European Commission

Study on scientific publishing in Europe

Development, diversity, and transparency of costs

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Report

Research and Innovation

Study on scientific publishing in Europe: development, diversity, and transparency of costs

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EUROPEAN COMMISSION

Study on scientific publishing in Europe

Development, diversity, and transparency of costs

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2024 Directorate-General for Research and Innovation

Table of contents

STUDY ON SCIENTIFIC PUBLISHING IN EUROPE - DEVELOPMENT, DIVERSITY, AND TRANSPARENCY OF COSTS

Executive summary

With the growth of open access, financial flows have become progressively complex. They are also in large part untransparent, especially where they are tied to previous subscription spending. Academics, researchers, librarians, and eventually national funders, often lack information on how public money is being spent in publishing research, and what conditions are attached.

The Council of the European Union has emphasised the need to take concrete measures against the proliferation of insufficiently transparent contractual arrangements in interactions of institutions and funders with publishers, and together with member states work towards a high-quality, transparent, open, trustworthy, and equitable publishing system including a variety of models that do not depend on article processing charges.

To support the Commission's policies on open access, this study was commissioned to provide a deeper understanding of the issues around practices and costs of scholarly publications, offer an analysis of the situation, and propose advice for policy actions.

This report first provides an overview of information on national (funder) policies regarding the financing of publication costs, as well as of national (consortium) deals and national funder deals for OA publishing. It then explores the availability of financial information on publication costs, including current gaps and limitations. The next part of the report consists of an analysis of the development and diversity of scientific publishing in Europe, fully based on open data sources. Finally, the study includes advice on possible actions that could be taken by the Commission and/or EU Member States to increase the transparency of publishing costs.

The geographical scope of the study is restricted to EU Member States with the addition of a number of countries for which information on OA policies and national / consortial agreements is readily available: Norway, Switzerland and the United Kingdom. These countries, in particular also have long-standing mandates and OA policies that will contribute to the understanding of how OA publishing is financed across Europe.

National (funder) open access financing policies

This study highlights the lack of complete, up-to-date and comparable information on publication costs and the support thereof by national governments, funders, and library consortia. Regarding national open science policies and financial support, the most comprehensive and up-to-date inventory is the Survey on National Contributions to EOSC 2022, which looked in detail at requirements around publication routes, embargo times, licenses and rights retention, as well as modes and conditions for financial support.

In total, 17 countries in scope of this report provided information on how much their country financially invested in open access to publications in 2021, with amounts ranging from 0-30 million Euros, with 3 countries reporting zero national investment (Denmark, Estonia and Latvia), two countries with annual investment less than 1M (Cyprus and Luxembourg), seven countries with annual investment between 1-7 M (Bulgaria, Germany, Norway, Poland, Slovakia and Slovenia), and three countries spending between 20-30M (Finland, France and Spain).

Information on funder policies is scattered, with the exception of policies of funders that, as part of cOAlitionS, are aligning their policies with Plan S. A 2019 survey conducted by SPARC Europe showed that funders that cover APCs generally do so by treating APCs as eligible costs of grant funding, with a minority (also) paying APCs directly. Such direct payment can be through publisher agreements in which the funder participates, as is the case for FWF in Austria. Finally, funders in some countries supply dedicated grants to RPOs from which APCs can be paid.

While funders can and do cover open access publications costs for their grantees, it is often more complicated to fund diamond open access and non-profit publishing infrastructure, other than through temporal grant funding, e.g. for specific development projects. Nonetheless, some funders in the European region do have specific support for such initiatives. Here again, FWF is an example, funding a number of open access infrastructures as does NWO in the Netherlands. In addition, the European Commission set up Open Research Europe (ORE) as a dedicated platform to publish research outcomes resulting from their funding at no direct cost for authors, and is looking to transition ORE to an collective non-profit publishing service run on an open source platform.

Publisher deals and other forms of open access financing

Information on institutional support of open access publishing, often through library consortia, is available from both consortia and publisher websites. These sources often do not correspond (e.g. where publisher deals are made with individual institutions, rather than consortia), making obtaining a complete picture difficult. In addition to deals with traditional commercial and society publishers that include open access, in many countries there is organised support for other open access models (e.g. through publisher deals for APC-based full open access journals, Subscribe2Open, diamond open access and non-profit publishing infrastructure and services). The extent of this support is most apparent in countries that also have extensive contracts with traditional publishers for open access publishing in subscription journals (e.g. Austria, Germany, Netherlands, Norway, Spain, Sweden, Switzerland and the UK).

The most comprehensive information on institutional support is available for transformative agreements (that combine subscription access with open access publishing) through the ESAC Registry. Around half of current agreements in the countries in scope for this report are indicated as being (fully) disclosed and published. Some countries (like the UK, Ireland, Sweden and the Czech Republic) manage to negotiate public sharing of contracts with all or almost all publishers, while other countries can or do share only part of their contracts, or none at all – Austria being an example of the latter case. While many contracts do indeed include the total cost of the contract, far fewer include details on the split between reading and publishing costs, and how this is determined. In addition, there are varying models in use in these agreements regarding the number of publications covered, making an estimation of per-article costs for open access publishing especially difficult.

These publicly available contracts, in addition to other sources like OpenAPC, provide information on what funders, research performing organisations or individual authors pay for open access publishing. While from the perspective of these stakeholders, this does represent their costs, for publishing organisations, it does not represent the cost of providing services for open access publishing, but rather the revenue received for these services. In addition, the prices charged usually comprise full publishing services (and sometimes publishing and reading services combined). This makes it harder for research performing organisations and funders to meaningfully compare prices between publishers, and assess to what extent they relate to the individual elements of publishing services provided.

Development and diversity of scientific publishing

To complement and contextualise information on the costs research performing organisations and funders spend on open access publishing (both for APC-based and non-APC-based models), the development and diversity (in open access models) of scientific publishing in the countries in scope of the report was analysed. Challenges in obtaining this information include variation in definitions of OA models, unrestricted availability of bibliographic information, coverage and quality of the required variables in bibliographic databases, and the linking of publications to funding policies of research performing organisations and funders.

