REPORT

An Analysis of Open Science Policies in Europe, v5

February 2020

SPARC Europe

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1. Introduction

This Open Science policy update is the fifth in a series prepared in partnership between SPARC Europe and the Digital Curation Centre (DCC) and reflects changes in the European policy landscape since our last update was released in August 2019.[1]

This document presents an updated review of national Open Data and Open Science policies in Europe as of January 2020. As with previous updates, this report does not cover Open Access to publications policies but rather focuses on research data. It is important to note here that we considered national policies and also national laws, research plans and roadmaps, concordats and codes of research practice as part of this review. We concentrated on the twenty-eight EU member states, but we also considered relevant countries from the European Research Area, namely Iceland, Norway, Serbia and Switzerland. In this update we focus specifically on presenting and analysing national policies. National Funder Policies are listed separately in Table 3.

Based on work for the FAIRSFAIR Project, we have introduced a new section in this report that presents a deeper analysis of the national policy documents.[2] This section analyses the policies against ten policy elements including: policy scope, data definition, mandates, exceptions, mentions of FAIR, DMPs, data citation, data availability statements, re-use, IP and licensing, and costs.[3] This does not analyse funder policies, which are increasingly under development as published in the recent policy report for FAIRSFAIR, however, this might be considered in future versions depending on feedback. [4] The data collected for the deeper analysis is openly accessible from Zenodo.[5]

Continuing our approach of working collaboratively with the European research community to prepare these updates, we are particularly grateful to the OpenAIRE National Open Access Desks (NOADs) for their help in identifying relevant documents and initiatives and in particular for extremely helpful comments and pointers to documents which are not currently available in English or are works in progress and have not yet been publicised. This data has passed by the OpenAIRE NOADS for verification.

Our analysis shows that while no new policies have been reported to have been produced in the last 6 months, there has been a great deal of policy development amongst governments, publishers and funders alike as has been reported in the recent FAIR Policy Landscape Analysis released by FAIRSFAIR. In addition, there has been good progress across Europe to define policies and there are several areas where national policies provide good coverage of key Open Science elements including providing a definition for data, recommending data sharing, encouraging the production of data management plans and addressing Intellectual Property (IP). Areas that are less well covered include expectations around data citation, providing data availability statements and mention of costs associated with RDM and making data FAIR.

[1] SPARC Europe, & Digital Curation Centre. (2019, August 28). *An Analysis of Open Science Policies in Europe v4*. Zenodo. http://doi.org/10.5281/zenodo.3379705
[2] FAIRSFAIR Project: www.fairsfair.eu
[3] This update employs a subset of the policy characterisation elements developed in the FAIRsFAIR project. http://doi.org/10.5281/zenodo.3550544
[4] D3.1 FAIR Policy Landscape Analysis http://doi.org/10.5281/zenodo.3558173
[5] *Open Science Policies in Europe v5,* 2020 Dataset http://doi.org/10.5281/zenodo.3689437

Summary of changes from version 4:

Addition of a new national policy analysis section as well as updating the following country profiles:

- Belgian entry updated
- Cypriot entry updated
- Finnish entry updated
- French entry updated
- Netherlands entry updated
- Slovenian entry updated
- Icelandic entry updated
- Norwegian entry updated
- Swiss entry updated

The information held within this report is accurate to the best of DCC's knowledge as of January 2020. We will continue to investigate the open data policy landscape across Europe, updating this document periodically. It is a living document. If you are aware of existing policies or relevant national initiatives, or have corrections to share, please get in touch: info@dcc.ac.uk

2. Executive summary

As of February 2020, we count 14 national policies, of which 11 are those of EU member states (Cyprus, Czech Republic, Spain, Finland, France, Netherlands, Ireland, Slovenia and Slovakia). In the European Research Area, four non-EU members have national policies (Switzerland, Norway, Serbia and the UK).

To summarise changes since the previous update released in August 2019, no new national policies have been added but there is a great deal of ongoing activity to progress the implementation of existing policies in almost all EU countries and beyond, which are presented in a Table 3.

The results of our detailed analysis of national policy elements has revealed:

- About two thirds of national policies provide a definition for data
- Data sharing is mostly recommended rather than mandated
- Exceptions to data sharing are allowed in most policies yet few currently require formal justifications
- Under half of the policies refer to the FAIR principles explicitly while most do implicitly
- DMPs are required or recommended by most policies
- Expectations around data citation are not yet common in policies
- None of the policies require data availability statements
- IP is covered in the majority of policies
- Specific license types are included in about a third of policies

Aside from strengthening current national policies partly based on our findings, the European policy landscape will be influenced by two key drivers over the next two years – the implementation of the Directive on Open Data and the Re-use of Public Sector Information (PSI Directive)[6] and the introduction of Horizon Europe[7]. Global efforts to improve research integrity will also be a key factor influencing policy development in the years ahead.

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1561563110433&uri=CELEX:32019L1024
[7] https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en

3. National OS policies examined

This section analyses a range of national Open Science policies as against ten criteria: policy scope, data definition, mandates, exceptions, mentions of FAIR, DMPs, data citation, data availability statements, re-use, IP and licensing, and costs. These policies are generally national collaborative policies, government plans, frameworks or strategies; we do not include research funder policies in this analysis. The aim is to highlight areas where further alignment would be advised across countries as well as good practices for policymakers. Note that in a time of great policy flux that this is a snapshot in time taken in January 2020.

3.1 Policy scope

The majority of national policies studied address both Open Access to publications and research data in one combined policy. These include policies of the Czech Republic, Cyprus, the Netherlands, Ireland, Finland and Serbia. The *Norwegian National Strategy on Access to and Sharing of Research Data,* however, is purely dedicated to research data as is the UK's *Concordat on Open Research Data*.[89]

Other policies have wider scopes, including the French *National Plan for Open Science* policy which, aside from OA to publications and research data, addresses the development and preservation of software and commitments for the Open Government Partnership (OGP).[10] The Slovak Republic also aligns its policy to the OGP. This is, therefore, more unique in scope since it is an OGP action plan.[11] For example, it addresses Open Education and Open Science, Government Open to Dialogue, Open Information (Open Government data), and Open Justice.

The *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020* addresses another type of scope since it primarily addresses research infrastructure as a whole, with data management one of its foci amongst others including ID management, e-publishing, e-learning, cloud computing and others.[12] Infrastructure is also addressed by the Irish Framework.[13]

[8] Norway: *National Strategy on Access to and Sharing of Research Data,* https://www.regjeringen.no/contentassets/3a0ceeaa1c9b4611a1b86fc5616abde7/en-gb/pdfs/national-strategy-on-access_summary.pdf

[9] UK: *Concordat on Open Research Data,* https://www.ukri.org/files/legacy/documents/concordatonopenresearchdata-pdf/

[10] French *National Plan for Open Science*, 2018, https://www.ouvrirlascience.fr/national-plan-for-open-science-4th-july-2018/

[11] Slovak Republic: *The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019,* https://www.minv.sk/swift_data/source/rozvoj_obcianskej_spolocnosti/otvorene_vladnutie/akcne_plany/2017_2019/Slovakia-OGP-nap-2017-english.pdf

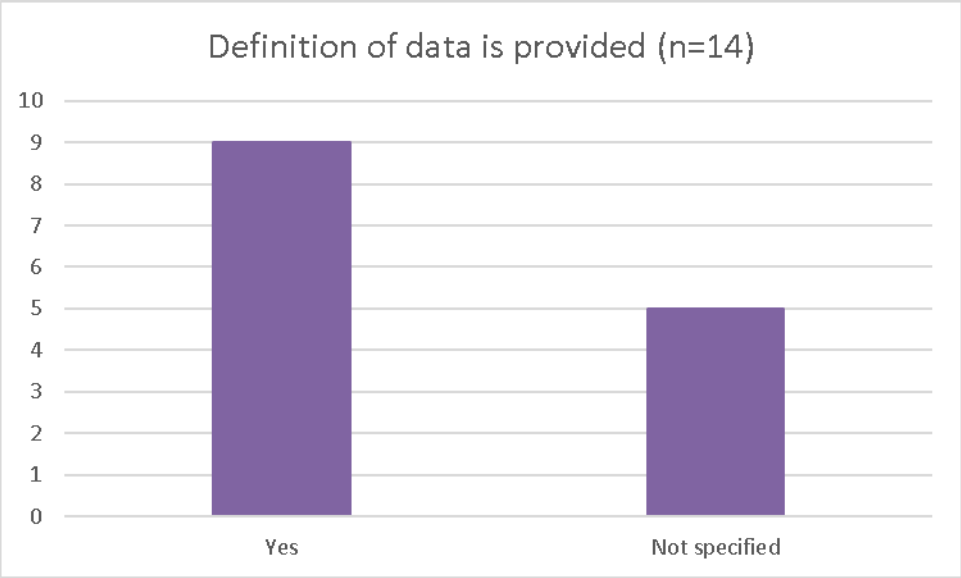
[12] Switzerland: *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020,* https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Organisation/SUK-P/SUK_P-2/WhitePaper_V1.1-EN.pdf

[13] Ireland: *National Framework on the Transition to an Open Research Environment, 2019,* http://norf-ireland.net/wp-content/uploads/2019/07/NORF_Framework_10_July_2019-2.pdf

3.2 Data definition

A clear data definition is critical for effective policy implementation. It is important for policymakers to define what sorts of outputs are covered by the term data and which of these they expect researchers should - or are recommended to - make available.

Figure 1. Number of policies that provide a definition of data.



The majority of the national policies studied for this report provide a definition for research data although they are not always well aligned, which brings complexity to the understanding that researchers have on what is required if moving to a new country.

Two national policies provide particular clarity to researchers on what is intended with respect to research data that should be shared. The French *National Plan for Open Science* provides a very clear yet concise definition:

> *"Research data: Factual records (figures, texts, images, sounds, videos, etc.) used as primary sources for research and which are generally accepted by the scientific community as being necessary to validate research results."* [14]

The National Policy of the Republic of Cyprus for Open Access to Scientific Information also provides a clear definition that provides slightly more detail:

> *"Science Data is the primary information, namely the data or numbers which were collected and are considered as a basis for reflection, discussion or calculation in order to carry out a scientific research. Examples of scientific data include statistical data, results of experiments, measurements, observations resulting from field research, survey results, recordings of interviews and images, with emphasis on data available at digital form."* [15]

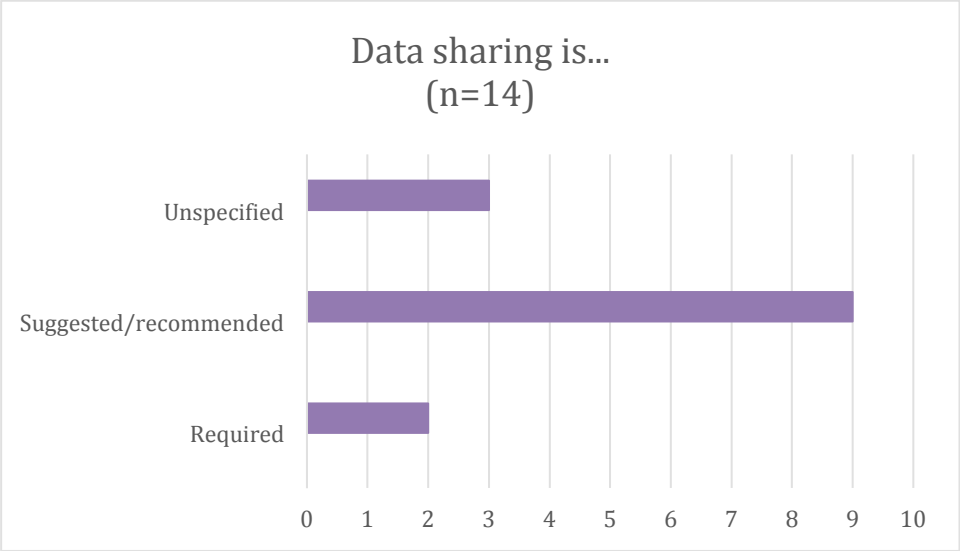
[14] France: *National Plan for Open Science,* 2018, p. 10
[15] Cyprus: *The National Policy of the Republic of Cyprus for Open Access to Scientific Information,* 2016, p. 4 http://opensciencecy.ucy.ac.cy/wp-content/uploads/2019/09/FINAL-EN-National-Policy-for-Open-Access-to-Scientific-Information.pdf

The Finnish Action Programme also specifies what is not included in the definition, i.e. physical resources, which can be very helpful for providing further clarity on what is *not* required. The Finnish Action Programme describes three research data types in more detail: cumulative, permanent and public data, which is helpful to show the range of data that should be considered at different stages of the research lifecycle.[16]

3.3 Mandates

The majority of national policies studied do not mandate or require open access to research data so far but rather suggest or recommend this practice.

Figure 2. Number of policy mandates related to data sharing.



Two examples of those who do require data sharing include the Norwegian *National Strategy on Access to and Sharing of Research Data* and the Slovenian *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020* with its pilot programme which allows opt-outs. The French *National Plan Open Science* does not yet require data sharing but has plans to introduce this mandate.[17] [18] [19] Most of the other policies recommend or suggest data sharing providing more ambitions, frameworks, strategies and principles for working with research data where requirements are less prescriptive.

[16] Finland: *Open Science and data - Action Programme for the Finnish Scholarly Community,* p. 6 http://www.doria.fi/bitstream/handle/10024/164174/UNIFI_Open_Science_and_Data_Action_Programme.pdf?sequence=1&isAllowed=y

[17] Norway: *National Strategy on Access to and Sharing of Research Data,* p. 6

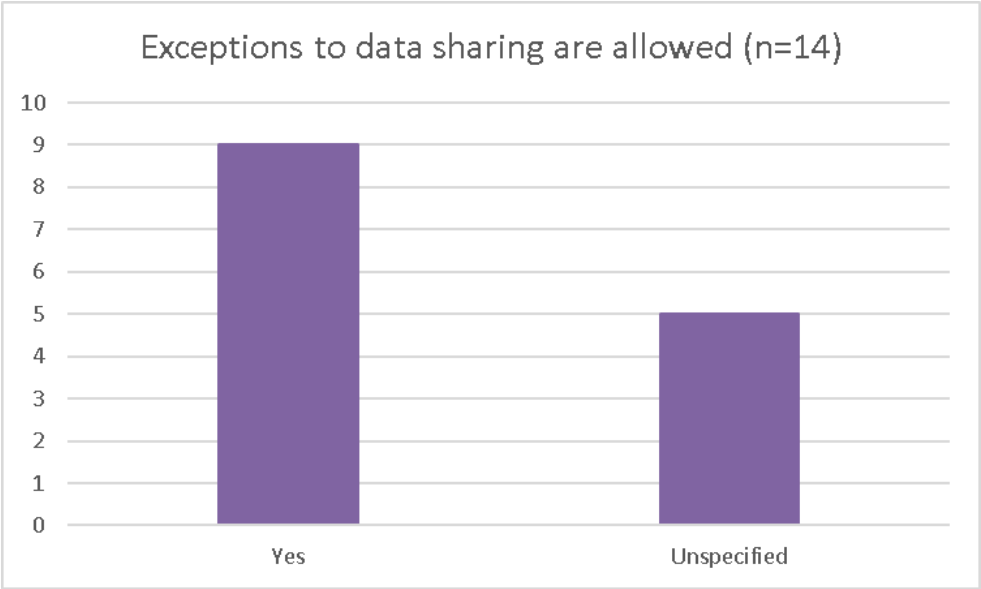
[18] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 20 https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/Strategije/National-strategy-of-open-access-to-scientific-publications-and-research-data-in-Slovenia-2015-2020.pdf

[19] France: *National Plan for Open Science,* 2018, p. 6

3.4 Exceptions

To make research data as open as possible but as closed as necessary, the majority of national policies allow exceptions to sharing data.

Figure 3. Number of policies that allow exceptions to data sharing.



Most policies allow legitimate exceptions to data sharing where data relates to national security, or where there are issues relating to confidentiality, privacy, intellectual property rights, and trade secrets. A few policies provide further information which provide greater clarity on what is expected, which others might consider when revising or developing new research data policy. For example, the Slovenian policy text on data sharing exceptions is succinct, and states that if data cannot be made available, its associated metadata should be made available making clear what data are available and where.

