EOSC Future

WP1 Report

Analysis of Survey on National Contributions to EOSC 2022

The EOSC Future project is co-funded by the European Union Horizon Programme call INFRAEOSC-03-2020, Grant Agreement number 101017536

Version 1.0
February 2024

WP2 Report / Analysis of Survey on National Contributions to EOSC 2022

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Dissemination Level of the Document

Public

Abstract

This report provides an analysis of the Survey on National Contributions to EOSC 2022. The annual survey on National Contributions to EOSC monitors policies, practices, and impacts related to EOSC and Open Science at national and institutional levels in Europe. The survey is aimed at representatives of European member states and countries associated to Horizon Europe who are members of the EOSC Steering Board. The survey for 2022 ran from 19 January 2023 until 09 June 2023 and collected responses from 32 countries. The survey data is openly available in the online dashboard of the EOSC Observatory: https://eoscobservatory.eosc-portal.eu.

DOI

10.5281/zenodo.10215971

Version History

Version	Date	Authors/Contributors	Description
V0.1	11/09/2023	Viola Peter (TGB)	First draft
V0.2	14/11/2023	Pantelis Tziveloglou (EC), Viola Peter (TGB), and Volker Beckmann (EOSC SB)	Draft report reviewed and comments incorporated
V0.3	17/01/2024	Viola Peter (TGB)	Additional data and comments incorporated
V0.4	05/02/2024	Gareth O'Neill (TGB), Fleur Lebhardt (TGB), and Athanasia Spiliotopoulou (JNP)	Report edited and technically formatted
V1.0	06/02/2024	Gareth O'Neill (TGB) and Viola Peter (TGB)	Final version of report published

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Table of Contents

Table of Tables

Table of Figures

Table of Boxes

List of Abbreviations

Acronym	Definition
CERN	European Organisation for Nuclear Research
DMP	Data Management Plan
e.g.	For example
EC	European Commission
EOSC	European Open Science Cloud
EOSC-A	EOSC Association
EOSC-SB	EOSC Steering Board
ESFRI	European Strategy Forum on Research Infrastructures
EU	European Union
EuroHPC	European High Performance Computing Joint Undertaking
FTE	Full-time equivalents
HELIX	Hellenic Data Service
i.e.	That is
JNP	JNP Consulting
MS	Member States
NFDI	Nationale Forschungsdateninfrastruktur
OA	Open Access
R&D	Research and Development
RFO	Research funding organisation
RPO	Research performing organisation
SCOAP$_3$	Sponsoring Consortium for Open Access Publishing in Particle Physics
SESAME	Synchrotron-light for Experimental Science and Applications in the Middle East
TGB	Technopolis Group Belgium

1 Introduction

The EOSC Steering Board (EOSC-SB) is an expert group advising the European Commission (EC) on the European Open Science Cloud (EOSC) and Open Science. It collaborates with the EOSC Association (EOSC-A) and EC in a tripartite governance model. The subgroup on National Contributions to EOSC benchmarks policies and practices, aiming to foster collaboration and shape national policies. In 2022, it worked on data collection mechanisms to monitor Open Science adoption and EOSC contributions. Its goals include assessing member states' (MS) contributions to EOSC, evaluating support for data policies and FAIR principles, analysing national funding, and coordinating with EOSC-A and EC for strategic EOSC implementation.

Monitoring the efforts made at national level are of special interest to EOSC-SB. Based on the experience gained with the 2021 pilot survey [1], a new survey was developed and launched in December 2022[2]. The Survey on National Contributions to EOSC 2022 was implemented online in the EOSC Observatory [3] and ran from 19 January 2023 until 09 June 2023. 32 countries responded to the survey and validated their data. The validated data is available in the EOSC Observatory [4] and in the EOSC Observatory Zenodo Community [5].

In total there were 102 questions, most of them grouped together such as in the following example so that in fact the components addressed were more confined.

Does your country have a national policy on open access to publications?

- Is this policy mandatory?
- Is information on this policy available publicly on the web?
- Please provide links to the relevant webpages

Figure 1.1 provides an overview of the key components of the survey as defined in the Monitoring Framework for National Contributions to EOSC [6]. The survey questions are first divided into policies and practices. The questions are then separated according to the eight categories that are relevant for EOSC and Open Science: publications, data, software, services, infrastructure, skills/training, assessment, and engagement. The policy questions address countries which have a national policy and financial strategy as well as RPOs and RFOs in the countries which have a policy for each category. The practice questions lastly address countries which have national monitoring, use cases, and country investments as well as key outputs relevant for each category.

Figure 1.1: Summary of the survey questions

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

Source: Technopolis Group Belgium

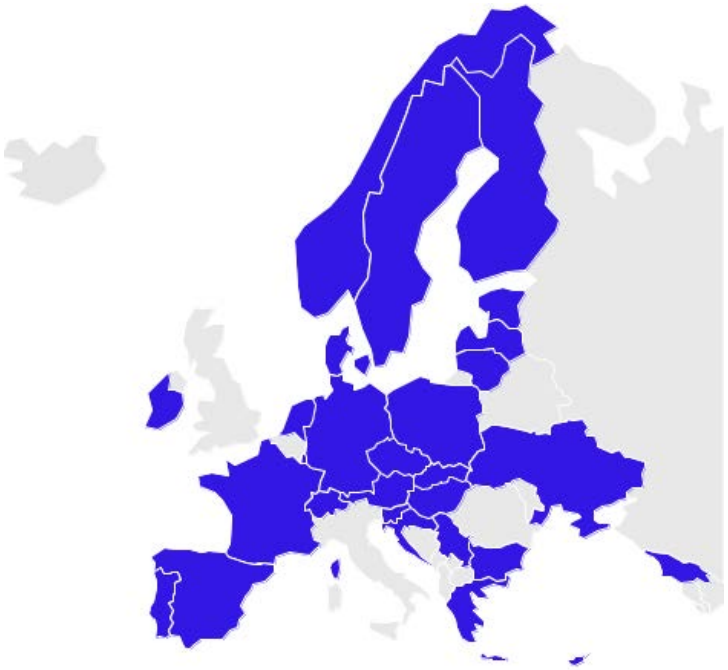
This report first provides an overview of the general questions presented to the EOSC-SB representatives as well as questions related to national investments in and monitoring of policies on EOSC and Open Science. The report then provides a summary of responses by the countries to key policy and practice questions asked across the eight categories relevant for EOSC and Open Science. The report closes with a short conclusion.

2 General

2.1 Respondents

By 09 June 2023, 24 EU Member States (MS), and eight non-EU countries (seven Associated to Horizon Europe and Switzerland) had validated their survey responses (see Figure 2.1). The data they provided form the basis for this reporting.

Figure 2.1: Countries covered in the monitoring



Data: Survey on National Contributions to EOSC 2022

2.2 Researchers

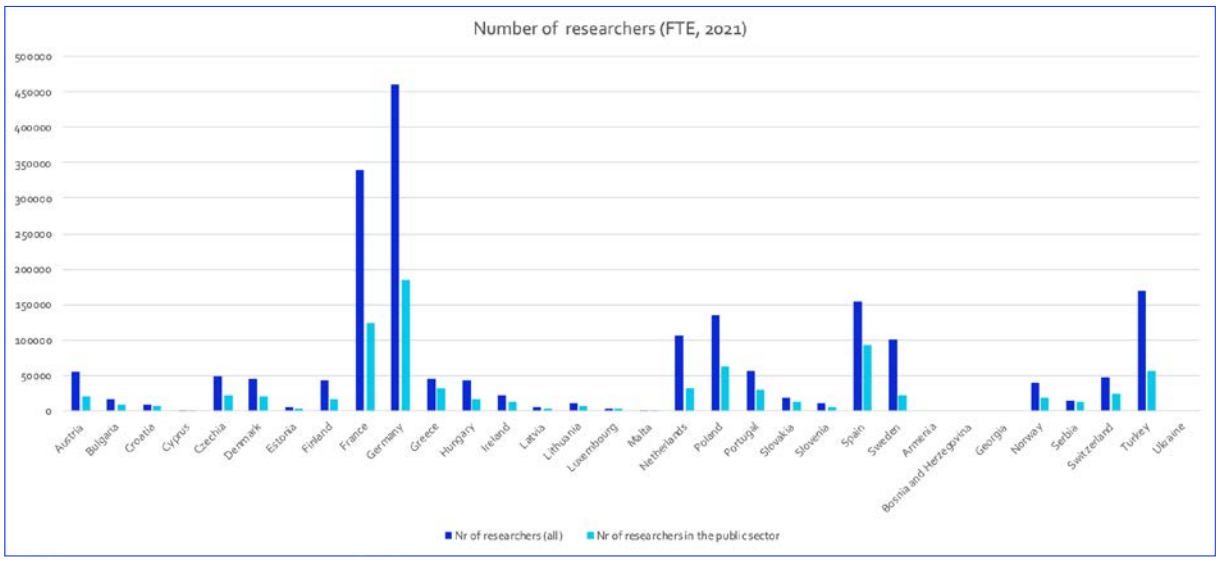
The survey did not include pre-filled Eurostat data on the number of researchers but asked respondents to check in Eurostat and asked if they would agree to the data in Eurostat. Only for a few of the covered non-EU countries, Eurostat includes data (i.e., Norway, Serbia, Switzerland, and Turkey). Several countries indicated simply "yes" or "no", others included data – which was sometimes matching the Eurostat data, sometimes not. Some countries have also included their data source with the provided data. Given that it is not clear on what the respondents indicate "yes" or "no", we suggest replacing this information with the official Eurostat data, which every national statistical office coordinates. Another challenge with the question seemed to be the guideline on "researcher". Eurostat provides data on researchers by sector, i.e., by higher education, the government sector, private sector and non-profit. Of the few respondents who inserted data, there were cases that seemed to have taken "all" researchers, others only the ones in the public sector. Therefore, the following Figure 2.2 provides the Eurostat data on "all researchers" as well as the sub-group of public sector researchers, which include the higher education and government sector.

We suggest that in the upcoming version of the survey the question regarding the number of researchers is removed and the corresponding data are directly retrieved from Eurostat.

Given that EOSC is an ecosystem mainly by and for the public research sector, the focus on researchers in the public sector seems more relevant. In 14 of the countries (including the two non-EU countries Turkey and Norway), more than 50% of the researchers are working in the private sector. This ranges from 77.6% in Sweden to 49.6% in Bulgaria. Therefore, if the total number of researchers is to be used as denominator, the use of "all researchers" will lead to miscalculations.

Since this indicator was not properly provided, we refrain from using it as a denominator in this monitoring report.

Figure 2.2: Number of researchers in FTE 2021



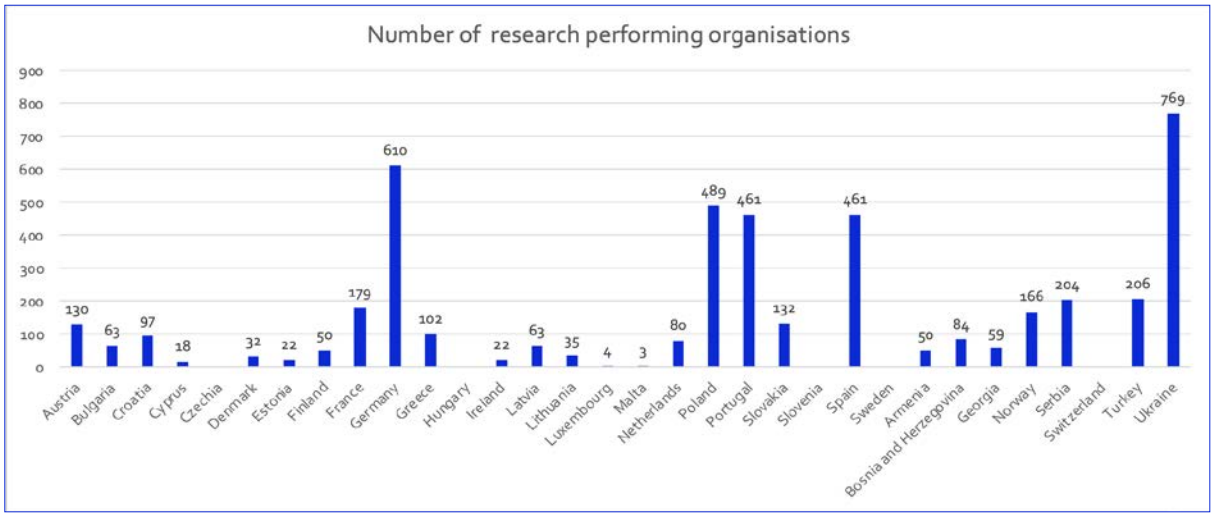
Source: Eurostat
Note: Data for CH: 2019 (latest available year). Armenia, Bosnia and Herzegovina, Georgia and Ukraine: not covered

2.3 Organisations

In many countries, there are no or only patchy official statistics on the number of research performing organisations available. The EOSC survey correspondents provided the above data. In many cases, they equally explained what they had included.

Most often, public universities and public research institutes are mentioned, but also other structures such as centres of excellence (Cyprus), academies of sciences (Bulgaria), government research institutes (Finland), private non-profit organisations (Greece), research and development (R&D) units as well as laboratories (Portugal), universities of applied sciences (Germany), but also private universities and research organisations (Latvia), or even business enterprises (Ukraine). This mixture explains the somewhat surprisingly high numbers in some countries and equally suggests that a more concise guideline on what to include may help the future monitoring. It equally suggests that normalisation based on these numbers should for now not be considered and will therefore not be used in this report.

