify those cross-cutting topics for which further funding is likely to be required to make significant progress.

This report outlines the results of the strategy workshop for the 16 cross-cutting topics that the workshop participants agreed were most relevant.⁴ On average, consortia wanted to participate in more than ten of the 16 topics. For most cross-cutting topics at least one consortium agreed to take the lead. Given the variety of research data management contexts, workshop results suggest that the definitions of the cross-cutting topics were largely clear: eleven out of the 16 topics were mainly rated as clear. However, for most topics a certain kind of further specification was deemed necessary. Lastly, for a number of topics, consortia expected significant additional financial requirements in order to be able to make progress, meaning they have not allocated sufficient funds to address these topics.

¹ Berlin Declaration on NFDI Cross-Cutting Topics (15/08/2019): <https://zenodo.org/record/3457213>.

² Leipzig-Berlin-Declaration on NFDI Cross-Cutting Topics on Infrastructure Development (15/07/2020): <https://zenodo.org/record/3895209>.

³ The aim is to have up to 30 consortia covering all major research communities by 2022.

⁴ The 16 topics represent the intermediate results and might change, further topics can be added over time.

The results confirm the importance of the cross-cutting topics for NFDI. They can be seen as a preliminary basis for the further addressing of cross-cutting topics in NFDI's planned inter-consortial sections and working groups, that will also include the consortia of funding rounds two and three.

Background

NFDI is a science-led initiative funded by the German federal government and Länder (states) with the goal to provide the scientific community in Germany with systematic access to research data. NFDI is organized by scientists from different disciplines that join together in consortia to develop FAIR (findable, accessible, interoperable, reuseable) research data management services. The NFDI Directorate coordinates and facilitates their structured process of collaboration.⁵

Cross-cutting topics have long been subject of on-going discussion in consortia and consortia initiatives in the run-up to NFDI. The 'Berlin Declaration on NFDI Cross-Cutting Topics' and the 'Leipzig-Berlin-Declaration on NFDI Cross-Cutting Topics on Infrastructure Development' demonstrate a far-reaching consensus: successfully addressing cross-cutting-topics will be central to building NFDI. With the *Berlin Declaration*, eleven participating and ten supporting NFDI consortial candidates agreed not only on the importance of cooperation and communication among the NFDI consortia, but also on a common list of specific cross-cutting topics. They further agreed that the list is not comprehensive and that the topics shall be addressed by several inter-consortial working groups. With the *Leipzig-Berlin-declaration*, 27 participating consortial candidates agreed on a joint development of cross-cutting topics in accordance with the NFDI Directorate and committees towards - what the paper terms - "one NFDI". They further agreed on four main areas of activities as well as on four exemplary suggestions. The respective funding proposals each echoed this consensus.

Consortia can apply for NFDI funding in three rounds. In July 2020, nine consortia were confirmed: DataPlant, GHGA, KonsortSWD, NFDI4BioDiversity, NFDI4Cat, NFDI4Chem, NFDI4Culture, NFDI4Health, and NFDI4Ing. At the same time, the NFDI Directorate started to initiate the coordination of collaboration and networking. In the first Strategy Workshop held on 26 August 2020, these consortia from the first round joined the NFDI Directorate in order to determine the road ahead regarding cross-cutting topics. The goal was to initiate further progress towards the formation of inter-consortial NFDI sections and working groups.⁶

⁵ Agreement of the Federal Government and Länder:
https://www.dfg.de/download/pdf/foerderung/programme/nfdi/blv_en.pdf

⁶ Sections are part of the NFDI association and get established by the Scientific Senate to enable interdisciplinary cooperation. Working groups are an informal and short-term formation with the goal to solve one tangible problem.