> *"If access to research data is limited because of the legitimate exemptions, then at least openly accessible metadata have to be prepared for the catalogue of a thematic data centre that specify where and under which conditions the research data is available."* [20]

Slovenia is currently running a pilot programme on Open Access to Scientific Publications and Research Data which clearly specifies which circumstances allow for opting-out. The policy draws directly from the Horizon 2020 European Commission Open Access policy to ensure alignment.[21]

> *"Exemptions from the default fully open access have to be exactly defined and founded, e.g. because of the national security, the protection of personal data and the intellectual property rights of private co-funders. Legal and ethical aspects for open access have to be verified. If access to research data is limited because of the legitimate exemptions, then at least openly*

[20] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 6
[21] *Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020,* European Commission, 2017

accessible metadata have to be prepared for the catalogue of a thematic data centre that specify where and under which conditions the research data is available."[22]

The UK's *Concordat on Open Research Data* includes an extensive section on exceptions to data sharing.[23] The Concordat makes exceptions its second principle:

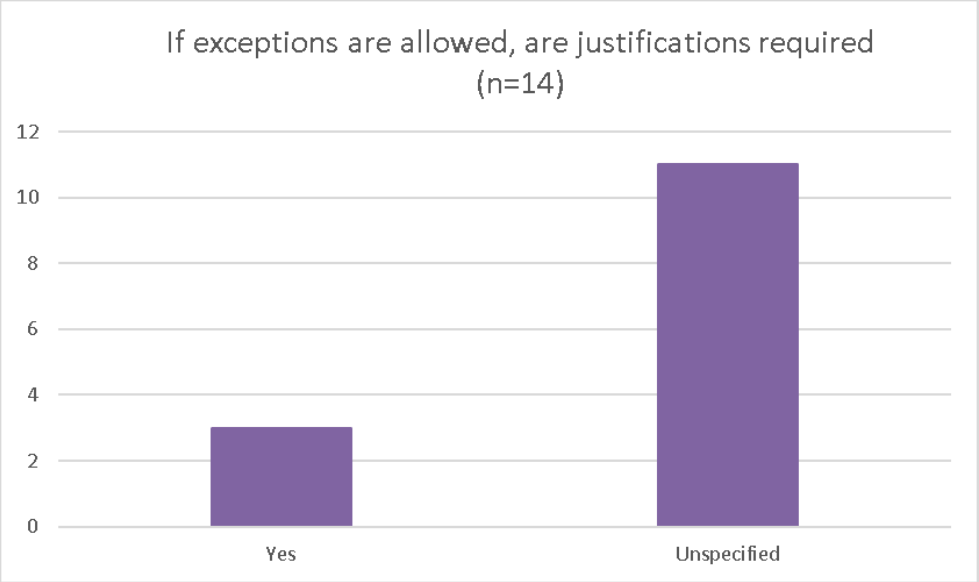
"There are sound reasons why the openness of research data may need to be restricted but any restrictions must be justified and justifiable."

The Concordat calls for governance arrangements to be put in place for personal data protection to safeguard privacy and confidentiality and makes clear that access to data should "be proportionate to the level of risk associated with the particular data holding".[24] When making data available, one is advised to regard "legal, regulatory and ethical requirements – including applicable data protection laws and relevant codes on research ethics and research integrity" an element that is rarely mentioned in other policies reviewed for this report. The Concordat also refers to the challenge of sharing open research data that might be in conflict with the interests of companies or third-party data providers who collaborate with research institutions and universities. It suggests developing protocols on whether, when, and how certain commercially sensitive data may be made openly accessible; ensuring that there is "an appropriate balance between openness and commercial incentives" so as to nurture innovation and collaborations between academia and industry while making as much of the resulting data as possible accessible for reuse. Furthermore, the Concordat states that a valid reason for restricting data access comes into play when the costs of preserving or supplying data are disproportionately large.

The Norwegian policy states that certain data – though closed for legitimate reasons at one point in time – may be made available at a later point in time. It also states that certain closed data may be available to certain users provided they meet clearly stated access criteria.[25] This approach demonstrates that closed access can be temporary and that controlled access options should be considered where open access is not feasible.

[22] *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020*, 2015, p 6
[23] UK: *Concordat on Open Research Data*, p. 9
[24] Ibid
[25] Norway: *National Strategy on Access to and Sharing of Research Data*, p. 6

Figure 4. Number of policies that require justifications for not sharing data.



Justifications for data not sharing data are required by just three of the policies studied. The UK *Concordat on Open Research Data,* the *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020* and by the *National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020*.[26] [27] [28]

The UK *Concordat on Open Research Data,* in its second principle, states that:

> *"constraints on openness must not be applied on a blanket basis but should be justified and justifiable case by case. Research organisations or individual researchers withholding data must therefore consider carefully the grounds on which they are acting and be prepared to justify their actions."*[29]

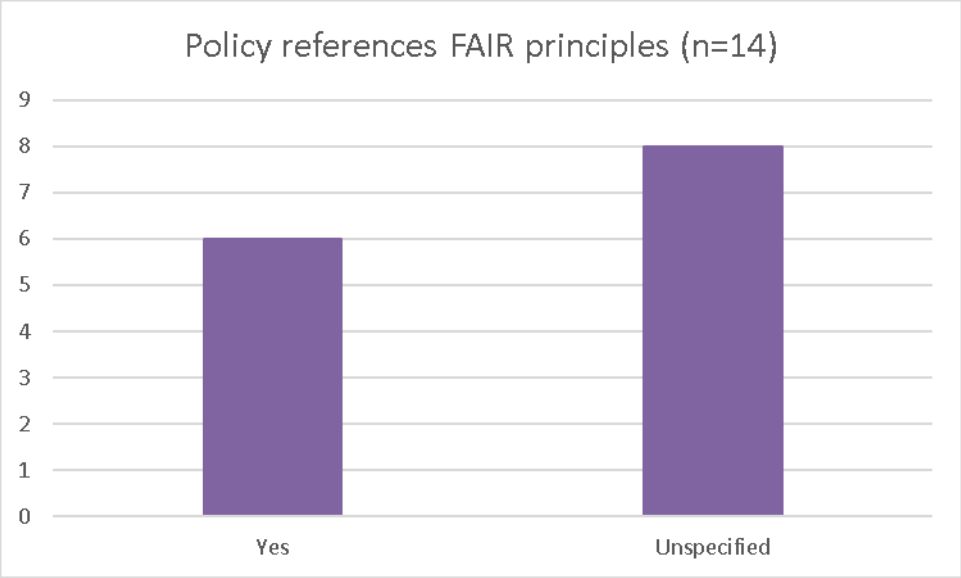
This approach helps deter those from easily opting-out of sharing research data without sound reasons. As noted, this is not yet standard practice but highly advisable to foster a culture where data-sharing becomes standard practice.

[26] UK: *Concordat on Open Research Data*, p. 9
[27] *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 6
[28] *National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020*
[29] UK: *Concordat on Open Research Data*, p. 10

3.5 Mentions of FAIR

Requiring FAIR data is increasingly gaining ground in Europe. Nevertheless, as at February 2020, only six of the identified national OS policies mention FAIR explicitly. These include the policies from the Netherlands, France, the UK, Finland, Spain and the recent Irish *National Framework on the Transition to an Open Research Environment.*[30]

Figure 5. Number of policies that reference FAIR.



Others meanwhile refer to elements of the FAIR principles without mentioning them explicitly. For example, the Slovakian policy inserts Open Science into an Open Government Partnership Action Plan (Slovak Republic).[31] In its definition, it specifies that data "must be accessible, easy to understand and work with them must be possible without constraints (technical and licensing)" which supports the majority of the FAIR principles without naming them explicitly. It is advisable that policies in future refer to FAIR specifically to better promote a culture of FAIR practice.

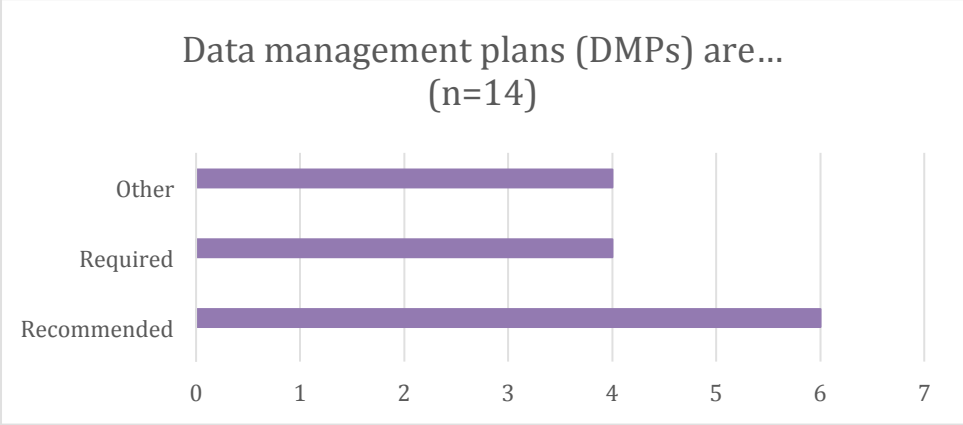
[30] Ireland: *National Framework on the Transition to an Open Research Environment, 2019,* http://norf-ireland.net/wp-content/uploads/2019/07/NORF_Framework_10_July_2019-2.pdf

[31] Slovak Republic: *The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019*, p. 7, footnote 7

3.6 DMPs

As at February 2020, four of the selected national policies require data management plans (DMPs). These include the French *National Plan for Open Science,* the *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* the Irish *National Framework on the Transition to an Open Research Environment and the Norwegian National Strategy on Access to and Sharing of Research Data.* [32] [33] [34] Most other national policies studied recommend rather than require DMPs. Requiring DMPs is good practice as developing outline plans at the outset of new research and updating them over the life of the project helps to ensure that risks can be mitigated, and challenges overcome.

Figure 6. Number of policy mandates for DMPs.



The timing of developing the DMP varies across policies. Of those with requirements or recommendations, two policies request DMPs be created at the pre-award stage (*The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019 and the UK Concordat on Open Research Data*). One policy request that DMPs are generated at the post-award stage (the Norwegian *National Strategy on Access to and Sharing of Research Data* policy). The *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 – 2020 does not specify when the DMP should be prepared.*[35] [36] No policies specifically call for the sharing of DMPs throughout the research process as some funders are.

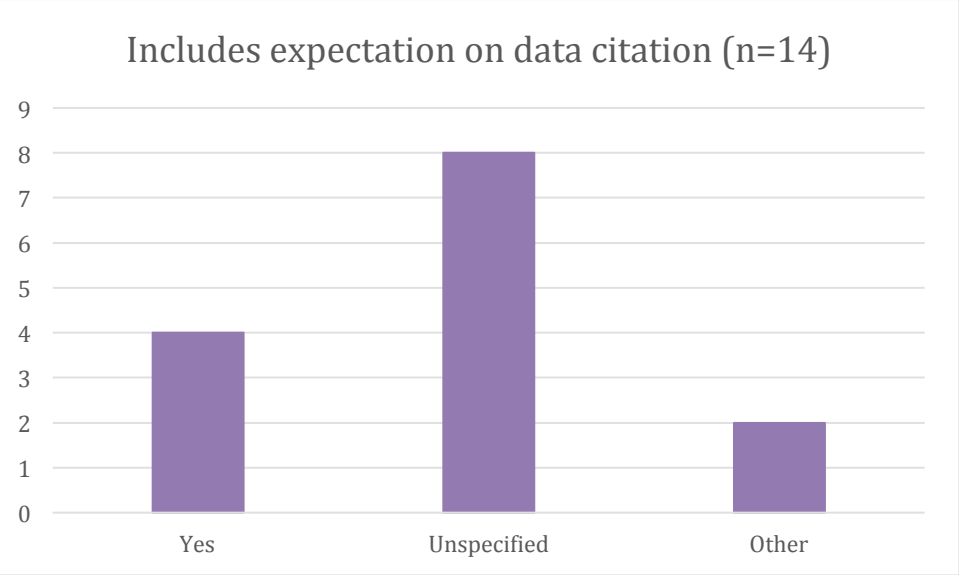
3.7 Data citation

Data is a valuable output of the research process. To progress the recognition of data and other research outputs including software as legitimate research outputs in their own right, it is vital that the formal acknowledgment of the creator(s) is encouraged by all stakeholders (national policies, funding bodies, publishers and research performing organisations), and then in a standardised way. Standards for data citation are necessary to ensure that citations can be easily aggregated as a more

[32] France: *National Plan for Open Science*, 2018, p. 6
[33] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 19
[34] Ireland: *National Framework on the Transition to an Open Research Environment*, 2019, p. 8
[35] Norway: *National Strategy on Access to and Sharing of Research Data*, p. 4
[36] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 – 2020*, 2015, p. 19

varied collection of research outputs are considered worthy of appraisal as part of the research evaluation process.

Figure 7. Number of policies that have expectations on data citation.



Four policies include an expectation on data citation including the UK's *Concordat on Open Research Data*, the *Norwegian National Strategy on Access to and Sharing of Research Data,* the Irish *National Framework on the Transition to an Open Research Environment* and the *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020*. [37] [38] [39] [40] Ireland's policy makes the case most succinctly:

> *"A robust citation mechanism for referencing data is necessary for research validation and to make data findable and accessible."* [41]

The UK's *Concordat on Open Research Data* underlines the importance of data citation and acknowledging data creators and requires data to be cited although it does not provide details on how this should be done. The *Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019* does include specific information on the importance of using persistent identifiers for researchers and outputs (specifically ORCID and DataCite[42]) which is essential for standardised citation practice.

The UK Concordat also makes the case for data citation in the research evaluation process, which is key for embedding data sharing data in the research process. The example below shows good practice that other policymakers may wish to emulate.

[37] UK: *Concordat on Open Research Data*, p. 5, 7, 12, 13, 16
[38] Norway: the *Norwegian National Strategy on Access to and Sharing of Research Data*, p. 7
[39] *National Framework on the Transition to an Open Research Environment*, 2019, p.
[40] *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020*, p.
[41] Ireland: *National Framework on the Transition to an Open Research Environment,* 2019, p. 7
[42] Slovak Republic: *The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019,* p. 16-17

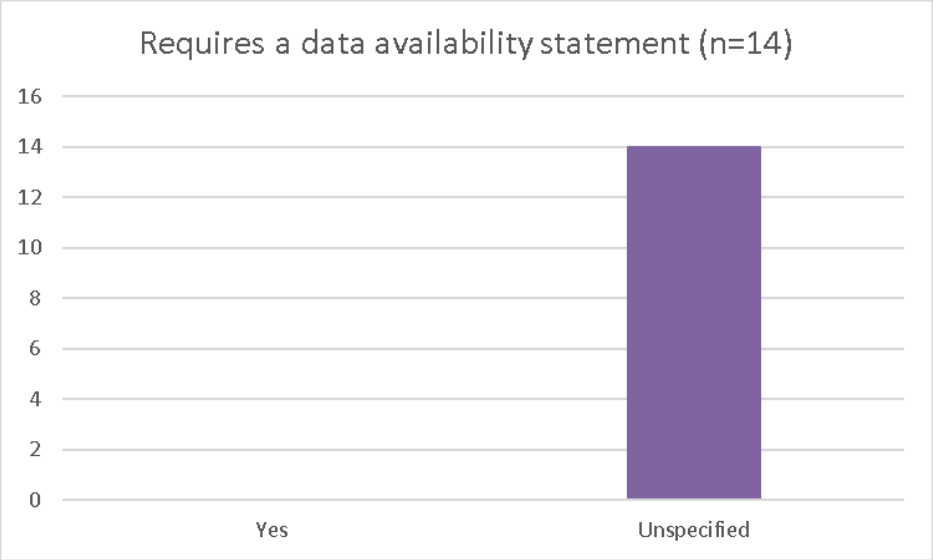
"Production of open research data should be acknowledged formally as a legitimate output of the research process and should be recognised as such by employers, research funders and others in contributing to an individual's professional profile in relation to promotion, research assessment and research funding decisions. Such formal recognition should be accompanied by the development and use of responsible metrics that allow the collection and tracking of data use and impact. In general, data citations should be accorded appropriate importance in the scholarly record relative to citations of other research objects, such as publications." [43]

The Open Science and data - Action Programme for the Finnish Scholarly Community goes one step further and refers to a data citation roadmap that was developed in 2018.[44] [45]

3.8 Data availability statements

None of the policies reviewed currently require data availability statements to be included in research publications.

Figure 8. Number of policies that require data availability statements.



This is unfortunate as providing a clear link between the publication and the underlying data is crucial for supporting reproducibility and re-use. Requiring data availability statements stimulates researchers to provide concrete information on where and under what conditions data can be accessed. A growing number of publishers now require data availability statements to enable substantiation of written results against the underlying data. National policies should consider endorsing the inclusion of data availability statements in research publications as part of good research practice.

[43] UK: *Concordat on Open Research Data*, p. 13
[44] Finland: *Open Science and data - Action Programme for the Finnish Scholarly Community,* p. 7
[45] Laine, H (ed.) 2018, *Tracing Data - Data Citation Roadmap for Finland*. Helsinki, Finland: Finnish Committee for Research Data. http://urn.fi/URN:NBN:fi-fe201804106446

3.9 Re-use, IP and licensing

Stimulating data re-use saves time, increases potential for collaboration, enhances the return on investment for research activities, increases the impact of research funding, and accelerates the pace of discovery. Many of the policies reviewed do aim to stimulate data re-use including the Netherlands, Norway, Slovenia, Slovak Republic, and the UK.