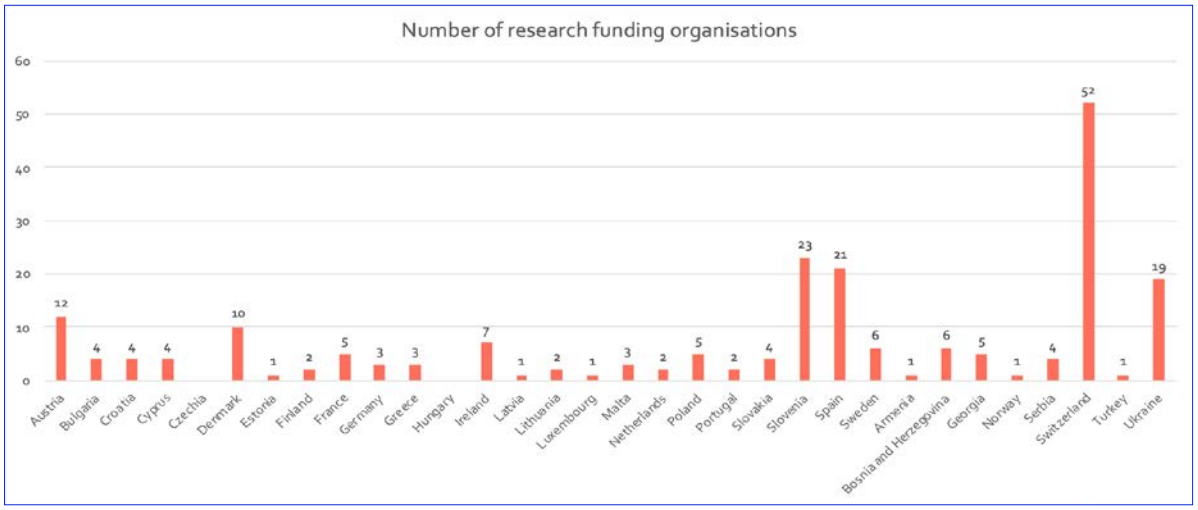
Figure 2.3: Number of research performing organisations by country



Data: Survey on National Contributions to EOSC 2022

When it comes to the number of research funding organisations, the data reflects the somewhat differing interpretation of the provided guideline. Several countries provided explanations on what is included. The funding organisations are, for example, national ministries (Croatia, Lithuania) or funding agencies (Cyprus), regional agencies (Spain), as well as numerous private funders (Denmark, Sweden). Sweden also indicated a number of foundations. In the absence of official data, Germany did not provide a figure but explained all the various levels and types. Therefore, the number included in the graph reflects only key funders. Also, Ireland indicated that there are several more. Also here, we suggest to further clarify what organisations shall be included, and to reach a consensus for the upcoming Survey on National Contributions to EOSC 2023 [7].

Figure 2.4: Number of research funding organisations by country

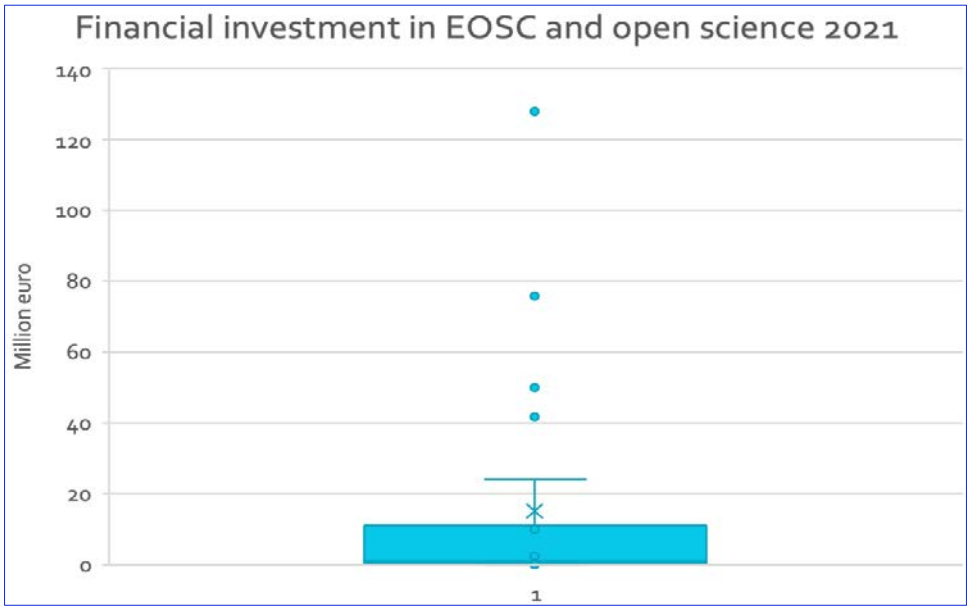


Data: Survey on National Contributions to EOSC 2022

2.4 Investments

The survey asked "How much did your country financially invest in total in EOSC and Open Science in 2021 in millions of Euros?". Eight countries did not provide a number. Figure 2.5 shows the range of answers given. The boxplot indicates that the majority of the funding is limited, as represented through the box: in fact, 10 countries reported that they invested between €100,000 and €700,000. The countries with the highest investments are visible as outliers – indicated through a dot. These are the Netherlands, Germany, France, Spain, and Finland.

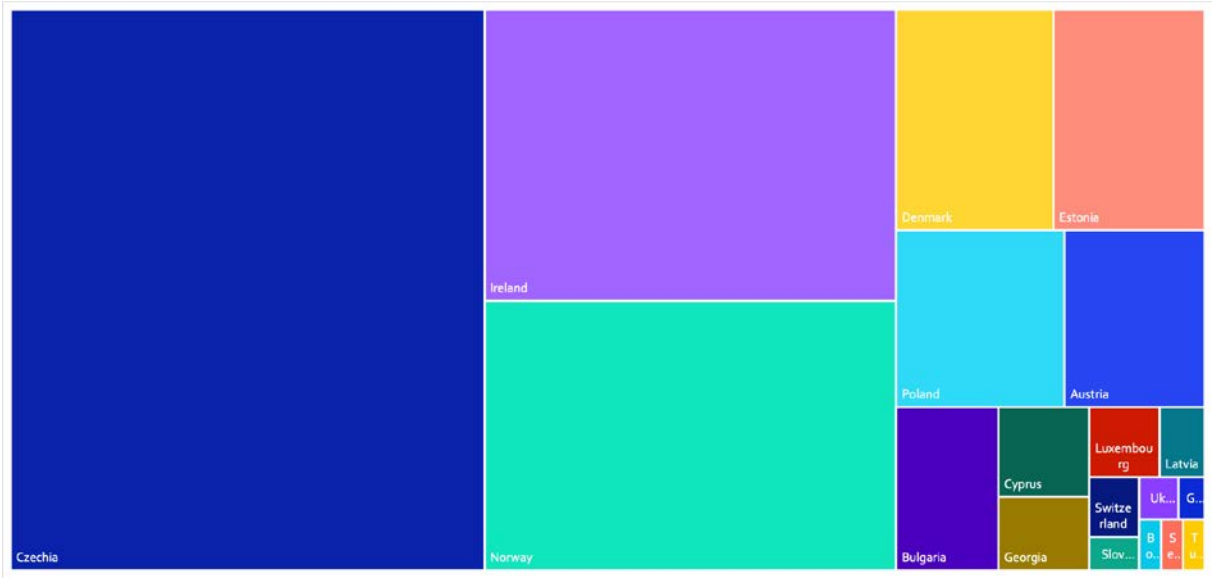
Figure 2.5: Financial investments in EOSC and Open Science



Data: Survey on National Contributions to EOSC 2022

The investments of the other countries are indicated in Figure 2.6. While the Czech Republic's investment accounted for almost €24 million (statistically not an outlier but within the range of the upper whisker of the box), Ireland and Norway followed with about €10 million, the smallest investments were about €100,000.

Figure 2.6: Funding for EOSC and Open Science (<20 million EUR 2021)



Data: National Contributions to EOSC 2022

It is insightful to use the explanations of the countries.

Several countries are able to provide investments based on their national contributions to specific international and national infrastructures (ESFRI, CERN, SESAME, EuroHPC, HELIX (Greece), SCOAP3 (Turkey), NFDI (Germany). Yet, much is left to best estimation.

The Netherlands, for example, explained "*In transition Costs for Open Science in the Netherlands (NPOS, 2019) the annual spent was estimated between 110 and 265 million EUR. Our estimation is that out of the €6,3 billion spend for R&D in institutions and higher education organisations (CBS) some 2% could be labelled 'Open Science including EOSC', this leads possibly to €126 million*".

Spain indicated earmarked budget, which is fully dedicated to Open Science, as well as research budget dedicated to Open Science activities. Beside Spain, other countries such as Portugal equally indicate difficulties to provide estimates at the national level.

The complexity to distinguish EOSC and Open Science investments in a federally organised country was indicated by Switzerland: "*On EOSC directly, including membership fees, the amount is around 270 000 € and several FTE*". Furthermore, mandates for EOSC taskforce members and membership fees for Swiss organisations can equally be added. Yet, for Open Science, there is federal, cantonal, and regional investments as well as federal project contributions. "*While this represents investments in policy issues linked to EOSC, not all investments are directly or indirectly related to EOSC activities*." Therefore, the national contributions are likely to be underestimated – a conclusion shared by other countries such as Ireland. Yet, in the latter case, the accounting is based on investments made by the research performing organisations.

Sweden explained that the country "*does not provide ear-marked or direct financial contributions to EOSC at a national level. Several public organisations contribute financially towards open and FAIR research data including co-financing of infrastructures that contribute towards EOSC's objectives* (…)."

Finland indicated a number of activities which are supported through the ministry's Open Science-related activities "which are directly beneficial for EOSC: publishing platform for national journals, subsidies for publications of learned societies, funding of research integrity board, funding of the coordination of Open Science in Finland, and funding of the journal classification forum." Also, Cyprus provided a breakdown that

included membership fees, infrastructures, open and fair data, publications, software, services, skills, and connecting to EOSC.

The variety of the calculated funding data and the provided explanations suggest that the funding systems of national research differ considerably and that these structures make it more or less difficult to provide reasonable estimates.

The total of the reported investments in EOSC and Open Science for 2021 is €406 million, which indicates double the investments reported in the pilot survey for 2020 (which was €206 million).

2.5 Monitoring

The survey addressed the monitoring by countries of policies on the eight categories relevant for EOSC and Open Science. "Open access to publications" stands out as the most widely tracked policy, with 14 countries actively monitoring this, 17 countries not monitoring this, and one not providing information.

The second most monitored policy is "Skills and training," with five countries keeping track of this. For the remaining aspects, only one to three countries typically engage in monitoring. In many cases, countries note that they do not collect data, except for a few that utilise surveys to report on multiple indicators. However, there are instances where respondents mention that their national surveys do not include specific questions related to the monitoring indicators for EOSC and Open Science.

Table 2-1: Status of monitoring of policies on EOSC and Open Science

	Open access to publications	Data manage-ment	FAIR data	Open source software	Offering services through EOSC	Connecting repositories to EOSC	Long-term data preservation	Data stewardship	Skills/ training for Open Science	Incentives/ rewards for Open Science	Citizen science
Austria											
Bulgaria											
Croatia											
Cyprus											
Czechia											
Denmark											
Estonia											
Finland											
France											
Germany											
Greece											
Hungary											
Ireland											
Latvia											
Lithuania											
Luxembourg											
Malta											
Netherlands											
Poland											
Portugal											
Slovakia											
Slovenia											
Spain											
Sweden											
Armenia											
Bosnia and Herzegovina											
Georgia											
Norway											
Serbia											
Switzerland											
Turkey											
Ukraine											

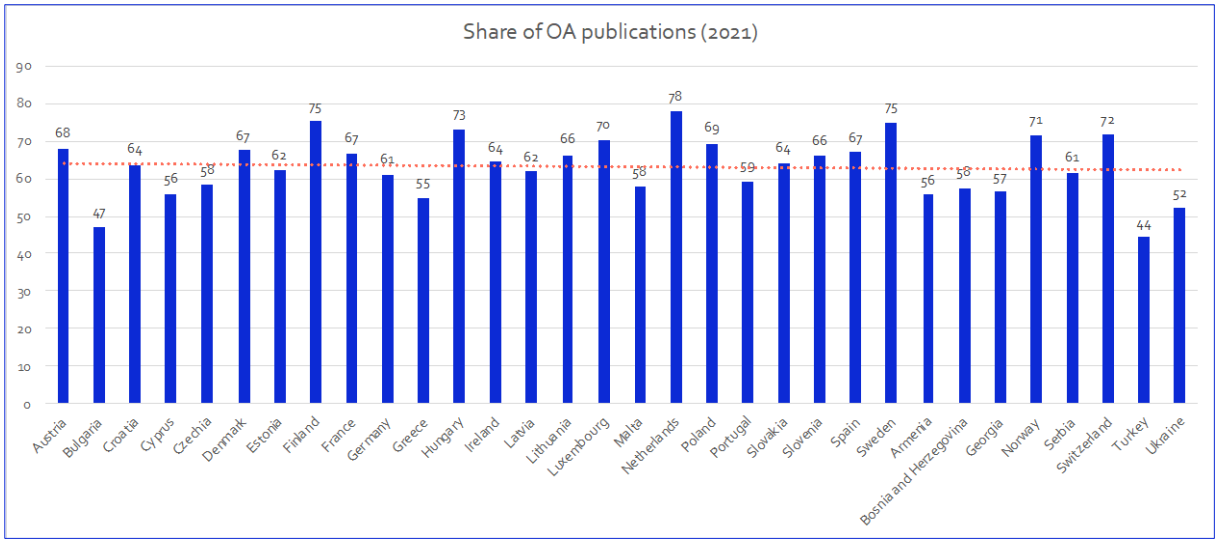
Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

3 Publications

3.1 Publications versus Open Access Publications

Before digging into the policies, let's see the status of open access (OA) publications in the countries. In the following figure, the share of OA publications (all types of OA) of all publications for 2021 is depicted. In all but two countries (Bulgaria, Turkey), more than 50% of the scientific publications were in one form of open access. While the average for all the countries taken together is 63%, this share is surpassed by 17 counties, led by the Netherlands with almost 80%.

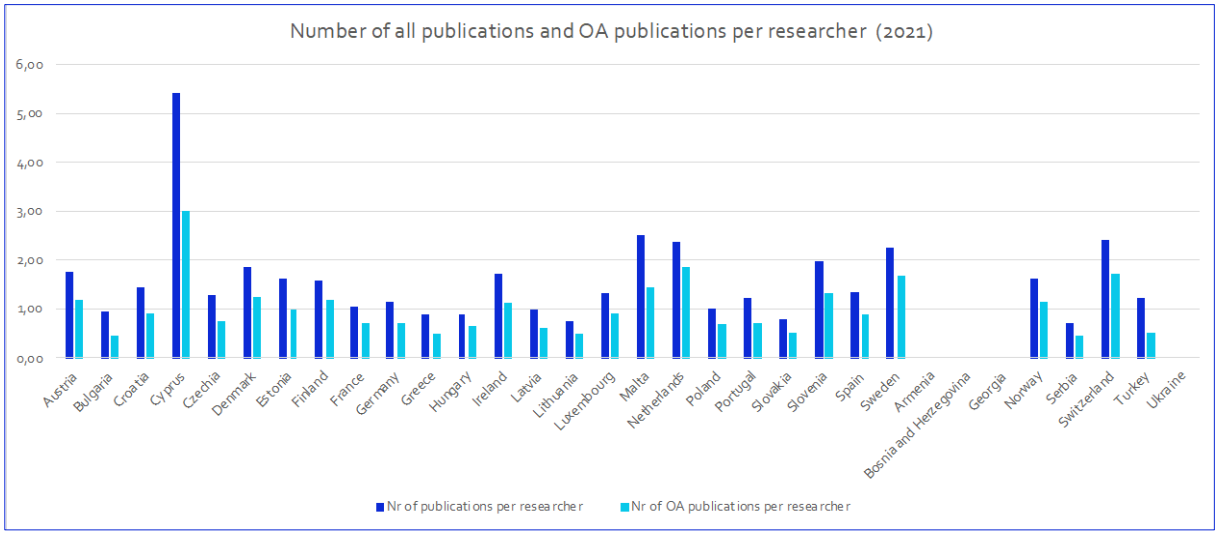
Figure 3.1: Share of OA publishing in all scientific publishing



Source: Scopus; extraction: Technopolis Group

Normalising by the number of researchers per publication numbers, the following Figure 3.2 shows the total number of publications per researcher and the OA publications per researcher in 2021. The picture is showing several aspects. First, it shows for three small publishing countries Cyprus, Malta, and Slovenia, and medium-sized countries the Netherlands, Sweden, and Switzerland, a higher publication rate than two publications per researcher. All other countries are below two. For open access publications, Cyprus reached three publications per researcher, followed by the Netherlands, Sweden, and Switzerland. The "distances" between the two bars indicate similar to Figure 3.1 the share of open access publishing and its prevalence in a country.

