D2.2b

Mapping of EOSC Readiness of EU MS/AC

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Abstract

This deliverable is an update of *D2.2a - Mapping of EOSC Readiness of EU MS/AC* for EOSC Future and summarises the development of a monitoring framework and annual surveys with the EOSC Steering Board to monitor the implementation of EOSC and Open Science across Member States and Associated Countries. The deliverable specifically presents the pilot Survey on National Contributions to EOSC 2021, the Monitoring Framework for National to Contributions to EOSC, and the revised Survey on National Contributions 2022.

Version History

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List of Abbreviations

Acronym	Definition
ARC	Athena Research Centre
EOSC	European Open Science Cloud
EOSC-SB	EOSC Steering Board
ESFRI	European Strategy Forum on Research Infrastructures
JNP	JNP Strategy and Management Consulting
MESR	Ministry of Higher Education, Research and Innovation in France
MS/AC	Member States and Associated Countries
RFO	Research-funding Organisation
RPO	Research-performing Organisation
SGA	Subgroup A on National Contributions to EOSC
SRIA	Strategic Research and Innovation Agenda
TGB	Technopolis Group Belgium

1   Introduction

This report is an update to deliverable D2.2a - Mapping of EOSC Readiness of EU MS/AC [1] which provided an overview of existing initiatives on indicators for monitoring the readiness of Member States and Associated Countries (MS/AC) for the European Open Science Cloud (EOSC). This initial overview focused especially on indicators for monitoring EOSC readiness of MS/AC by the Task Force on Landscaping of the INFRAEOSC-05-2018-2019 projects [2] , indicators for monitoring the EOSC Partnership by the EOSC Association [3] in the Strategic Research and Innovation Agenda (SRIA) [4] and memorandum of understanding for the EOSC Partnership [5] , and indicators for monitoring the European Strategy Forum on Research Infrastructures (ESFRI) by the Working Group on Monitoring of Research Infrastructures Performance [6] . The main aim of the overview was to support the future development of a monitoring framework for EOSC for MS/AC in collaboration with the EOSC Steering Board (EOSC-SB) [7] . This activity has been carried out under Task 2.2 on EOSC Alignment and Task 2.3 on the EOSC Observatory [8] in Work Package 2 of the EOSC Future project.

The project has worked extensively with EOSC-SB Subgroup A on National Contributions to EOSC (SGA) to support the monitoring and development of policies and practices for EOSC and Open Science across MS/AC. A pilot survey was first developed to test relevant survey questions and set a baseline for policies and practices on EOSC and Open Science in MS/AC as well as to test the survey tool functionality of the EOSC Observatory. A new monitoring framework which builds on the pilot survey was then developed with indicators to monitor policies and practices on EOSC and Open Science as well as to structure and steer future annual surveys aimed at MS/AC. A revised survey was finally developed to implement the new monitoring framework and kick-start the new annual surveys targeted at MS/AC to monitor policies and practices for EOSC and Open Science.

This deliverable presents the main results of the collaboration with EOSC-SB on monitoring the EOSC readiness of MS/AC. Section 2 summarises the development and lists all of the questions of the pilot Survey on National Contributions to EOSC 2021. Section 3 describes the development and lists all of the indicators of the Monitoring Framework for National Contributions to EOSC. Section 4 outlines the development and lists all of the questions of the revised Survey on National Contributions to EOSC 2022. Section 5 lastly offers a conclusion and sketches the future next steps for the monitoring of EOSC readiness of MS/AC with EOSC-SB.

2   Survey on National Contributions to EOSC 2021

The project worked closely with EOSC-SB to achieve the objectives of SGA and develop a comprehensive survey to (1) benchmark relevant activities on international, national, regional, and institutional levels for EOSC (2) monitor the benefits of national policies for EOSC and the benefits of EOSC for national research communities. The members of EOSC-SB initially proposed 145 potential questions relevant for EOSC and Open Science, whereby 19 of the most importantly deemed questions were selected to be included in a first pilot survey. The main aim of the pilot survey was to understand the state of play of policies and practices (with a focus on national financial contributions) for EOSC and Open Science across MS/AC. A secondary aim of the pilot survey was to test the survey questions and reach a common understanding of key definitions for EOSC and Open Science as well as to test the survey tool functionality of the EOSC Observatory [9] .

The pilot Survey on National Contributions to EOSC 2021 [10] was published in the EOSC Observatory and ran from December 2021 until August 2022. The survey received 34 validated responses from MS/AC, whereby the survey data was deposited in Zenodo [11] and published openly in the interactive dashboard of the EOSC Observatory [12] . An analysis of the survey data was also published openly in Zenodo [13] . The pilot survey provided valuable lessons learned from the survey questions and implementation of the survey tool and data visualisation in the EOSC Observatory. The pilot survey also provided mutual learning and support for MS/AC, which were faced with similar issues when responding to the survey questions, such as with definitions, data sources, and calculating national financial contributions to EOSC. The pilot survey further provided valuable input to develop a new monitoring framework for EOSC-SB for national contributions to EOSC. Responses to the pilot survey lastly resulted in the publication of a catalogue of use cases on EOSC and Open Science [14] .

The pilot survey consisted of an introduction to the survey, a section with 14 questions on policies and financial investments for EOSC, and a section with 5 questions on practices for EOSC. The pilot survey included explanations to each question with example answers, recommendations on how to calculate national financial contributions to EOSC, and a list of key definitions related to EOSC and Open Science. The responses to the survey questions consisted of date responses (date), single-choice responses (single), multiple-choice responses (multiple), or open textual responses (text). The pilot survey questions are presented in full below.