The Dutch policy makes data re-use one of its key ambitions:

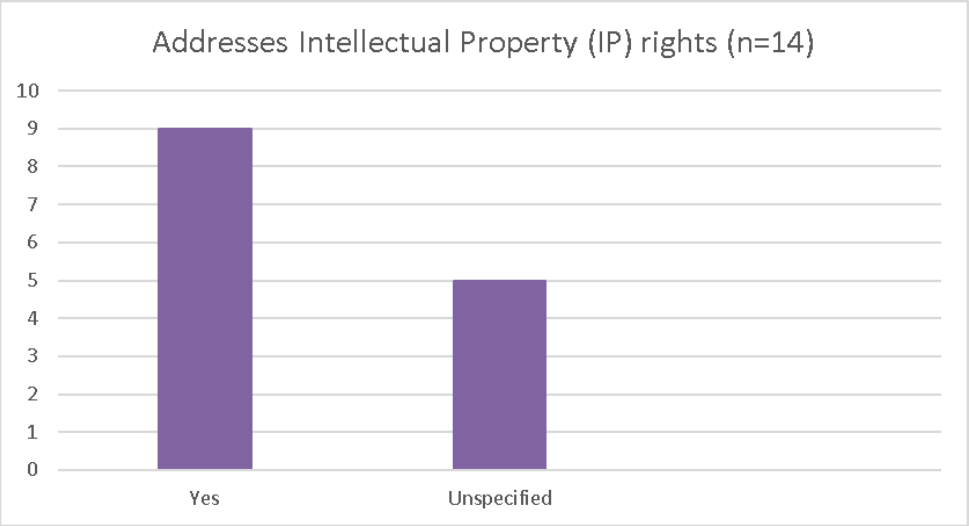
> *"To set clear and agreed technical and policy-related preconditions to facilitate reuse of research data, including provision of the necessary expertise and support."*[46]

The policy promotes re-use on several levels: calling on researchers to re-use the data and services of others where possible, to make their data accessible for re-use, and to allow for their research to be reproduced.[47] The Slovak Republic policy goes further to make a commitment to seek mechanisms to monitor the re-use of research data.[48] Norway's policy succinctly refers to the importance of describing data effectively and sharing information on how it can be re-used.

> *"Research data must be adapted for searchability and retrieval and, when relevant, structured for genuine reusability. This means, among other things, that the data must be equipped with reliable metadata and published under a license that clearly specifies how the data can be used."*[49]

As at January 2020, just over half of the analysed national policies mention IP related to data in some form. These include Cyprus, France, the Czech Republic, the Slovak Republic, Slovenia, Switzerland, Serbia, the Netherlands and the UK.

Figure 9. Number of policies that address IP in some form.



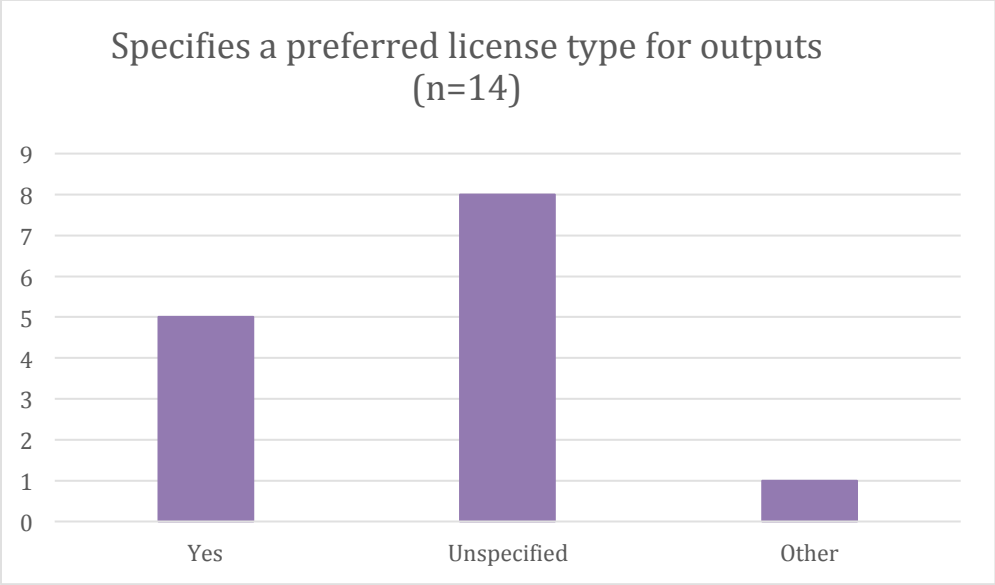
[46] Netherlands: *National Plan Open Science*, 2017, p5 https://www.openscience.nl/files/openscience/2019-02/nationalplanopenscience_en.pdf
[47] Netherlands: *National Plan Open Science*, 2017, p. 23
[48] Slovak Republic: *Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019*, p. 23
[49] Norway: *National Strategy on Access to and Sharing of Research Data*, p6

Countries that address IP generally approach it when describing the conditions under which data should or should not be made available (i.e. when abiding by IPR, or in the case of copyright infringement). Slovenia goes one step further by pointing out the importance of respecting IP while at the same time using licensing to enable re-use with a section entitled *Licensing scientific information with open access licenses enables the widest reuse of research results*.

> *"Public research organisations should, also with encouraging the use of open access licenses (e.g., Creative Commons), encourage licensing the scientific publications, and when necessary, the research data according to the open access principles so that copyright of authors and third parties will be respected and the widest possible open access and re-use of scientific publications and research data enabled."* [50]

Several policies address the legal challenges in making data available for re-use around the exploitation and ownership of data IP and the need for more action in this area. To help put effective re-use strategies in place, more research, reports or common guidelines are necessary as specified by the Swiss or the Dutch policies. The Dutch policy also points out the need for more research into research data ownership for public and private entities.[51] It also suggests the need for a code of conduct, principles or tighter opt-out criteria for both business and research communities. More research and work are clearly necessary on this topic to truly enable the more comprehensive re-use of research data.

Figure 10. Number of policies that specify a preferred license type.



Five national policies refer to a specific licence type for outputs, including the Creative Commons licence. One policymaker promotes the use of open licences without naming a specific type. As an example, Slovenia's policy states

[50] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 - 2020*, 2015, p. 11

[51] Netherlands: National Plan Open Science, 2017, p. 23

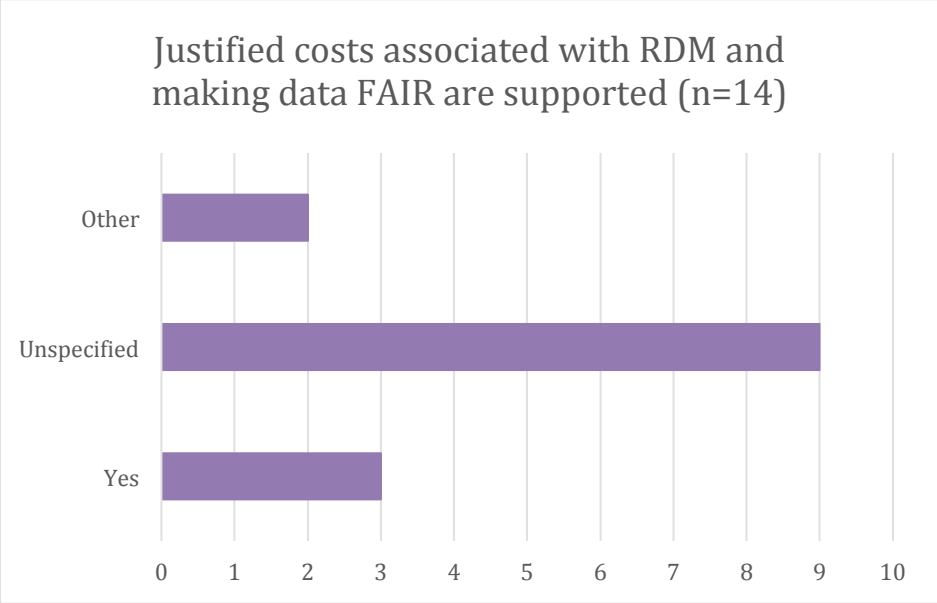
"Programmes and projects in the pilot programme must take measures to enable for third parties to access, mine, exploit, reproduce and disseminate the research data, free of charge to all users. Licensing with open access licenses Creative Commons (CC BY or CC0) is a straightforward and effective way to attain this goal." [52]

While it is good practice to specify open licenses in policies, it is also crucial to provide adequate support to help researchers determine when a license is relevant for their outputs, how to choose the best license for their needs and how to associate licenses with their outputs.

3.10 Costs

It is essential that policies address the issue of eligible costs relating to RDM since policy implementation will depend on the resources available to make data FAIR or accessible to lesser or greater extents. However, this is often tasked to the national research funder rather than specified in a national policy, plan or strategy.

Figure 11. Number of policies that allow justified costs for RDM.



As at January 2020, three national policies explicitly mention justifying costs associated with RDM and making data FAIR (explicitly or implicitly). These include the French *National Plan for Open Science,* the Government of Slovenia's *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020, and the* UK's *Concordat on Open Research Data*. Slovenia states that costs incurred related to OA to research data are eligible for reimbursement for example.[53]

[52] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 - 2020,* 2015, p. 20
[53] Ibid

4. Country Profiles

4.1 Overview

In this section, we present the policy landscape by providing short country profiles and list within each, the policy in question and any other relevant documents and developments towards policy making on open science/open data. We present a short context for the work that is ongoing, and developments since the first version of this report back in 2016.

We have sought to identify where national open data policies are linked to other agendas, such as Open Access or Open Science more broadly. In addition to addressing the benefits of openness, it should be said that many of these policies are also explicit about situations where data should not be shared, for ethical, commercial or security-related reasons.

Below we present national policies (Table 1) and laws (Table 2), in two separate tables, with names of, and links to, each individual document. Table 3 presents links to National Funder Policies whereas Table 4 presents further analysis of each policy document.

Table 1 - List of National Policies in Europe; status January 2020

National Policies of EU Member States In alphabetical order by country code	
Country	**Name of policy**
CY	National Policy of the Republic of Cyprus for Open Access to Scientific Information
CZ	Action Plan for Implementation of the National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020
CZ	National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020
ES	State Plan for Research, Development and Innovation 2017-2020
FR	National Plan for Open Science
FI	Open Science and data - Action Programme for the Finnish Scholarly Community
IE	National Framework on the Transition to an Open Research Environment
NL	National Plan Open Science
SI	National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020
SK	The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019

Selected non-EU National Policies	
CH	White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020
NO	National Strategy on Access to and Sharing of Research Data
SRB	Open Science Platform
UK	Concordat on Open Research Data (Policy of a UK multi-stakeholder group, including research funders and higher education associations)

Table 2 - List of National Laws; status January 2020

National Laws referring to Open Science, i.e. research data, in European Member States	
FR	Law for a Digital Republic
LT	Law on Higher Education and Research

Table 3 List of selected National Funder Policies

National Funder Policies	
AT	FWF Open Access Policy: Open Access to Research Data
BE	BELSPO Open Research Data mandate
DE	DFG Guidelines on the Handling of Research Data
LT	LMT Guidelines on Open Access to Scientific Publications and Data
PT	FCT Policy on management and sharing of data and other results arising from FCT-funded research
SE	FORMAS Guidelines for applicants
UK	UKRI Common Principles on Data Policy (Policy of UK national funder organisation UK Research and Innovation)

1. Introduction

This Open Science policy update is the fifth in a series prepared in partnership between SPARC Europe and the Digital Curation Centre (DCC) and reflects changes in the European policy landscape since our last update was released in August 2019.[1]

This document presents an updated review of national Open Data and Open Science policies in Europe as of January 2020. As with previous updates, this report does not cover Open Access to publications policies but rather focuses on research data. It is important to note here that we considered national policies and also national laws, research plans and roadmaps, concordats and codes of research practice as part of this review. We concentrated on the twenty-eight EU member states, but we also considered relevant countries from the European Research Area, namely Iceland, Norway, Serbia and Switzerland. In this update we focus specifically on presenting and analysing national policies. National Funder Policies are listed separately in Table 3.

Based on work for the FAIRSFAIR Project, we have introduced a new section in this report that presents a deeper analysis of the national policy documents.[2] This section analyses the policies against ten policy elements including: policy scope, data definition, mandates, exceptions, mentions of FAIR, DMPs, data citation, data availability statements, re-use, IP and licensing, and costs.[3] This does not analyse funder policies, which are increasingly under development as published in the recent policy report for FAIRSFAIR, however, this might be considered in future versions depending on feedback. [4] The data collected for the deeper analysis is openly accessible from Zenodo.[5]

Continuing our approach of working collaboratively with the European research community to prepare these updates, we are particularly grateful to the OpenAIRE National Open Access Desks (NOADs) for their help in identifying relevant documents and initiatives and in particular for extremely helpful comments and pointers to documents which are not currently available in English or are works in progress and have not yet been publicised. This data has passed by the OpenAIRE NOADS for verification.

Our analysis shows that while no new policies have been reported to have been produced in the last 6 months, there has been a great deal of policy development amongst governments, publishers and funders alike as has been reported in the recent FAIR Policy Landscape Analysis released by FAIRSFAIR. In addition, there has been good progress across Europe to define policies and there are several areas where national policies provide good coverage of key Open Science elements including providing a definition for data, recommending data sharing, encouraging the production of data management plans and addressing Intellectual Property (IP). Areas that are less well covered include expectations around data citation, providing data availability statements and mention of costs associated with RDM and making data FAIR.

[1] SPARC Europe, & Digital Curation Centre. (2019, August 28). *An Analysis of Open Science Policies in Europe v4*. Zenodo. http://doi.org/10.5281/zenodo.3379705
[2] FAIRSFAIR Project: www.fairsfair.eu
[3] This update employs a subset of the policy characterisation elements developed in the FAIRsFAIR project. http://doi.org/10.5281/zenodo.3550544
[4] D3.1 FAIR Policy Landscape Analysis http://doi.org/10.5281/zenodo.3558173
[5] *Open Science Policies in Europe v5,* 2020 Dataset http://doi.org/10.5281/zenodo.3689437

Summary of changes from version 4:

Addition of a new national policy analysis section as well as updating the following country profiles:

- Belgian entry updated
- Cypriot entry updated
- Finnish entry updated
- French entry updated
- Netherlands entry updated
- Slovenian entry updated
- Icelandic entry updated
- Norwegian entry updated
- Swiss entry updated

The information held within this report is accurate to the best of DCC's knowledge as of January 2020. We will continue to investigate the open data policy landscape across Europe, updating this document periodically. It is a living document. If you are aware of existing policies or relevant national initiatives, or have corrections to share, please get in touch: info@dcc.ac.uk

2. Executive summary

As of February 2020, we count 14 national policies, of which 11 are those of EU member states (Cyprus, Czech Republic, Spain, Finland, France, Netherlands, Ireland, Slovenia and Slovakia). In the European Research Area, four non-EU members have national policies (Switzerland, Norway, Serbia and the UK).

To summarise changes since the previous update released in August 2019, no new national policies have been added but there is a great deal of ongoing activity to progress the implementation of existing policies in almost all EU countries and beyond, which are presented in a Table 3.

The results of our detailed analysis of national policy elements has revealed:

- About two thirds of national policies provide a definition for data
- Data sharing is mostly recommended rather than mandated
- Exceptions to data sharing are allowed in most policies yet few currently require formal justifications
- Under half of the policies refer to the FAIR principles explicitly while most do implicitly
- DMPs are required or recommended by most policies
- Expectations around data citation are not yet common in policies
- None of the policies require data availability statements
- IP is covered in the majority of policies
- Specific license types are included in about a third of policies

Aside from strengthening current national policies partly based on our findings, the European policy landscape will be influenced by two key drivers over the next two years – the implementation of the Directive on Open Data and the Re-use of Public Sector Information (PSI Directive)[6] and the introduction of Horizon Europe[7]. Global efforts to improve research integrity will also be a key factor influencing policy development in the years ahead.

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1561563110433&uri=CELEX:32019L1024
[7] https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en

3. National OS policies examined

This section analyses a range of national Open Science policies as against ten criteria: policy scope, data definition, mandates, exceptions, mentions of FAIR, DMPs, data citation, data availability statements, re-use, IP and licensing, and costs. These policies are generally national collaborative policies, government plans, frameworks or strategies; we do not include research funder policies in this analysis. The aim is to highlight areas where further alignment would be advised across countries as well as good practices for policymakers. Note that in a time of great policy flux that this is a snapshot in time taken in January 2020.