Figure 3.2: Number of open access publications 2021 and share of OA publications per researcher



Source: Scopus, Eurostat

Note: No researcher data for Armenia, BIH, Georgia, Ukraine in Eurostat. Researcher includes only higher education and government sector, in FTE

3.2 Open Access Policies

To the question "Does your country have a national policy on open access to publications?", 22 countries reported that they have a policy while nine do not (Table 3-1). Out of the reporting 24 EU MS, five do not have a national policy (Croatia, Czechia, Estonia, Hungary, Sweden). In eight countries, the policy is mandatory versus 14 countries that do not require the policy. In all but in Greece, the policy is available on the web.

Table 3-1: Status of national policy on open access to publications

	Does your country have a national policy on open access to publications?	Is this policy mandatory?	Is information on this policy available publicly on the web?
Austria	Yes	Yes	Yes
Bulgaria	Yes	Yes	Yes
Croatia	No		
Cyprus	Yes	Yes	Yes
Czechia	No		
Denmark	Yes	Yes	Yes
Estonia	No		
Finland	Yes	Yes	Yes
France	Yes	Yes	Yes
Germany	Yes		Yes
Greece	Yes	Yes	Yes
Hungary	No		
Ireland	Yes	Yes	Yes
Latvia	Yes	Yes	Yes
Lithuania	Yes	Yes	Yes
Luxembourg	Yes	Yes	Yes
Malta	Yes	Yes	Yes
Netherlands	Yes	Yes	Yes
Poland	Yes	Yes	Yes
Portugal	Yes	Yes	Yes
Slovakia	Yes	Yes	Yes
Slovenia	Yes	Yes	Yes
Spain	Yes	Yes	Yes
Sweden	No		
Armenia	No		
Bosnia and Herzegovina	No		
Georgia	Yes	Yes	Yes
Norway	Yes	Yes	Yes
Serbia	Yes	Yes	Yes
Switzerland	Yes	Yes	Yes
Turkey	No		
Ukraine	No		

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

When asked "Is there a specific policy on immediate open access to publications?" (Table 3-2), 14 countries confirm having such a policy versus nine which do not have. In six countries, this policy is mandatory (Cyprus,

Luxembourg, Slovenia, Spain, Norway, Switzerland) versus eight where it is not mandatory. In all countries that have a policy, it is publicly available on the web.

If one analyses if countries have a mandatory national policy on open access to publications and a mandatory one on immediate open access, one finds five countries meeting both criteria with Cyprus, Luxembourg, Slovenia, Spain, and Norway.

Table 3-2: Status of policy on immediate open access to publications

	Is there a specific policy on immediate open access to publications?	Is this policy mandatory?	Is information on this policy available publicly on the web?
Austria			
Bulgaria			
Croatia			
Cyprus			
Czechia			
Denmark			
Estonia			
Finland			
France			
Germany			
Greece			
Hungary			
Ireland			
Latvia			
Lithuania			
Luxembourg			
Malta			
Netherlands			
Poland			
Portugal			
Slovakia			
Slovenia			
Spain			
Sweden			
Armenia			
Bosnia and Herzegovina			
Georgia			
Norway			
Serbia			
Switzerland			
Turkey			
Ukraine			

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

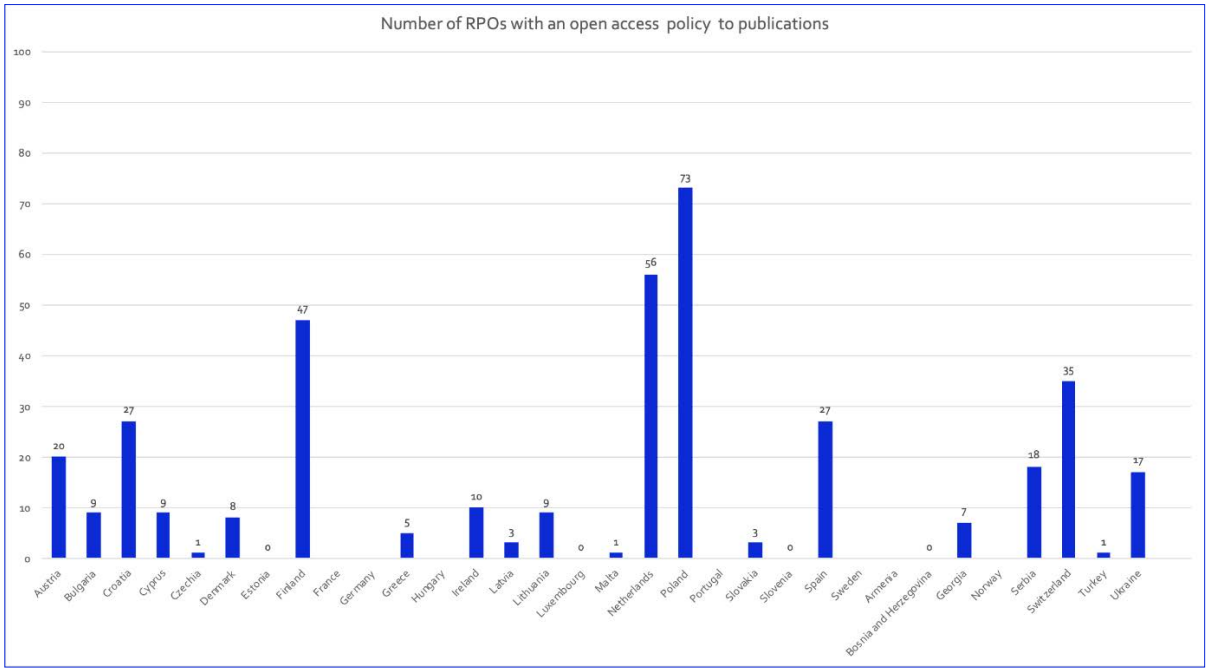
Several countries have included examples on open access to publications. A selection is included in the following Box A. A more detailed presentation of examples by the countries of the implementation of EOSC and Open Science across the various survey categories will be made available soon [8].

The following two figures show how many research performing organisations (Figure 3.3) and how many research funding organisations (Figure 3.4) respectively have an open access policy to publications.

When considering the explanations given, it is evident that survey respondents counted differently, and used different means to obtain the numbers. Several countries listed RPOs with such a policy (Bulgaria, Croatia, Cyprus, Denmark, Latvia). Croatia listed four RPOs and additionally counted the number of faculties.

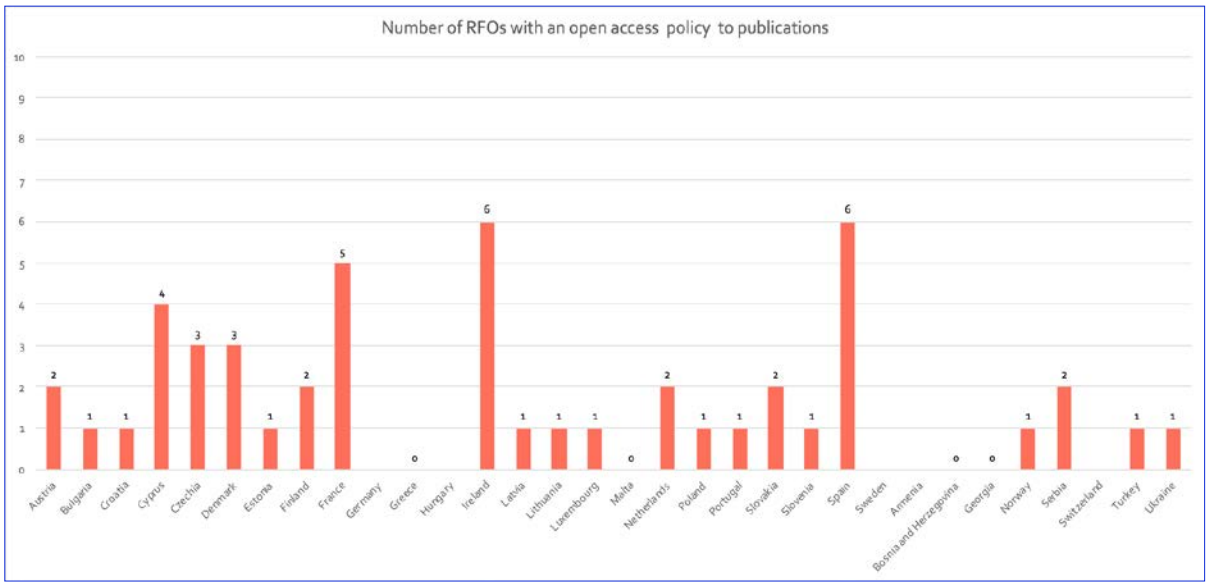
Countries such as Finland, France, Poland or Spain used a survey, although for France, results were not yet available. Germany pointed to its applicable Pact for Research, which applies to the 285 public research institutes of the four main umbrella research organisations but did not provide an estimate. The Netherlands estimated that 70% of its RPOs have such a policy and thus came up with a figure. Luxembourg mentioned that "*RPOs don't have policies per se but need to conform to the FNR guidelines for research funded through the FNR.*"

Figure 3.3: Research performing organisations with policy on open access to publications



Data: Survey on National Contributions to EOSC 2022

Figure 3.4: Research funding organisations with policy on open access to publications



Data: Survey on National Contributions to EOSC 2022

The data regarding the status of research funding organisations and their open access policies for publications, as depicted in Figure 3.4, indicates significantly lower numbers compared to the research performing organisations as shown in Figure 3.3 earlier. The explanations provided suggest that in many countries there is a lack of monitoring, resulting in a limited overview of available information. This issue pertains to both private and public funding.

In several countries, the figures provided encompass not only the count of funding organisations but also various funding streams. For instance, this includes specific programmes, as observed in the Czech Republic, or expected initiatives, as anticipated in Greece. In Slovakia, the figures may also reflect policies. Furthermore, Spain has taken into account its autonomous regions, each of which has its own open access mandates, further adding to the complexity of the data.

3.3 Intellectual Property Rights (IPR)

The following two tables summarise six questions on intellectual property rights.

Table 3-3 includes the questions if there is a specific policy on the retention of IPR on publications and if the policy is mandatory and publicly available on the web.

When it comes to a policy on retention of IPR on publications, the picture is divided: eleven countries each have or do not have a relevant policy, ten countries did not answer the question (Table 3-3).

Table 3-3: Status of policy on retention of IPR on publications

	Is there a specific policy on retention of IPR on publications?	Is this policy mandatory?	Is information on this policy available publicly on the web?
Austria	Yes	No	Yes
Bulgaria	Yes	No	Yes
Croatia	No answer	No answer	No answer
Cyprus	No	No answer	No answer
Czechia	No answer	No answer	No answer
Denmark	No	No answer	No answer
Estonia	No answer	No answer	No answer
Finland	Yes	No	Yes
France	Yes	Yes	Yes
Germany	No answer	No answer	No answer
Greece	No	No answer	No answer
Hungary	No answer	No answer	No answer
Ireland	Yes	No	Yes
Latvia	No	No answer	No answer
Lithuania	Yes	No	Yes
Luxembourg	Yes	Yes	Yes
Malta	Yes	No	Yes
Netherlands	No	No answer	No answer
Poland	No	No answer	No answer
Portugal	No	No answer	No answer
Slovakia	No	No answer	No answer
Slovenia	Yes	Yes	Yes
Spain	Yes	Yes	Yes
Sweden	No answer	No answer	No answer
Armenia	No answer	No answer	No answer
Bosnia and Herzegovina	No answer	No answer	No answer
Georgia	No	No answer	No answer
Norway	Yes	Yes	Yes
Serbia	No	No answer	No answer
Switzerland	No	No answer	No answer
Turkey	No answer	No answer	No answer
Ukraine	No answer	No answer	No answer

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

A similar divide exists concerning the question if the policy is mandatory. In five countries it is mandatory (France, Luxembourg, Slovenia, Spain, Norway), while in another six this is not the case. And nine countries did not provide information. All countries with a policy do also inform about the policy on the web.

A similar block of questions concerns open licensing policies (Table 3-4).

A specific policy on open licences is implemented in ten countries, while 13 countries do not have such a policy. In four it is mandatory (Bulgaria, Luxembourg, Spain, Norway) and nine did not answer the question. In all the countries with a policy, it is equally available on the web.

Thus, if we compare the situation on the retention of IPR versus open licensing, we can see that Austria, Bulgaria, Finland, Ireland, Luxembourg, Malta, Spain and Norway have both policies, but only in three countries are both policies mandatory (Luxembourg, Spain, Norway).

There are a few countries without an IPR retention policy but with an open licensing policy (France, Lithuania, Slovenia).