Using exclusively open data sources, marked differences are observed between countries in the development of publications in hybrid journals, in full OA journals (and within that, in the proportion of publications in non-APC based journals as well as full OA journals not indexed in DOAJ), and repository-based OA.

Potential for assessing costs of open access publishing

Theoretically, by combining information on publication patterns with information on costs for open access publishing, estimates can be made on total costs of open access publishing for research performing organisations, funders and national governments and how these are distributed across open access models. However, there are important limitations to the information that is currently available to link publication output to publishing costs at the level of institutions, funders and countries. These include the often opaque split between publishing and reading costs in transformative agreements, the varying models in use in these agreements, the limited coverage of APCs included in initiatives like OpenAPC, the availability at scale of current and historical list prices, and the distributed nature of information on support of non-APC publishing initiatives and community-based publishing infrastructure. In addition, identifying output resulting from specific funding (e.g. specific national funders), and identifying eligibility of articles in publisher deals requires good quality (open) metadata.

Based on the observations in this study, a number of recommendations are made to national governments, (national) research funders and research performing organisations to increase transparency around financial aspects of open access publishing. The recommendations focus on the availability of standardised information on open access policies, transparency of publisher contracts including financial information, availability of information on open access investments in general, public availability of publication metadata relevant to open access, and transparency on costs of open access publishing as supplied by publishers.

0. Introduction .

0.1. Context and background information

Open access in scholarly publishing and communication has gradually become mainstream in an environment dominated by a handful of commercial and often long-established publishers, trying to retain and, where possible, expand their customer base and revenue. Meanwhile, newer, independent, specialised, and non-for-profit journals and platforms are bringing innovative solutions and practices, competing to attract authors and offer them an improved and/or more equitable publishing experience. They are also competing with established publishers to obtain the necessary funding to sustain their operations and further development.

Research performing organisations (RPOs), research funding organisations (RFOs) and governments face the challenge on how to best create and support an environment where public money spent on research optimally benefits society, including through open access availability of research results. On one hand, this often means setting mandates on open access publishing and other open science practices, and aligning recognition and rewards systems with principles of open science. On the other hand, it requires enabling researchers to meet these demands and expectations, by providing them with the practical support and financial means to make their research results openly available (Bosman et al. 2021a).

There is a variety of funding strategies for open access and a vast array of cost types and charges, from individually charged article-processing charges (APCs) for articles in full open access journals and open access articles in subscription journals to bundled deals that provide reading and publishing rights to authors affiliated with participating RPOs, often with a stated aim of transforming a publisher's income and portfolio more fully to open access (for an overview see Hinchliffe 2019). Full open access publishers increasingly offer similar deals to RPOs, covering publication in the publisher's portfolio of full open access journals, often with a discount on the price of individual APCs.

While these arrangements cover open access publishing for researchers affiliated with participating institutions (or willing and able to pay APCs through different means), other models provide more equitable opportunities for open access publishing – including Subscribe2Open (S2O, see https://subscribetoopencommunity.org/) which repurposes existing subscription processes to convert the journal to full Open Access without APCs, and various models to finance non-APC journals, including through grant funding, collective funding models and in-kind support (Bosman et al., 2021b). Finally, some RFOs, including the European Commission, have started to finance funder-specific publishing platforms to publish research outcomes resulting from their funding at no direct cost for authors (Johnson 2022, Ross-Hellauer, Schmidt & Kramer, 2018).

In navigating this landscape, RPOs and RFOs not only have to make decisions on where and how public money is best spent to achieve an open access scholarly publishing ecosystem, but also have to coordinate this spending, often at a national level. Publisher contracts are often negotiated at consortium level, which gives rise to questions on how to distribute reading and publishing costs among consortium members, especially when there is a mix of research-intensive and teaching-intensive RPOs (Banks, 2019, van der Vooren, 2019). In addition, when both RFOs and RPOs are financing open access, coordination between these two types of organisations can be beneficial.

Thus, with the growth of open access, financial flows have become progressively complex. They are also in large part untransparent, especially where they are tied to previous subscription spending. Academics, researchers, librarians, and eventually national funders, often lack information on how public money is being spent in publishing research, and what conditions are attached.

Such overall opaqueness regarding charges and contractual arrangements eventually led EU Research Ministers in June 2022 to issue, as part of the Council conclusions on Research assessment and implementation of Open Science (Council of the European Union, 2022), a point reading as follows:

"[The Council of the EU] ASKS the Commission to monitor, together with Member States, the development and diversity of scientific publishing in Europe and the practices and costs of scholarly publications, including the transparency of billing costs, taking stock of and sharing existing best procedures developed at national level, and, wherever possible, disclosing the findings, and to this end ENCOURAGES Member States or, where appropriate, research performing organisations, in cooperation with the Commission, to take concrete measures against the proliferation of insufficiently transparent contractual arrangements in their interactions with publishers;''

In addition, the May 2023 Council conclusions on High-quality, transparent, open, trustworthy and equitable scholarly publishing (Council of the European Union, 2023) recognises that increasing costs of paywalls for access to scientific publications and for scholarly publishing, makes them potentially unsustainable for public research funders and institutions accountable for the spending of public funds. These conclusions note the variety of models that do not depend on article processing charges and stress the importance of supporting the development of such models led by public research performing organisations. They specifically highlight the importance of not-for-profit, scholarly open access publishing models that do not charge fees to authors or readers and where authors can publish their work without funding/institutional eligibility criteria.

To support the Commission's policy on open access, this study was commissioned to provide a deeper understanding of the issues around practices and costs of scholarly publications, offer an analysis of the situation, and propose advice for policy actions.

0.2. Objectives

The aim of the study is to support further policy action and help define the next steps as to how the Commission, with EU Member States, may respond to the challenge posed in the above point of the Council Conclusions on research assessment and implementation of open science.