_____

Survey on National Contributions to EOSC 2021

EOSC Policies and Financial Investments

1. Are there EOSC-relevant policies in place at national or regional level? [multiple]
   - There are one or more policies relevant for EOSC in place:
     - Policy most relevant for EOSC in place since: [date]
     - Latest update of the policy most relevant for EOSC: [date]
     - Link(s) to EOSC-relevant policy/policies: [text]
   - Policy in planning
   - One or more of the Open Science policies explicitly mentions EOSC
   - Policy addresses open access to data, data management, and/or FAIR
   - Policy addresses FAIRisation of data
   - Policy addresses open access to software
   - Policy addresses preservation and reuse of scientific information
   - Policy addresses infrastructures that include aspects of Open Science
   - Policy addresses skills and competencies
   - Policy addresses incentives and rewards
   - Policy addresses citizen science
   - Other: [text]
2. Do the EOSC-relevant policies in place include measures to ensure implementation? [multiple]
   - Action plan
   - Concrete objectives
   - Indicators to monitor progress
   - Associated financial planning

3. Are the financial contributions to EOSC at national level linked to the policies and actions mentioned above? [single]
   - Yes
   - Partly
   - No
   - In planning
4. Total amount of national EOSC contributions spent (in million €) in 2020: [text]
5. What was the amount of funds allocated (in million €) in 2020 to current EOSC Association members (including mandated organisations)? [text]
6. How much of the funds were allocated (in million €) in 2020 to organisations which are now not members of the EOSC Association? [text]
7. What were the sources for the estimate? Please add links to documents supporting the choice(s) in the 'Other' field: [multiple]
   - Input/calculations from ministry
   - Input from RPO
   - Input from RFO
   - Existing documents
   - Other: [text]
8. The estimate includes government contributions from which levels? [multiple]
   - National level
   - Regional level
   - Direct governmental investment at institutional level
   - Other: [text]
9. If the national funds included earmarked funding (explicitly for EOSC and Open Science-related activities), how much was calculated (in million €)? [text]
10. If the national funding included non-earmarked funding (i.e. national funding not explicitly given for EOSC or Open Science-related activities, but (partly) used for EOSC-relevant activities), how much was calculated (in million €)? [text]
11. Did European Structural and Investment funds contribute to the EOSC-relevant investment, and if so, how much was calculated (in million €)? [text]
12. Were one or more of the following EOSC-relevant activities considered in your funding? If a box is checked here, a field opens in which you can indicate indicate how much was spent (in million €) for each activity in 2020: [multiple]
    - Provision of making FAIR data searchable with EOSC: [text]
    - FAIRisation of data: [text]
    - Open data from government and non-profit organisations (Public Sector Information Directive): [text]
    - Further EOSC-relevant activities targeting data: [text]
13. Were one or more of the following service-related activities considered in your funding? If a box is checked here, a field opens in which you can indicate indicate how much was spent (in million €) for each activity in 2020: [multiple]
    - Services provided by computing and data centres: [text]
    - Services provided by national network (NREN): [text]
    - Support for the private sector to participate in EOSC-relevant activities: [text]
    - Further EOSC-relevant activities targeting services: [text]
14. Were one or more of the following infrastructure-related activities considered in your funding? If a box is checked here, a field opens in which you can indicate how much was spent (in million €) for each activity in 2020: [multiple]
    - E-infrastructures like computing and data centres: [text]
    - National research infrastructures: [text]
    - National contributions to international organisations contributing to EOSC development (including European research infrastructures): [text]

- Further EOSC-relevant activities targeting infrastructures: [text]
- Other: [text]

EOSC Practices

15. Has your country appointed a mandated organisation to the EOSC Association? [single]
    - Yes
    - No
    - In planning

16. Is there any official national monitoring or mapping exercise of one or several of the following Open Science elements? [multiple]
    - Open access to data, data management, and/or FAIR
    - FAIRisation of data
    - Open access to software
    - Preservation and reuse of scientific information
    - Infrastructures that include aspects of Open Science
    - Skills and competencies
    - Incentives and rewards
    - Citizen science
    - Monitoring or mapping exercise in planning
    - No monitoring takes place
    - Other: [text field]

17. If there is a monitoring indicated in the previous question, how is it reported? If possible, please add a link to the monitoring exercise or national dashboard in the last field: [multiple]
    - Periodic reports
    - Mapping exercise
    - Dashboard
    - Please provide a link/links to the national monitoring/mapping: [text]

18. In which Open Science dimensions do you have use cases and best practices to present? [multiple]
    - Open access to data, research data management, and FAIR
    - FAIRisation of data
    - Open access to software
    - Preservation and reuse of scientific information
    - Infrastructures that include aspects of Open Science
    - Skills and competencies
    - Incentives and rewards
    - Citizen science
    - None
    - Other: [text]

19. If you indicated occurrence of an Open Science use case in the previous question, please provide a description: [text]

3 Monitoring Framework for National Contributions to EOSC

The project collaborated extensively with EOSC-SB to build on the existing monitoring indicators identified in D2.2a and the lessons learned from the pilot survey to develop a new structured Monitoring Framework for National Contributions to EOSC [15] . The framework consists of sets of indicators to track the implementation of EOSC and Open Science across the 2 dimensions of policies and practices (with impact soon to be defined) as in Table 3-1. The framework also recognises 8 thematic categories relevant for EOSC and Open Science: publications; data; software; services; infrastructure; skills/training; assessment; engagement. The framework further identifies 4 types of indicators for policies across categories: # of countries with a national policy; # of countries with a financial strategy; # of research-performing organisations (RPOs) in a country with a policy; # of research-funding organisations (RFOs) in a country with a policy. The framework lastly identifies 4 types of indicators for practices across categories: # of countries with national monitoring; # of countries with uses cases; # of country investments in million €; # of country outputs (which are specific for each category).