Table 3-4: Status of policy on open licensing of publications

	Is there a specific policy on open licensing of publications?	Is this policy mandatory?	Is information on this policy available publicly on the web?
Austria			
Bulgaria			
Croatia			
Cyprus			
Czechia			
Denmark			
Estonia			
Finland			
France			
Germany			
Greece			
Hungary			
Ireland			
Latvia			
Lithuania			
Luxembourg			
Malta			
Netherlands			
Poland			
Portugal			
Slovakia			
Slovenia			
Spain			
Sweden			
Armenia			
Bosnia and Herzegovina			
Georgia			
Norway			
Serbia			
Switzerland			
Turkey			
Ukraine			

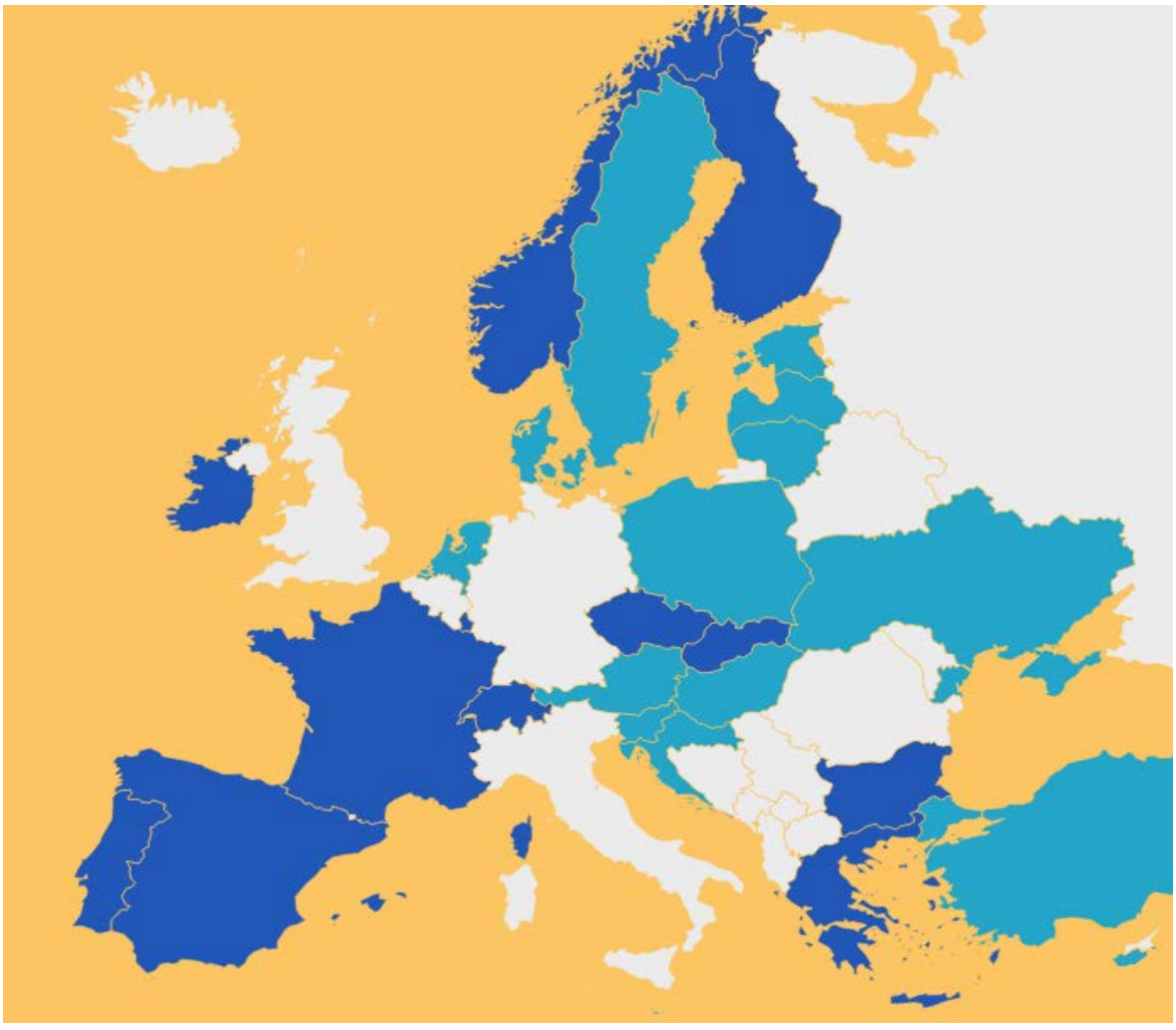
Data: Survey on National Contributions to EOSC2022. Colouring scheme: Yes | No | No answer

3.4 Financial Strategy on Open Access Publications

19 countries answered with "no" to the question on "Does your country have a financial strategy on open access to publications?" while 12 confirmed with "yes" (see Figure 3.5). Only Germany did not answer that question. However, if one takes into account the comments provided, some confirmations need to be reconsidered. Greece wrote clearly "*Although no national financial strategy is in place*, (…)" while Norway explains on costs. Germany explained that "*funding to promote open access is included in the budget of the ministry*." It seems that only a limited number of countries can point to a national strategy or policy where open access to publications is clearly mentioned (e.g., National RDI Policy of the Czech Republic, Second French Open Science Plan, National Action Plan 2022 Ireland). Others indicate documents that are more specific such as Slovakia "The policy defines how the costs on gold OA publishing are funded" or Spain, which refers to a dedicated funding call "*There is a financial strategy for literature repositories, institutional publishing services and current research information (CRIS) systems based on María de Guzmán National Call (…)".*

In a similar case, Serbia indicated "no" and explained that even if the country does not have a strategy, "*the Ministry of Science subsidises Serbian journals through annual calls, allowing for practically all scholarly journals in Serbia to be open access.*"

Figure 3.5: Status of countries with financial strategy on open access to publications



Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

3.5 Use Cases on Open Access

Several respondents provided use cases of open access to publications. A selection is included in Box A.

Box A: Use cases on open access to publications

Finland

Monitoring Model for Open Science and Research - Principles and Practices. In the Finnish national Open Science and research monitoring, research performing organisations were asked to provide case studies on best practices regarding open access to publications. A total number of 36 best practices was collected.

https://avointiede.fi/en/policies-materials/monitoring/monitoring-results-2022

Greece

HEAL-Link is involved in open access initiatives such as SCOAP3 and negotiates with scientific publishers, representing all Greek academic and research libraries to make a provision for open access publications, alongside with the access to the full text of the subscribed content. HEAL-Link monitors the progress of its open access programmes in Greece. HEAL1000 (https://f1000research.com/heallink) is the outcome of the collaboration with F1000 to replicate the EC's Open Research Europe - ORE model and offer an open access open peer review platform for Greek and Greek affiliated researchers.

https://scholarly.heal-link.gr/news/oaheal

Poland

Polish National Agency for Academic Exchange: Pursuant to the Act of 7 July 2017 on the Polish National Agency for Academic Exchange, the agency does not finance scientific research, therefore it does not have a strategy/regulation on open access to publications at the organisation level. Nevertheless, selected activities undertaken by NAWA may indirectly contribute to the development of research results, e.g., in the form of scientific publications of researchers supported under NAWA programmes. Therefore, issues related to open access are regulated at the level of the program, depending on its nature. Beneficiaries are either required to make research results available in the open access formula or are recommended to do so.

ICM University of Warsaw: The Library of Science (https://bibliotekanauki.pl), run by the Open Science Platform at the Interdisciplinary Centre for Mathematical and Computational Modelling, University of Warsaw, provides open access to over 520,000 scientific articles from over 1,600 journals and a growing number of books with rich metadata. The publications are available without charge for anyone; 42% are CC licensed. They are also available through open APIs and are described using widely adopted standards such as JATS.

CLARIN: All language resources created within the CLARIN-PL infrastructure until 2020 are published fully in open access. Some of the resources produced between 2020 and 2023 are also available as open access for research purposes.

France

HAL is a platform to promote open access to publications. Publications are easy to find, well referenced by search engines and interconnected with other services (ORCID, preprint servers). The largest French research organisations and the majority of French universities have chosen and support HAL, a public, sustainable and responsible infrastructure. HAL guarantees the long-term preservation of publications. A set of services (CV, institutional portals, collections, documentary watch, APIs, identifiers) contribute to their valorisation.

Portugal

RCAAP – Open Access Scientific Repositories of Portugal - National initiative of Open Access that aims to store, preserve and promote access to scientific knowledge produced in Portugal.

b-on – A service that provides unlimited, permanent access to thousands of journals and e-books from some of the leading international scientific content providers. Under b-on 13 transformative agreements are being deployed.

Sweden

Publicera is the national digital platform for open access Swedish scholarly journals developed and hosted by the National Library of Sweden. Publicera provides a common interface for journal editors to manage the entire scholarly publishing workflow, from manuscript submission to peer review to publishing full-text material and metadata with immediate open access. The platform is based on the open-source Open Journal Systems (OJS).

Turkey

TUBITAK ULAKBIM promotes a sustainable community-driven diamond open access scholarly communication ecosystem and endorses 11 diamond open access journals. JournalPark is an open access journal hosting and editorial process management software to collect, evaluate, and publish manuscripts for peer-reviewed Journals.

https://journals.tubitak.gov.tr/communities.html

Ukraine

The National Open Science Plan (until 2030) has been developed by the Ministry of Education and Science of Ukraine with the help of stakeholder representatives and approved by the Ukrainian Government on 08 October 2022. Objective 1 aims to ensure open access to research results and scientific information.

https://mon.gov.ua/eng/tag/mizhnarodni-naukovi-proekti
https://mon.gov.ua/storage/app/media/nauka/2023/01/26/National-Open-Science-Plan-Ukraine.pdf

The open peer review platform "Peers International" has been created within the EU-funded Erasmus+ project OPTIMA ("Open Practices, Transparency and Integrity for Modern Academia") and is used to establish open editorial workflows for academic conferences in Ukraine (https://peers.international).

Medical Research Agency uses publicly available publications to prepare educational and informational materials addressed to various groups of recipients, with particular emphasis on patients. During preparing information materials, Medical Research Agency quote original publications.

4 Data

4.1 Data Management

4 countries responded positively, including 12 EU MS and two non-EU countries Switzerland and Norway, while 11 EU MS and five non-EU countries replied negatively. Sweden and Armenia did not provide a response. Although all countries with a data management policy confirmed that the policy is accessible online, it is obligatory in five countries (Cyprus, Denmark, Latvia, Spain, Norway). While not mandatory in many countries, ten nations have associated financial plans. The most comprehensive package of policies appears to be in Denmark, Latvia, Spain, and Norway (as detailed in Table 4-1).

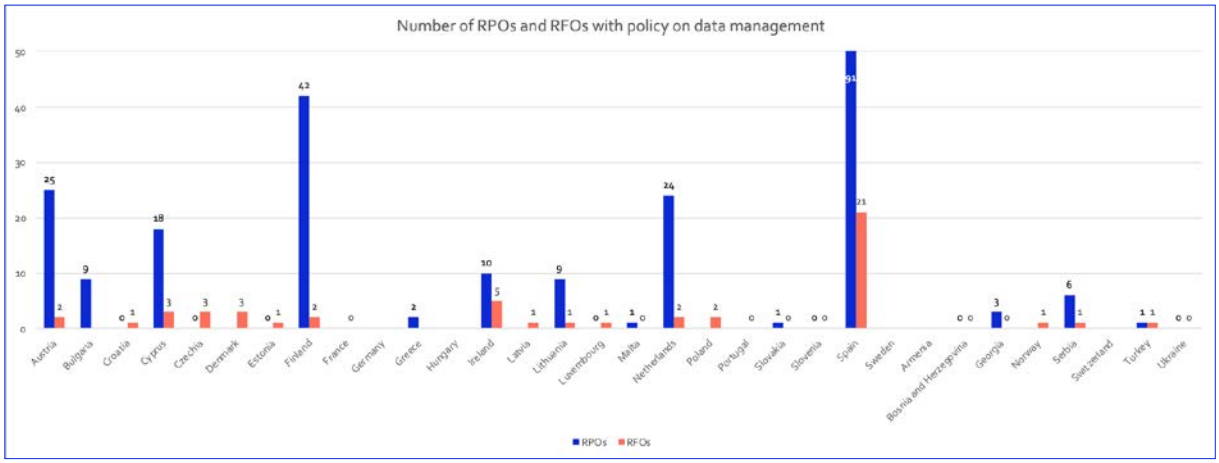
Table 4-1: Status of policy on data management

	Does your country have a national policy on data management?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on data management?
Austria	Yes	No	Yes	No
Bulgaria	Yes	No	Yes	No
Croatia	No			No
Cyprus	Yes	Yes	Yes	No
Czechia	No			Yes
Denmark	Yes	Yes	Yes	Yes
Estonia	No			No
Finland	Yes	No	Yes	Yes
France	No			No
Germany	Yes	No	Yes	Yes
Greece	No			No
Hungary	No			No
Ireland	Yes	No	Yes	Yes
Latvia	Yes	Yes	Yes	Yes
Lithuania	Yes	No	Yes	No
Luxembourg	No			No
Malta	Yes	No	Yes	No
Netherlands	Yes	No	Yes	Yes
Poland	No			No
Portugal	No			No
Slovakia	No			No
Slovenia	No			No
Spain	Yes	Yes	Yes	Yes
Sweden				
Armenia				
Bosnia and Herzegovina	No			No
Georgia	No			No
Norway	Yes	Yes	Yes	Yes
Serbia	No			No
Switzerland	Yes	No	Yes	Yes
Turkey	No			No
Ukraine	No			No

Data: Survey on National contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

Regarding the dissemination of information on data management policies by RPOs or RFOs, some countries rely on surveys (e.g., Finland, France, Sweden), while for others, data collection is either absent or not systematically available (as illustrated in Figure 4.1). Germany indicated that the DFG, one of their largest funding organisations, "*has published guidelines and a checklist for handling research data*". An explanation for the highest absolute number as recorded for Spain is given with "*all funding agencies in Spain (both national and regional ones) are under the legal mandate of the Science Law and the Universities Law, and under the Spanish Strategy for Open Science*." The Netherlands "*expect all Dutch universities have such a policy, but we are not sure because there we don't have any national / central overview*". In addition, the Netherlands estimates that 30% of their RPOs have such a policy.

Figure 4.1: Organisations with a policy on data management



Data: Survey on National Contributions to EOSC 2022

Several respondents provided additional information on data management. A selection is included in Box B.

Box B:Use cases on data management

Czech Republic

A recognised data-management-plan (DMP) support tool (recommended by the Horizon Europe Programme Guide), Data Stewardship Wizard (https://ds-wizard.org), is under development in the Czech Republic. The tool consists of an open-source system with extensible API for integrability and machine-actionability supporting a detailed description of research data handling using common or domain-specific knowledge model.