Workshop Setup

The spokespersons/representatives of the nine already funded NFDI consortia as well as the NFDI Directorate participated in the workshop. The workshop started with broader discussions about the cross-cutting topics in general, followed by specific semi-structured discussions and a survey for each topic. To initiate lively discussion, two overviews had been prepared:

- A reviewed and slightly adjusted list of cross-cutting topics from the *Berlin declaration* with 17 possible cross-cutting topics. This overview served as a basis for discussion with the goal to further specify the cross-cutting topics and to generate a common understanding of each topic.
- An overview with an initial allocation of the consortia to different cross-cutting topics, based on their proposals. This overview served as a basis for discussion with the goal to determine the importance of the individual topics and preferences of consortia.

Part of the semi-structured discussions were the questions whether there is a common understanding of the topics or if the topics need to be reworked or recombined. Also, possible involvements and leads as well as partners for topics were identified. To complete the picture, a survey was conducted parallel to discussions, giving each consortium the option to express the individual opinion for each topic. The online survey included four multiple choice questions and one open comment field for each of the cross-cutting topics, as follows:

- My consortium participates in / contributes to topic X. Yes / No
- I see my consortium in a leading position in topic X. Yes / No
- I expect high additional financial requirements. Yes / No
- In my point of view, topic X is basically ... A: clear / B: in need to be specified / C: unclear
- Further comments on topic X (optional) ...

The online survey was filled out by one representative per consortium which led to nine participants. The aim of the survey was to get a clearer impression of how the consortia assign themselves and see a possible contribution, helping to initiate the identification of possible collaborations and the formation of inter-consortial sections within the NFDI Association.

Results Overview

This section summarizes the main workshop results. Figure 1 shows the cross-cutting topics that were determined during the workshop. The prepared list of cross-cutting topics that is based on the Berlin Declaration was redefined during the discussion, which led to 16 remaining topics that are clustered into four subject areas, as follows.

Technical infrastructure and concepts

- Topic 1: Research Data Commons
- Topic 2: (Meta)Data, Findability
- Topic 3: Terminologies
- Topic 4: Provenance
- Topic 5: Infrastructure/Interoperability/Interfaces
- Topic 6: Quality Management and Assurance

Legal and ethical aspects

- Topic 7: Ethical & Legal Aspects in general
- Topic 8: Ethical-legal Aspects (person-related)

Community (User) involvement

- Topic 9: User-driven Development
- Topic 10: Training and Education

Collaborative governance and general framework

- Topic 11: Common Vision and Strategy
- Topic 12: Cultural Change
- Topic 13: Governance and Sustainability
- Topic 14: HR
- Topic 15: Internationalization
- Topic 16: Policy Advice and Consultation

Figures 1-3 show the answers of each of the nine consortia to the survey questions in table form.

Figure 1: Results for the questions: ‘My consortium participates in / contributes to topic X.’ and ‘I see my consortium in a leading position in topic X.’ The figure shows the answers of the consortia (columns) for the 16 topics (rows). Every consortium is on average involved in 10.44 topics. There are minimum 9, maximum 15 topic involvements per consortium. Every topic has on average 6.75 consortiums involved. Every consortium is willing to take the lead for 2 topics on average. There are at least 1 and maximal 4 leads per consortium. The Directorate offered to take the lead for 2 topics. Every topic has an average of 1.25 leads. There are 3 topics with 0 leads.

Involvement & Lead	DataPlant	NFDI4Chem	Konsort SWD	NFDI4 Culture	NFDI4 BioDiversity	GHGA	NFDI4 Health	NFDI4Ing	NFDI4Cat	Directorate
Research Data Commons	Lead	Yes	No	Yes	Lead	Lead	Yes	Lead	Yes	
(Meta)Data, Findability	Yes	Yes	Yes	Lead	Yes	Yes	Yes	Lead	Yes	
Terminologies	No	Lead	No	Lead	Yes	No	Yes	Yes	Yes	
Provenance	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	
Infrastr./Interoper./Interfaces	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Lead	
Quality Management & Assurance	Yes	No	Yes	Yes	Yes	Yes	Yes	Lead	Yes	
Ethical & Legal Aspects in General	Yes	Yes	No	Lead	Yes	No	No	Yes	Yes	
Ethical-legal Aspects Person-related	No	Yes	Yes	Yes	No	Lead	Lead	No	No	
User-driven Development	No	No	Lead	Yes	Yes	No	No	No	Yes	
Training & Education	Yes	Lead	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Common Vision & Strategy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Lead
Cultural Change	Lead	Yes	Yes	Lead	Yes	Yes	Yes	Yes	Yes	
Governance & Sustainability	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	
HR	No	No	No	No	Yes	No	No	No	Yes	
Internationalisation	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Lead
Policy advice & Consultation	Yes	No	Lead	Yes	Yes	Yes	Yes	No	Yes	