The report will address the following core topics:

0.2.1. Overview of national (funder) policies regarding the financing of publication costs.

This part will be comprised of an inventory, for EU Member States and a number of additional countries, of national and national funder open access financing policies. Institutional open access financing policies, though relevant in the landscape as a whole, are out of scope for this report.

0.2.2. Overview of national (consortium) deals and national funder deals for OA publishing

This part is comprised of an inventory, for EU Member States and a number of additional countries, of existing national (consortium) deals and national funder deals for OA publishing in EU Member States and a number of additional countries.

0.2.3. Overview of currently available information on publication costs

This part will analyse the availability of financial information required with a level of detail encompassing breakdown of reading and publishing costs in read-and-publish deals, and per-item and total amounts involved in open access funding policies for the deals and financing policies identified. It will make an inventory of the methods and data sources available and their limitations, and summarise existing initiatives to provide an estimation of total publication costs.

0.2.4. Analysis of the development and diversity of scientific publishing in Europe

Such an analysis will be used to link more general publication trends to open access policies and open access financing practices. This will allow to understand correlations and provide potential indications of direct or indirect influence of open access policies and financing practices on publication trends (e.g. shifts to journals/publishers under read-and-publish deals, shifts towards or away from green open access, shifts towards diamond open access, shifts towards higher or lower total OA spend etc.).

0.2.5. Possible actions

Finally, the study will include advice on possible actions that could be taken by the Commission and/or EU Member States to increase the transparency of publishing costs.

0.3. Geographical scope

Geographical scope is restricted to EU Member States with the addition of a number of countries for which information on OA policies and national / consortial agreements is readily available: Norway, Switzerland and the United Kingdom. These countries, in particular, also have long-standing mandates and OA policies that will contribute to the understanding of how OA publishing is financed across Europe.

Additional parameters that are used to classify or group countries in the analysis are continental subregions (Eastern, Northern, Southern and Western Europe, according to United Nations Statistics Division (UNSD), 2023), and Research and Innovation (R&I) performance as defined by R&D expenditure as proportion of GDP (latest data from 2019-2020) (World Bank Data, 2022) (Table 1, Figure 1-2).

Country	EU member state	Geographic region	R&D expenditure (% of GDP)
Austria	X	Western Europe	2.99
Belgium	X	Western Europe	2.46
Bulgaria	X	Eastern Europe	0.80
Croatia	X	Southern Europe	0.79
Cyprus	X	Western Asia	0.47
Czech Republic	X	Eastern Europe	2.00
Denmark	X	Northern Europe	3.08
Estonia	X	Northern Europe	1.44
Finland	X	Northern Europe	3.17
France	X	Western Europe	2.26
Germany	X	Western Europe	2.87
Greece	X	Southern Europe	0.84
Hungary	X	Eastern Europe	1.37
Ireland	X	Northern Europe	1.52
Italy	X	Southern Europe	1.29
Latvia	X	Northern Europe	0.69
Lithuania	X	Northern Europe	1.01
Luxembourg	X	Western Europe	1.26
Malta	X	Southern Europe	0.85

Country	EU member state	Geographic region	R&D expenditure (% of GDP)
Netherlands	X	Western Europe	1.97
Poland	X	Eastern Europe	0.94
Portugal	X	Southern Europe	1.29
Romania	X	Eastern Europe	0.38
Slovakia	X	Eastern Europe	0.89
Slovenia	X	Southern Europe	2.39
Spain	X	Southern Europe	1.23
Sweden	X	Northern Europe	3.16
Norway	-	Northern Europe	1.71
Switzerland	-	Western Europe	2.97
United Kingdom	-	Northern Europe	1.70

Table 1: Overview of countries inside and outside the EU that are included in the study, together with geographical region (source: UNSD, 2023) and R&D expenditure as percentage of GDP (source: World Bank, 2022)

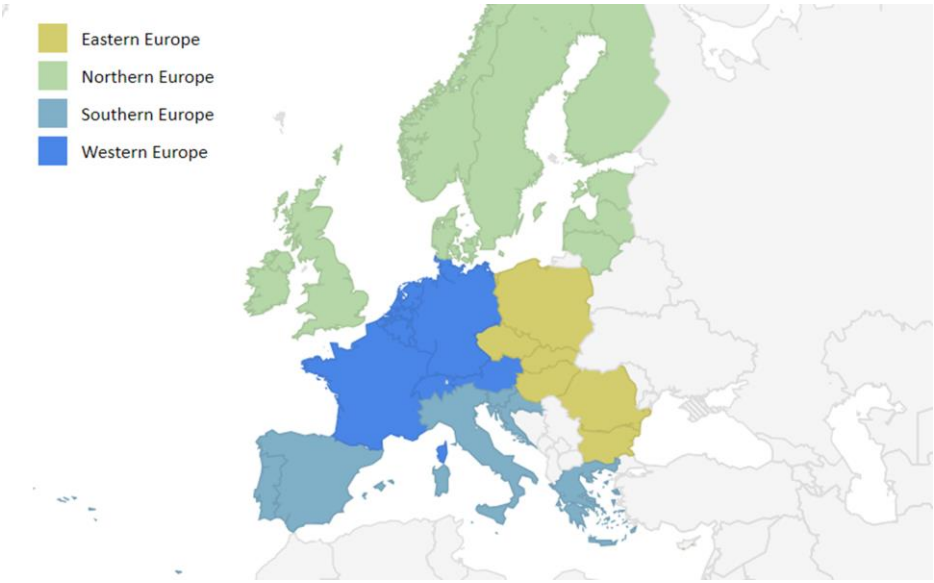


Figure 1. Countries included in the report, by geographic region (source: UNSD, 2023)