France

DMP OPIDoR guides the drafting and implementation into practice of data or software management plans. It is accessible by any member of the French High Education and Research community as well as its French or foreign partners. The DMPs are machine actionable, which facilitates data entry and interactions with data management services.

https://dmp.opidor.fr

Poland

The National Science Centre has implemented DMPs as a mandatory form in all applications for research funding. Moreover, the institution requires that all datasets underlying publications resulting from research projects should be shared publicly with a CCo licence (if there were no restrictions that would justify closing them). The guidelines attached to the DMP indicate the FAIR principles, which should be taken into account when drafting the plan.

https://ncn.gov.pl/en/aktualnosci/2020-03-06-plan-zarzadzania-danymi-pytania
https://ncn.gov.pl/sites/default/files/pliki/regulaminy/wytyczne_zarzadzanie_danymi_06_2020_ang.pdf

Sweden

The Swedish Research Council and the Association of Swedish Higher Education Institutions (SUHF) have developed a template for DMPs with six central aspects that a DMPs should cover. There is also a guidance to the template. The template is a partially reworked version of Science Europe's "Core Requirements for Data Management Plans".

https://www.vr.se/english/applying-for-funding/requirements-terms-and-conditions/producing-a-data-management-plan/data-management-plan-template.html

SciLifeLab Data Centre is a central research data infrastructure at SciLifeLab, with responsibility for information technology and data management as well as services for Open Science and FAIR data sharing. Data services are open for all users and target both researchers and data-producing research infrastructures. Services include the national Swedish COVID-19 and pandemic preparedness portal, FAIR data publishing, DMPs, and sharing of AI models and compute applications.

https://www.scilifelab.se/data

Norway

Sikt's DMP is adapted to different research disciplines at all levels. The plan is interactive and offers different options based on the information provided. In addition to being adapted to different types of funding (European Research Council, Norwegian Research Council, etc.) and meeting the requirements of Science Europe, the DMP is a dynamic tool that can be updated along the way and shared with all project participants.

https://sikt.no/en/data-management-plan

4.2 FAIR Data

When it comes to FAIR policies, the picture is equally divided: 15 countries each either have or do not have a national policy. Two countries did not provide an answer (Table 4-2). There were 13 EU MS and two non-EU countries with a national policy on FAIR data for which information is available on the web. In five countries, this policy is mandatory (Cyprus, Latvia, Slovenia, Spain, Norway), in ten it is not, while 17 countries have not answered this question. In terms of financial strategy, ten countries indicate to have such a strategy. This aspect is mainly found in the countries with a national policy but not entirely: the Czech Republic indicated that a financial strategy for FAIR data exists also without a national FAIR data policy.

Yet, the interpretation of the question is variable. Latvia indicated a national strategy "*FAIR is a core part of our National Open Science Strategy*" while others referred to the FAIR data policies of individual funders or programmes (e.g., Austria, Portugal, Spain, Norway).

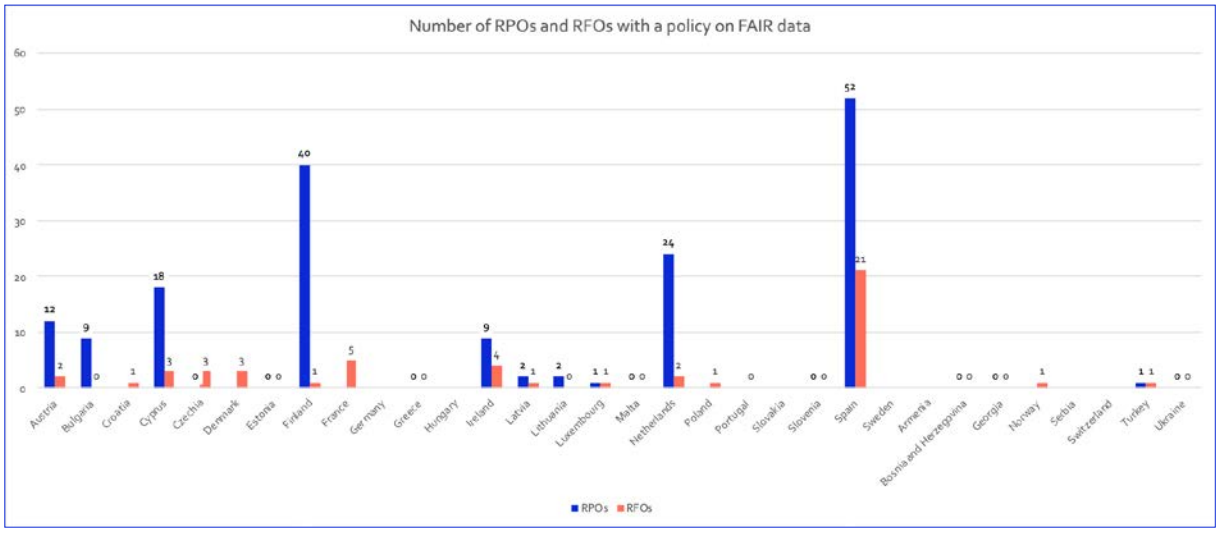
Table 4-2: Status of policy on FAIR data

	Does your country have a national policy on FAIR data?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on FAIR data?
Austria	Yes	No	Yes	Yes
Bulgaria	Yes	No	Yes	No
Croatia	No			No
Cyprus	Yes	Yes	Yes	No
Czechia	No			Yes
Denmark	Yes	No	Yes	Yes
Estonia	No			No
Finland	Yes	No	Yes	Yes
France	Yes	No	Yes	No
Germany	Yes	No	Yes	
Greece	No			No
Hungary	No			
Ireland	Yes	No	Yes	Yes
Latvia	Yes	Yes	Yes	Yes
Lithuania	No			No
Luxembourg	No			No
Malta	Yes	No	Yes	No
Netherlands	Yes	No	Yes	Yes
Poland	No			No
Portugal	No			No
Slovakia	No			No
Slovenia	Yes	Yes	Yes	No
Spain	Yes	Yes	Yes	Yes
Sweden				
Armenia				
Bosnia and Herzegovina	No			No
Georgia	No			No
Norway	Yes	Yes	Yes	Yes
Serbia	No			No
Switzerland	Yes	No	Yes	Yes
Turkey	No			No
Ukraine	No			No

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

Similar to the previous question, most countries are unable to provide information on funders' policies. Those with surveys (such as Finland or Spain) provide data on RPOs, while the Netherlands does not "*expect any institution to have a separate policy on FAIR data, because FAIR data is considered an aspect of research data management*."

Figure 4.2: Organisations with a policy on FAIR data



Data: Survey on National Contributions to EOSC 2022

Several respondents provided a range of use cases on FAIR data. A selection is provided in Box C.

Box C: Use cases on FAIR data

Spain

Framework for validating EOSC FAIR data requirements. It provides automated deployment of data repositories and fairness verification. One of the key components is the FAIR evaluator "FAIR EVA" (Evaluator, Validator and Advisor). FAIR EVA has been developed to check the FAIRness level of digital objects from different repositories or data portals. It requires the object identifier and the repository to check and it can be adapted to different contexts and environments.

https://www.eosc-synergy.eu/results/fair-framework

France

The French Ministry of Research is building a national federated data repository: RechercheDataGouv as part of its Open Science Plan. In this context, three French research organisations, each maintaining an institutional data repository based on Dataverse software, initiated the BRIDGE project funded by the French National Research Agency (ANR) following a special Open Science call. The goal is to provide guidelines and harmonise research data policies and repository management in a reusable approach for other institutes or contexts, focusing on three priorities: (1) analysing and improving institutional data governance policies (2) providing and endorsing common guidelines for data producers and managers (3) choosing FAIR vocabularies and developing IT tools to improve FAIRness of repositories with some shared metadata schemas.

https://bridge-science-ouverte.fr/;https://zenodo.org/record/6652405#.ZC1kLsFBzao

4.3 Open Data

A total of 17 countries have a national policy on open data while 12 mention that they do not have such a policy (Table 4-3). Three countries did not provide an answer. 12 EU-MS as well as Norway and Switzerland are among the ones with an open data policy. It is mandatory in nine countries and not mandatory in in seven. For all countries with a policy, information is available on the web. Ten countries have a financial strategy on open data. The results are almost identical to the situation on FAIR data in the previous section, with the exception of Slovenia which has a policy on FAIR data but not on open data.

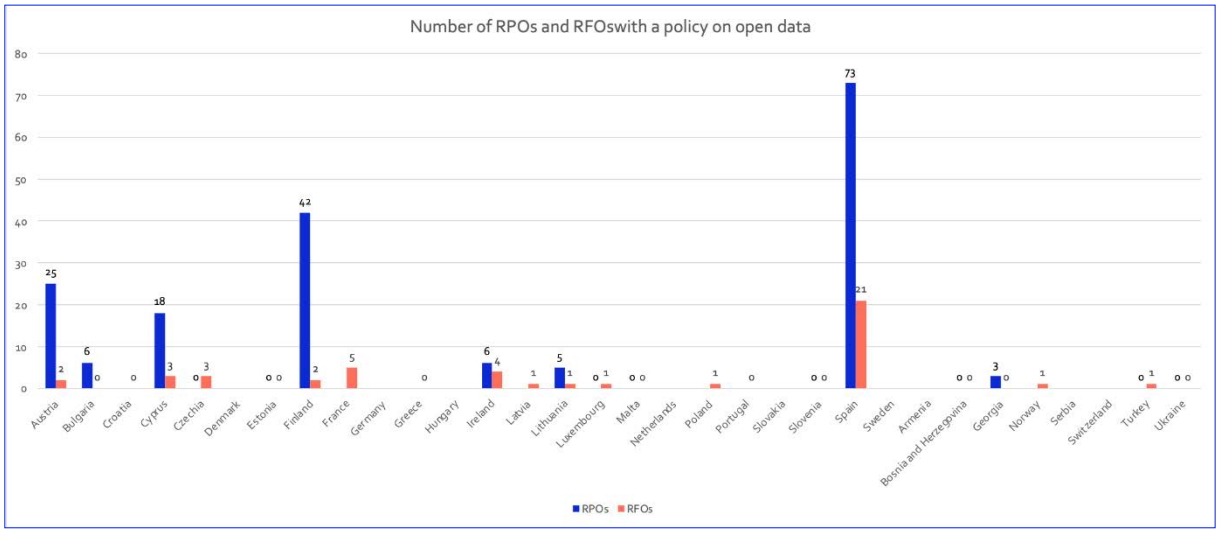
Table 4-3: Status of policy on open data

	Does your country have a national policy on open data ?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on open data?
Austria				
Bulgaria				
Croatia				
Cyprus				
Czechia				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Armenia				
Bosnia and Herzegovina				
Georgia				
Norway				
Serbia				
Switzerland				
Turkey				
Ukraine				

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

The situation at the level of RPOs and RFOs is again similar to the previous questions on data policies. The very low data availability is mainly due to the fact that data is not collected.

Figure 4.3:Organisations with a policy on open data

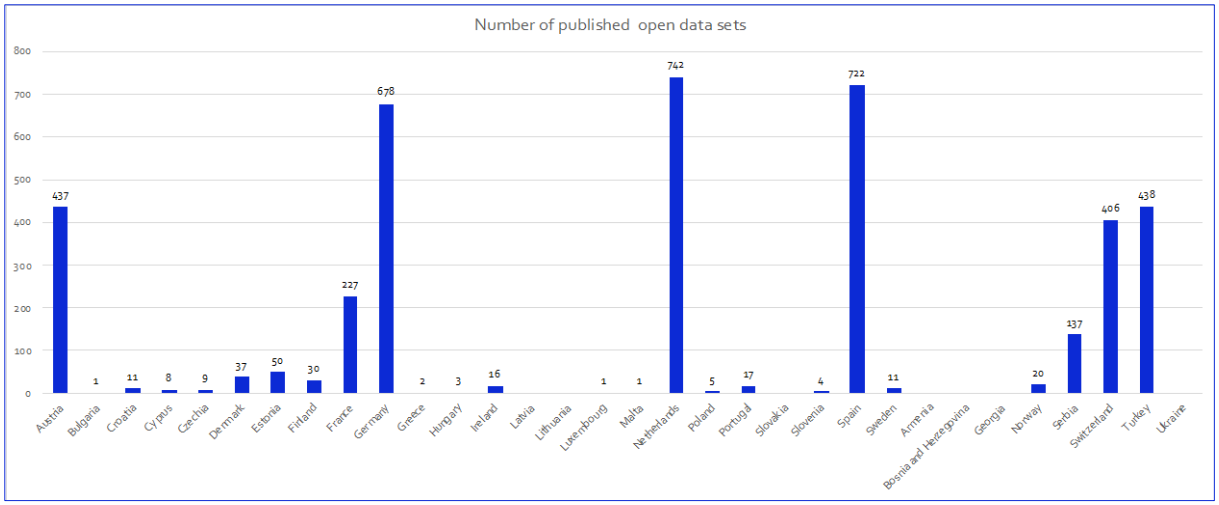


Data: Survey on National Contributions to EOSC 2022

The survey also asked "How much did a given country invest in open data in 2021". Only ten countries included information. Six out of the ten indicated zero. The four which indicated a figure were Luxembourg, Cyprus, Ireland, and Georgia and investments ranged from €200,000 in Luxembourg to €600,000 in Georgia. Several respondents explained that this information is not available or cannot be extracted from total research.

Finally, the number of open data sets published in 2021 was asked. The data has been extracted from the Open Science Observatory from OpenAIRE [9]. There is a variety in terms of open data sets. A number of countries do not have data sets deposited at all. The range for those with open data sets published varies between one in Bulgaria to 742 in the Netherlands. One should bear in mind that the number of open data sets indexed in OpenAIRE is not yet fully representative of the total available open data sets and that this quantitative metric does not say anything about the size or quality or reuse of the data.

Figure 4.4: Open data sets



Data: OpenAIRE Open Science Observatory

Several respondents provided a range of use cases on open data. A selection is provided below in Box D.

Box D: Use cases on open data

Czech Republic

A national Open Data portal (https://data.gov.cz/english) provides services on the Czech Open Data (https://opendata.gov.cz). The portal is a National Catalogue of Open Data in the Czech Republic. However, this portal is specialised in public administration data according to an eGovernment plan.

https://data.gov.cz/english/

Norway

The Norwegian Mapping Authority has released its central national datasets as open data. Data sets from the Norwegian Mapping Authority are available as downloads from geonorge.no which also offers an English menu to search and access the data sets. Among the open datasets are topographical land data (N50, N100, N250, N500, N1000, N2000, and N5000), property data, administrative/ property boundaries, road networks including addresses, national elevation models, place name data, historical maps, marine geospatial data, hiking trails and official addresses.

https://www.kartverket.no/en/api-and-data;https://data.norge.no

The Netherlands

TU Delft researcher Dr Anneke Zuiderwijk-van Eijk has launched the Open Data Lab, with the mission to raise visibility of the open data research happening at the TU Delft Engineering Systems and Services (ESS) department to the outside world.

https://www.tudelft.nl/tbm/open-data-research-lab

5 Software

The survey asked "Does your country have a national policy on open-source software?" Such a policy only exists in six EU MS (Bulgaria, Cyprus, France, the Netherlands, Slovakia, Spain), whereby information on the policy is available on the web for all six. The Netherlands clarified that "*there is no national policy but there is a national ambition*". Spain noted that "*the National Strategy for Open Science includes open software as a research output and as a requirement for Open Science digital infrastructures*."