3.1 Policy scope

The majority of national policies studied address both Open Access to publications and research data in one combined policy. These include policies of the Czech Republic, Cyprus, the Netherlands, Ireland, Finland and Serbia. The *Norwegian National Strategy on Access to and Sharing of Research Data,* however, is purely dedicated to research data as is the UK's *Concordat on Open Research Data*.[89]

Other policies have wider scopes, including the French *National Plan for Open Science* policy which, aside from OA to publications and research data, addresses the development and preservation of software and commitments for the Open Government Partnership (OGP).[10] The Slovak Republic also aligns its policy to the OGP. This is, therefore, more unique in scope since it is an OGP action plan.[11] For example, it addresses Open Education and Open Science, Government Open to Dialogue, Open Information (Open Government data), and Open Justice.

The *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020* addresses another type of scope since it primarily addresses research infrastructure as a whole, with data management one of its foci amongst others including ID management, e-publishing, e-learning, cloud computing and others.[12] Infrastructure is also addressed by the Irish Framework.[13]

[8] Norway: *National Strategy on Access to and Sharing of Research Data,* https://www.regjeringen.no/contentassets/3a0ceeaa1c9b4611a1b86fc5616abde7/en-gb/pdfs/national-strategy-on-access_summary.pdf

[9] UK: *Concordat on Open Research Data,* https://www.ukri.org/files/legacy/documents/concordatonopenresearchdata-pdf/

[10] French *National Plan for Open Science*, 2018, https://www.ouvrirlascience.fr/national-plan-for-open-science-4th-july-2018/

[11] Slovak Republic: *The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019,* https://www.minv.sk/swift_data/source/rozvoj_obcianskej_spolocnosti/otvorene_vladnutie/akcne_plany/2017_2019/Slovakia-OGP-nap-2017-english.pdf

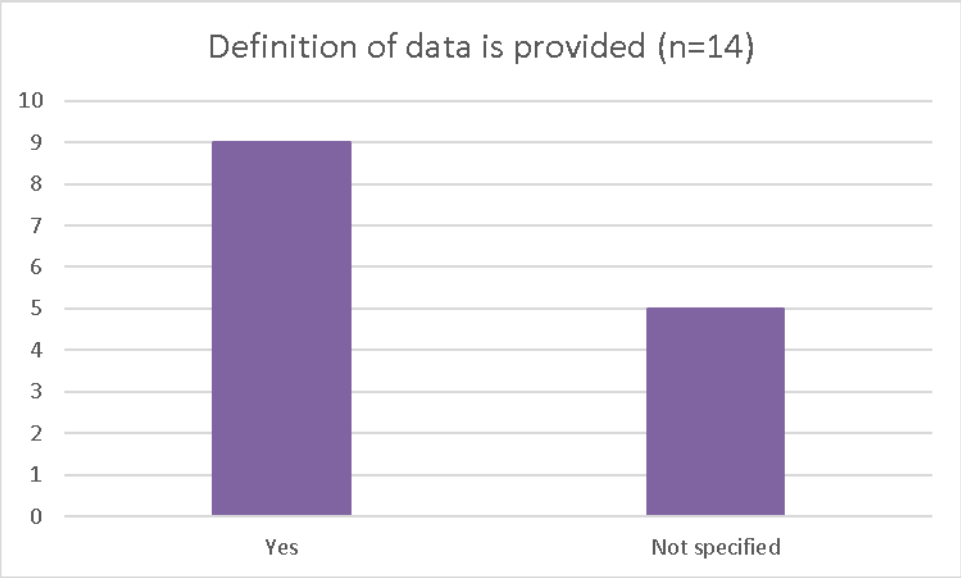
[12] Switzerland: *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020,* https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Organisation/SUK-P/SUK_P-2/WhitePaper_V1.1-EN.pdf

[13] Ireland: *National Framework on the Transition to an Open Research Environment, 2019,* http://norf-ireland.net/wp-content/uploads/2019/07/NORF_Framework_10_July_2019-2.pdf

3.2 Data definition

A clear data definition is critical for effective policy implementation. It is important for policymakers to define what sorts of outputs are covered by the term data and which of these they expect researchers should - or are recommended to - make available.

Figure 1. Number of policies that provide a definition of data.



The majority of the national policies studied for this report provide a definition for research data although they are not always well aligned, which brings complexity to the understanding that researchers have on what is required if moving to a new country.

Two national policies provide particular clarity to researchers on what is intended with respect to research data that should be shared. The French *National Plan for Open Science* provides a very clear yet concise definition:

> *"Research data: Factual records (figures, texts, images, sounds, videos, etc.) used as primary sources for research and which are generally accepted by the scientific community as being necessary to validate research results."* [14]

The National Policy of the Republic of Cyprus for Open Access to Scientific Information also provides a clear definition that provides slightly more detail:

> *"Science Data is the primary information, namely the data or numbers which were collected and are considered as a basis for reflection, discussion or calculation in order to carry out a scientific research. Examples of scientific data include statistical data, results of experiments, measurements, observations resulting from field research, survey results, recordings of interviews and images, with emphasis on data available at digital form."* [15]

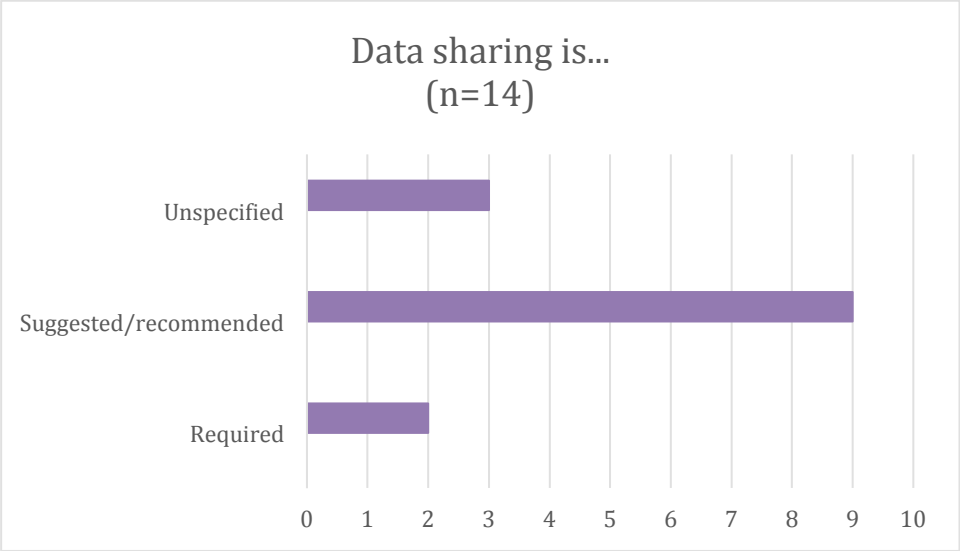
[14] France: *National Plan for Open Science,* 2018, p. 10
[15] Cyprus: *The National Policy of the Republic of Cyprus for Open Access to Scientific Information,* 2016, p. 4 http://opensciencecy.ucy.ac.cy/wp-content/uploads/2019/09/FINAL-EN-National-Policy-for-Open-Access-to-Scientific-Information.pdf

The Finnish Action Programme also specifies what is not included in the definition, i.e. physical resources, which can be very helpful for providing further clarity on what is *not* required. The Finnish Action Programme describes three research data types in more detail: cumulative, permanent and public data, which is helpful to show the range of data that should be considered at different stages of the research lifecycle.[16]

3.3 Mandates

The majority of national policies studied do not mandate or require open access to research data so far but rather suggest or recommend this practice.

Figure 2. Number of policy mandates related to data sharing.



Two examples of those who do require data sharing include the Norwegian *National Strategy on Access to and Sharing of Research Data* and the Slovenian *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020* with its pilot programme which allows opt-outs. The French *National Plan Open Science* does not yet require data sharing but has plans to introduce this mandate.[17] [18] [19] Most of the other policies recommend or suggest data sharing providing more ambitions, frameworks, strategies and principles for working with research data where requirements are less prescriptive.

[16] Finland: *Open Science and data - Action Programme for the Finnish Scholarly Community,* p. 6 http://www.doria.fi/bitstream/handle/10024/164174/UNIFI_Open_Science_and_Data_Action_Programme.pdf?sequence=1&isAllowed=y

[17] Norway: *National Strategy on Access to and Sharing of Research Data,* p. 6

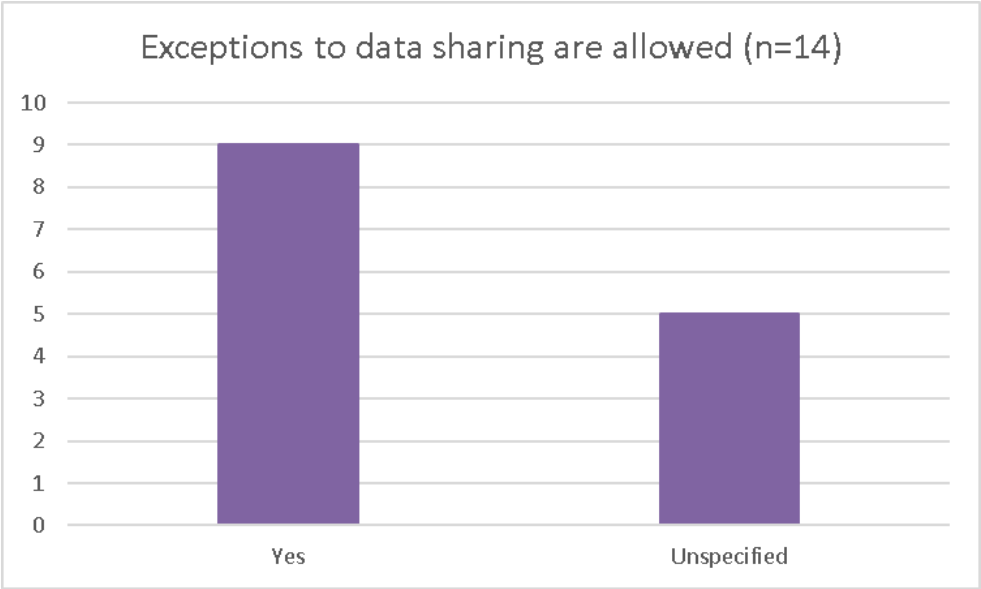
[18] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 20 https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/Strategije/National-strategy-of-open-access-to-scientific-publications-and-research-data-in-Slovenia-2015-2020.pdf

[19] France: *National Plan for Open Science,* 2018, p. 6

3.4 Exceptions

To make research data as open as possible but as closed as necessary, the majority of national policies allow exceptions to sharing data.

Figure 3. Number of policies that allow exceptions to data sharing.



Most policies allow legitimate exceptions to data sharing where data relates to national security, or where there are issues relating to confidentiality, privacy, intellectual property rights, and trade secrets. A few policies provide further information which provide greater clarity on what is expected, which others might consider when revising or developing new research data policy. For example, the Slovenian policy text on data sharing exceptions is succinct, and states that if data cannot be made available, its associated metadata should be made available making clear what data are available and where.

> *"If access to research data is limited because of the legitimate exemptions, then at least openly accessible metadata have to be prepared for the catalogue of a thematic data centre that specify where and under which conditions the research data is available."* [20]

Slovenia is currently running a pilot programme on Open Access to Scientific Publications and Research Data which clearly specifies which circumstances allow for opting-out. The policy draws directly from the Horizon 2020 European Commission Open Access policy to ensure alignment.[21]

> *"Exemptions from the default fully open access have to be exactly defined and founded, e.g. because of the national security, the protection of personal data and the intellectual property rights of private co-funders. Legal and ethical aspects for open access have to be verified. If access to research data is limited because of the legitimate exemptions, then at least openly*

[20] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 6
[21] *Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020,* European Commission, 2017

accessible metadata have to be prepared for the catalogue of a thematic data centre that specify where and under which conditions the research data is available."[22]

The UK's *Concordat on Open Research Data* includes an extensive section on exceptions to data sharing.[23] The Concordat makes exceptions its second principle:

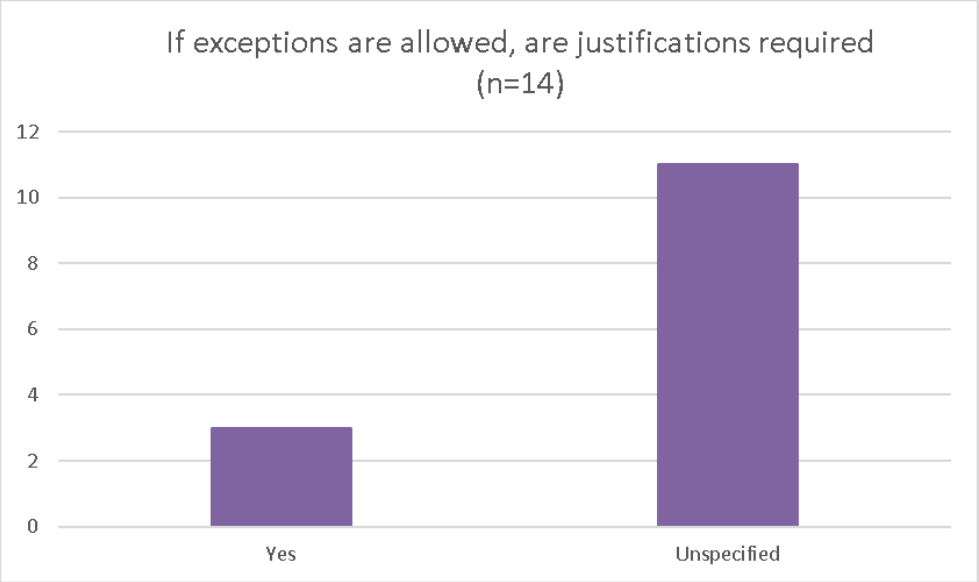
> *"There are sound reasons why the openness of research data may need to be restricted but any restrictions must be justified and justifiable."*

The Concordat calls for governance arrangements to be put in place for personal data protection to safeguard privacy and confidentiality and makes clear that access to data should "be proportionate to the level of risk associated with the particular data holding".[24] When making data available, one is advised to regard "legal, regulatory and ethical requirements – including applicable data protection laws and relevant codes on research ethics and research integrity" an element that is rarely mentioned in other policies reviewed for this report. The Concordat also refers to the challenge of sharing open research data that might be in conflict with the interests of companies or third-party data providers who collaborate with research institutions and universities. It suggests developing protocols on whether, when, and how certain commercially sensitive data may be made openly accessible; ensuring that there is "an appropriate balance between openness and commercial incentives" so as to nurture innovation and collaborations between academia and industry while making as much of the resulting data as possible accessible for reuse. Furthermore, the Concordat states that a valid reason for restricting data access comes into play when the costs of preserving or supplying data are disproportionately large.

The Norwegian policy states that certain data – though closed for legitimate reasons at one point in time – may be made available at a later point in time. It also states that certain closed data may be available to certain users provided they meet clearly stated access criteria.[25] This approach demonstrates that closed access can be temporary and that controlled access options should be considered where open access is not feasible.

[22] *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020*, 2015, p 6
[23] UK: *Concordat on Open Research Data*, p. 9
[24] Ibid
[25] Norway: *National Strategy on Access to and Sharing of Research Data*, p. 6

Figure 4. Number of policies that require justifications for not sharing data.



Justifications for data not sharing data are required by just three of the policies studied. The UK *Concordat on Open Research Data,* the *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020* and by the *National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020*.[26] [27] [28]

The UK *Concordat on Open Research Data,* in its second principle, states that:

> *"constraints on openness must not be applied on a blanket basis but should be justified and justifiable case by case. Research organisations or individual researchers withholding data must therefore consider carefully the grounds on which they are acting and be prepared to justify their actions."*[29]

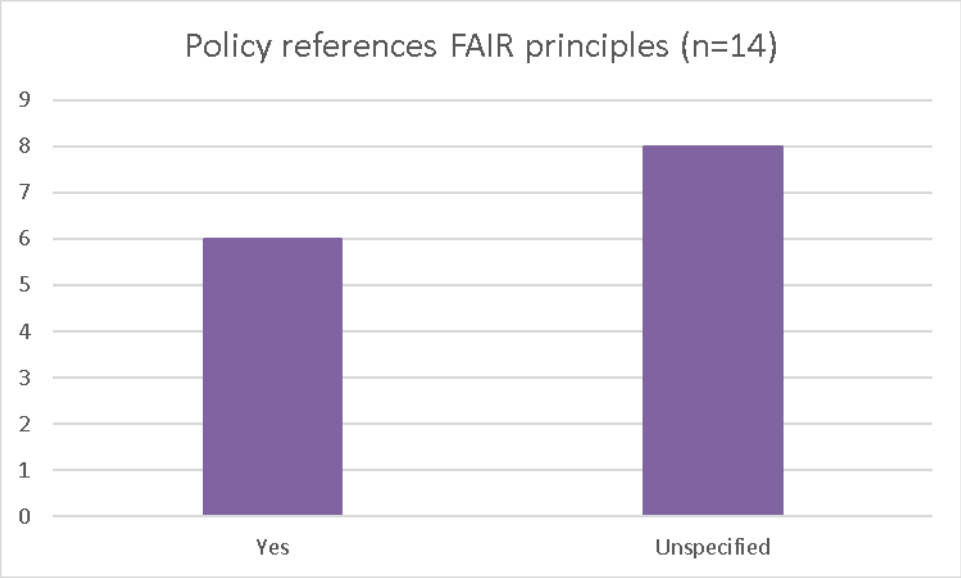
This approach helps deter those from easily opting-out of sharing research data without sound reasons. As noted, this is not yet standard practice but highly advisable to foster a culture where data-sharing becomes standard practice.