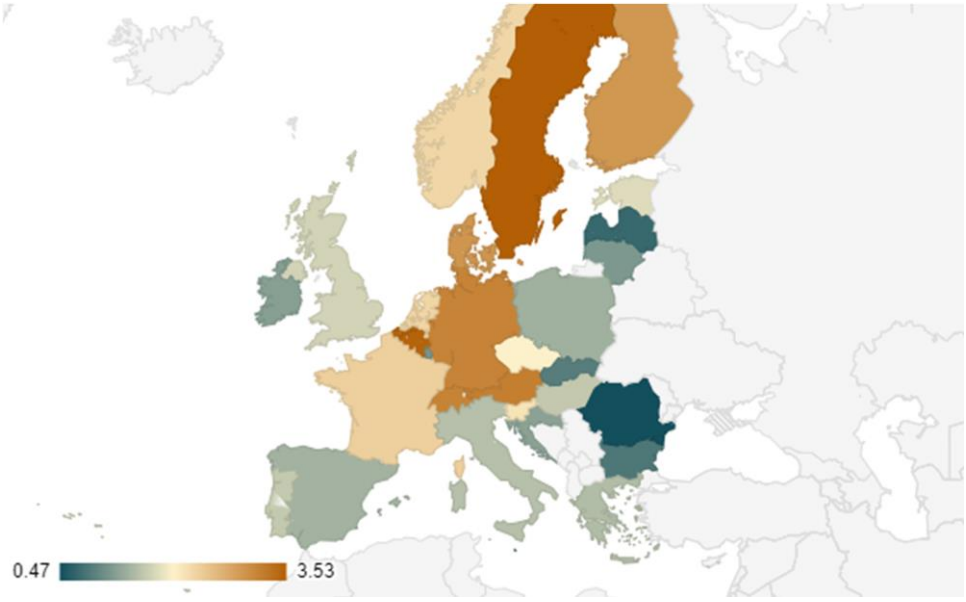


Figure 2. R&D expenditure as percentage of GDP of countries included in the report (source: World Bank, 2022)

When looking at the average R&D expenditure by European region, the regional differences are apparent (Table 2). While there are also considerable differences between countries in each region, this subclassification will be used throughout the report. It should be noted that since Cyprus falls outside the four main European regions, it will be included in all country-level data, but not in regional data.

Geographic region	Number of countries	Average R&D expenditure (% of GDP)
Western Europe	7	2.68
Northern Europe	9	2.03
Southern Europe	7	1.45
Eastern Europe	6	1.20

Table 2: Basic characteristics of geographic regions: number of countries in scope of this report and average R&D Expenditure as % of GDP across these countries (sources: UNSD, 2023 and: World Bank, 2022)

1. Methodology

1.1. Methodology

1.1.1. Analysis of the current practices regarding the financing of publication costs in EU Member States

This inventory will focus on the number, size and nature of publishing deals and OA financing policies, including publishers involved and type of OA covered (R&P deals, full OA deals, deals including green OA, S2O).

- **Sources for national (funder) open access financing policies**
  The following primary sources for information on open access financing policies were used:

  - Survey on National Contributions to EOSC 2022, implemented by OpenAIRE in 2023. Based on self-reporting and validation by member states, information is offered about the existence of policies, financial strategies and investments in various areas of open science, including access to publications.

    Limitations: differences in interpretation of questions among respondents; high-overview data on financial strategies and investments.

  - SPARC Europe 'Insights into European research funder Open policies and practices' based on a survey of main government and philanthropic funders in a selection of EU member states. Includes questions on financing options / financial support.

    Limitations: survey results from 2019, limited to funders.

  - Policies of Coalition S funders for financing open access costs, including for transformative journals.

The following alternative sources for information on open access financing policies were included in the inventory, but not used in the final report:

- SPARC Europe 'An Analysis of Open Science Policies in Europe, v7, 2021' contains an overview of open science policies (not limited to open access) in EU member states.

  Limitations: most recent report is from 2021 and focuses on data policies, policies are generally described at high level, financing policies are often not included.

- CoNOSC Overview of OS policies of countries included in network of national Open Science coordinators in the UN-European region.

  Limitations: only a subset of countries represented; varying scope of Open Science policies, only summarised information.

- ROARmap Registry charting open access mandates adopted by universities, research institutions and research funders that require their researchers to provide open access to their peer-reviewed research article output by depositing it in an open access repository. Also covers other aspects of OA policies, including licensing requirements and funding of APCs.

  Limitation: information often not up to date (most recent update from funders in countries in scope of this report: 2019).

- Sherpa Juliet (JISC) Registry of research funders' policies and their requirements on open access publication and data archiving.

  Limitation: not all information up to date, no information on financial policies.

- **Sources for existing national (consortium) deals:**

The following primary sources for information on national (consortium) deals were used:

ESAC Transformative Agreement Registry – the registry contains information on past and current transformative agreements by country and publisher. Basic data was retrieved in csv format , and additional data collected from the ESAC website using a programmatic approach. Where agreements themselves have been disclosed and published, information on total costs and cost breakdowns (where available) was retrieved from the agreement itself for further analysis.

Limitations of the ESAC Registry include that it is based on self-reporting by consortia (so not all agreements might be included), excludes agreements with full OA publishers, and does not include information at journal level. Therefore, additional information was retrieved from additional sources as mentioned below.

- Websites of national consortia were checked for information on publisher deals, especially for full open access publishers, Subcribe2Open (S2O) and diamond OA.

- Websites of selected publishers and publishing initiatives were checked for information on institutional and consortial deals.

The result of this part of the analysis will be an overview and characterisation of existing national (funder and/or consortium) publisher agreements and national (funder) policies for financing open access, specifically looking at the number of agreements by country and publisher, development over time, type of agreements). Special attention will be paid to the characterisation of transformative agreements regarding OA coverage, costs and financial shift (= transformativeness). A further characterisation could be made by correlating country-level data to subregions and R&I performance as described above. Gaps in available information will be highlighted.

1.1.2. Overview of currently available information on publication costs

The availability of financial information that would be required to calculate total publication costs is inventoried and discussed, to provide an overview of possible approaches and the data required for such an exercise: Existing examples of estimating/calculating total OA publication costs at a national level are discussed as reference. The following data sources are analysed and discussed, including their limitations, both in general and for the specific deals, financing policies and countries involved.

- **Sources for information on OA publication costs.**

  - Transformative/read-and-publish deals in the ESAC registry, including breakdown of reading and publishing costs.