Figure 2: Results for the question: 'I expect high additional financial requirements.' The figure shows the answers of the consortia (columns) for the 16 topics (rows). The number of topics in need for additional financials differs from 2 to 13 for each consortium. The number of consortia expecting additional financial requirements differs from 0 to 6 for each topic. Please note that the table just provides a snapshot at the time the workshop has been performed. Depending on the progress of NFDI financial demands are subject to change.

Additional Financial Requirement	DataPlant	NFDI4Chem	Konsort SWD	NFDI4 Culture	NFDI4 BioDiversity	GHGA	NFDI4 Health	NFDI4Ing	NFDI4Cat
Research Data Commons	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
(Meta)Data, Findability	No	Yes	No	No	No	No	Yes	Yes	No
Terminologies	No	No	No	No	No	No	Yes	Yes	No
Provenance	No	No	No	No	No	No	Yes	No	No
Infrastr./Interoper./Interfaces	Yes	Yes	Yes	No	No	Yes	Yes	No	No
Quality Management & Assurance	No	No	No	No	No	No	Yes	Yes	No
Ethical & Legal Aspects in General	Yes	No	No	No	Yes	No	Yes	No	Yes
Ethical-legal Aspects Person-related	No	No	Yes	No	No	No	Yes	Yes	Yes
User-driven Development	No	Yes	No	No	No	No	No	No	No
Training & Education	Yes	Yes	No	No	Yes	No	Yes	No	No
Common Vision & Strategy	No	No	No	No	No	No	Yes	No	No
Cultural Change	No	Yes	No	No	No	No	Yes	No	No
Governance & Sustainability	No	No	No	No	No	Yes	Yes	No	No
HR	No	No	No	No	No	No	No	No	No
Internationalisation	No	No	No	No	No	No	No	Yes	No
Policy advice & Consultation	No	No	No	Yes	No	No	Yes	Yes	No

Figure 3: Results for the question: 'In my point of view, topic X is basically: A: clear; B: in need to be specified or C: unclear.' The figure shows the answers of the consortia (columns) for the 16 topics (rows). The table shows that 11 out of 16 topics are mainly clear, however none of the topics is fully clear for all consortia. Therefore, all topics need to be further specified to a certain degree.

Topic is...	A: clear	B: to be specified	C: unclear	DataPlant	NFDI4Chem	Konsort SWD	NFDI4 Culture	NFDI4 BioDiversity	GHGA	NFDI4 Health	NFDI4Ing	NFDI4Cat
Research Data Commons	A	B	C	A	A	A	B	A	A	A	B	A
(Meta)Data, Findability	A	B	C	A	A	A	A	A	B	A	A	A
Terminologies	B	A	B	B	A	B	A	A	C	A	A	A
Provenance	A	A	B	B	B	B	B	B	A	A	B	B
Infrastr./Interoper./Interfaces	A	B	B	C	C	C	C	C	A	B	B	C
Quality Management & Assurance	A	A	B	B	B	B	B	B	A	B	B	A
Ethical & Legal Aspects in General	A	A	A	B	B	B	B	B	C	B	B	A
Ethical-legal Aspects Person-related	A	A	A	B	C	C	C	C	A	B	A	A
User-driven Development	A	A	C	B	A	A	A	A	A	B	B	A
Training & Education	A	A	A	A	B	A	B	A	A	A	A	A
Common Vision & Strategy	A	A	B	A	B	B	B	B	A	C	B	A
Cultural Change	A	A	A	B	B	B	B	B	A	A	C	A
Governance & Sustainability	A	A	C	B	A	A	A	A	A	A	A	A
HR	A	B	B	A	B	B	B	B	C	B	B	A
Internationalisation	A	A	B	B	B	B	B	B	A	C	A	A
Policy advice & Consultation	A	B	B	A	A	A	A	A	A	B	A	A