[26] UK: *Concordat on Open Research Data*, p. 9
[27] *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 6
[28] *National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020*
[29] UK: *Concordat on Open Research Data*, p. 10

3.5 Mentions of FAIR

Requiring FAIR data is increasingly gaining ground in Europe. Nevertheless, as at February 2020, only six of the identified national OS policies mention FAIR explicitly. These include the policies from the Netherlands, France, the UK, Finland, Spain and the recent Irish *National Framework on the Transition to an Open Research Environment.*[30]

Figure 5. Number of policies that reference FAIR.



Others meanwhile refer to elements of the FAIR principles without mentioning them explicitly. For example, the Slovakian policy inserts Open Science into an Open Government Partnership Action Plan (Slovak Republic).[31] In its definition, it specifies that data "must be accessible, easy to understand and work with them must be possible without constraints (technical and licensing)" which supports the majority of the FAIR principles without naming them explicitly. It is advisable that policies in future refer to FAIR specifically to better promote a culture of FAIR practice.

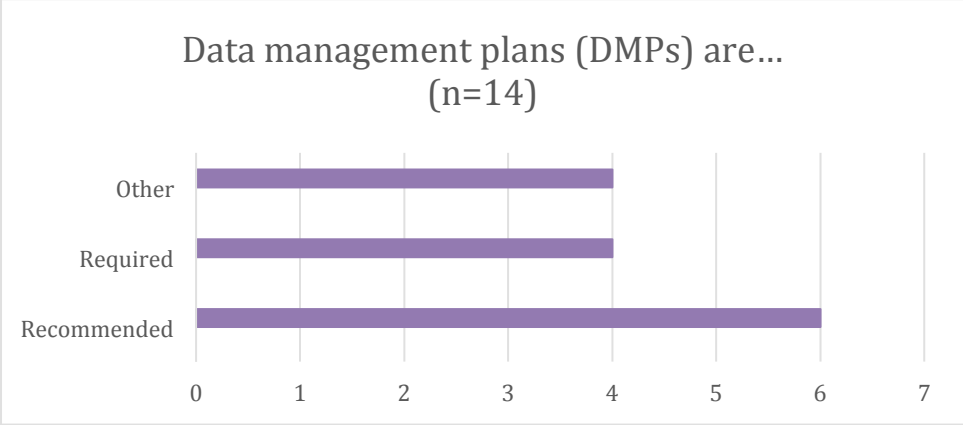
[30] Ireland: *National Framework on the Transition to an Open Research Environment, 2019,* http://norf-ireland.net/wp-content/uploads/2019/07/NORF_Framework_10_July_2019-2.pdf

[31] Slovak Republic: *The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019*, p. 7, footnote 7

3.6 DMPs

As at February 2020, four of the selected national policies require data management plans (DMPs). These include the French *National Plan for Open Science,* the *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* the Irish *National Framework on the Transition to an Open Research Environment and the Norwegian National Strategy on Access to and Sharing of Research Data.* [32] [33] [34] Most other national policies studied recommend rather than require DMPs. Requiring DMPs is good practice as developing outline plans at the outset of new research and updating them over the life of the project helps to ensure that risks can be mitigated, and challenges overcome.

Figure 6. Number of policy mandates for DMPs.



The timing of developing the DMP varies across policies. Of those with requirements or recommendations, two policies request DMPs be created at the pre-award stage (*The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019 and the UK Concordat on Open Research Data*). One policy request that DMPs are generated at the post-award stage (the Norwegian *National Strategy on Access to and Sharing of Research Data* policy). The *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 – 2020 does not specify when the DMP should be prepared*.[35] [36] No policies specifically call for the sharing of DMPs throughout the research process as some funders are.

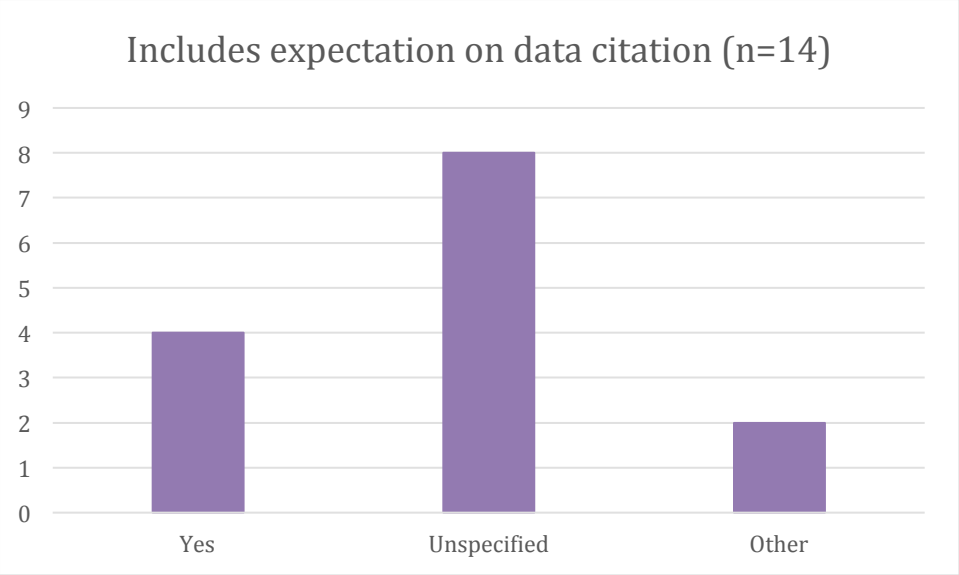
3.7 Data citation

Data is a valuable output of the research process. To progress the recognition of data and other research outputs including software as legitimate research outputs in their own right, it is vital that the formal acknowledgment of the creator(s) is encouraged by all stakeholders (national policies, funding bodies, publishers and research performing organisations), and then in a standardised way. Standards for data citation are necessary to ensure that citations can be easily aggregated as a more

[32] France: *National Plan for Open Science*, 2018, p. 6
[33] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020,* 2015, p. 19
[34] Ireland: *National Framework on the Transition to an Open Research Environment*, 2019, p. 8
[35] Norway: *National Strategy on Access to and Sharing of Research Data*, p. 4
[36] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 – 2020*, 2015, p. 19

varied collection of research outputs are considered worthy of appraisal as part of the research evaluation process.

Figure 7. Number of policies that have expectations on data citation.



Four policies include an expectation on data citation including the UK's *Concordat on Open Research Data*, the *Norwegian National Strategy on Access to and Sharing of Research Data,* the Irish *National Framework on the Transition to an Open Research Environment* and the *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020*. [37] [38] [39] [40] Ireland's policy makes the case most succinctly:

> *"A robust citation mechanism for referencing data is necessary for research validation and to make data findable and accessible."* [41]

The UK's *Concordat on Open Research Data* underlines the importance of data citation and acknowledging data creators and requires data to be cited although it does not provide details on how this should be done. The *Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019* does include specific information on the importance of using persistent identifiers for researchers and outputs (specifically ORCID and DataCite[42]) which is essential for standardised citation practice.

The UK Concordat also makes the case for data citation in the research evaluation process, which is key for embedding data sharing data in the research process. The example below shows good practice that other policymakers may wish to emulate.

[37] UK: *Concordat on Open Research Data*, p. 5, 7, 12, 13, 16
[38] Norway: the *Norwegian National Strategy on Access to and Sharing of Research Data*, p. 7
[39] *National Framework on the Transition to an Open Research Environment*, 2019, p.
[40] *White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020*, p.
[41] Ireland: *National Framework on the Transition to an Open Research Environment,* 2019, p. 7
[42] Slovak Republic: *The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019,* p. 16-17

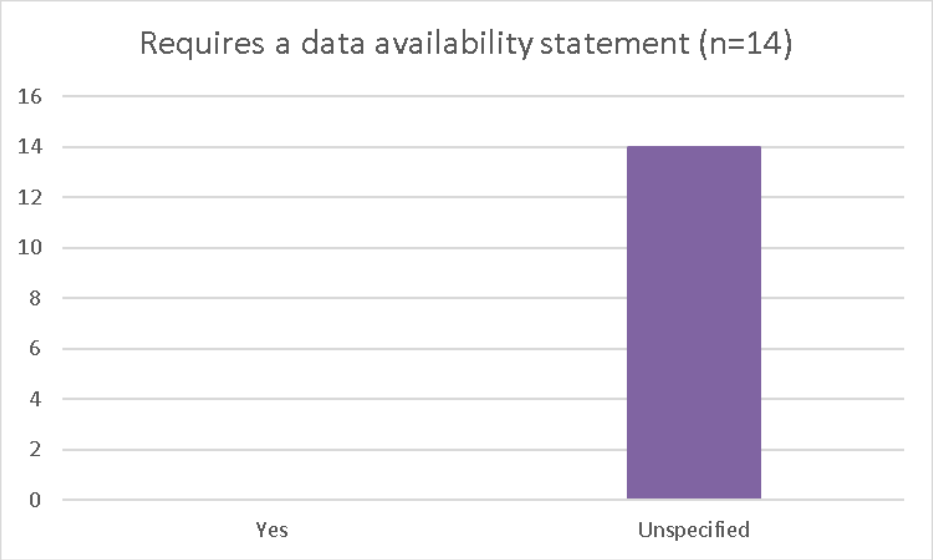
"Production of open research data should be acknowledged formally as a legitimate output of the research process and should be recognised as such by employers, research funders and others in contributing to an individual's professional profile in relation to promotion, research assessment and research funding decisions. Such formal recognition should be accompanied by the development and use of responsible metrics that allow the collection and tracking of data use and impact. In general, data citations should be accorded appropriate importance in the scholarly record relative to citations of other research objects, such as publications." [43]

The Open Science and data - Action Programme for the Finnish Scholarly Community goes one step further and refers to a data citation roadmap that was developed in 2018.[44] [45]

3.8 Data availability statements

None of the policies reviewed currently require data availability statements to be included in research publications.

Figure 8. Number of policies that require data availability statements.



This is unfortunate as providing a clear link between the publication and the underlying data is crucial for supporting reproducibility and re-use. Requiring data availability statements stimulates researchers to provide concrete information on where and under what conditions data can be accessed. A growing number of publishers now require data availability statements to enable substantiation of written results against the underlying data. National policies should consider endorsing the inclusion of data availability statements in research publications as part of good research practice.

[43] UK: *Concordat on Open Research Data*, p. 13
[44] Finland: *Open Science and data - Action Programme for the Finnish Scholarly Community,* p. 7
[45] Laine, H (ed.) 2018, *Tracing Data - Data Citation Roadmap for Finland*. Helsinki, Finland: Finnish Committee for Research Data. http://urn.fi/URN:NBN:fi-fe201804106446

3.9 Re-use, IP and licensing

Stimulating data re-use saves time, increases potential for collaboration, enhances the return on investment for research activities, increases the impact of research funding, and accelerates the pace of discovery. Many of the policies reviewed do aim to stimulate data re-use including the Netherlands, Norway, Slovenia, Slovak Republic, and the UK.

The Dutch policy makes data re-use one of its key ambitions:

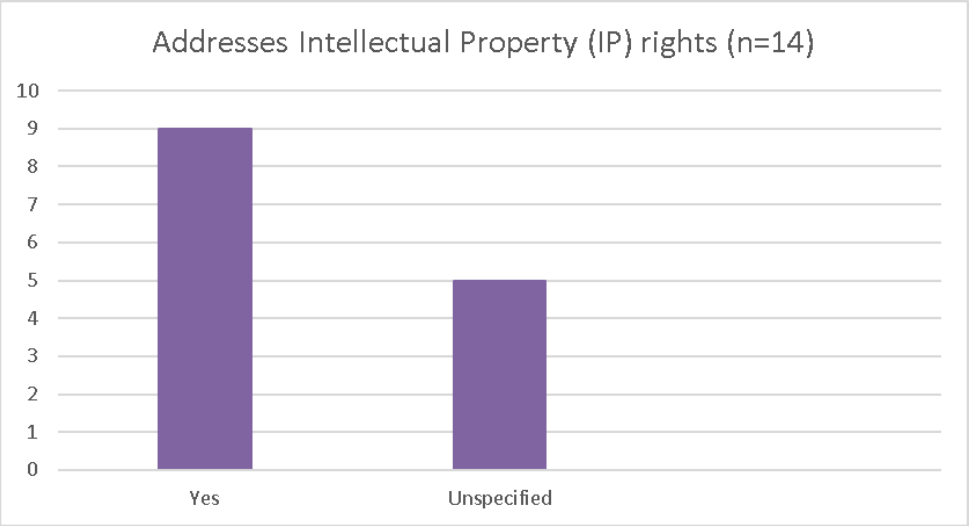
> *"To set clear and agreed technical and policy-related preconditions to facilitate reuse of research data, including provision of the necessary expertise and support."*[46]

The policy promotes re-use on several levels: calling on researchers to re-use the data and services of others where possible, to make their data accessible for re-use, and to allow for their research to be reproduced.[47] The Slovak Republic policy goes further to make a commitment to seek mechanisms to monitor the re-use of research data.[48] Norway's policy succinctly refers to the importance of describing data effectively and sharing information on how it can be re-used.

> *"Research data must be adapted for searchability and retrieval and, when relevant, structured for genuine reusability. This means, among other things, that the data must be equipped with reliable metadata and published under a license that clearly specifies how the data can be used."*[49]

As at January 2020, just over half of the analysed national policies mention IP related to data in some form. These include Cyprus, France, the Czech Republic, the Slovak Republic, Slovenia, Switzerland, Serbia, the Netherlands and the UK.

Figure 9. Number of policies that address IP in some form.



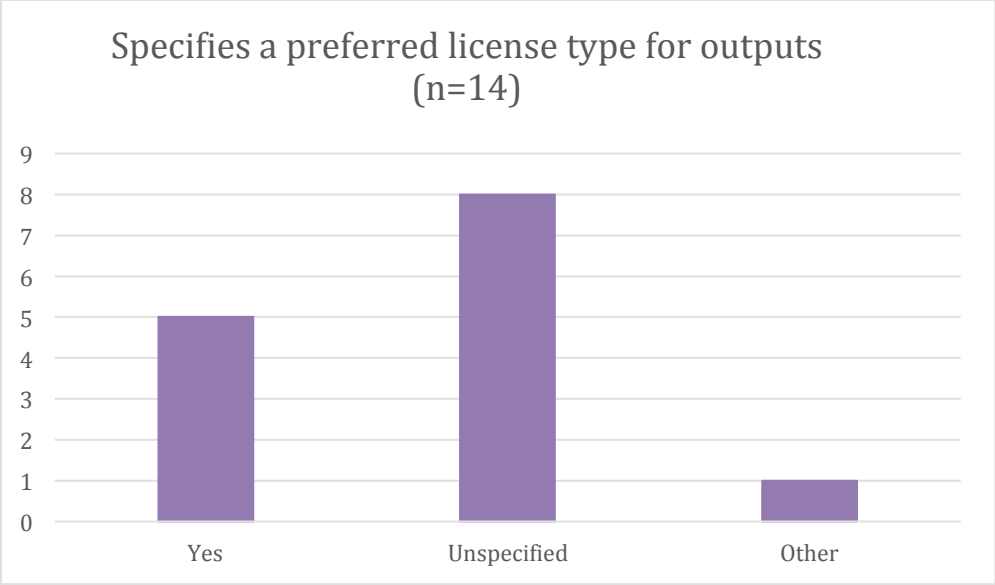
[46] Netherlands: *National Plan Open Science*, 2017, p5 https://www.openscience.nl/files/openscience/2019-02/nationalplanopenscience_en.pdf
[47] Netherlands: *National Plan Open Science*, 2017, p. 23
[48] Slovak Republic: *Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019*, p. 23
[49] Norway: *National Strategy on Access to and Sharing of Research Data*, p6

Countries that address IP generally approach it when describing the conditions under which data should or should not be made available (i.e. when abiding by IPR, or in the case of copyright infringement). Slovenia goes one step further by pointing out the importance of respecting IP while at the same time using licensing to enable re-use with a section entitled *Licensing scientific information with open access licenses enables the widest reuse of research results*.

> *"Public research organisations should, also with encouraging the use of open access licenses (e.g., Creative Commons), encourage licensing the scientific publications, and when necessary, the research data according to the open access principles so that copyright of authors and third parties will be respected and the widest possible open access and re-use of scientific publications and research data enabled."* [50]

Several policies address the legal challenges in making data available for re-use around the exploitation and ownership of data IP and the need for more action in this area. To help put effective re-use strategies in place, more research, reports or common guidelines are necessary as specified by the Swiss or the Dutch policies. The Dutch policy also points out the need for more research into research data ownership for public and private entities.[51] It also suggests the need for a code of conduct, principles or tighter opt-out criteria for both business and research communities. More research and work are clearly necessary on this topic to truly enable the more comprehensive re-use of research data.