  - OpenAPC

  - DOAJ – for publisher-supplied APCs for full OA journals

  - Current / historical APC list prices

  - Websites of publishers (including full OA publishers) and publishing initiatives

  - Plan S Journal Comparison service

1.1.3. Analysis of the development and diversity of scientific publishing in Europe

- **Publishing development for EU member states – general trends**

For the countries included in the report, a longitudinal overview was made of their publication output (journal articles only) and the proportions of different OA types (diamond, APC-gold, hybrid, green, closed) over the period 2014-2023.

To generate these data, open data from OpenAlex, Crossref, DOAJ and Unpaywall were used, using analysis infrastructure based on Google Big Query, provided by COKI (Curtin Open Knowledge Institute).

These results allow observations to be made on general trends, e.g. shifts towards or away from APC-gold and hybrid open access, shifts in green open access, shifts towards diamond open access, which can be correlated to open access policies and open access financial practices.

Limitations: most open data sources do not (yet) include information on corresponding authors. At the time of this analysis, OpenAlex had introduced information on corresponding authors, but this was not included in the analysis, as the information was relatively new, and might not yet be stable regarding coverage and quality. In general, affiliation information in OpenAlex is still being under active development and improvement.

Code and aggregated data for this analysis are available on Zenodo (Kramer, B. 2024b).

2. National (funder) open access financing policies

2.1. Introduction

National research funding organisations (RFOs) and governments, together with RPO's and other public RFOs, have an important role in setting conditions for open access publishing of research resulting from public funding. This can involve both setting mandates (or defining expectations) for open access publishing by funded or affiliated researchers, respectively, as well as providing financial support to enable publishers to provide open access option and authors to make use of these options. Importantly, through these actions, RFOs, RPOs and governments also shape developments in scholarly publishing, as commercial publishers will shape their offerings in response to market demand one way or another, and not-for-profit publishing organisations also require both demand and financial support to provide sustainable alternatives.

At a national level, the interplay between governments, (national) RFOs and RPOs also shapes the conditions for publishing – with questions on whether mandates/expectations align and to what extent financial support for open access publishing is provided by RFO's (e.g. by covering APCs from grants or dedicated OA funds, or providing direct support for publishing infrastructures), or by RPOs (e.g. by participation in agreements with publishers that include open access publishing, and, here too, providing direct support for publishing infrastructures). RPOs can also be indirectly funded by RFOs to support OA publishing, as is the case in the United Kingdom with block grant funding.

In terms of mandates and expectations, relevant parameters in national funder and government policies include:

- whether OA publishing is either required or encouraged;
- whether there is a stated preference or requirement for OA availability of the publisher version of an article at the publisher website (also known as 'gold OA'), or of a peer-reviewed version at an institutional or subject repository (also known as 'green OA');

- whether there are additional preferences or requirements regarding embargoes, licenses and copyright retention.

In terms of financial support, relevant parameters in national funder and government policies include:

- whether financial support for OA publishing is available (directly or indirectly) from the funder or government;

- whether financial support is subject to additional criteria (e.g. only for publication in full OA journals or also for OA publication in subscription journals ('hybrid OA').

2.2. Potential for inventory of national (funder) open access financing policies

While there are a number of initiatives bringing together information on open access policies at national level as well as at the level of national funders (see section 2.1.1), combining and comparing information from different sources is still challenging, due to variations in the extent to which the information in the various sources is up to date (with policies being updated regularly, this is of particular concern), varying coverage across countries and funders, and different types of information collected.

The most comprehensive and up-to-date inventory is likely the 'Survey on National Contributions to EOSC 2022' (hereafter referred to as EOSC survey 2022) implemented by OpenAIRE, the results of which will also feed into the revised OpenAIRE information portal on Open Science in Europe by country and the EOSC Observatory. The survey was based on self-reporting and validation by member states, providing information about the existence of policies, financial strategies and investments in various areas of open science, including access to publications. Data were collected up until July 31, 2023, and in the end, validated results from 24 EU member states and eight non-EU countries were included in the survey report (O'Neill & Martziou, 2023). This overlaps with 26 of the 30 countries in scope for this report - the exceptions being Belgium, Italy, Romania and the United Kingdom.

Here, we will present an overview of the survey data (O'Neill & Martziou, 2023) regarding open access policies, while also discussing which gaps and challenges remain and how to potentially address them.

The following questions from the EOSC survey regarding open access policies are relevant:

- Does your country have a national policy on open access to publications? Is this policy **mandatory**?

- Is there a specific policy on immediate open access to publications? Is this policy **mandatory**?

- Is there a specific policy on intellectual property rights (IPR) retention? Is this policy **mandatory**?

- Is there a specific policy on **open licensing** of publications? Is this policy mandatory?

- How many **research performing organisations** in your country have a policy on open access to publications?
- How many **research funding organisations** in your country have a policy on open access to publications?
- Does your country have a **financial strategy** on open access to publications?
- How much did your country **financially invest in open access to publications** in 2021 in millions of Euros?

2.2.1. Existence of national open access policies

Table 3 lists the existence of national open access policies and specific aspects of it (regarding immediate open access and licensing). Of the 26 countries who supplied data, 21 have a national open access policy, with Croatia, Czechia, Estonia, Hungary, and Sweden reporting not having a national policy. In eight countries, the policy is reported to be mandatory: Cyprus, France, Latvia, Luxembourg, Portugal, Slovenia, Spain and Norway – with no apparent pattern relative to European region.