Table 3-1: *Monitoring Framework for National Contributions to EOSC*

	Policies	Practices
Publications Data Software Services Infrastructure Skills/Training Assessment Engagement	# of Countries with a National Policy	# of Countries with National Monitoring
	# of Countries with a Financial Strategy	# of Countries with Use Cases
	# of RPOs in a Country with a Policy	# of Country Investments in Million €
	# of RFOs in a Country with a Policy	# of Country Outputs

The new monitoring framework will guide the future annual surveys on National Contributions to EOSC. The surveys will be structured around the 2 dimensions of policies and practices as well as the 8 categories relevant for EOSC and Open Science. The survey questions will be based on the framework indicators and targeted at representatives of MS/AC in EOSC-SB. The indicators, and thus the survey questions, may change over time depending on the lessons learned from each annual iteration of the survey. There are as yet no indicators for monitoring impact of EOSC and Open Science. Such impact indicators will be developed after the EOSC Future project and will be incorporated as questions into future surveys on National Contributions to EOSC.

The monitoring framework was adopted by EOSC-SB in December 2022. The framework consists of two main sections with 48 indicators for policies and 48 indicators for practices which are grouped according to the 8 categories relevant for EOSC and Open Science. The data category, due to its complexity, is in turn further differentiated for data management, FAIR data, and open data. The infrastructure category is likewise further differentiated for connecting repositories to EOSC, data stewardship, and long-term data preservation. The new monitoring framework indicators for policies and practices for each category are presented in full below.

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Monitoring Framework for National Contributions to EOSC

Policies

    Publications
- # of Countries with a National Policy on Open Access to Publications
- # of Countries with a Financial Strategy on Open Access to Publications
- # of RPOs in a Country with a Policy on Open Access to Publications
- # of RFOs in a Country with a Policy on Open Access to Publications

    Data
- # of Countries with a National Policy on Data Management
- # of Countries with a Financial Strategy on Data Management
- # of RPOs in a Country with a Policy on Data Management
- # of RFOs in a Country with a Policy on Data Management

- # of Countries with a National Policy on FAIR Data
- # of Countries with a Financial Strategy on FAIR Data
- # of RPOs in a Country with a Policy on FAIR Data
- # of RFOs in a Country with a Policy on FAIR Data

- # of Countries with a National Policy on Open Data
- # of Countries with a Financial Strategy on Open Data
- # of RPOs in a Country with a Policy on Open Data
- # of RFOs in a Country with a Policy on Open Data

Software
- # of Countries with a National Policy on Open Source Software
- # of Countries with a Financial Strategy on Open Source Software
- # of RPOs in a Country with a Policy on Open Source Software
- # of RFOs in a Country with a Policy on Open Source Software

Services
- # of Countries with a National Policy on Offering Services through EOSC
- # of Countries with a Financial Strategy on Offering Services through EOSC
- # of RPOs in a Country with a Policy on Offering Services through EOSC
- # of RFOs in a Country with a Policy on Offering Services through EOSC

Infrastructure
- # of Countries with a National Policy on Connecting Repositories to EOSC
- # of Countries with a Financial Strategy on Connecting Repositories to EOSC
- # of RPOs in a Country with a Policy on Connecting Repositories to EOSC
- # of RFOs in a Country with a Policy on Connecting Repositories to EOSC

- # of Countries with a National Policy on Data Stewardship
- # of Countries with a Financial Strategy on Data Stewardship
- # of RPOs in a Country with a Policy on Data Stewardship
- # of RFOs in a Country with a Policy on Data Stewardship

- # of Countries with a National Policy on Long-term Data Preservation
- # of Countries with a Financial Strategy on Long-term Data Preservation
- # of RPOs in a Country with a Policy on Long-term Data Preservation
- # of RFOs in a Country with a Policy on Long-term Data Preservation

Skills/Training
- # of Countries with a National Policy on Skills/Training for Open Science
- # of Countries with a Financial Strategy on Skills/Training for Open Science
- # of RPOs in a Country with a Policy on Skills/Training for Open Science
- # of RFOs in a Country with a Policy on Skills/Training for Open Science

Assessment
- # of Countries with a National Policy on Incentives/Rewards for Open Science
- # of Countries with a Financial Strategy on Incentives/Rewards for Open Science
- # of RPOs in a Country with a Policy on Incentives/Rewards for Open Science
- # of RFOs in a Country with a Policy on Incentives/Rewards for Open Science

Engagement
- # of Countries with a National Policy on Citizen Science
- # of Countries with a Financial Strategy on Citizen Science
- # of RPOs in a Country with a Policy on Citizen Science
- # of RFOs in a Country with a Policy on Citizen Science

Practices
Publications
- # of Countries with National Monitoring on Open Access to Publications
- # of Countries with Use Cases on Open Access to Publications
- # of Country Investments in Million € in Open Access to Publications
- # of Country Open Access Publications