Figure 10. Number of policies that specify a preferred license type.



Five national policies refer to a specific licence type for outputs, including the Creative Commons licence. One policymaker promotes the use of open licences without naming a specific type. As an example, Slovenia's policy states

[50] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 - 2020*, 2015, p. 11

[51] Netherlands: National Plan Open Science, 2017, p. 23

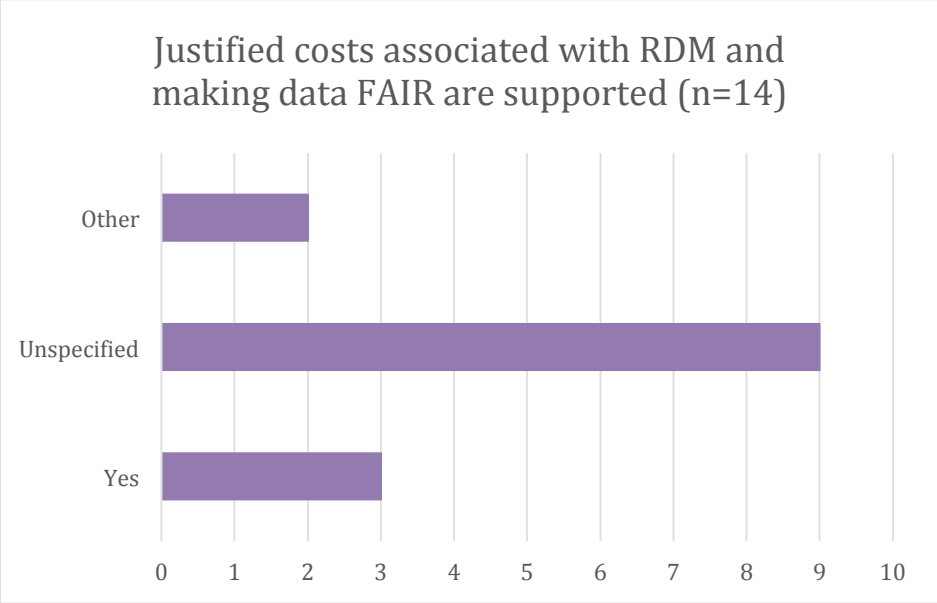
"Programmes and projects in the pilot programme must take measures to enable for third parties to access, mine, exploit, reproduce and disseminate the research data, free of charge to all users. Licensing with open access licenses Creative Commons (CC BY or CC0) is a straightforward and effective way to attain this goal." [52]

While it is good practice to specify open licenses in policies, it is also crucial to provide adequate support to help researchers determine when a license is relevant for their outputs, how to choose the best license for their needs and how to associate licenses with their outputs.

3.10 Costs

It is essential that policies address the issue of eligible costs relating to RDM since policy implementation will depend on the resources available to make data FAIR or accessible to lesser or greater extents. However, this is often tasked to the national research funder rather than specified in a national policy, plan or strategy.

Figure 11. Number of policies that allow justified costs for RDM.



As at January 2020, three national policies explicitly mention justifying costs associated with RDM and making data FAIR (explicitly or implicitly). These include the French *National Plan for Open Science,* the Government of Slovenia's *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020, and the* UK's *Concordat on Open Research Data*. Slovenia states that costs incurred related to OA to research data are eligible for reimbursement for example.[53]

[52] Slovenia: *National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015 - 2020,* 2015, p. 20
[53] Ibid

4. Country Profiles

4.1 Overview

In this section, we present the policy landscape by providing short country profiles and list within each, the policy in question and any other relevant documents and developments towards policy making on open science/open data. We present a short context for the work that is ongoing, and developments since the first version of this report back in 2016.

We have sought to identify where national open data policies are linked to other agendas, such as Open Access or Open Science more broadly. In addition to addressing the benefits of openness, it should be said that many of these policies are also explicit about situations where data should not be shared, for ethical, commercial or security-related reasons.

Below we present national policies (Table 1) and laws (Table 2), in two separate tables, with names of, and links to, each individual document. Table 3 presents links to National Funder Policies whereas Table 4 presents further analysis of each policy document.

Table 1 - List of National Policies in Europe; status January 2020

National Policies of EU Member States In alphabetical order by country code	
Country	**Name of policy**
CY	National Policy of the Republic of Cyprus for Open Access to Scientific Information
CZ	Action Plan for Implementation of the National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020
CZ	National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020
ES	State Plan for Research, Development and Innovation 2017-2020
FR	National Plan for Open Science
FI	Open Science and data - Action Programme for the Finnish Scholarly Community
IE	National Framework on the Transition to an Open Research Environment
NL	National Plan Open Science
SI	National Strategy of Open Access to Scientific Publications and Research Data in Slovenia 2015-2020
SK	The Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019

Selected non-EU National Policies	
CH	White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020
NO	National Strategy on Access to and Sharing of Research Data
SRB	Open Science Platform
UK	Concordat on Open Research Data (Policy of a UK multi-stakeholder group, including research funders and higher education associations)

Table 2 - List of National Laws; status January 2020

National Laws referring to Open Science, i.e. research data, in European Member States	
FR	Law for a Digital Republic
LT	Law on Higher Education and Research

Table 3 List of selected National Funder Policies

National Funder Policies	
AT	FWF Open Access Policy: Open Access to Research Data
BE	BELSPO Open Research Data mandate
DE	DFG Guidelines on the Handling of Research Data
LT	LMT Guidelines on Open Access to Scientific Publications and Data
PT	FCT Policy on management and sharing of data and other results arising from FCT-funded research
SE	FORMAS Guidelines for applicants
UK	UKRI Common Principles on Data Policy (Policy of UK national funder organisation UK Research and Innovation)

Table 4 - Countries with National Policies in Place[54]

MEMBER STATE / COUNTRY	TYPE OF POLICY (STATUTE, GOVERNMENT MINISTRY, FUNDER POLICY)	YEAR POLICY CAME INTO EFFECT	SPONSORING ORGANISATION (MINISTRY, FUNDER, ETC)	SCOPE / COVERAGE BEYOND DATA	LINKED TO OA / OPEN SCIENCE POLICY?	SOFT/ HARD[55]	COVERAGE OF SKILLS OR TRAINING?	MONITORING AND/ OR COMPLIANCE[56]
EU								
BE	Code of Ethics	2009	Learned Societies, supported by Federal Government	Protocols	No	Hard	No	No
CY	Joint policy of Government and Funder	2016	Working group involving government ministry, funder and universities	Publications	Yes	Soft	Yes	Yes
CZ	National Strategy	2017	Ministry of Science, Research and Innovation	Publications	Yes	Soft	Yes	No
ES	State Plan	2018	Ministry	Covers data alongside many other RDI related issues, including OA	Yes	Soft	Yes	No

[54] In this table we also include national funders that have had a significant national impact.
[55] Here we define a 'hard' policy as one that employs language such as "must" or "should", as opposed to soft policies which more gently advise or encourage.
[56] In this column, a "No" entry means either that compliance is not addressed explicitly or is devolved to a lower level.

MEMBER STATE / COUNTRY	TYPE OF POLICY (STATUTE, GOVERNMENT MINISTRY, FUNDER POLICY)	YEAR POLICY CAME INTO EFFECT	SPONSORING ORGANISATION (MINISTRY, FUNDER, ETC)	SCOPE / COVERAGE BEYOND DATA	LINKED TO OA / OPEN SCIENCE POLICY?	SOFT/ HARD[55]	COVERAGE OF SKILLS OR TRAINING?	MONITORING AND/ OR COMPLIANCE[56]
FI	Action plan	2018	Finnish Universities' Council of Rectors	Data only	No	Soft	No	No
FR	Law/National Plan	2016/2018	Parliament/Ministry	Covers data alongside many other ICT related issues, including OA	Yes	Hard	No/Yes	No
IE	National Framework	2019	Ministry for Training, Skills, Innovation, Research and Development	Publications, Infrastructure	No	Hard	Yes	Yes
LT	Law	2016	Parliament	Publications	Yes	Hard	No	Yes
NL	National Plan / Concordat	2017	Ministry	Publications	Yes	Soft	Yes	Yes
SK	National Action Plan	2017	Government	Publications	Yes	Soft	No	Yes
SI	National Policy	2015	Government	Publications	Yes	Hard	Yes	Yes
NON-EU								
NO	National Strategy	2017	Government	Only data	No	Hard	No	No

MEMBER STATE / COUNTRY	TYPE OF POLICY (STATUTE, GOVERNMENT MINISTRY, FUNDER POLICY)	YEAR POLICY CAME INTO EFFECT	SPONSORING ORGANISATION (MINISTRY, FUNDER, ETC)	SCOPE / COVERAGE BEYOND DATA	LINKED TO OA / OPEN SCIENCE POLICY?	SOFT/ HARD[55]	COVERAGE OF SKILLS OR TRAINING?	MONITORING AND/ OR COMPLIANCE[56]
CH	White Paper	2014	Universities	Covers data alongside many other ICT related issues, including OA	Yes	Hard	Yes	Yes
RS	National policy	2018	Ministry	Open Science	Yes	Soft	Yes	Yes
UK	National Policy / Concordat	2015/2016	Funding Council, Research Councils, Universities, Private Funder	Software (in the FAQs and Concordat)	No	Hard	Yes	No

4.2 Member states with existing national policies (11/27)

BELGIUM (BE)

An Open Access clause was adopted in the Belgian Copyright law in Sep. 2018. This law gives authors the right to make research publications available in open access if the publication is a result of research funded by public funds for at least 50%, with a maximum embargo period of 6 months for STM and 12 months for SSH. The law doesn´t mention data specifically. This law completes and reinforces the recent decree of the fédération Wallonie-Bruxelles (FWB) which requires the deposit in open access of scientific articles in institutional repositories. We have included this law here, as it demonstrates Belgium's commitment to OA, which could see a stronger focus on research data in the future.

The Belgian research funder, BELSPO, published an Open Research Data Mandate on 3rd December 2019. The mandate applies to digital data and associated metadata, collected by research projects partially or fully funded by BELSPO. The policy covers issues such as selection of repositories, the FAIR principles, data formats and licensing (recommending CCO and CC BY licences. The policy also recognises the that some data will need protecting and refers to "as open as possible, as closed as necessary" principle in that respect. DMPs are a requirement for all grantees who use, re-use or generate data and refers users to a BELSPO DMP template.

Preserving and providing access to data to allow verification of published research is addressed within the "Code of Ethics for Scientific Research in Belgium", which states that "the primary data of a research project and the protocols must be kept and made accessible during a determined and sufficient period of time. When publications, especially review and summary articles, do not contain all the necessary data for verification, the data should nevertheless be available." (p8.) The rationale for RDM stems from the need for verifiability of research results.

The Belgian approach, which is similar in some ways to Estonia's Statement of Principles, was led by the Learned Societies of Belgium, with the support of the Federal Government, and covers both primary data and the protocols and methods required to replicate scholarly findings. The document draws legitimacy from its origins within the Belgian learned societies, claiming that: "A code of ethics offers advantages in relation to legal or statutory standards. Indeed, it is impossible to elaborate precise rules covering all cases and circumstances. Furthermore, a code, which is based on the values shared by researchers, has a greater moral legitimacy than the rules imposed top down."

It is noteworthy for being the longest-lived of the policies considered in this report. While this is a 'hard' policy in terms of its language, the policy appeals more to the scholar's sense of being part of a community sharing high standards than some other 'carrot-and-stick' types approaches. This is demonstrated by the process of its creation, via the Learned Societies. Skills and training are addressed only in very general terms, in that researchers must become skilled in all techniques necessary to conduct their research, data management being but one of these.

Additional information
In addition to the Code of Ethics, "The Brussels Declaration on Open Access" of 2012 (signed by the federal, Flemish and Brussels-Wallonia Science Ministers), commits the signatories to

"investigating possibilities and new opportunities in the broad Open Access field, all in frequent collaboration with relevant stakeholders, considering Open Access to scientific publications a forerunner of new initiatives in the 'Open Data' and 'Open Science' areas".

Research Foundation Flanders (FWO), a national funding agency now mandates the use of DMPs for all projects funded by the agency.[57]

CYPRUS (CY)

The National Policy of the Republic of Cyprus for Open Access to Scientific Information was developed via a working group including government, national funder and universities, and approved at Government level in 2016, although – as with the Portuguese and Norwegian policies – it is important to note that the Cypriot policy encourages without mandating. The Horizon 2020 Open Data Pilot is currently the only 'hard' mandate governing HE research in Cyprus. The national policy has also been adopted by the national funder, the Research Promotion Foundation (RPF), and universities are expected to follow the national policy, but are also free to create their own institutional policies which align with it. The policy covers both data and Open Access publications and encourages Data Management Plans for funded projects and requests that all researchers submit data and metadata to a suitable repository. Monitoring of compliance is described, through a special Monitoring Mechanism. Revision of the policy is under discussion. A draft version of the revised document has been formatted.

CZECH REPUBLIC (CZ)

A National Strategy on Open Access To Scientific Information (2017–2020) was approved by the Government in 2017, which covers both research publications and research data. This document originates from the office of the Deputy Prime Minister and is pitched at quite a high level. In the first half of 2019, a long foreseen Action Plan for Implementation of the National Strategy on Open Access to Scientific Information of the Czech Republic for 2017–2020 was approved by the Czech Government. The Action Plan defines concrete goals and methods in the aim of fulfilling general ideas of the National Strategy.

Besides the National Strategy, several research institutions in the Czech Republic have their own Open Access policies, for example, AV ČR, MUNI, VŠB-TUO, and VUT, to name some of them. A brief overview of the current situation of Open Access in the Czech Republic can be found at http://openaccess.cz/en/open-access-in-the-czech-republic/

FINLAND (FI)

On 10th December 2019 a Declaration for Open Science and Research (Finland) 2020-2025 was approved by the National Open Science and Research Steering Group. The Declaration was jointly created by the Finnish Research Community and provides a common direction for the development of Open Science within the community. With regard to Open Research Data, the declaration refers to the principles of "as open as possible, as closed as necessary" and the FAIR principles. The next step will be for the research community to express its commitment to the declaration. Open Science Co-ordination will invite all the organisations of the research community in Finland to sign the joint Declaration for Open Science and Research in February 2020.

[57] https://www.fwo.be/en/the-fwo/organisation/data-management-plan/

The Finnish universities' council of rectors (UNIFI) established the 2018 Open Science and data - Action Programme for the Finnish Scholarly Community, which is being co-ordinated by The Federation of Finnish Learned Societies. The Action programme refers to FAIR data as one of the key three themes of the programme, the other two being 'open publications' and 'culture of openness'. The action programme follows on from the development of Finland's "Open Science and Research Roadmap 2014–2017", which was led by the government's Ministry of Education and Culture, and sets out the policy framework for a national approach. The document is both ambitious – its aim is "to make Finland the leading country for openness in science and research by 2017, and for the opportunities afforded by open science to be extensively harnessed in Finnish society" – and it is consequently broad in scope, covering publications, data, methods and tools. It is linked to the national Open Access strategy and is complemented by an Open Science Handbook and a Data Management Guide for Finnish researchers.

The language used is relatively hard, using terms such as "will" rather than "should". Monitoring and compliance responsibilities are divided amongst stakeholder groups, and responsibility for skills and training is delegated to the Doctoral Training Centres, placing it firmly within the academic domain, and putting the emphasis on shared best practice as opposed to a top-down mandate. The Roadmap refers to a forthcoming Certificate of Open Research, due in 2017.

FRANCE (FR)

The French approach is, together with Lithuania, the most high level of all: the "Law for a Digital Republic" (Loi n°2016-1321 pour une République numérique,) passed by the French Parliament in 2016. Designed by the French government as a framework for the development of the entire national digital economy, this is also the most wide-ranging of all the policies examined in this study, covering a multitude of digital issues, including both Open Access publications and research data. Article 30 ensures the re-usability of open data deriving from public funding:

> When data result from a research activity funded for at least half by the State, local authorities or public institutions, by national agencies or by European Union grant are not protected by a specific right or a particular regulation and have been made public by the researcher, the institution or the research agency, their reuse is free. The publisher of a scientific publication […] cannot limit the reuse of the research data made public in the publication.58

The French law is unlike most of the other policies in that it focuses on rights, rather than obligations, such as the right to access research data and the right to deposit publications in an Open Access repository. In practical terms, it seems somewhat obvious to say that implementation and monitoring will not be the duty of the French parliament but rather devolved to individual research organisations and publishers, although the ultimate arbiter of any disputes will be the French legal system. Being a law, it is very much a hard policy.