Country	National policy on open access?	Policy URL(s)
Austria	Yes, not mandatory	-
Belgium	-	
Bulgaria	Yes, not mandatory	https://www.mon.bg/bg/53
Croatia	No	
Cyprus	Yes, mandatory	https://www.dmrid.gov.cy/dmrid/research.nsf/research01b_el/research01b_el?OpenDocument
Czech Republic	No	
Denmark	Yes, not mandatory	https://ufm.dk/en/research-and-innovation/cooperation-between-research-and-innovation/open-access/Publications/denmarks-national-strategy-for-open-access/denmarks-national-strategy-for-open-access
Estonia	No	

Country	National policy on open access?	Policy URL(s)
Finland	Yes, not mandatory	https://edition.fi/tsv/catalog/book/76
France	Yes, mandatory	https://www.enseignementsup-recherche.gouv.fr/sites/default/files/2021-10/second-frenchplan-for-open-science-13715.pdf; https://anr.fr/en/latest-news/read/news/science-ouverte-point-detape-sur-la-politique-commune-du-reseau-des-agences-de-financement-franca/
Germany	Yes	https://zenodo.org/record/6472672#.ZB2KJMKZO8Q;https://www.bmbf.de/bmbf/de/forschung/digitale-wirtschaft-und-gesellschaft/open-access/open-access_node.html; https://www.bildung-forschung.digital/digitalezukunft/de/wissen/freier-zugang-zu-wissen-in-der-digitalen-welt.html?nn=251298
Greece	Yes, not mandatory	-
Hungary	No	
Ireland	Yes, not mandatory	https://norf.ie/national-action-plan/
Italy	-	
Latvia	Yes, mandatory	https://www.izm.gov.lv/en/media/17072/download?attachment
Lithuania	Yes, not mandatory	https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/8113c930e0b811e5b18181b790158f61?jfwid=lbwuxeb1i; https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.343430/asr
Luxembourg	Yes, mandatory	https://storage.fnr.lu/index.php/s/ZhgLACsznLOn7jp
Malta	Yes, not mandatory	-
Netherlands	Yes, not mandatory	https://www.openaccess.nl/en;https://www.openaccess.nl/en/in-the-netherlands;https://www.universiteitenvannederland.nl/en_GB/openaccess-eng.html; https://www.openscience.nl/en/npos-2/; https://www.openscience.nl/en/docs/

Country	National policy on open access?	Policy URL(s)
Poland	Yes, not mandatory	https://www.gov.pl/documents/1068557/1069061/20180413_Kierunki_rozwoju_OD_wersja_ostateczna.pdf
Portugal	Yes, mandatory	https://www.fct.pt/en/sobre/politicas-e-estrategias/politicas-de-ciencia-aberta/acesso-aberto-a-publicacoes-cientificas/
Romania	-	
Slovakia	Yes, not mandatory	https://otvorenaveda.cvtisr.sk/en-gb/national-strategy-for-open-science/
Slovenia	Yes, mandatory	http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO7733#; https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/Nacionalni-dokumenti/Resolution-on-the-Slovenian-Scientific-Research-and-Innovation-Strategy-2030; https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/Strategije/NRRI-2021-2030/NRRI-2030_EN.pdf
Spain	Yes, mandatory	https://www.boe.es/buscar/pdf/2022/BOE-A-2022-14581-consolidado.pdf;https://www.boe.es/buscar/act.php?id=BOE-A-2023-7500; https://www.ciencia.gob.es/InfoGeneralPortal/documento/c30b29d7-abac-4b31-9156-809927b5ee49
Sweden	No	
Norway	Yes, mandatory	https://www.regjeringen.no/en/dokumenter/national-goals-and-guidelines-for-open-access-to-research-articles/id2567591/
Switzerland	Yes, not mandatory	https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Hochschulpolitik/Open_Access/Open_Access_strategy_final_e.pdf;https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Hochschulpolitik/Open_Access/Plan_d_action-f.pdf; https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Hochschulpolitik/Open_Science/PgB_OpenScience_-_Implementation_Phase_A_2021-2024_v6.4.pdf; https://oa100.snf.ch/en/funding/guidelines/;https://w

Country	National policy on open access?	Policy URL(s)
		ww.snf.ch/SiteCollectionDocuments/snsf-general-implementation-regulations-for-the-funding-regulations-e.pdf; https://www.snf.ch/SiteCollectionDocuments/Reglement-ueber-OA-Publikationsfoerderung-E.pdf
United Kingdom	-	

Table 3: Existence of national open access policies as reported by EU member states and other countries in Survey on National Contributions to EOSC 2022 (source: O'Neill & Martziou, 2023)

Regarding specific aspects of national open access policies (immediate open access, retention of IPR, open licensing), of the 21 national open access policies, 8 include specific policies on all three aspects, 2 on two of these, and 5 on only one (Table 4). Immediacy of open access was most often addressed, followed by open licenses and IPR. In the majority of cases, these special policies follow the country overall policy in whether they are mandatory or not. One notable example is Latvia, which reports having a mandatory open access policy, but where specific policy on immediacy is non-mandatory.

Country	Specific policy on immediate open access?	Specific policy on IPR retention?	Specific policy on open licensing?
Austria	Yes, not mandatory	Yes, not mandatory	Yes, not mandatory
Belgium	-	-	-
Bulgaria	Yes, not mandatory	Yes, not mandatory	Yes, mandatory
Croatia	-		
Cyprus	Yes, mandatory	No	No
Czech Republic	-		-
Denmark	No	No	No
Estonia	-		-

Country	Specific policy on immediate open access?	Specific policy on IPR retention?	Specific policy on open licensing?
Finland	Yes, not mandatory	Yes, not mandatory	Yes, not mandatory
France	No	Yes, mandatory	No
Germany	No	-	No
Greece	No	No	No
Hungary	-	-	-
Ireland	Yes, not mandatory	Yes, not mandatory	Yes, not mandatory
Italy	-	-	-
Latvia	Yes, not mandatory	No	No
Lithuania	Yes, not mandatory	Yes, not mandatory	No
Luxembourg	Yes, mandatory	Yes, mandatory	Yes, mandatory
Malta	Yes, not mandatory	Yes, not mandatory	Yes, not mandatory
Netherlands	Yes, not mandatory	No	Yes, not mandatory
Poland	No	No	No
Portugal	No	No	No
Romania	-	-	-
Slovakia	No	No	Yes, not mandatory
Slovenia	No	Yes, mandatory	No
Spain	Yes, mandatory	Yes, mandatory	Yes, mandatory
Sweden	-	-	-