Results per Topic

This section shows the results of the workshop discussions and survey for each of the 16 topics individually in a concise list style following the sequence: rough topic definition, insights from the survey, further discussed aspects.

Topic 1: Research Data Commons

Topic 1 includes...

... cloud infrastructures, computing power, identity and access management (IAM) and interfaces between data providers and users across domains, as well as scalability of tools and services.

Out of the 9 consortia ...

- ... 8 want to be involved.
- ... 4 offer to take the lead.
- ... 6 expect additional financial requirements.
- ... 7 consider the topic to be clear (0 unclear).
- ... 2 suggest to specify the topic further.

Further discussed aspects:

- A deeper discussion about the involvement of high-performance computer centers in terms of layer- and functions shipping (not data warehouse or data shipping) is necessary.
- A separation of technological questions and applications is suggested.
- Distributed data analysis necessary?
- Differentiation from library services, de.NBI, EOSC is seen as necessary.

Topic 2: (Meta)Data, Findability

Topic 2 includes...

... (meta)data harmonization, findability; common data and metadata standards and encodings (e.g., NFDI core metadata) and persistent unique identifier systems.

Out of the 9 consortia ...

- ... 9 want to be involved.
- ... 2 offer to take the lead.
- ... 3 expect additional financial requirements.
- ... 8 consider the topic to be clear (0 unclear).
- ... 1 suggests to specify the topic further.

Further discussed aspects:

- Suggestion to separate the topics into (Meta)Data and Findability.
- Possible Partners: Schema.org

Topic 3: Terminologies

Topic 3 includes...

... everything around terminologies, terminology-management and -services.

Out of the 9 consortia ...

- ... 6 want to be involved.
- ... 2 offer to take the lead.
- ... 2 expect additional financial requirements.
- ... 6 consider the topic to be clear (1 unclear).
- ... 2 suggest to specify the topic further.

Further discussed aspects:

- Possible tools: Lookups, Data Mappings

Topic 4: Provenance

Topic 4 includes...

... cultural as well as technical aspects, content-related provenance, the exact experiment conduction, creation context, electronic laboratory notebooks.

Out of the 9 consortia ...

- ... **8** want to be involved.
- ... **4** offer to take the lead.
- ... **1** expects additional financial requirements.
- ... **4** consider the topic to be clear (**0** unclear).
- ... **5** suggest to specify the topic further.

Further discussed aspects:

- Methodical research approach vs. carrying out experiments
- Differentiation between technical and legal aspects
- Data Provenance vs. Culture, all important data are archived
- Long term access and long-term availability
- How can we restore the research context?
- Possible issue-linkages: legal aspects, ethical-legal aspects, metadata
- Suggestion to have a separate first workshop for this topic in order to specify the definition

Topic 5: Infrastructures, Interoperability, Interfaces

Topic 5 includes...

... the harmonization and standardization of the three I's.

Out of the 9 consortia ...

- ... **8** want to be involved.
- ... **1** offers to take the lead.
- ... **5** expect additional financial requirements.

- ... **2** consider the topic to be clear (**3** unclear).
- ... **4** suggest to specify the topic further.

Further discussed aspects:

- Achievement of interoperability through infrastructures and interfaces?
- Achievement of interoperability through the linkage of infrastructures?
- Topic is also related with the topic (*Meta*)data (content- & technical-wise) as well as *Research Data Commons* → Suggestion to split the topic and include parts in other topics
- Differentiation of interoperability: APIs vs. metadata and ontologies

Topic 6: Quality Management & Assurance

Topic 6 includes...