Data
- # of Countries with National Monitoring on Data Management
- # of Countries with Use Cases on Data Management
- # of Country Investments in Million € in Data Management
- # of Country Data Management Plans

- # of Countries with National Monitoring on FAIR Data
- # of Countries with Use Cases on FAIR Data
- # of Country Investments in Million € in FAIR Data
- # of Country FAIR Data Sets

- # of Countries with National Monitoring on Open Data
- # of Countries with Use Cases on Open Data
- # of Country Investments in Million € in Open Data
- # of Country Open Data Sets

Software
- # of Countries with National Monitoring on Open Source Software
- # of Countries with Use Cases on Open Source Software
- # of Country Investments in Million € in Open Source Software
- # of Country Open Source Software Sets

Services

- # of Countries with National Monitoring on Offering Services through EOSC
- # of Countries with Use Cases on Offering Services through EOSC
- # of Country Investments in Million € in Offering Services through EOSC
- # of Country Services Offered through EOSC

Infrastructure
- # of Countries with National Monitoring on Data Stewardship
- # of Countries with Use Cases on Data Stewardship
- # of Country Investments in Million € in Data Stewardship
- # of Country Data Stewards

- # of Countries with National Monitoring on Connecting Repositories to EOSC
- # of Countries with Use Cases on Connecting Repositories to EOSC
- # of Country Investments in Million € in Connecting Repositories to EOSC
- # of Country Repositories Connected to EOSC

- # of Countries with National Monitoring on Long-term Data Preservation
- # of Countries with Use Cases on Long-term Data Preservation
- # of Country Investments in Million € in Long-term Data Preservation
- # of Country Repositories Offering Long-term Data Preservation

Skills/Training
- # of Countries with National Monitoring on Skills/Training for Open Science
- # of Countries with Use Cases on Skills/Training for Open Science
- # of Country Investments in Million € in Skills/Training for Open Science
- # of Country Educational Curricula with an Open Science Dimension

Assessment
- # of Countries with National Monitoring on Incentives/Rewards for Open Science
- # of Countries with Use Cases on Incentives/Rewards for Open Science
- # of Country Investments in Million € in Incentives/Rewards for Open Science
- # of Country Signatories of Agreement on Reforming Research Assessment

Engagement
- # of Countries with National Monitoring on Citizen Science
- # of Countries with Use Cases on Citizen Science
- # of Country Investments in Million € in Citizen Science
- # of Country Projects with a Citizen Science Dimension

4   Survey on National Contributions to EOSC 2022

The lessons learned from the pilot Survey on National Contributions to EOSC 2021 and the new Monitoring Framework for National Contributions to EOSC served as input for the project and EOSC-SB to develop a revised Survey on National Contributions to EOSC 2022 [16] . The revised survey was structured around the 2 dimensions of policies and practices as well as the 8 categories relevant for EOSC and Open Science. The indicators were translated directly into survey questions and general questions were added on the number of researchers, RPOs, RFOs, repositories, and total financial investment in EOSC and Open Science per country. The representatives of MS/AC were further provided with supporting documentation to help them respond to the survey questions, including slides, recordings, and response examples as well as a report from surveys, interviews, and workshops with EOSC-SB on Calculating National Financial Contributions to EOSC [17] .

The revised survey was published in the EOSC Observatory and ran from January 2023 until June 2023. The survey data is now being validated by EOSC-SB members and is approaching 30 validated responses, which is a high response rate similar to the pilot survey response rate given the increase in complexity and number of survey questions. The validated survey data will be openly published in the interactive dashboard of the EOSC Observatory and in Zenodo [18] . An analysis of the survey data will also be openly published in Zenodo [19] . The lessons learned from this new revised survey will feed into future annual iterations of the survey and the survey data collected annually from MS/AC will provide longitudinal tracking on the EOSC readiness of MS/AC and also support the development of policies and practices for EOSC and Open Science across Europe. When the indicators for impact are added to the Monitoring Framework for National Contributions, questions on the impact of EOSC and Open Science will then also be added to the Survey on National Contributions to EOSC.

The revised Survey on National Contributions to EOSC 2022 consisted of an introduction to the survey, a section with 5 general questions, a section with 48 questions on policies, a section with 48 questions on practices, a section with 1 feedback question to improve the survey, and an appendix with definitions of key terms used in the survey. The survey included links to supporting documentation to help EOSC-SB members fill in the survey. The responses to the questions consisted of yes/no responses (yes/no), numeric responses (numeric), or open textual responses (text). The revised survey questions are presented in full below.

_____

Survey on National Contributions to EOSC 2022

General

1. How many researchers were employed in your country in 2021 in full-time equivalents? [numeric]
    1.1. Do you agree with the number of researchers in full-time equivalents collected from Eurostat? [yes/no]
        1.1.1. Please provide the correct number of researchers in full-time equivalents [numeric]
    1.2. Please clarify your response if relevant [text]
2. How many research-performing organisations are there in your country? [numeric]
    2.1. Please clarify your response if relevant [text]
3. How many research-funding organisations are there in your country? [numeric]
    3.1. Please clarify your response if relevant [text]
4. How many repositories are there in your country? [numeric]
    4.1. Please clarify your response if relevant [text]
5. How much did your country financially invest in total in EOSC and Open Science in 2021 in millions of Euros? [numeric]
    5.1. Please clarify your response if relevant [text]