Country	Specific policy on immediate open access?	Specific policy on IPR retention?	Specific policy on open licensing?
Norway	Yes, mandatory	Yes, mandatory	Yes, mandatory
Switzerland	No	No	No
United Kingdom	-	-	-

Table 4: Existence of specific policies on immediate open access, intellectual property rights (IPR) and open licensing in national open access policies as reported by EU member states and other countries in Survey on National Contributions to EOSC 2022 (source: O'Neill & Martziou, 2023)

One important issue to consider is that national policies may differ in type and scope – while in some countries, they represent official government policy and outline requirements for research institutions and researchers, in other countries they represent an agreement among stakeholders (often government, research institutions and funders), and provide a framework for development of more specific policies and/or mandates at the level of research institutions and funders. Similarly, the absence of a policy in a country does not necessarily imply that open access to scientific publications is not implemented or not financially supported, as again this might be implemented at the level of research funding and/or research performing organisations. Therefore, such institutional and funder policies are also important to take into account.

2.2.2. Existence of institutional and funder open access policies

While the EOSC 2022 survey mainly asked about national policies and initiatives, it did inventorise both the number of RPOs and RFOs in each country, as well as (in a separate question), the number of RPOs and RFOs with open access policies (see Table 5). While no data were collected on the details of these policies, the results give some indication on the complexity of the research landscape, and the role of RPOs and RFOs in the open access policy landscape.

As explained in the accompanying report “Monitoring National Contributions to EOSC” (Peters, 2024, in press), in many countries, a lack of monitoring will have resulted in a limited overview of available information, and countries may have had different approaches in obtaining these numbers – e.g. via a survey or by estimation. Some included specific programmes or expected initiatives in their count of policies. In addition, countries differed in what they counted as RPOs and RFOs, e.g. when dealing with separate funding streams in funding organisations, or separate faculties within research institutions. Germany pointed out to its applicable Pact for Research which applies to the 285 public research institutes of the four main umbrella research performing organisations but did not provide an estimate. As another example, Spain has taken into account its autonomous regions, each of which has its own open access mandates, further adding to the complexity of the data.

The variety in both the existence and the characteristics of open access policies, both at the national level and the level of institutions and funders, make a comparison among countries harder. Each country has its own situation in how the higher education sector is organised, funded and regulated, and consequently how and at what level open access policies are addressed.

Country	RPOs with open access policy	RFOs with open access policy
Austria	20 of 130	2 of 12
Belgium	-	-
Bulgaria	9 of 63	1 of 4
Croatia	27 of 97	1 of 4
Cyprus	9 of 18	4 of 4
Czech Republic	1 of -	-
Denmark	8 of 32	3 of 10
Estonia	0 of 22	1 of 1
Finland	47 of 50	2 of 2
France	- of 179	5 of 5
Germany	- of 610	- of 3
Greece	5 of 102	0 of 3
Hungary	-	-
Ireland	10 of 22	6 of 7
Italy	-	-
Latvia	3 of 63	1 of 1

Country	RPOs with open access policy	RFOs with open access policy
Lithuania	9 of 35	1 of 2
Luxembourg	0 of 4	1 of 1
Malta	1 of 3	0 of 3
Netherlands	56 of 80	2 of 2
Poland	73 of 489	1 of 5
Portugal	- of 461	1 of 2
Romania	-	-
Slovakia	3 of 132	2 of 4
Slovenia	0 of -	1 of 23
Spain	27 of 461	6 of 21
Sweden	- of -	- of 6
Norway	- of 166	1 of 1
Switzerland	35 of -	- of 52
United Kingdom	-	-

Table 5: Number of RPOs and RFOs with open access policies, as reported by EU member states and other countries in Survey on National Contributions to EOSC 2022 (source: O'Neill & Martziou, 2023)

2.2.3. Financial strategy and investments

As part of the EOSC 2022 survey, member states and other participating countries were asked about their financial commitments to open access and other aspects of open science. Regarding the existence of a (national) financial strategy on open access publishing (Figure 3, Table 6), 13 countries in scope of this report indicated such a strategy existed. There does not appear to be any obvious correlation between region or R&D expenditure, with examples in every region of countries with a national strategy regarding financing of open access.

However, as also noted in the report Monitoring National Contributions to EOSC (Peters, in press), there may have been multiple interpretations at play, and some answers might have to be reconsidered or contextualised based on accompanying free text responses. Some cases, like Greece, answered 'yes' to this question while later stating "Although no national financial strategy is in place, (…)". Some countries were able to refer to a national strategy or policy where open access to publications is clearly mentioned (e.g., National RDI Policy of the Czech Republic, the Second French Open Science Plan, National action plan 2022 Ireland). Others mention documents that are more specific such as Slovakia "The policy defines how the costs of gold OA publishing are funded" or Spain, which refers to a dedicated funding for literature repositories, institutional publishing services and current research information (CRIS). Here, too, it is apparent that if a national financial strategy exists in the first place, it might address very different aspects of open access publishing, depending on the priorities set and the options available for (national) financing.