... the certification of services with data, software and service quality criteria, evaluation and qualification criteria, qualification and/or certification processes for NFDI service offerings.

Out of the 9 consortia ...

- ... **8** want to be involved.
- ... **1** offers to take the lead.
- ... **2** expect additional financial requirements.
- ... **4** consider the topic to be clear (**0** unclear).
- ... **5** suggest to specify the topic further.

Further discussed aspects:

- Focus on content-related quality assurance, creation of trust (e.g., through certification, what kind of systems exist?)
- Workflow, definitely to be further discussed within NFDI
- Possible solution: open standards.

Topic 7: Ethical & Legal Aspects (in general)

Topic 7 includes...

... e.g., ethical aspects of sharing research data and software, IP topics, licensing. The topic can be seen as an umbrella topic, that will most likely be divided into different working groups or sections for subtopics, since ethical and legal issues vary from consortium to consortium.

Out of the 9 consortia ...

- ... 6 want to be involved.
- ... 1 offers to take the lead.
- ... 4 expect additional financial requirements.
- ... 4 consider the topic to be clear (1 unclear).
- ... 4 suggest to specify the topic further.

Further discussed aspects:

- Need for advice on a regular basis, prompt and widely offered
- Example: *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization*
- Protection vs. Open Access

Topic 8: Ethical-legal Aspects (person-related)

Topic 8 includes...

... all ethical-legal aspects of managing person-related data for research. Within person-related aspects ethical and legal issues are often correlated and cannot completely be considered separately.

Out of the 9 consortia ...

- ... 5 want to be involved.
- ... 2 offer to take the lead.
- ... 4 expect additional financial requirements.
- ... 6 consider the topic to be clear (1 unclear).

... 2 suggest to specify the topic further.

Further discussed aspects:

- Overarching questions
- Very expensive topic, might need supplementary financing.
- Involves many subtopics, such as health
- An overall consulting approach for NFDI is important
- From discipline to discipline the meaning of the topic varies and needs specific treatment
- Lead could be taken later by a law consortium or external partner
- Topic could also be handled as working group topic under the umbrella of Topic 7
- Possible Partners: New consortium/ new partners; Universities Tübingen & Heidelberg

Topic 9: User-driven Development

Topic 9 includes...

... the user-driven adaptive development of NFDI and involves cross-domain use cases.

Out of the 9 consortia ...

- ... 4 want to be involved.
- ... 1 offers to take the lead.
- ... 1 expects additional financial requirements.
- ... 5 consider the topic to be clear (1 unclear).
- ... 3 suggest to specify the topic further.

Topic 10: Training and Education

Topic 10 includes...

... training, undergraduate and graduate education, professional development, e.g., data literacy.

Out of the 9 consortia ...

... **9** want to be involved.
... **1** offers to take the lead.
... **4** expect additional financial requirements.
... **8** consider the topic to be clear (**0** unclear).
... **1** suggests to specify the topic further.

Further discussed aspects:

- Has the power to create visibility of NFDI. (e.g., a UdeMy course)
- No Infrastructure without the introduction to users
- All consortia are affected: synergies should be used
- Differentiation of training and academic education
- Financial resources for this topic cannot be cut

Topic 11: Common Vision and Strategy

Topic 11 includes...

... the common vision of NFDI, long-term foresight and common strategic planning as well as visibility. This involves mainly PR and communications.

Out of the 9 consortia ...

... **9** want to be involved.
... **Directorate** offers to take the lead.
... **1** expects additional financial requirements.
... **5** consider the topic to be clear (**1** unclear).
... **3** suggest to specify the topic further.

Further discussed aspects:

- Possible to merge with Topic 12?
- Everyone should be involved here
- Possible to include the topics HR und Governance here?
- Clear lead of the topic has the NFDI Directorate

Topic 12: Cultural Change

Topic 12 includes...

... the general reputation, publication/funding policies and credit systems as well as stimulating a cultural change of users and providers towards FAIR and open research data.