Policies

Publications

6. Does your country have a national policy on Open Access to publications? [yes/no]
    6.1. [if yes] Is this policy mandatory? [yes/no]
    6.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        6.2.1. [if yes] Please provide links to the relevant webpages [text]
    6.3. [if yes] Is there a specific policy on immediate Open Access to publications? [yes/no]
        6.3.1. [if yes] Is this policy mandatory? [yes/no]

    6.3.2. [if yes] Is information on this policy available publicly on the web? [yes/no]

      6.3.2.1. [if yes] Please provide links to the relevant webpages [text]

   6.4. [if yes] Is there a specific policy on retention of IPR on publications? [yes/no]

    6.4.1. [if yes] Is this policy mandatory? [yes/no]

    6.4.2. [if yes] Is information on this policy available publicly on the web? [yes/no]

      6.4.2.1. [if yes] Please provide links to the relevant webpages [text]

   6.5. [if yes] Is there a specific policy on open licensing of publications? [yes/no]

    6.5.1. [if yes] Is this policy mandatory? [yes/no]

    6.5.2. [if yes] Is information on this policy available publicly on the web? [yes/no]

      6.5.2.1. [if yes] Please provide links to the relevant webpages [text]

   6.6. Please clarify your response if relevant [text]

7. Does your country have a financial strategy on Open Access to publications? [yes/no]

   7.1. Please clarify your response if relevant [text]

8. How many research-performing organisations in your country have a policy on Open Access to publications? [numeric]

   8.1. Please clarify your response if relevant [text]

9. How many research-funding organisations in your country have a policy on Open Access to publications? [numeric]

   9.1. Please clarify your response if relevant [text]

Data

10. Does your country have a national policy on data management? [yes/no]

   10.1. [if yes] Is this policy mandatory? [yes/no]

   10.2. [if yes] Is information on this policy available publicly on the web? [yes/no]

    10.2.1. [if yes] Please provide links to the relevant webpages [text]

   10.3. Please clarify your response if relevant [text]

11. Does your country have a financial strategy on data management? [yes/no]

   11.1. Please clarify your response if relevant [text]

12. How many research-performing organisations in your country have a policy on data management? [numeric]

   12.1. Please clarify your response if relevant [text]

13. How many research-funding organisations in your country have a policy on data management? [numeric]

   13.1. Please clarify your response if relevant [text]

14. Does your country have a national policy on FAIR data? [yes/no]

   14.1. [if yes] Is this policy mandatory? [yes/no]

   14.2. [if yes] Is information on this policy available publicly on the web? [yes/no]

    14.2.1. [if yes] Please provide links to the relevant webpages [text]

   14.3. Please clarify your response if relevant [text]

15. Does your country have a financial strategy on FAIR data? [yes/no]

   15.1. Please clarify your response if relevant [text]

16. How many research-performing organisations in your country have a policy on FAIR data? [numeric]

   16.1. Please clarify your response if relevant [text]

17. How many research-funding organisations in your country have a policy on FAIR data? [numeric]

   17.1. Please clarify your response if relevant [text]

18. Does your country have a national policy on open data? [yes/no]

   18.1. [if yes] Is this policy mandatory? [yes/no]

   18.2. [if yes] Is information on this policy available publicly on the web? [yes/no]

    18.2.1. [if yes] Please provide links to the relevant webpages [text]

   18.3. Please clarify your response if relevant [text]

19. Does your country have a financial strategy on open data? [yes/no]

   19.1. Please clarify your response if relevant [text]

20. How many research-performing organisations in your country have a policy on open data? [numeric]

   20.1. Please clarify your response if relevant [text]

21. How many research-funding organisations in your country have a policy on open data? [numeric]

   21.1. Please clarify your response if relevant [text]

Software

22. Does your country have a national policy on open source software? [yes/no]
    22.1. [if yes] Is this policy mandatory? [yes/no]
    22.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        22.2.1. [if yes] Please provide links to the relevant webpages [text]
    22.3. Please clarify your response if relevant [text]
23. Does your country have a financial strategy on open source software? [yes/no]
    23.1. Please clarify your response if relevant [text]
24. How many research-performing organisations in your country have a policy on open source software? [numeric]
    24.1. Please clarify your response if relevant [text]
25. How many research-funding organisations in your country have a policy on open source software? [numeric]
    25.1. Please clarify your response if relevant [text]

Services

26. Does your country have a national policy on offering services through EOSC? [yes/no]
    26.1. [if yes] Is this policy mandatory? [yes/no]
    26.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        26.2.1. [if yes] Please provide links to the relevant webpages [text]
    26.3. Please clarify your response if relevant [text]
27. Does your country have a financial strategy on offering services through EOSC? [yes/no]
    27.1. Please clarify your response if relevant [text]
28. How many research-performing organisations in your country have a policy on offering services through EOSC? [numeric]
    28.1. Please clarify your response if relevant [text]
29. How many research-funding organisations in your country have a policy on offering services through EOSC? [numeric]
    29.1. Please clarify your response if relevant [text]