Finland indicated that a relevant policy will be published in 2023 and Estonia also reported that a policy is being planned. In the Dutch case, a "Practical Guide to Software Management Plans" was developed in 2022 by NOW and the eScience Centre.

None of the countries have made the policy mandatory or have a financial strategy on open-source software.

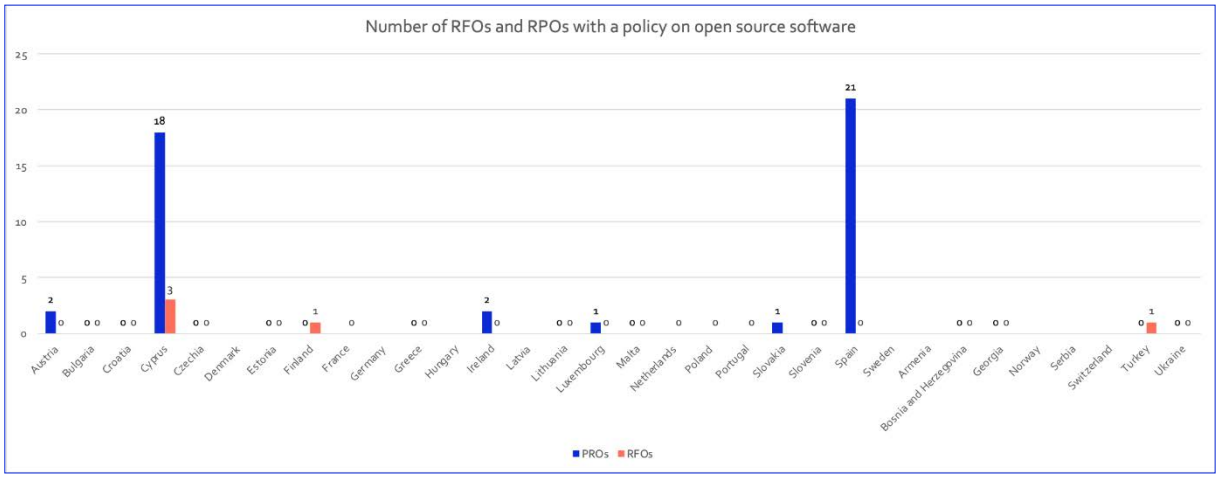
Table 5-1: Status of policy on open-source software

	Does your country have a national policy on open source software?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on open source software?
Austria				
Bulgaria				
Croatia				
Cyprus				
Czechia				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Armenia				
Bosnia and Herzegovina				
Georgia				
Norway				
Serbia				
Switzerland				
Turkey				
Ukraine				

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

Given that in most countries data is not collected, the information on RPOs and RFOs (Figure 5.1) is similarly as patchy as the previous ones on data policies. Considering the number of open-source software sets, it is interesting to note that in Germany, without a dedicated policy or funding, the highest number of published open-source software can be located.

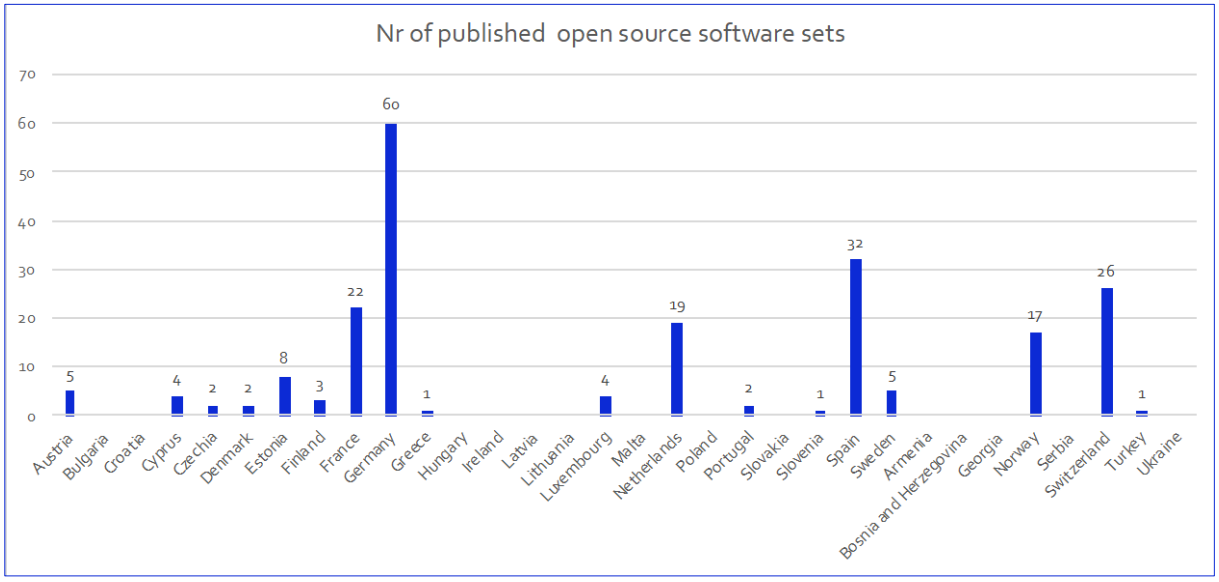
Figure 5.1: Organisations with a policy on open-source software



Data: Survey on National Contributions to EOSC 2022

Among the data collected through the Open Science Observatory from OpenAIRE is the number of open-source software sets. The following Figure 5.2 provides an overview of the situation in 2021. Several countries, including nine EU MS and five non-EU countries, had no open-source software sets indexed in OpenAIRE. The range of the numbers of published open-source software was between one (in Greece and Slovenia) to 60 in Germany. One should bear in mind that the number of open-source software sets indexed in OpenAIRE is not yet fully representative of the total available open-source software sets and that this quantitative metric does not say anything about the quality or reuse of the code.

Figure 5.2: Open source software sets



Data: OpenAIRE Open Science Observatory

Some use cases on open-source software were provided by respondents. A selection is included in Box E.

Box E: Use cases on open-source software

The Netherlands

The Netherlands *eScience Centre* annually supports a wide variety of RPOs in developing and applying open research software, to be used in scientific and scholarly research projects. The Netherlands eScience Centre also offers open-source programming workshops to over 500 researchers in the Dutch academic system each year. Their software portfolio is available online as well as their project portfolio

https://research-software-directory.org/organisations/netherlands-escience-center

https://research-software-directory.org/organisations/netherlands-escience-center?page=projects

4TU.ResearchData has recently migrated away from the proprietary software to run its research data and software repository to an in-house developed open-source software. TU Delft developed a policy on research software, focusing primarily on open-source software. In short, if a researcher wishes to make their software open source, then TU Delft automatically transfers copyright to researchers. In other words, the policy makes it easy to publish research software open source.

https://community.data.4tu.nl/2023/01/30/we-are-going-free-and-open-source

https://data.4tu.nl

https://doi.org/10.5281/zenodo.4629662;https://research-software-directory.org

https://www.nwo.nl/en/researchprogrammes/open-science/open-science-fund

Spain

SQAaaS (https://sqaaas.eosc-synergy.eu) is a Software Quality Assurance platform for open-source software that has been developed to freely evaluate scientific software and issue quality badges that assure that the software is compliant to a quality baseline.

https://sqaaas.eosc-synergy.eu

6 Services

A range of questions centred around services offered through EOSC. Data for the year 2021 indicates that there is much room for improvement: nine EU MS and six associated countries did not provide any services through EOSC. Among those that did, one can cluster three groups: one or two services (such as Croatia, Estonia, Slovenia), four to eight services (such as Poland, the Czech Republic), and finally more than 10 services (with ranges from 12 in Finland to 51 in the Netherlands).

Out of the 32 respondents, six countries indicated that they have a national policy on offering services through EOSC (Austria, France, Germany, Ireland, Slovenia, and Norway). While Sweden and Armenia did not respond to the question, all other countries indicated not having such a policy. Only in Slovenia and Norway is the policy mandatory. While all available policies are equally available on the web, a financial strategy on offering services through EOSC is only available in the Czech Republic and Germany.

Table 6-1: Status of policy on offering services through EOSC

	Does your country have a national policy on offering services through EOSC?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on offering services through EOSC?
Austria				
Bulgaria				
Croatia				
Cyprus				
Czechia				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Armenia				
Bosnia and Herzegovina				
Georgia				
Norway				
Serbia				
Switzerland				
Turkey				
Ukraine				

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

Several respondents provided use cases on services offered through EOSC. A selection is included in Box F.

Box F: Use cases on offering services through EOSC

Spain

12 centres in Spain offer (directly or via international centres) a total of 96 services in the EOSC marketplace.

https://search.marketplace.eosc-portal.eu

Finland

CSC - IT Center for Science and EUDAT have published services in the EOSC marketplace: ePouta Virtual Cloud, Pouta community Cloud, Rahti container; Chipster, B2SHARE as part of DICE project; B2SAFE

https://search.marketplace.eosc-portal.eu

France

French RPOs are the main providers of computing and data storage infrastructure for the federated EGI services. These services are also partly provided through the EOSC portal. French data centres provided 72 service endpoints and delivered 578 million CPU hours in total to EGI communities in 2021.

https://cdn.egi.eu/app/uploads/2023/04/2021_Impact-Report_FR.pdf

Switzerland

SELVEDAS: data and compute-as-a-service workflow demonstrator targeting supercomputing ecosystems.

https://www.dora.lib4ri.ch/psi/islandora/object/psi%3A37404

Germany

BASE4NFDI, one of the 27 NFDI consortia and also a joint endeavour of all NFDI consortia, is a framework for user-driven and quality-assured basic service development with the aim to establish an NFDI-wide basic service portfolio. BASE4NFDI builds on existing solutions and complements EOSC.

https://base4nfdi.de

7 Infrastructure

7.1 Connecting Repositories to EOSC

The next block of EOSC-related questions concerned the policies of connecting repositories to EOSC. As indicated in Table 7-1, five countries have a policy, 22 do not have a policy, and five countries did not answer this question. In three out of the five countries with a policy, the policy is not mandatory (Bulgaria, Cyprus, Finland). In all but Bulgaria, the policy is publicly available on the web. Three countries report having a financial strategy and two of them (the Czech Republic, Lithuania) were among the countries which did not respond to the initial policy question. The Czech Republic provided an explanation that the "*Czech National Strategy for Open Access to Scientific Information for 2017-2020 […] is not valid anymore in 2021"*, and that "*OA was not mandatory*". Other respondents pointed out that although there is no national policy, interoperability and onboarding have been provided by OpenAIRE through EU projects (Greece, Spain), or are required through other arrangements (Latvia), or there are plans to connect to EOSC in the future (Cyprus, Denmark, Ireland).

Table 7-1: Status of policy on connecting repositories to EOSC

	Does your country have a national policy on connecting repositories to EOSC?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on connecting repositories to EOSC?
Austria				
Bulgaria				
Croatia				
Cyprus				
Czechia				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Armenia				
Bosnia and Herzegovina				
Georgia				
Norway				
Serbia				
Switzerland				
Turkey				
Ukraine				

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

The survey also asked about the number of RPOs and RFOs with a policy to connect repositories to EOSC. For RPOs, 15 countries indicated zero, four indicated one to three RPOs (Greece, Latvia, Luxembourg, Georgia), and 13 did not answer. For RFOs, 22 countries indicated that there are no policies, while ten did not respond.

Several respondents provided use cases of repositories connected to EOSC. A selection can be found in Box G.

Box G:Use cases on connecting repositories to EOSC

Czech Republic

LINDAT/CLARIAH-CZ Repository is connected to EOSC.

https://lindat.mff.cuni.cz/integration

https://marketplace.eosc-portal.eu/datasources/eosc.lindatclariah-cz.6dc98fcb5294282acf3d92f3ab3376b2

Spain

Recolecta National Infrastructure on Open Access Scientific Repositories is connected to EOSC.

https://recolecta.fecyt.es/home?language=en

Poland

CLARIN Virtual Language Observatory (VLO) is connected to EOSC.

https://www.clarin.eu/eosc

Croatia

Croatia onboarded 6 repositories into the NI4OS Catalogue which will be onboarded into EOSC.

https://catalogue.ni4os.eu

7.2 Data Stewardship

A number of questions asked about data stewards (Table 7-2). The first question asked if the country has a national policy on data stewardship. Nine countries have such a policy, while the majority of 20 countries does not have such a policy. Three countries did not provide an answer. Out of the eight EU countries and Switzerland with a policy, only in Latvia is this policy mandatory. All countries have the policy publicly on the web. Beside Malta and Finland, the remaining six countries also have a financial strategy on data stewardship.

Some countries provided qualitative information. Poland and Georgia, for example, reported that a general strategy is in development. In Malta and Norway, data stewardship is included in the national policy, while in the Netherlands, it is part of the "National Programme for Open Science". Austria indicated that there is no national policy, but in order to build skills and competences, the University of Vienna has developed a formal part-time further education programme with a certified course "Data Steward". The first round started in 2022 with 25 persons from 10 countries.