In July 2018, The Ministry of Higher Education, Research and Innovation adopted the ambitious National Plan for Open Science. The plan presents three broad commitments under the headings:

[58] OpenAIRE blog, New *French Digital Republic Law boosts support for OA and TDM*, 29.11.2016. https://www.openaire.eu/blogs/new-french-digital-republic-law-boosts-support-for-oa-and-tdm-1

- ‘Generalising Open Access to Publications’
- ‘Structuring Research Data and Making it Available through Open Access’
- ‘Be part of a sustainable European and international open science dynamic’

Each commitment is accompanied by a short Roadmap section, which outlines the stepping stones to meeting each commitment. The section on open data can be summarised in the following quote:

“Our ambition is to make sure that the data produced by French public research are gradually structured in accordance with FAIR principles (Easy to find, Accessible, Interoperable, Reusable), preserved and, when this is possible, open.”[59]

The Plan references the "Artificial Intelligence Strategy" which was launched in March 29, 2018, where the President announced the establishment of openness principles by default for all data published by projects funded by public funds. The plan furthermore recognizes the limitations placed on some data by law, professional secrecy, commercial limitations and IPR issues etc. Data processing will now be an eligible research expense in funded projects and researchers will be invited to submit their data to in certified data repositories. The plan also states that Data Management Plans will be generalized; a prize for research data will be set up to reward and highlight research teams who are excelling this this area and pledges the support of France to the RDA and software and technical solution development in this field.

The main national research funder (National Research Agency) has also an Open Science policy, which specifically addresses open research data and is guided by the principle of “as open as possible, as closed as necessary”. The agency draws their grantees attention to data management and all projects funded from 2019 requires data management plans.

Additional information

As a member of the G8, together with Germany, Italy and the UK, France is party to the G8 science ministers statement, made in London on 12 June 2013.[60] This statement “proposes to the G8 for consideration new areas for collaboration and agreement on global challenges, global research infrastructure, open scientific research data, and increasing access to the peer-reviewed, published results of scientific research.”

France is a member of The Open Government Partnership, and the OGP National Action Plan presents commitments to open science.

IRELAND (IE)

In July 2019 the Minister of State for Training, Skills, Innovation, Research and Development launched a new National Framework on the Transition to an Open Research Environment. The framework is a first step in a process to creation a National Action Plan for the transition to an open research environment in Ireland. The framework is aligned with European

[59] National Plan for Open Science (2018) p.6. http://cache.media.enseignementsup-recherche.gouv.fr/file/Recherche/50/1/SO_A4_2018_EN_01_leger_982501.pdf
[60] G8 Science Ministers Statement (2013), URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/206801/G8_Science_Meeting_Statement_12_June_2013.pdf

Commission policy and developed in response to EU Recommendation 2018/790 25 April 2018, which asks Member States to set and implement clear policies which cover open access to publications, management of research data etc, preservation and reuse of scientific information, infrastructures for open research, skills and competencies and incentives and rewards.[61]

With regard to open access publications, the frameworks states that "all Irish scholarly publications resulting from publicly funded research will be openly available by default from 2020 onwards."[62]

The framework specifically aims to enable FAIR data by supporting the foundational principles of Findable, Accessible, Interoperable and Reusable research data. To support FAIR data, the framework specifically highlights skills and competencies; research management planning and DMPs; interoperability across disciplines, systems and domains; the use of citations and persistent identifiers. Regarding data openness, the framework refers to the EC guidance that data should be "as open as possible, as closed as necessary"[63] and that funders and institutions should support requirements for data management and sharing through grant conditions, and monitor compliance.

Until now, the EPA (Environmental Protection Agency) was the sole Irish funder requiring data deposit from projects which they fund. "All significant datasets produced during the research project must be submitted to the EPA at the end of the project for archiving in the EPA Research Data Archive. Some other funders' OA publications policies also mention archiving data where possible, and a few HEIs, including Trinity College Dublin and University College Cork, have introduced RDM policies.[64]

LITHUANIA (LT)

Policy specifics

Although Lithuania has a Law on Higher Education and Research (2009, revised 2015 and 2016) which covers Open Access and research data, stipulating that "the results of all research works carried out in state higher education and research institutions must be communicated to the public," in practice the more relevant policy document is the Research Council of Lithuania's "Guidelines on Open Access to Scientific Publications and Data" (2016). These guidelines likewise cover both publications and data. Skills are not addressed, but responsibilities for various aspects of Open Access and Open Data are covered in detail, indeed in more explicit detail than most of the other national policies. As with France, the only other EU country known to have enshrined OA and research data in law, the focus is more on rights than on obligations, and the inference is that universities will be responsible for developing their own policies, procedures, guidance and monitoring systems.

[61] Commission Recommendation (EU) 2018/790 of 25 April 2018 on access to and preservation of scientific information C/2018/2375.*(OJ L 134, 31.5.2018, p. 12–18)*. Available online: http://data.europa.eu/eli/reco/2018/790/oj

[62] Government of Ireland, (2019) National Framework on the Transition to an Open Research Environment. Prepared by the National Open Research Forum, p. 6. Available online: http://norf-ireland.net/wp-content/uploads/2019/07/NORF_Framework_10_July_2019-2.pdf

[63] Ibid. p 8.

[64] In a distant but still noteworthy initiative, the Irish government's Government Reform Unit has recently published its "Open Data Strategy 2017 – 2022" which notes an intention to "Explore the possibility to broaden the initiative to include Open Research Data, in line with the requirements of the Horizon 2020 research programmes, and with emerging policy in Irish research funding bodies. Where research is publicly-funded, make the research findings available in Open Data formats." This exploratory work is anticipated to begin in 2021.

Additional information

Some research institutions in Lithuania, including Kaunas University of Technology Lithuanian University of Health Sciences, Mykolas Romeris University, Vytautas Magnus University, Lithuanian University of Educational Sciences and Vilnius Gediminas Technical University are understood to have adopted institutional policies aligned with the Research Council guidelines, the Horizon 2020 Open Access Mandate and Open Research Data Pilot, and the Guidelines on Data Management in Horizon 2020.[65]

NETHERLANDS (NL)

In the National Plan Open Science, dated from 2017, one of the Theme groups was "the optimal reuse of research data". In the spring of 2019 NPOS changed to a National Programme Open Science, and instead of Theme Groups ten projects were implemented under the flag of the NPOS. One of the projects is: "Exploration and optimization of the national data landscape". This project also focuses on "the optimal reuse of research data". The project will map all actors / organizations that are active in the field of research data management, that is to say, directly or indirectly assisting researchers in collecting, storing and archiving and also making (FAIR) research data available. This projects looks for good practices and areas for improvement, so that also proposals for optimizing the national data landscape can be made. This project is being carried out against the background of the development of the European Open Science Cloud (EOSC). One of the goals of this project is to give substance to the EOSC at national level.

Starting from 1st January 2020, the national funding agency Netherlands Organisation for Scientific Research (NWO) updated its data management protocol. The basic principles will remain. Researchers need to carefully manage data resulting from NWO-funded research and prospectively plan for data sharing and preservation. The guiding principle is that research data should be as open as possible, as closed as necessary. To ensure that data optimally benefits the wider research community and society, data should be made findable, accessible, interoperable and reusable (FAIR).

In 2019, NWO launched an initiative for the voluntary international alignment of research data management policies together with Science Europe. This initiative resulted in the Science Europe Data Management Plan Core Requirements and criteria for the selection of trustworthy repositories.

For all grants awarded from the 1st of January 2020, a new data management plan (DMP) template will apply. This template is in line with Science Europe's Core Requirements for Data Management Plans and it will better support researchers in ensuring that their data are FAIR.

SLOVAKIA (SK)

In 2017 „Open Government Partnership National Action Plan of the Slovak Republic 2017 – 2019" was approved and includes Open Science policy commitments. There are no special policies for Open Research Data. Open Data is mentioned in above do for example, to introduce the basic principles of Open Access to scientific publications under a public license under the Operational Program Research and Innovation; establish conditions for passportization of open research data under a public license and monitor its implementation in practice. Implementation work is ongoing.

[65] Further information is available in the blog post at http://eifl.net/eifl-in-action/open-access-lithuania

SLOVENIA (SI)

National open access strategy was adopted by the Government of the Republic of Slovenia in September 2015. The Strategy contains a chapter on an open data pilot, more or less in line with the EU H2020 pilot. It contains a requirement for Open Access by default, the production of a data management plan, and recommendations about where to store data for the long term. The government strategy was followed by an action plan which covers 2015-2020 wherein the national research agency will adapt the regulation and specify the scope and details of an open data pilot. It is expected that the coverage of the infrastructure will be broadened to include preservation and access as well as data storage and archiving.

SPAIN (ES)

The Spanish Government published the State Plan for Research, Development and Innovation 2017-2020 in January 2018. The plan includes a new focus on open access to scientific publications and research data.[66] The State Plan is the main instrument of the State Government for developing and achieving those objectives set at the Spanish Strategy for Science and Technology and Innovation 2013-2020, and at the Europe 2020 Strategy. The state plan presents a new focus on research data with a voluntary mandate that data from research funded by public funds should be stored and made available through Open Access for purposes of replication and reproduction of research and analysis.
The plan outlines how funded research projects may include, as an option, a plan for the management of research data that will be deposited in national/institutional/international repositories after the end of the project. The plan also recognises that data must be protected and some may not be amenable to openness for reasons of security, confidentiality or commercial reasons. The plan recommends that evaluation of researchers should take into account work published in open repositories and this regards both publications as well as research data.

Furthermore, two HE consortia ("Consorcio Madroño" in Madrid and CSUC in Catalonia) have developed RDM services to support their researchers. Work is currently underway to create guidance and policies for member institutions based on the LEARN model policy.[67]

4.3 Member states with no national policy but which are active in this space (15/27)

Thirteen further EU states do not yet have active policies in place but are known to be developing national approaches.

AUSTRIA (AT)

Austria has no national policies at present, but the Austrian Science Fund (FWF) has an open science policy, which mandates open access to research data, collected and/or analysed using FWF funds for projects approved from 1 January 2019, under new guidelines. The guidelines were developed following a pilot project of 12 research projects. The guidelines mandate open access to research data on which the research publications of the project are based. Research data are all data necessary to reproduce and to verify the results of the publications, including the associated metadata. All research data and their metadata should

[66] 2017-2020 Plan Estatal de Investigación Científica y Técnica y de Innovación (pages 30-31)
[67] LEARN, Highlights of the Fifth LEARN Workshop in Barcelona, 09.02.2017. http://learn-rdm.eu/en/highlights-of-the-fifth-learn-workshop-in-barcelona/

be FAIR (findable, accessible, interoperable and reusable) the guidelines provide criteria for choosing repositories, licencing models and persistent identifiers.

BULGARIA (BG)

The Bulgarian Government published a National Strategy for Development of Scientific Research in the Republic of Bulgaria 2017 – 2030. Better Science for Better Bulgaria. The strategy contains recommendations regarding the development of a national policy on open access to scientific results. Recommendation 13 states that "Planning open access and long-term conservation of the original data. The archiving of data should be planned, so as to ensure present and future access to them." [68]

CROATIA (HR)

No national policy is yet in place, but there is much on-going work in this area. National policies on access and preservation of scientific information (both publications and data) are under the responsibility of the Ministry of Science, Education and Sports. The Ministry strongly supports open access to scientific information to provide maximum impact from the research they support. The Croatian "Research and Innovation Infrastructures Roadmap 2014-2020" addresses the promotion of open access to research data, "especially data funded from public sources." (See p.8, paragraphs g to j.)

DENMARK (DK)

A Danish National Strategy for Open Access was published in June 2018. The strategy states that the implementation of Open Access is to take place through the green model and to monitor the transition this transition to OA publications, an OA indicator service has been set up. With regard to open access to research data The Ministry of Higher Education commissioned experts in 2017 to carry out a preliminary analysis of the potential for implementing FAIR data in Denmark, which may be a precede policy or strategy formation in this area. The report was published in March 2018 and highlights, for example, the need for national co-ordination and cooperation across research actors, libraries and research funding actors. The ministry webpage refers to a longstanding tradition of data management and refers back to work carried out in 2014 carried out by the Steering Group for National Data Management, which presented a strategy on data management in 2015 (in Danish.) This advocates a structured, holistic approach to data management, data preservation and data infrastructures, with a bottom-up process based on stakeholder collaboration. (Source: NordForsk (2016), "Open Access to Research Data – Status, Issues and Outlook"). A National Forum for Data Management (Danish language) was formed in 2015, with representatives from the Danish universities and national libraries and a secretariat from DeIC. Its vision is "to promote academic and research initiatives in research data management within universities and link them in a national and international cooperation."

The Danish policy employs terms such as "should" and "shall", although practical implementation and monitoring are devolved to individual research organisations via their own policies and procedures. The strategy, being a national one, is quite wide-ranging, covering both data and the software/protocols necessary to re-run experiments (although not publications, which are mentioned only in passing), noting also the need to foster research data management skills. The strategy is clearly the product of considerable liaison across and

[68] See OpenAIRE entry on Bulgaria for information on the recommendations. Available online: https://www.openaire.eu/item/bulgaria

between stakeholder groups and is sensitive to the differences between academic disciplines in terms of how research data management should be organised in practice.

ESTONIA (EE)

Responsibility for research data lies with the Estonian Research Council, who host a webpage dedicated to it (in English). Their report "Open Science in Estonia - Open Science Expert Group of the Estonian Research Council, Principles and Recommendations for Developing National Policy" outlines the current state of play. The expert committee behind this report comprise representatives of government ministries, Estonian universities and the national library, so here again we see an example of a collaborative, consultative and collegiate approach.

The document is wide-ranging in terms of its scope, covering publications, data, code and methodologies, and addresses the relationship between data and OA publications. It is not a mandate as such, but rather lays out a series of (fairly strongly worded) recommendations for a national policy. Skills are explicitly addressed, with responsibility for developing researcher abilities and understanding placed at the door of the research libraries. As in the Danish case, monitoring and compliance are expected to be devolved to individual institutions' policy documents. In practical terms, RDM in Estonia remains a work in progress. Most research projects will deposit their output, including data, with international publishers and third-party service providers. University libraries – such as Tartu and Tallinn - have joined the DataCite consortium and offer data archiving services. Some research centres are also members of CLARIN and DARIAH, and the national data archive for social science data (ESTA) is a CESSDA member.

GERMANY (DE)

Policy specifics

In Germany, DFG (the main German research funder) has "DFG Guidelines on the Handling of Research Data," which also point towards a set of "Data "developed in partnership between a number of high profile German research organisations and adopted by the Alliance of German Science Organisations in June 2010. The DFG policy focuses on research data, although it also addresses the software and methods necessary for validation and/or replication. It is a hard policy, and does not explicitly address skills or training, but does make reference to the necessity of national infrastructure funding, which could be seen to cover human as well as technical infrastructure. (The accompanying Principles document, an analogue of which the UK also uses in its FAQs, does address skills explicitly.)

As with the Dutch approach, the German policy emphasises the need to formally recognise the effort and time required for data management:

> The commitment and efforts of researchers to make research data available, for example the subject-specific further development of the discussion process or the technical possibilities of archiving, evaluating and networking research data should be given greater emphasis in the appraisal of scientific qualifications and achievements.

Additional information

In 2016 the Helmholtz Association, a union of 18 German scientific-technical and biological-medical research Centres, adopted a position paper on the management of research data. This includes a commitment to "store research data from the Centres within suitable data

infrastructures and make them available openly and free of charge for subsequent use by science and society."

As a member of the G8, together with France, Italy and the UK, Germany is party to the G8 science ministers statement, made in London on 12 June 2013.[69] This statement "proposes to the G8 for consideration new areas for collaboration and agreement on global challenges, global research infrastructure, open scientific research data, and increasing access to the peer-reviewed, published results of scientific research."

GREECE (EL)

Law 4310/2014 supports open access to publicly funded research, however Greece does not have a national Open Access/Open Science policy as of yet. On the 29 and 30 November 2018 OpenAIRE organised a Greek Open Science Symposium which aimed at understanding the current research ecosystem and prioritise actions towards the development of a National Open Science Strategy. Drawn from discussions during the 1st day, a proposal for the re-formulation of a National Open Science High Level Task Force under the auspices of the General Secretariat of Research and Technology (GSRT) was made.

HUNGARY (HU)

No policy is yet in place, but first steps are being taken in Autumn 2017, with the formation of a joint committee on open science. The committee has produced a policy draft which is currently being discussed.

ITALY (IT)

There is no known national policy as yet, but there have been announcements about a national policy on Open Science and research data from the Ministry of Research and Education. A recent report from the Ministry (June 2016) makes reference to it:

> The current Italian National Research Program aims to encourage the development and dissemination of Open Science and Big Data [.] The plan is to adopt a national policy on the deposit, open access and the reuse of products and research data, in consideration also of big data. In this regard, a working group will be set up to define and propose short strategies, guidelines, implementation plans and shared tools at inter-institutional level, European and international level[.] (Translated from p. 74.)