Out of the 9 consortia ...

... **9** want to be involved.
... **2** offer to take the lead.
... **4** expect additional financial requirements.
... **8** consider the topic to be clear (**0** unclear).
... **1** suggests to specify the topic further.

Further discussed aspects:

- Possible to merge with Topic 11?
- Differentiation of user perspectives and political-strategical aspects

Topic 13: Governance and Sustainability

Topic 13 includes...

... all governance and sustainability aspects.
Also e.g. long-term archiving can be discussed further here.

Out of the 9 consortia ...

... 7 want to be involved.
... 0 offer to take the lead.
... 2 expect additional financial requirements.
... 7 consider the topic to be clear (1 unclear).
... 1 suggests to specify the topic further.

Further discussed aspects:

- Business Model for assurance of sustainability of data publication (long-term, additional financial resources, development of business models and operation of software).
- Considering moderate user fees, not permitted by the current contract structure, would need high additional administrative expenses (not in line with NFDI).

Topic 14: HR

Topic 14 includes...

... everything around *HR* – Human resource management, recruitment and development. A special focus is on the long-term development of scientific career paths in the field of NFDI.

Out of the 9 consortia ...

... 2 want to be involved.
... 0 offer to take the lead.
... 0 expect additional financial requirements.
... 3 consider the topic to be clear (1 unclear).
... 5 suggest to specify the topic further.

Further discussed aspects:

- Suggestion: Topic for the NFDI Directorate? (especially the political part); rather workshops than section? Development of career models only possible with a stable funding
- HR depends on the organization type (policy area, funding area)
- Question for working group: Could certain career paths work across consortia?
- Challenges, especially in the training of Data Stewards

Topic 15: Internationalization

Topic 15 includes...

... everything around *internationalization*, mainly international visibility and networking of NFDI...

Out of the 9 consortia ...

... 7 want to be involved.
... **Directorate** offers to take the lead.
... 1 expects additional financial requirements.
... 5 consider the topic to be clear (1 unclear).
... 3 suggest to specify the topic further.

Further discussed aspects:

- Integration in EOSC
- Contributing to RDA
- A common NFDI-opinion for Germany in EOSC.
- Get connected to networks of other research data initiatives.
- development of metadata standards only works on a global level
- International Publication Guidelines
- Maybe on a lower level than a section, edited in workshops on a regular basis (e.g. assembly of consortia)
- Focus on EOSC as its development is picking up speed and NFDI will be participating

Topic 16: Policy Advice and Consultation

Topic 16 includes...

... all about policy advice, consultation and outreach with respect to NFDI.

Out of the 9 consortia ...

- ... 7 want to be involved.
- ... 1 offers to take the lead.
- ... 3 expect additional financial requirements.
- ... 6 consider the topic to be clear (0 unclear).
- ... 3 suggest to specify the topic further.