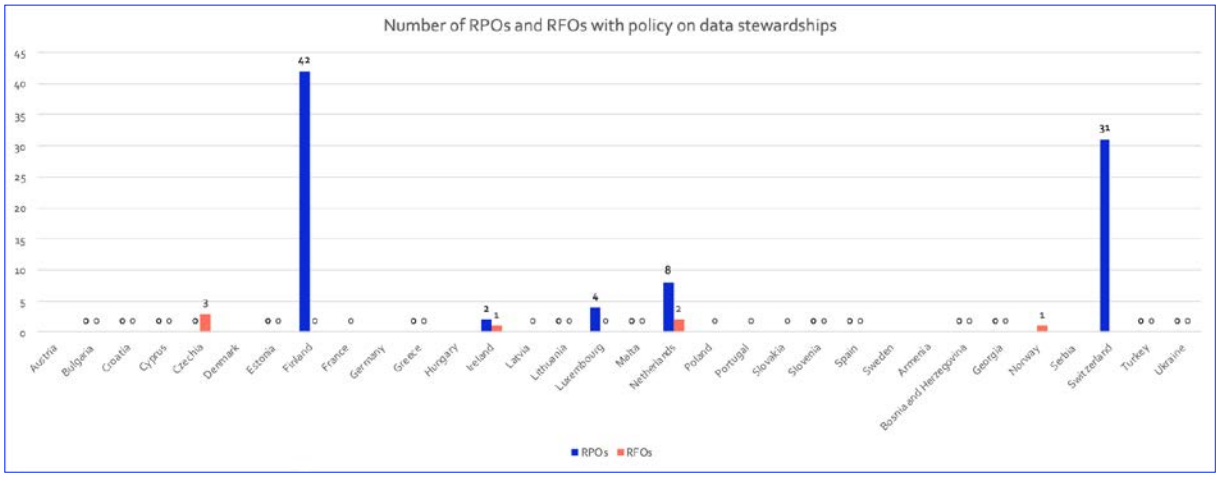
Table 7-2: Status of policy on data stewardship

	Does your country have a national policy on data stewardship?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on data stewardship?
Austria				
Bulgaria				
Croatia				
Cyprus				
Czechia				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Armenia				
Bosnia and Herzegovina				
Georgia				
Norway				
Serbia				
Switzerland				
Turkey				
Ukraine				

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

The survey further asked about the number of RPOs and RFOs with a policy on data stewardship. Given that there are only a few countries with a national policy, it is no surprise that at organisational level, the situation is similar. Four countries (Croatia, Ireland, the Netherlands, Norway) reported having one to three funding organisations with a data stewardship policy. When it comes to RPOs, several countries noted that there were no data stewards or data was not available. The exceptions providing numbers were Ireland (2), Luxembourg (4), the Netherlands (8), Switzerland (31), and Finland (42). The large number for Switzerland is due to the fact that 31 higher education organisations "*have institutional action plans on data stewardship*". The 42 Finnish organisations take into account guidelines on OA which equally include targets for data stewards.

Figure 7.1: Organisations with a policy on data stewardships



Data: Survey on National Contributions to EOSC 2022

The survey also asked about the number of data stewards in the country in 2021. Only three countries Croatia (10), Ireland (9), and the Czech Republic (5) were able to provide concrete numbers of data stewards.

Respondents provided only a few use cases on data stewards. Some indicated activities to support FAIRisation of data (France) or a "Research Data Training Portal" (Turkey), but information on the education and training as well as employment of data stewards is scarce[1].

One use case on data stewardship is presented in Box H.

Box H: Use cases on data stewardship

Austria

The recently initiated course on Data Steward by the University of Vienna provides recognised data stewards within the research environment.

https://www.postgraduatecenter.at/en/programs/communication-media/data-steward

7.3 Long-term Data Preservation

The following Table 7-3 summarises the situation on policies on long-term data preservation. Eight countries including six EU MS and two non-EU countries have a long-term data preservation policy, while 22 do not have such a policy. Two countries did not provide an answer. Except for Norway, this is not mandatory. In Bulgaria and Luxembourg, the policy is not available on the web.

Yet, perhaps in reality, there is more data preservation even without a dedicated policy. In the Netherlands, for example, "*the Netherlands Code of Conduct for Research Integrity 2018 recommends storing both the raw and processed versions for a period appropriate for the discipline and methodology at issue. Although there is no national policy there are national organisations who take the responsibility for long-term data preservation. DANS, 4TU-research data, SURF, Royal Library.*" Denmark further explains: "*the extent to which primary materials and data are retained and the recommended retaining period should always be determined by the current practices applicable to the specific field of research. However, data should in general be kept for a period of at least five years from the date of publication.*" Spain notes that "*there is no specific obligation to keep research data beyond the end of a project, although preservation of publications and their underlying data is required through uploading in open*

[1] While this data may not be collectable at national level, an alternative to obtain information could be through LinkedIn where professionals indicate their job titles. It shows that 'Research data stewards' or 'Research data manager (Data Stewards)' can be identified in a number of Dutch and Belgian (Flemish) universities but also in Hungary or Germany. A more systematic analysis may be useful.
Another 'proxy' could be developed through analysis of the Data steward training from FAIRsFAIR And EOSC Synergy (use of Youtube, certificates awarded).

repositories." The latter can also explain why Spain indicated that there is no policy but it is one of the three countries next to Finland and Norway which indicated that there is a financial strategy on long-term data preservation.

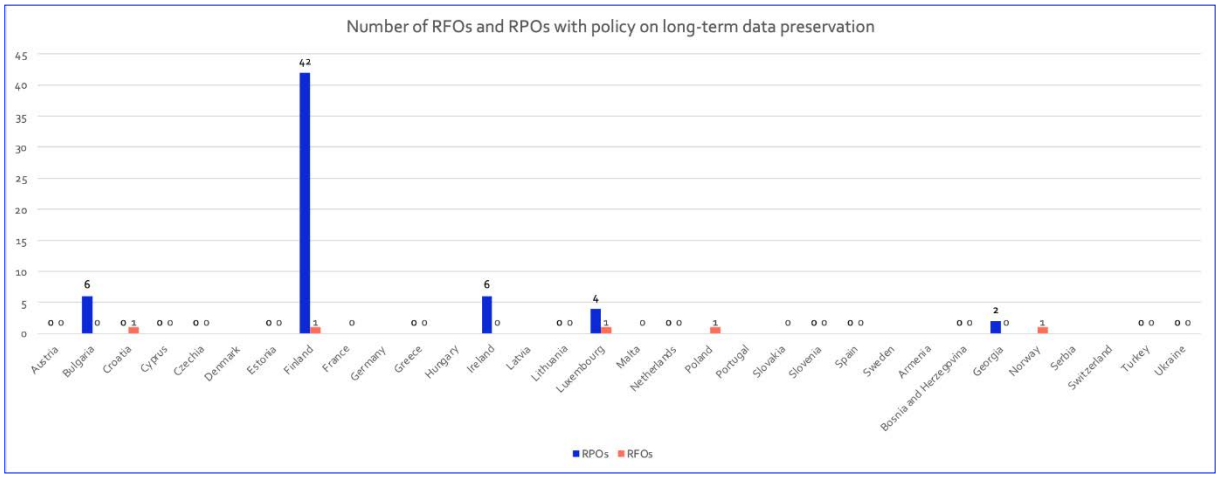
Table 7-3: Status of policy on long-term data preservation

	Does your country have a national policy on long-term data preservation?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on long-term data preservation?
Austria	Yes			Yes
Bulgaria	No	Yes	Yes	Yes
Croatia	Yes			Yes
Cyprus	Yes			Yes
Czechia	Yes			Yes
Denmark	No	Yes	No	Yes
Estonia	Yes			Yes
Finland	No	Yes	No	No
France	Yes			Yes
Germany	Yes			Yes
Greece	Yes			Yes
Hungary	Yes			Yes
Ireland	No	Yes	No	Yes
Latvia	Yes			Yes
Lithuania	Yes			Yes
Luxembourg	No	Yes	Yes	Yes
Malta	Yes			Yes
Netherlands	No	Yes	No	Yes
Poland	Yes			Yes
Portugal	Yes			Yes
Slovakia	Yes			Yes
Slovenia	Yes			Yes
Spain	Yes			No
Sweden				
Armenia				
Bosnia and Herzegovina	Yes			Yes
Georgia	Yes			Yes
Norway	No	No	No	No
Serbia	Yes			Yes
Switzerland	No	Yes	No	Yes
Turkey	Yes			Yes
Ukraine	Yes			Yes

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

This information can be complemented with survey questions on how many RPOs and RFOs have a policy on long-term data preservation (Figure 7.2). Several respondents indicated that the data is not collected nor collectable. The Finnish data may be misleading as the data provided refers to survey data and "*42 respondents […] take into account the policy component for open access to research data*" which is included in the relevant Finnish guideline. Yet, the explanation provided also mentions that "*appropriate data storage covering the whole research life cycle is included in the policy component*".

Figure 7.2: Organisations with a policy on long-term data preservation



Data: Survey on National Contributions to EOSC 2022

Several respondents provided examples of long-term data preservation. A selection in shown in Box I below.

Box I: Use cases on long-term data preservation

Austria, Croatia, Ireland

Several countries point to their national service for archiving of social sciences data and being part of the CESSDA infrastructure.

https://aussda.at

https://www.crossda.hr

http://www.issda.ie

Spain

DIGITAL.CSIC is the institutional CoreTrustSeal repository of the Spanish National Research Council.

https://digital.csic.es

France

CINES is a high-performance computing and archiving centre under the supervision of the Ministry of Higher Education and Research (MESR). It provides archiving services for research data.

https://www.cines.fr/en/preservation/how-to-archive-at-cines

The Netherlands

In the framework of the national Growth Fund (a novel socio-economic innovation funding programme), the Dutch government has recently decided to invest €69 million for the next 7 years in realising Health-RI, which is a fully FAIR-based national health(care) data infrastructure within the medical science domain connecting all relevant Dutch stakeholders in the healthcare, research, and innovation fields.

Greece

Hellenic Data Service HELIX is one of the core national infrastructures for research of the National Roadmap for Research Infrastructures.

https://hellenicdataservice.gr

Switzerland

Materials Cloud is built to enable the seamless sharing and dissemination of resources in computational materials science, offering educational, research, and archiving tools, simulation software and services, and curated and raw data.

https://www.materialscloud.org

Portugal

The Portuguese Open Access Repositories (RCAAP) portal aims to collect, aggregate, and index open access scientific contents from Portuguese institutional repositories.

https://www.rcaap.pt/about.jsp

Estonia

The Estonian research infrastructures roadmap on "Natural History Archives and Information Network" (NATARC) develops services related to hosting and computing of scientific repositories and data archives for the natural sciences.

https://natarc.ut.ee

Norway

The Norwegian Language Bank is a national infrastructure for language technology and big datasets, which provides available online resources and open-source licensing.

https://www.nb.no/sprakbanken/en/resource-catalogue

8 Skills/Training

The topic of skills/training for Open Science has been addressed in another series of questions. This started with the question if the country has a national policy on skills/training for Open Science. 12 countries mentioned "yes" while 17 indicated "no" and three did not provide an answer as shown in Table 8-1. In none of the 12 countries is the policy mandatory. In all but Bulgaria the policy is publicly available on the web. When it comes to a financial strategy on skills/training for Open Science, 26 countries indicated "no" and only four countries indicated "yes". The three EU MS indicating yes (Czech Republic, Lithuania, Poland) all indicated that they have no national policy. The only country with a policy and a financial strategy is Switzerland.

Several respondents provided additional explanations. In a number of cases, skills/training for Open Science are included in a national strategy (Spain, Malta) or in an existing Open Science policy (Latvia, Germany, the Netherlands).

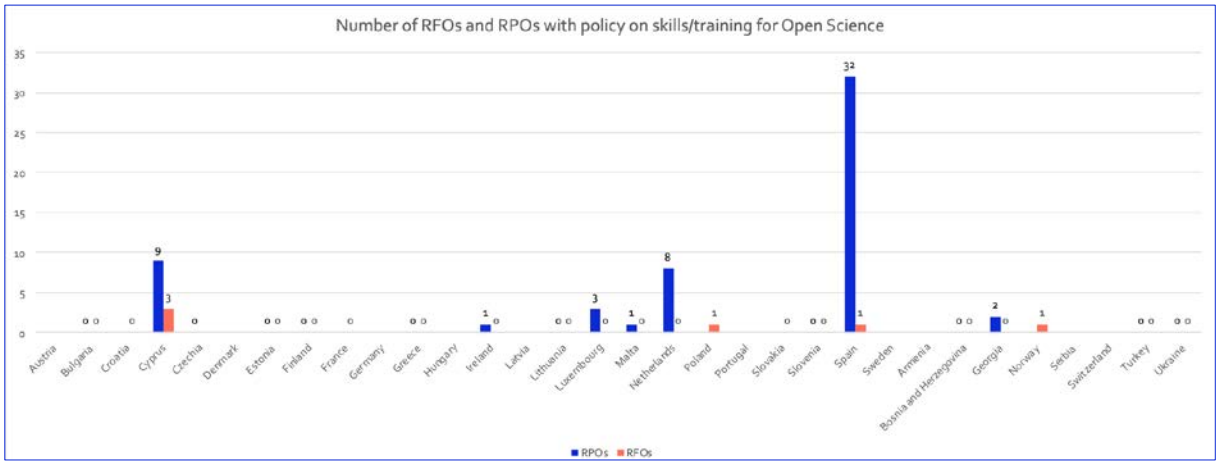
Table 8-1: Status of policy on skills/training for Open Science

	Does your country have a national policy on skills/training for Open Science?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on skills/training for Open Science?
Austria				
Bulgaria				
Croatia				
Cyprus				
Czechia				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Armenia				
Bosnia and Herzegovina				
Georgia				
Norway				
Serbia				
Switzerland				
Turkey				
Ukraine				

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

At organisational and funder level, policies on skills/training for Open Science are limited as shown in Figure 8.1. Seven countries indicate a number for their RPOs ranging from one in Ireland and Malta to 32 in Spain. Yet, most countries either indicate zero or provide no answer. Four countries indicate that one or more of their RFOs have a policy. Poland, Spain, and Norway all indicate one organisation. Cyprus, which mentioned three, explains that these are public universities.

Figure 8.1: Organisations with a policy on skills/training for Open Science



Data: Survey on National Contributions to EOSC 2022

A dedicated question was asked on how many educational curricula with an Open Science dimension were offered in the country in 2021. Only six countries were able to provide data. The results range from one in the Netherlands to 63 in Georgia. This is a question that deserves more clarification before the question is repeated in future surveys. Malta asked "*What constitutes a curriculum having an Open Science foundation? Open Science is generally non-EU with research practices rather than with curricula. We have no data for, and are not even clear about sources from where, to obtain and identify "Open Science dimensions" of curricula*".

Several respondents provided use cases on skills/training for Open Science. A selection is presented in Box J.