Infrastructure

30. Does your country have a national policy on connecting repositories to EOSC? [yes/no]
    30.1. [if yes] Is this policy mandatory? [yes/no]
    30.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        30.2.1. [if yes] Please provide links to the relevant webpages [text]
    30.3. Please clarify your response if relevant [text]
31. Does your country have a financial strategy on connecting repositories to EOSC? [yes/no]
    31.1. Please clarify your response if relevant [text]
32. How many research-performing organisations in your country have a policy on connecting repositories to EOSC? [numeric]
    32.1. Please clarify your response if relevant [text]
33. How many research-funding organisations in your country have a policy on connecting repositories to EOSC? [numeric]
    33.1. Please clarify your response if relevant [text]
34. Does your country have a national policy on data stewardship? [yes/no]
    34.1. [if yes] Is this policy mandatory? [yes/no]
    34.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        34.2.1. [if yes] Please provide links to the relevant webpages [text]
    34.3. Please clarify your response if relevant [text]
35. Does your country have a financial strategy on data stewardship? [yes/no]
    35.1. Please clarify your response if relevant [text]
36. How many research-performing organisations in your country have a policy on data stewardship? [numeric]
    36.1. Please clarify your response if relevant [text]
37. How many research-funding organisations in your country have a policy on data stewardship? [numeric]
    37.1. Please clarify your response if relevant [text]

38. Does your country have a national policy on long-term data preservation? [yes/no]
    38.1. [if yes] Is this policy mandatory? [yes/no]
    38.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        38.2.1. [if yes] Please provide links to the relevant webpages [text]
    38.3. Please clarify your response if relevant [text]
39. Does your country have a financial strategy on long-term data preservation? [yes/no]
    39.1. Please clarify your response if relevant [text]
40. How many research-performing organisations in your country have a policy on long-term data preservation? [numeric]
    40.1. Please clarify your response if relevant [text]
41. How many research-funding organisations in your country have a policy on long-term data preservation? [numeric]
    41.1. Please clarify your response if relevant [text]

Skills/Training
42. Does your country have a national policy on skills/training for Open Science? [yes/no]
    42.1. [if yes] Is this policy mandatory? [yes/no]
    42.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        42.2.1. [if yes] Please provide links to the relevant webpages [text]
    42.3. Please clarify your response if relevant [text]
43. Does your country have a financial strategy on skills/training for Open Science? [yes/no]
    43.1. Please clarify your response if relevant [text]
44. How many research-performing organisations in your country have a policy on skills/training for Open Science? [numeric]
    44.1. Please clarify your response if relevant [text]
45. How many research-funding organisations in your country have a policy on skills/training for Open Science? [numeric]
    45.1. Please clarify your response if relevant [text]

Assessment
46. Does your country have a national policy on incentives/rewards for Open Science? [yes/no]
    46.1. [if yes] Is this policy mandatory? [yes/no]
    46.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        46.2.1. [if yes] Please provide links to the relevant webpages [text]
    46.3. Please clarify your response if relevant [text]
47. Does your country have a financial strategy on incentives/rewards for Open Science? [yes/no]
    47.1. Please clarify your response if relevant [text]
48. How many research-performing organisations in your country have a policy on incentives/rewards for Open Science? [numeric]
    48.1. Please clarify your response if relevant [text]
49. How many research-funding organisations in your country have a policy on incentives/rewards for Open Science? [numeric]
    49.1. Please clarify your response if relevant [text]

Engagement
50. Does your country have a national policy on citizen science? [yes/no]
    50.1. [if yes] Is this policy mandatory? [yes/no]
    50.2. [if yes] Is information on this policy available publicly on the web? [yes/no]
        50.2.1. [if yes] Please provide links to the relevant webpages [text]
    50.3. Please clarify your response if relevant [text]
51. Does your country have a financial strategy on citizen science? [yes/no]
    51.1. Please clarify your response if relevant [text]
52. How many research-performing organisations in your country have a policy on citizen science? [numeric]
    52.1. Please clarify your response if relevant [text]
53. How many research-funding organisations in your country have a policy on citizen science? [numeric]
    53.1. Please clarify your response if relevant [text]

Practices

Publications

54. Does your country have a national monitoring on Open Access to publications? [yes/no]
    54.1. Please clarify your response if relevant [text]
55. Does your country have use cases on Open Access to publications? [yes/no]
    55.1. [if yes] Please provide a short description of the use case [text]
    55.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        55.2.1. [if yes] Please provide links to the relevant webpages [text]
    55.3. Please clarify your response if relevant [text]
56. How much did your country financially invest in Open Access to publications in 2021 in millions of Euros? [numeric]
    56.1. Please clarify your response if relevant [text]
57. How many publications were published in Open Access in your country in 2021? [numeric]
    57.1. Do you agree with the number of publications collected from OpenAIRE Open Science Observatory? [yes/no]
        57.1.1. [if no] Please provide the correct number of publications [numeric]
    57.2. Please clarify your response if relevant [text]