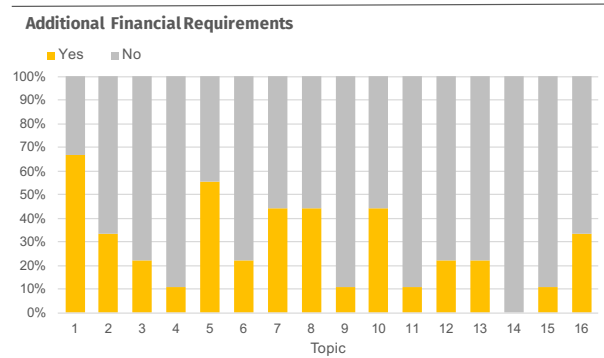
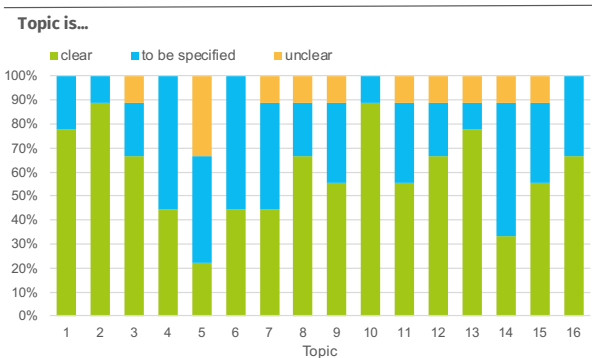
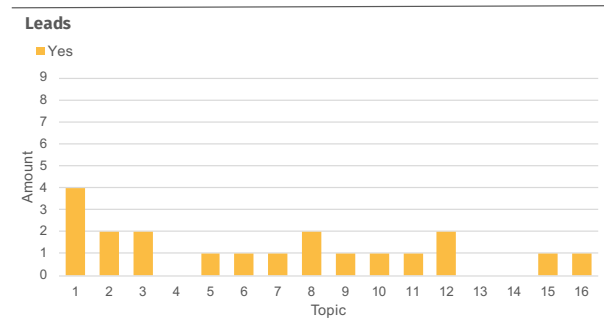
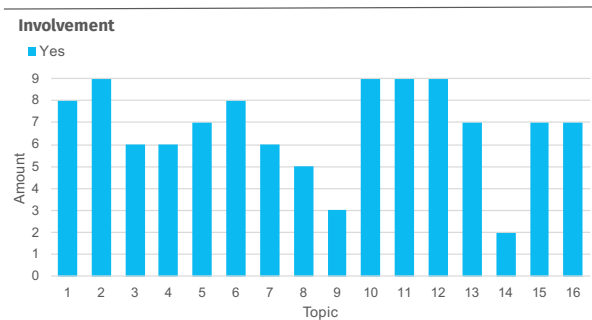
Further discussed aspects:

- Participation in papers, committee work, statement for legislative process
- Connection to cultural change
- Quick qualified reaction to requests.
- Technical input of consortia, must be coordinated.
- European and German level
- Representatives of NFDI for long-term committee work and lobbying, statements
- Example NFDI4Culture:
https://www.bmjv.de/SharedDocs/Gesetzgebungsverfahren/Stellungnahmen/2020/Downloads/073120_Stellungnahme_NFDI4Culture_RefE_Urheberrecht-II.pdf
- Portal to collect such papers
- KonsortSWD: connection to RatSWD
- Feedback needs to be communicated from NFDI as a whole to gain attention, might have a positive effect on sustainable funding
- Directorate already working on it, trying to get capable of providing information

Summary & Outlook

Conclusively, Figure 4 illustrates the workshop survey results in four tables. The results can be seen as a starting point for a more detailed specification of the associated tasks and the formation of suitable NFDI inter-consortial sections or working groups. As the results show, none of the topics is fully clear to all of the consortia. It is necessary to get a deeper understanding of the scope and implications of a joint approach in each topic, e.g., regarding resource planning. It is also a testament to the logic of NFDI's architecture that involvement across topics varies: some cross-cutting topics can therefore be addressed by a smaller number of consortia while others will need to be addressed across all domains. Also, some topics can be clearly distinguished while others might overlap with other cross-cutting topics. Here, the need for more refined definitions and differentiations is most evident. It is up for further discussions which topics are suitable to work on in a section, working group, or task force. Overall, further processing of the cross-topics will include the upcoming round 2 and 3 consortia. As a next step the results will be discussed in a follow-up workshop.

Figure 4: Overview of the workshop survey results per question. Y-axis: amount/percentage of the nine participating consortia. X-axis: Cross-cutting topics. 1: Research Data Commons. 2: (Meta)Data, Findability. 3: Terminologies. 4: Provenance. 5: Infrastructures, Interoperability, Interfaces. 6: Quality Management & Assurance. 7: Ethical & Legal Aspects (in general). 8: Ethical-legal Aspects (person-related). 9: User-driven Development. 10: Training and Education. 11: Common Vision and Strategy. 12: Cultural Change. 13: Governance and Sustainability. 14: HR. 15: Internationalization. 16: Policy Advice and Consultation.



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