Box J: Use cases on skills/training for Open Science

The Netherlands

Open Science Knowledge Platform offers a series of webinars on Open Science.

https://open-science.cwts.nl

Sweden

National network of local Data Access Units (DAUs) at Swedish higher education institutions, public research institutes, and authorities. These DAUs assist researchers in research data management with the aim of making data as accessible as possible in accordance with the FAIR principles.

https://snd.gu.se/en/about-us/snd-network

Slovakia

Regular courses are offered to develop skills and competencies for Open Science, including open access publishing as well as infrastructure, data management, policy making, and advocacy for Open Science.

https://otvorenaveda.cvtisr.sk

Portugal

The University of Minho has developed an RDM Essential MOOC which targets early-career researchers at Portuguese higher education institutions and professionals offering support in Research Data Management.

https://www.openaire.eu/blogs/strengthening-research-data-management-practices-in-portugal

Germany

In the DALIA project, basic principles for the development and validation of a needs/user-oriented platform for teaching and learning materials has been developed with the goal of FAIR data usage and supply.

https://www.fst.tu-darmstadt.de/forschung_fst/zusammenarbeit_in_der_forschung/dalia/dalia_ueberblick.de.jsp

Czech Republic

DocEnhance Data Stewardship Course for doctoral candidates has been piloted at UCT Prague.

https://phd.vscht.cz/phd-students/educational-courses/docenhance-project-at-uct-prague/data-stewardship-course

Greece

RDM training programme for upskilling the academic librarian community in Greece has been developed.

https://www.skills4eosc.eu

9 Assessment

Incentives/rewards for Open Science were addressed in another range of questions as in Table 9-1. A total of 13 countries reported having policies on incentives/rewards for Open Science, 17 countries have no policies, and two countries did not respond. Only in two countries (Germany, Slovenia) is the policy mandatory. All countries but Lithuania have published information on the policy publicly on the web. This policy is accompanied by a financial strategy in six countries (Bulgaria, Finland, Germany, Ireland, Spain, Switzerland).

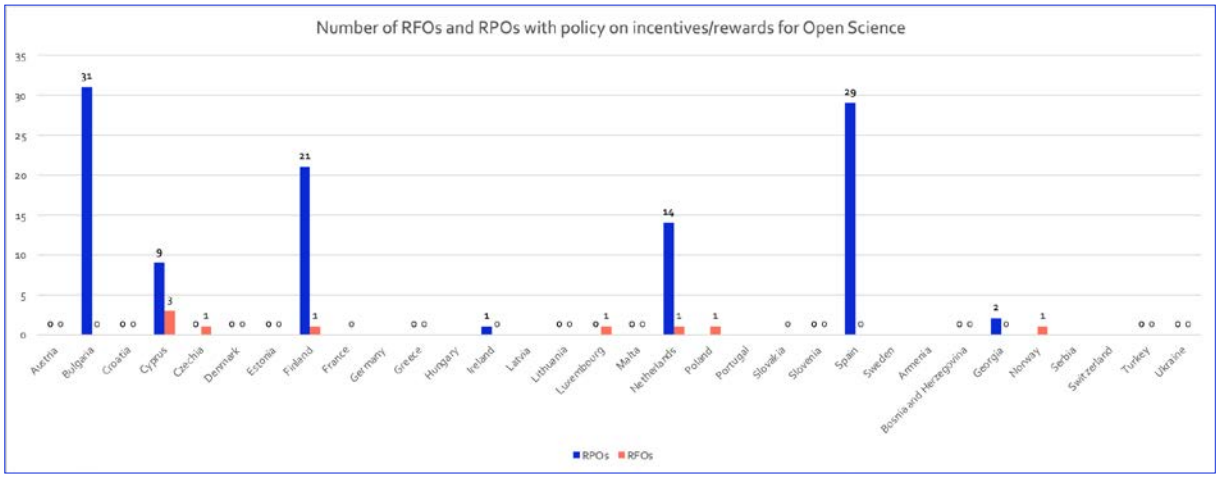
Table 9-1: Status of policy on incentives/rewards for Open Science

	Does your country have a national policy on incentives/rewards for Open Science?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on incentives/rewards for Open Science?
Austria	Yes	No	Yes	No
Bulgaria	Yes	No	Yes	Yes
Croatia	No	No answer	No answer	No
Cyprus	Yes	No	Yes	No
Czechia	No	No answer	No answer	No answer
Denmark	No	No answer	No answer	No
Estonia	No	No answer	No answer	No
Finland	Yes	No	Yes	Yes
France	Yes	No	Yes	No
Germany	Yes	Yes	Yes	Yes
Greece	No	No answer	No answer	No
Hungary	No	No answer	No answer	No
Ireland	Yes	No	Yes	Yes
Latvia	No	No answer	No answer	No
Lithuania	Yes	No	No	No
Luxembourg	No	No answer	No answer	No
Malta	Yes	No	Yes	No
Netherlands	Yes	No	Yes	No
Poland	No	No answer	No answer	No
Portugal	No	No answer	No answer	No
Slovakia	No	No answer	No answer	No
Slovenia	Yes	Yes	Yes	No
Spain	Yes	No	No answer	Yes
Sweden	No answer	No answer	No answer	No answer
Armenia	No answer	No answer	No answer	No answer
Bosnia and Herzegovina	No	No answer	No answer	No
Georgia	No	No answer	No answer	No
Norway	No	No answer	No answer	No
Serbia	No	No answer	No answer	No
Switzerland	Yes	No	Yes	Yes
Turkey	No	No answer	No answer	No
Ukraine	No	No answer	No answer	No

Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

In several countries, there are RPOs and RFOs with such a policy (Figure 9.1). Bulgaria and Spain each indicate about 30 RPOs with policies, followed by the Netherlands and Finland. A small number of RFOs in Cyprus, the Czech Republic, Luxembourg, the Netherlands, Poland, and Norway have policies. Several respondents indicated that the data has not been collected or is hard to estimate, which explains some of the data gaps.

Figure 9.1: Organisations with a policy on incentives/rewards for Open Science



Data: Survey on National Contributions to EOSC 2022

Several respondents provided examples of use cases on incentives/rewards for Open Science as in Box K.

Box K: Use cases on incentives/rewards for Open Science

The Netherlands

With its Open Science Funds, NWO launched a dedicated funding programme to give a boost to the recognition and rewards of Open Science in line with the national programme on Recognition and Rewards. Researchers who are frontrunners in Open Science can apply for projects of up to €50,000 on Open Science.

https://www.nwo.nl/en/researchprogrammes/open-science/open-science-fund

Norway

NOR-CAM is a Toolbox for Recognition and Rewards in Academic Careers in Norway.

https://www.uhr.no/en/front-page-carousel/nor-cam-a-toolbox-for-recognition-and-rewards-in-academic-careers.5780.aspx

France

CNRS has implemented a change in research assessment since 2019. The main objective is to reconsider the individual evaluation of researchers by using an approach that is compatible with the objectives of Open Science and by taking into account the contributions of a researcher to Open Science in their evaluation.

https://www.science-ouverte.cnrs.fr/wp-content/uploads/2019/11/CNRS_Roadmap_Open_Science_18nov2019.pdf

10 Engagement

The survey lastly asked about engagement policies related to citizen science as shown in Table 10-1. Overall, ten countries have citizen science policies versus 21 which have none. One country did not provide an answer. The policy is mandatory only in two countries (Slovenia, Switzerland). All countries have made the policy publicly available on the web. Only three countries (Germany, Lithuania, Spain) also have a financial strategy. All three countries indicate dedicated public funding programmes/calls for citizen science projects.

Table 10-1: Status of policy on citizen science

	Does your country have a national policy on citizen science?	Is this policy mandatory?	Is information on this policy available publicly on the web?	Does your country have a financial strategy on citizen science?
Austria	Yes	No	Yes	No
Bulgaria	No	No answer	No answer	No
Croatia	No	No answer	No answer	No
Cyprus	Yes	No	Yes	No
Czechia	No	No answer	No answer	No answer
Denmark	No	No answer	No answer	No
Estonia	No	No answer	No answer	No
Finland	Yes	No	Yes	No
France	No	No answer	No answer	No
Germany	Yes	No	Yes	Yes
Greece	No	No answer	No answer	No
Hungary	No	No answer	No answer	No
Ireland	No	No answer	No answer	No
Latvia	Yes	No	Yes	No
Lithuania	No	No answer	No answer	Yes
Luxembourg	No	No answer	No answer	No
Malta	No	No answer	No answer	No
Netherlands	Yes	No	Yes	No
Poland	No	No answer	No answer	No
Portugal	No	No answer	No answer	No
Slovakia	Yes	No	Yes	No
Slovenia	Yes	Yes	Yes	No
Spain	Yes	No	Yes	Yes
Sweden	No	No answer	No answer	No
Armenia	No answer	No answer	No answer	No answer
Bosnia and Herzegovina	No	No answer	No answer	No
Georgia	No	No answer	No answer	No
Norway	Yes	Yes	Yes	No
Serbia	No	No answer	No answer	No
Switzerland	No	No answer	No answer	No
Turkey	No	No answer	No answer	No
Ukraine	No	No answer	No answer	No

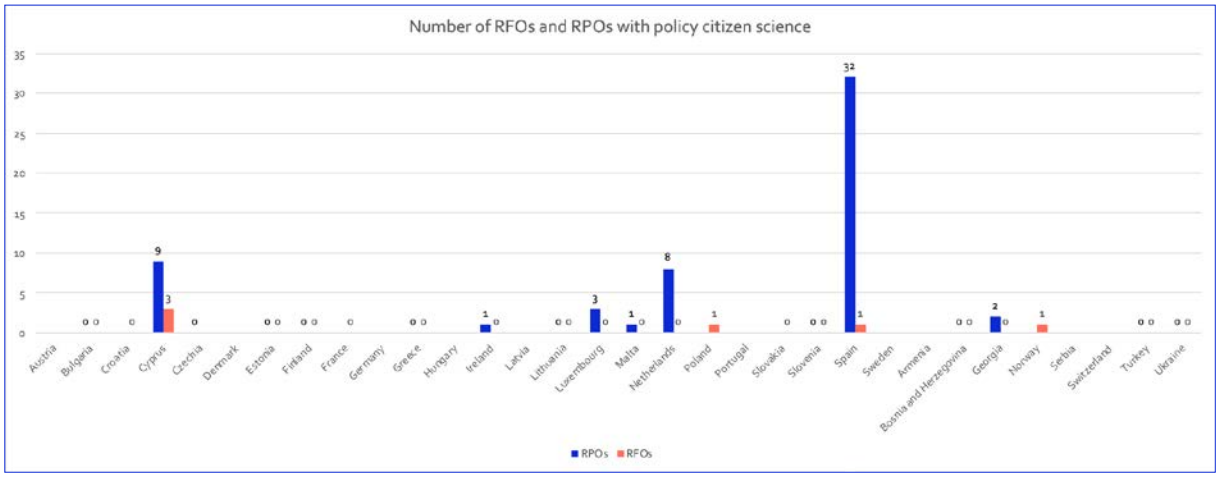
Data: Survey on National Contributions to EOSC 2022. Colouring scheme: Yes | No | No answer

At the organisational level of RPOs and RFOs, one can find the majority of RPOs with a citizen science policy in Spain (32), followed by Cyprus (9), and the Netherlands (8). There are only a few RFOs in Cyprus (3), Poland (1), Spain (1), and Norway (1) with policies. However, the explanations by respondents suggest that in some countries, there are quite a number of citizen science policies, but they are difficult to collect systematically.

Spain seems to have a rather long and fruitful history of funding citizen sciences. Already since 2013, the Spanish Ministry of Science and Innovation has supported citizen science in Spain via the FECYT Call for Proposals. Since 2018, MICINN-FECYT includes a specific funding call for citizen science projects.

Beside the three countries that mentioned specific calls, the Netherlands also supports citizen sience in projects: "*At the Dutch Research Council NWO activities in the area of Citizen Science can be included in grant budgets. See: https://www.nwo.nl/en/citizen-science. ZonMw has a dedicate program on Citizen Science: https://www.zonmw.nl/nl/over-zonmw/impact-versterken/vernieuwing-in-de-onderzoekspraktijk/citizen-science.*"

Figure 10.1: Organisations with a policy on citizen science



Data: Survey on National Contributions to EOSC 2022

Several respondents provided examples of use cases on citizen science with a selection shown in Box L.

Box L: Use cases on citizen science

Germany

In the FLOW project, the ecological condition of watercourses is being monitored and samples of insects and invertebrates are being taken from streams and analysed. Citizens learn to evaluate and document the ecological condition of streams and small rivers in a standardised way. Via training courses and water investigations throughout Germany, a comprehensive database on the condition of streams is being created.

https://www.flow-projekt.de

Portugal

Ciência Cidadã - The Portuguese Citizen Science Network is an informal nationwide network that seeks to bring together the communities involved in citizen science initiatives and projects in Portugal and to promote the involvement of different social agents (academic and scientific community, business sector, third sector, civil society) in the collaborative construction of knowledge.

https://www.cienciacidada.pt

Switzerland

Schweiz Forscht Citizen Science Network publishes projects and use cases on citizen science in Switzerland.

https://www.schweizforscht.ch

Denmark

SDU Citizen Science Knowledge Centre at the University of Southern Denmark supports citizen science in Denmark.

https://www.sdu.dk/en/forskning/forskningsformidling/citizenscience/om-videncentret

Czech Republic

Database of Citizen Science Projects provides information omn citizen science in the Czech Republic.

https://www.citizenscience.cz

Spain

Citizen Science Observatory of FECYT provides information on and supports citizen science in Spain.

https://eu-citizen.science/platform/10

Sweden

National web portal on citizen science provides information about citizen science, how to start a citizen science project, and links to a directory of citizen science projects to support citizen science in Sweden.

https://medborgarforskning.se/eng

11 Conclusions

The extensive array of survey questions covering policies and practices on EOSC and Open Science provide a comprehensive overview of the implementation and uptake of EOSC and Open Science across Europe. When looking at the response patterns, providing information at the national level seems to be more straightforward than at the organisational level. The identification of research-performing and research-funding organisations in a country and the subsequent gathering of relevant information from those organisations is complicated. The way of gathering that information from the organisations has also shown to be different across countries.

Some large countries show strong political commitment and substantial financial support to EOSC and Open Science, although this is typically focused on specific categories relevant for EOSC and Open Science. There is also a large group of medium-sized and small countries which are equally active but have comparatively limited financial resources and whose progress is slower and achievements are less prominent. The survey has further shown that there is a wide range of good practice examples at national and organisational levels. Mutual learning and support may be the best approach to foster learning and improvement across countries.

The pilot Survey on National Contributions to EOSC 2021 tested a range of questions to gauge the implementation and uptake of EOSC and Open Science across countries in Europe. The feedback on the pilot survey from the respondents resulted in the creation of a monitoring framework and the improvement of the questions in the Survey on National Contributions to EOSC 2022. This report shows that some survey questions still needed to be clarified and refined for the new Survey on National Contributions to EOSC 2023. It is likely that the survey will need a few more iterations before the questions may be considered fully stable.

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[4] Webpage of the EOSC Observatory on EOSC Readiness hosted on the EOSC Portal website by the EOSC Future project. Link: https://eoscobservatory.eosc-portal.eu/eoscreadiness/2022. Accessed 06 February 2024.

[5] O'Neill, Gareth and Stefania Martziou (2022) *Data of Survey on National Contributions to EOSC 2022*. Data set of the EOSC Future project. Link: https://zenodo.org/records/10155993. Accessed 06 February 2024.

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