Data

58. Does your country have a national monitoring on data management? [yes/no]
    58.1. Please clarify your response if relevant [text]
59. Does your country have use cases on data management? [yes/no]
    59.1. [if yes] Please provide a short description of the use case [text]
    59.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        59.2.1. [if yes] Please provide links to the relevant webpages [text]
    59.3. Please clarify your response if relevant [text]
60. How much did your country financially invest in data management in 2021 in millions of Euros? [numeric]
    60.1. Please clarify your response if relevant [text]
61. How many data management plans were published in your country in 2021? [numeric]
    61.1. Do you agree with the number of data management plans collected from DMPOnline? [yes/no]
        61.1.1. [if no] Please provide the correct number of data management plans [numeric]
    61.2. Please clarify your response if relevant [text]
62. Does your country have a national monitoring on FAIR data? [yes/no]
    62.1. Please clarify your response if relevant [text]
63. Does your country have use cases on FAIR data? [yes/no]
    63.1. [if yes] Please provide a short description of the use case [text]
    63.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        63.2.1. [if yes] Please provide links to the relevant webpages [text]
    63.3. Please clarify your response if relevant [text]
64. How much did your country financially invest in FAIR data in 2021 in millions of Euros? [numeric]
    64.1. Please clarify your response if relevant [text]
65. How many FAIR data sets were published in your country in 2021? [numeric]
    65.1. Do you agree with the number of FAIR data sets collected from OpenAIRE Open Science Observatory? [yes/no]
        65.1.1. [if no] Please provide the correct number of FAIR data sets [numeric]
    65.2. Please clarify your response if relevant [text]
66. Does your country have a national monitoring on open data? [yes/no]
    66.1. Please clarify your response if relevant [text]
67. Does your country have use cases on open data? [yes/no]
    67.1. [if yes] Please provide a short description of the use case [text]
    67.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        67.2.1. [if yes] Please provide links to the relevant webpages [text]
    67.3. Please clarify your response if relevant [text]
68. How much did your country financially invest in open data in 2021 in millions of Euros? [numeric]
    68.1. Please clarify your response if relevant [text]

69. How many open data sets were published in your country in 2021? [numeric]
    69.1. Do you agree with the number of open data sets collected from OpenAIRE Open Science Observatory? [yes/no]
        69.1.1. [if no] Please provide the correct number of open data sets [numeric]
    69.2. Please clarify your response if relevant [text]

Software
70. Does your country have a national monitoring on open source software? [yes/no]
    70.1. Please clarify your response if relevant [text]
71. Does your country have use cases on open source software? [yes/no]
    71.1. [if yes] Please provide a short description of the use case [text]
    71.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        71.2.1. [if yes] Please provide links to the relevant webpages [text]
    71.3. Please clarify your response if relevant [text]
72. How much did your country financially invest in open source software in 2021 in millions of Euros? [numeric]
    72.1. Please clarify your response if relevant [text]
73. How many open source software sets were published in your country in 2021? [numeric]
    73.1. Do you agree with the number of open source software sets collected from OpenAIRE Open Science Observatory? [yes/no]
        73.1.1. [if no] Please provide the correct number of open source software sets [numeric]
    73.2. Please clarify your response if relevant [text]

Services
74. Does your country have a national monitoring on offering services through EOSC? [yes/no]
    74.1. Please clarify your response if relevant [text]
75. Does your country have use cases on offering services through EOSC? [yes/no]
    75.1. [if yes] Please provide a short description of the use case [text]
    75.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        75.2.1. [if yes] Please provide links to the relevant webpages [text]
    75.3. Please clarify your response if relevant [text]
76. How much did your country financially invest in offering services through EOSC in 2021 in millions of Euros? [numeric]
    76.1. Please clarify your response if relevant [text]
77. How many services were offered through EOSC in your country in 2021? [numeric]
    77.1. Do you agree with the number of services offered through EOSC collected from EOSC Portal? [yes/no]
        77.1.1. [if no] Please provide the correct number of services offered through EOSC [numeric]
    77.2. Please clarify your response if relevant [text]

Infrastructure
78. Does your country have a national monitoring on connecting repositories to EOSC? [yes/no]
    78.1. Please clarify your response if relevant [text]
79. Does your country have use cases on connecting repositories to EOSC? [yes/no]
    79.1. [if yes] Please provide a short description of the use case [text]
    79.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        79.2.1. [if yes] Please provide links to the relevant webpages [text]
    79.3. Please clarify your response if relevant [text]
80. How much did your country financially invest in connecting repositories to EOSC in 2021 in millions of Euros? [numeric]
    80.1. Please clarify your response if relevant [text]
81. How many repositories were connected to EOSC in your country in 2021? [numeric]
    81.1. Do you agree with the number of repositories connected to EOSC collected from EOSC Portal? [yes/no]
        81.1.1. [if no] Please provide the correct number of repositories connected to EOSC [numeric]

81.2. Please clarify your response if relevant [text]

82. Does your country have a national monitoring on data stewardship? [yes/no]

    82.1. Please clarify your response if relevant [text]

83. Does your country have use cases on data stewardship? [yes/no]

    83.1. [if yes] Please provide a short description of the use case [text]

    83.2. [if yes] Is information on this use case available publicly on the web? [yes/no]

        83.2.1. [if yes] Please provide links to the relevant webpages [text]

    83.3. Please clarify your response if relevant [text]

84. How much did your country financially invest in data stewardship to EOSC in 2021 in millions of Euros? [numeric]

    84.1. Please clarify your response if relevant [text]

85. How many data stewards were employed in your country in 2021 in full-time equivalents? [numeric]

    85.1. Please clarify your response if relevant [text]

86. Does your country have a national monitoring on long-term data preservation? [yes/no]

    86.1. Please clarify your response if relevant [text]

87. Does your country have use cases on long-term data preservation? [yes/no]

    87.1. [if yes] Please provide a short description of the use case [text]

    87.2. [if yes] Is information on this use case available publicly on the web? [yes/no]

        87.2.1. [if yes] Please provide links to the relevant webpages [text]

    87.3. Please clarify your response if relevant [text]

88. How much did your country financially invest in long-term data preservation in 2021 in millions of Euros? [numeric]

    88.1. Please clarify your response if relevant [text]

89. How many repositories offered long-term data preservation in your country in 2021? [numeric]

    89.1. Do you agree with the number of repositories offering long-term data preservation collected from OpenAIRE Open Science Observatory? [yes/no]