The Conference of Rectors of Italian Universities, CRUI, has a Working Group on Open Access, which is planning to take action in this area. At the same time, several individual universities and research centres are creating their own policies to manage research data and provide support to researchers; some research centres have consolidated experience in research data management in their own specifics domains. A small working group (comprising IT, librarians and research administrators from five Italian universities) Italian Open Science Support Group (IOSSG) has produced templates for institutional research data policy, together with implementation guidelines. In recent years several RDM workshops have been organised under the auspices of OpenAIRE, RDA and the Italian Association for the Promotion of Open Science, but the lack of a single, central body to coordinate these efforts has been noted. In 2019 the group proposed to produce a guide for data repository compliance to FAIR principles.

[69] G8 Science Ministers Statement (2013), *op. cit.*

A newly formed working group ICDI (Italian Computing and Data Infrastructure) was recently created by representatives of some of the main Italian Research Infrastructures and Infrastructures with the aim of promoting synergies at national level in order to optimize Italian participation in current European challenges in this sector, including the European Open Science Cloud (EOSC), the European Data Infrastructure (EDI) and HPC. Due to its recent formation, it is as of yet unclear what activities on open research data will be carried out and what its role will be within the Italian research landscape.

Furthermore, as a member of the G8, together with France, Germany and the UK, Italy is party to the G8 science ministers statement, made in London on 12 June 2013.[70] This statement "proposes to the G8 for consideration new areas for collaboration and agreement on global challenges, global research infrastructure, open scientific research data, and increasing access to the peer-reviewed, published results of scientific research."

LUXEMBOURG (LU)

Luxembourg has had a National Policy on Open Access since 2015, which focuses on open access to publications. The national research funder (FNR) is a strong supporter of OA and led the policy's adoption. The Open Science Forum was held by OpenAIRE in Luxembourg in November 2018 and ahead of the event a working group consisting of stakeholders including CEOs from Luxembourg research institutions, as well as researchers and representatives from OpenAIRE, gathered to discuss a Luxembourg National Plan for Open Science. This working group will define a Luxembourg-wide plan for open access to science, with a goal to implement the plan by 2020. Five principles, including publications in open access journals, making data openly available, developing infrastructure, as well as making adjustments to how researchers and proposals are evaluated with a focus on open science practice, will be at the heart of the open science plan for Luxembourg.

MALTA (MT)

Malta does not have a national Open Access/Open Science policy. Open Access to publicly funded research is anchored within Malta's National Research and Innovation Strategy 2020. There is work underway to compile a National Open Science Policy for Malta, which is currently being undertaken by The University of Malta (UM) Library and MCST and other national stakeholders. Malta has submitted an application for support under the H2020 Policy Support Facility so as to implement a National Open Access Policy. The University of Malta adopted an Open Access Policy which was approved by Senate on 20th September, 2017 but this focuses solely on open access to publications.

POLAND (PL)

An initial document on the future of OA in Poland was published in 2015 with the title "Directions of the development of open access to research publications and research results in Poland. The document addresses data briefly, in a single paragraph stating that, in line with EC recommendations, Open Access should also be extended to research data, and recommends that research institutions and individual researchers should open research data taking into consideration world trends and best practices. These recommendations are non-binding.

In parallel, the Polish Ministry of Science and Higher Education has also undertaken to:

[70] G8 Science Ministers Statement (2013), *op. cit.*

- Analyse how data are processed, preserved, curated and shared in the Polish research environment;
- Identify best practices, strategies and policies for Open Data worldwide;
- Consult with key stakeholders to identify noteworthy differences between specific disciplines.[71]

In April 2018, 'Report on Open Access Policy in Poland' along with guidelines and educational materials on Open Access was published by the Ministry, which summarises OA efforts for the last two years, which has been hindered by a number of barriers such as lack of resources and systematic approach. The Ministry has declared that a new Open Access policy will be published.

PORTUGAL (PT)

A preparation of a National Policy for Open Science is underway in Portugal. The work is initiated by the Government and Ministry for Science, Technology and Higher Education (MCTES). The website set up for Open Science in Portugal, describes the three pillars of the policy to be: (1) transparency in practices, methodology, observation and data collection, (2) public availability and re-use of scientific data, (3) public access and transparency in scientific communication, (4) use of web-based tools to facilitate scientific collaboration.

FCT (the national research funder) has a policy on management and sharing of data and other results arising from FCT-funded research. In practice this is a general, aspirational call for researchers to share their data, and not a mandatory policy. The policy document is brief, at under two pages in length, and very much on the soft (suggest and encourage) end of the scale. It "encourages researchers to make available the data resulting from R&D projects it finances in appropriate Open Access databases, where possible," with scope for opting out if the nature of the data does not lend itself to open sharing. The focus is on sharing data (and other research outputs, such as samples and software models) "*with other researchers*." [our italics]

The policy suggests that a data management plan should be produced, proposing a basic template/table of contents, and that best practice be followed for whichever scientific discipline the research sits closest to. The only mandatory element of the policy is that FCT must be credited as a funder of any dataset made openly available. Skills are not addressed in the document, and – given the soft, aspirational approach – compliance is not covered either, but the document is clear that the policy will continue to be developed in order to "converge with international best practices, in particular with the initiatives of this domain that may be established within the European Union."

[71] Further information is available in the blog post at https://www.openaire.eu/blogs/poland-initial-open-access-policy-1

ROMANIA (RO)

Currently, Romania does not have a national Open Access/ Open Science policy although discussions are underway with various stakeholders with the view to develop one. Open Access is however mentioned in The National Plan for Research and Innovation 2015-2020. During the coming period, the UEFISCDI (Executive Agency for Higher Education, Research, Development and Innovation Funding) and the OpenAIRE Romania NOAD will start implementing a project financed through European structural funds which includes a strong component dedicated to the elaboration of a proposal for an Open Science national strategy. In late 2018, the Romanian Government did approve the 2018-2020 National Action Plan. The Plan includes a commitment which aims to lead to the adoption of a national Open Access strategy to research results, by implementing pilot programs and substantiating Open Government Partnership research and public consultations. The institution in charge with this activity is the Romanian Ministry of Research and Innovation.

SWEDEN (SE)

While no policies are yet in place, the Swedish Research Council (Vetenskapsrådet,VR) proposed a set of national guidelines for open access to scientific information in January 2015. This proposal includes a section on Guidelines for Open Access to publications, and a description of a process towards providing Open Access also to research data. The intention is that all research data, produced in whole or in part through public funding, should be made openly available as soon as possible, with the default responsibility for archiving and preservation of data falling on the shoulders of the Swedish HEIs, with pathfinder work currently underway coordinated by the Swedish Research Council (in a similar way to the National Library's coordination of Open Access implementation. (Source: NordForsk (2016), op. cit.)

In 2017 VR received the Swedish government's assignment to coordinate the national implementation of open access to research data. This will be carried out in conjunction with the National Library of Sweden and the National Archive of Sweden. VR intends to be a driving actor for policies regarding open access to research data, particularly with regard to developing guidelines and generating incentives for researchers to make their research data open.

In 2018 VR received the assignment from the Swedish Government to develop criteria assessing the extent to which research data, partly or fully resulting from public funding, complies with the so-called FAIR principles. The results are reported in the report Criteria for FAIR Research Data (in Swedish, which also gives recommendations on how to achieve FAIR research data in Sweden.

4.4 Member states with no policy or activity (1/27)

Those EU member states which are not covered above are understood to have no national open science or open data policies in place, nor any national activities underway, although there are individual research organisations in these countries which are leading the way by setting up institutional level working groups, and by organising and hosting symposia.

LATVIA (LV)

Latvia does not have a national Open Access/Open Science policy yet. However, in 2016 the Ministry of Education and Science released the "Latvian European Research Area Roadmap 2016-2020", listing the promotion of Open Access as a top priority.

4.5 Selected non-EU countries

ICELAND (IS)

Discussions on Open Access to research data have recently been initiated both within the Ministry of Education, Science and Culture and at the National and University Library, and awareness of the importance of issues relating to open access to digital research results, especially for smaller countries, is growing. The Ministry of Education set up a working group late 2019 who should focus on developing a policy on open science in accordance with the strategic plan for Icelandic higher education and research for the years 2017–2021. The importance of structured data management and open access to research data is likely to be included there. Currently, no requirements on (e.g.) providing a data management plan are imposed when applying for a grant in the public competitive funds. (Source: NordForsk (2016), op. cit.)

NORWAY (NO)

The Norwegian National Strategy on Access to and Sharing of Research Data was published in December 2017 and "states three basic principles for publicly funded research data in Norway:

- Research data should be as open as possible and as closed as necessary.
- Research data should be processed and adapted in such a way that the content of the data can be exploited in the best possible way.
- Decisions on archiving and facilitating research data must be taken in the research communities.

The Government established a new directorate (UNIT) in 2017 that, in addition to offering services, will also coordinate and harmonise IT services, increase synergies, reduce duplication of efforts and oversee the implementation of the aforementioned principles." [72]

SERBIA (RS)

Serbia adopted a national science policy called 'Open Science Platform' in July 2018. The Ministry of Education, Science and Technological Development (MESTD), which is also the main research funder in Serbia developed and published the policy, which is the national OA policy. The PASTEUR4OA and OpenAIRE projects contributed during the drafting phase.
The policy sets out the basic requirements for the depositing procedures, responsibilities for training, administration, monitoring the efficiency of OA policies, etc., but details will be set out in institutional policies. According to the policy, universities and research institutes should define and adopt their open science platforms within six months. Progress and compliance will be monitored by the Ministry. The overall focus of the policy is on OA publications

[72] NEIC (2018) The State of Open Science in the Nordic Countries: Enabling data-driven science in the Nordic countries. A report by Anders O. Jaunsen for NEIC, September 2018, p. 13. Available online: https://www.nordforsk.org/en/publications/publications_container/state-o-open-science-in-the-nordic-countries/view

resulting from MESTD research funding, which should now be mandatory (Green OA). Open research data is not mandated but recommended. The policy furthermore specifies instances where data should not be shared.

SWITZERLAND (CH)

As Switzerland is a federacy, a national policy will most likely never be created. However, strategy papers have been produced, that set the guiding principles for the main stakeholders, the cantonal universities and the two federal universities (ETH&EPFL). In 2019 Swissuniversities, the common voice of Swiss Universities, published Open Access guidelines, which refer to publications only. In October Swissuniversities were commissioned by the State Secretariat for Education, Research and Innovation (SERI) to extend the National Strategy on Open Access to Open Research Data and to coordinate stakeholder activities with the Swiss National Science Foundation (SNSF), SWITCH and the Swiss Data Science Centre (SDSC).

In 2013 the programme "Scientific information: access, processing and safeguarding," initiated by the Rectors' Conference of Swiss Universities (Program SUC 2013-2016 P-2), addresses research data in its "White Paper for a Swiss Information Provisioning and Processing Infrastructure 2020". The Swiss approach is the least "policy-like" of the documents examined, and the most like a project plan. Labelled as a white paper and led by the umbrella group representing the heads of the Swiss universities, the document is wide-ranging in scope, addressing data amongst a number of other ICT infrastructure issues, including Open Access publications. It is difficult to categorise this document as hard or soft, as it is more of a project plan, setting out what will be done. Non-compliance does not seem to be a likelihood, although reference is made to a potential future monitoring role for the Swiss National Science Foundation (SNSF). Further to this, in 2017 the SNSF released its Research Policy on Open Research Data, in which it states that the SNSF expects all researchers to store their research data, to share the research data (unless there are ethical or legal reasons not to do so) and to deposit their data and metadata into repositories in re-usable formats, where they are open and easily findable.

UNITED KINGDOM (UK)[73]

In December 2018, UK Research and Innovation (UKRI), the umbrella organisation for the UK Research Councils presented Common principles on data policy, which is the overarching framework for the individual UK Research Councils. All UKRI funded researchers should make their data available to the research community in a responsible and timely manner, unless there are justifications for not doing so. The seven principles describe publicly funded research data as a "public good" that should be made openly available with as few restrictions as possible. The principles stipulate the use of data management plans, good metadata practices and citations. Furthermore, they recognise the ethical and legal barriers to publishing data, and the use of embargoes to allow researchers to fully use their data, before publication. The last principle, importantly, recognises the costs associated with data management and sharing of research data and presents that as an eligible part of research funding applications.

The UK approach is multilevel, and also comprises the high level "Concordat on Open Research Data" (2016), which was signed by the HE funding council (HEFCE), the umbrella group representing the seven national research funders (RCUK), the umbrella group

[73] The United Kingdom left the European Union on 31st January 2020 and here counted along with non-EU countries for the first time

representing c. 135 of the c. 1964 UK universities (Universities UK), and one large and influential private funder (the Wellcome Trust).

Additional information

As a member of the G8, together with France, Germany and Italy, the UK is party to the G8 science ministers statement, made in London on 12 June 2013.[74] This statement "proposes to the G8 for consideration new areas for collaboration and agreement on global challenges, global research infrastructure, open scientific research data, and increasing access to the peer-reviewed, published results of scientific research."

5. Looking forward

As noted in our last update, the new EU's Directive on Open Data and the Re-use of Public Sector Information (PSI Directive) which came into effect in July 2019 puts a greater focus on enhancing the way that publicly funded research data should be made available, accessed and shared. The directive places an emphasis on improving access to publicly funded research data and Article 10 states that "Member States shall support the availability of research data by adopting national policies and relevant actions aiming at making publicly funded research data openly available ('open access policies') following the principle of 'open by default' and compatible with FAIR principles." As the legislation now needs to be implemented in each EU Member State, we anticipate that the number of new national policies relating to Open Data will increase and that the scope and coverage of existing national policies will be extended.

Also mentioned in our last update, the forthcoming European Commission R&I Framework Programme Horizon Europe will also likely be a key influence on the development and refinement of national policies. Horizon Europe emphasises the importance of Member State in "accelerating the transition towards open science, by monitoring, analysing and supporting the development and uptake of open science policies and practices, including the FAIR principles, at the level of Member States, regions, institutions and researchers, in a way that maximises synergies and coherence at EU level." The regulation goes further to encourage modernising recognition and reward systems on national levels, which are so crucial to the success of OA and OS. OA to research data is the general rule under the terms and conditions for the new EU funding programme's grant agreement. Details of the Horizon Europe Grant Agreement are currently being fleshed out.

A theme likely to dominate the policy landscape in the years ahead is Research Integrity. Already a key area of activity in several Member States, Horizon Europe's emphasis on transparency in support of Research Integrity will likely be a key influencer for other Member States in the earlier stages of defining and/or adopting concordats or codes of research practice.

The next policy update is planned for August 2020. SPARC Europe and DCC welcome ideas on how to make these reviews and the data collected most useful. To get involved or to provide suggestions, please contact the DCC on info@dcc.ac.uk.

[74] G8 Science Ministers Statement (2013), *op. cit.*

6. Acknowledgements

Many thanks are due to several colleagues from across Europe who have helped to identify relevant policy changes or confirmed their absence: the 'Additional Information' sections are largely down to information and insight that they provided. Thanks in particular are due to Anthony Ross-Hellauer and Anja Oberlaender (Austria & Germany), Myriam Mertens and Gwen Franck (Belgium), Milena Dobreva (Bulgaria & Malta), Anton Gerunov (Bulgaria), Vasiliki Koukounidou (Cyprus), Lenka Nemeckova and Michal Růžička (Czech Republic), Jesper Boserup Thestrup (Denmark), Raivo Ruusalepp and Priit Tamm (Estonia), André Dazy (France), Victoria Tsoukala, Marina Angelaki and Elli Papadopoulou (Greece), Gyöngyi Karácsony (Hungary), Anna Sigríður Guðnadóttir (Iceland), Breeda Herlihy and Niamh Brennan (Ireland), Paola Gargiulo and Liise Lehtsalu (Italy), Daina Ostrovska (Latvia), Gintare Tautkevičienė (Lithuania), Ryan Scicluna (Malta), Ingrid Dillo, Marjan Grootveld, Just de Leeuwe and Elly Dijk (Netherlands), Jens Harald Aasheim (Norway), Lidia Stępińska-Ustasiak (Poland), Eloy Rodrigues (Portugal), Ioana Spanach (Romania), Biljana Kosanovic (Serbia), Reme Melero (Spain), Irena Vipavc Brvar, Janez Štebe and Mojca Kotar (Slovenia), Beate Eellend (Sweden), André Hoffmann (Switzerland), Silvia Horakova (Slovakia), Iryna Kuchma (EIFL), Marlène Delhaye and Marin Dacos (France).

We gratefully acknowledge that, for this update, we have co-operated with the FAIRsFAIR project on collecting and analysing the policy data.

This work was commissioned by SPARC Europe, co-financed by SPARC Europe and the Digital Curation Centre (DCC), and carried out by DCC.