        89.1.1. [if no] Please provide the correct number of repositories offering long-term data preservation [numeric]

    89.2. Please clarify your response if relevant [text]

Skills/Training

90. Does your country have a national monitoring on skills/training for Open Science? [yes/no]

    90.1. Please clarify your response if relevant [text]

91. Does your country have use cases on skills/training for Open Science? [yes/no]

    91.1. [if yes] Please provide a short description of the use case [text]

    91.2. [if yes] Is information on this use case available publicly on the web? [yes/no]

        91.2.1. [if yes] Please provide links to the relevant webpages [text]

    91.3. Please clarify your response if relevant [text]

92. How much did your country financially invest in skills/training for Open Science in 2021 in millions of Euros? [numeric]

    92.1. Please clarify your response if relevant [text]

93. How many educational curricula with an Open Science dimension were offered in your country in 2021? [numeric]

    93.1. Please clarify your response if relevant [text]

Assessment

94. Does your country have a national monitoring on incentives/rewards for Open Science? [yes/no]

    94.1. Please clarify your response if relevant [text]

95. Does your country have use cases on incentives/rewards for Open Science? [yes/no]

    95.1. [if yes] Please provide a short description of the use case [text]

    95.2. [if yes] Is information on this use case available publicly on the web? [yes/no]

        95.2.1. [if yes] Please provide links to the relevant webpages [text]

    95.3. Please clarify your response if relevant [text]

96. How much did your country financially invest in incentives/rewards for Open Science in 2021 in millions of Euros? [numeric]

    96.1. Please clarify your response if relevant [text]

97. How many signatories of the Agreement on Reforming Research Assessment are from your country? [numeric]
    97.1. Do you agree with the number of signatories of the Agreement on Reforming Research Assessment collected from Coalition for Advancing Research Assessment? [yes/no]
        97.1.1. [if no] Please provide the correct number of signatories of the Agreement on Reforming Research Assessment [numeric]
    97.2. Please clarify your response if relevant [text]

Engagement
98. Does your country have a national monitoring on citizen science? [yes/no]
    98.1. Please clarify your response if relevant [text]
99. Does your country have use cases on citizen science? [yes/no]
    99.1. [if yes] Please provide a short description of the use case [text]
    99.2. [if yes] Is information on this use case available publicly on the web? [yes/no]
        99.2.1. [if yes] Please provide links to the relevant webpages [text]
    99.3. Please clarify your response if relevant [text]
100. How much did your country financially invest in citizen science in 2021 in millions of Euros? [numeric]
    100.1. Please clarify your response if relevant [text]
101. How many projects with a citizen science dimension were started in your country in 2021? [numeric]
    101.1. Please clarify your response if relevant [text]

Feedback
102. Do you have any suggestions on how to improve this survey for future iterations? [text]

5 Conclusion

This deliverable is an update of D2.2a - Mapping of EOSC Readiness of EU MS/AC for EOSC Future. The project has collaborated extensively with EOSC-SB to monitor the EOSC readiness of MS/AC in Europe. A pilot Survey on National Contributions 2021 was developed to understand the state of play of policies and practices for EOSC and Open Science in MS/AC, test survey questions and reach a common understanding of key definitions for EOSC and Open Science and test the survey tool functionality of the EOSC Observatory. A new Monitoring Framework for National Contributions to EOSC was then developed, building on lessons learned from the pilot survey, with indicators for tracking the implementation of policies and practices across multiple categories relevant for EOSC and Open Science in MS/AC to guide the future annual surveys for EOSC-SB. A revised Survey on National Contributions 2022 was lastly developed, translating the indicators in the new monitoring framework directly into survey questions, to implement the new monitoring framework and kick-start the new annual surveys targeted at MS/AC to monitor policies and practices for EOSC and Open Science.

Several key lessons have been learned from the pilot survey, new monitoring framework, and revised survey:

1. Key definitions on EOSC and Open Science are not yet universally understood whereby EOSC-SB members have started and will continue to come to a common understanding of key definitions.
2. The surveys on National Contributions to EOSC not only support the monitoring but also mutual learning and the development of policies and practices for EOSC and Open Science across MS/AC.
3. Providing guidance and supporting documentation to EOSC-SB to fill in the surveys on National Contributions to EOSC has been well received and paid off in terms of a high survey response rate.
4. EOSC-SB is committed to the new Monitoring Framework for National Contributions to EOSC and revised survey despite the increase in complexity and the number of questions in the revised survey.
5. The Monitoring Framework for National Contributions to EOSC and Survey on National Contributions to EOSC are still evolving will be iteratively assessed and improved by EOSC-SB in the annual surveys.
6. A definition of the impact of EOSC and Open Science is missing whereby more discussion is needed to develop indicators for impact for the Monitoring Framework for National Contributions to EOSC.

The work on supporting EOSC-SB with the monitoring of EOSC and Open Science through the annual surveys and the EOSC Observatory will continue after EOSC Future in a Horizon Europe Coordination and Support Action to continue the implementation of the EOSC monitoring mechanism. This work should feed into the future development of the Monitoring Framework for National Contributions to EOSC, annual collection of data for the Survey on National Contributions to EOSC in the EOSC Observatory, and open publishing and analysis of validated survey data in the EOSC Observatory and EOSC Observatory Zenodo Community [20] .

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