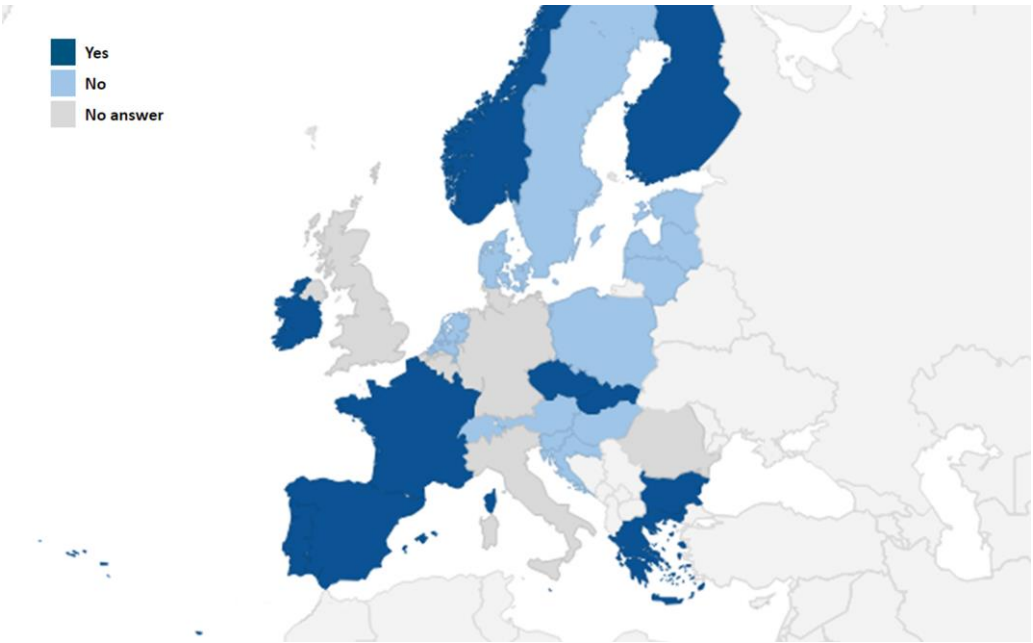


Figure 3: Existence of financial strategy on open access publishing, as reported by EU member states and other countries in Survey on National Contributions to EOSC 2022 (source: O'Neill & Martziou, 2023)

A very interesting part of the EOSC survey 2022 consisted of questions on concrete financial investments in various aspects of open science, including open access publishing (Figure 4, Table 6). In total, 17 countries in scope of this report provided information on how much their country financially invested in open access to publications in 2021. Amounts ranged from 0-30 million Euros, with 3 countries reporting zero national investment (Denmark, Estonia and Latvia), two countries with annual investment less than 1M (Cyprus and Luxembourg), seven countries with annual investment between 1-7 M (Bulgaria, Germany, Norway, Poland, Slovakia and Slovenia), and three countries spending between 20-30M (Finland, France and Spain).

It should be noted here as well that countries may have differed in how they accounted for (or estimated) this total spend, as well as in how and where investments were made (e.g. national publishing infrastructure, publisher agreements, repository infrastructure). For example, both Germany and Latvia indicated their reported spend did not include individual APCs which are covered by project funding, while for other countries, like Czech Republic, Slovakia, Slovenia the total spend consists of individual APCs (excluding transformative agreements), while yet other countries, like Finland, include individual APCs, transformative agreements, institutional OA publishing, membership fees and voluntary contributions to OA infrastructure, and the costs of self-archiving infrastructure. Also, a number of countries, including the Netherlands, Sweden and the United Kingdom, either didn't provide financial data or were not part of the survey at all. Thus, while the figures for each country are informative in themselves (taking into account the context provided), comparing figures between countries and drawing general conclusion about open access spend across European regions is not really possible based on the current information.

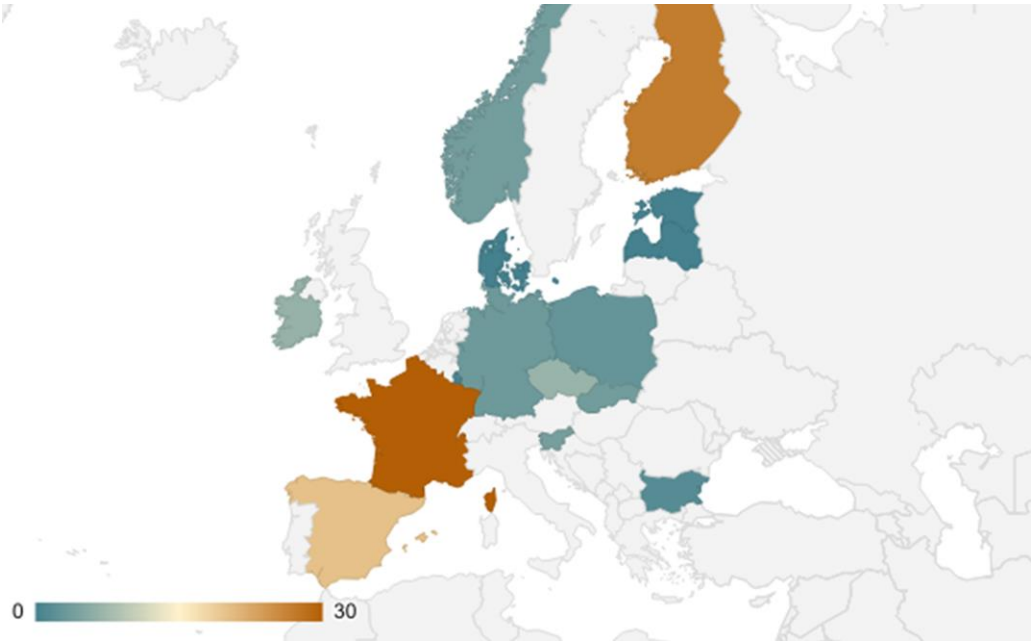


Figure 4: Financial investments in open access publishing in 2021 in million Euros, as reported by EU member states and other countries in Survey on National Contributions to EOSC 2022 (source: O'Neill & Martziou, 2023)

Country	Financial strategy on open access publishing?	Financial investment in open access publishing in 2021 (in million Euros)
Austria	No	-
Belgium	-	-
Bulgaria	Yes	1.50

Country	Financial strategy on open access publishing?	Financial investment in open access publishing in 2021 (in million Euros)
Croatia	No	-
Cyprus	No	0.26
Czech Republic	Yes	6.80
Denmark	No	0.00
Estonia	No	0.00
Finland	Yes	26.94
France	Yes	30.00
Germany	-	3.00
Greece	Yes	-
Hungary	No	-
Ireland	Yes	6.50
Italy	-	-
Latvia	No	0.00
Lithuania	No	-
Luxembourg	Yes	0.30
Malta	No	-
Netherlands	No	-
Poland	No	-
Portugal	Yes	-

Country	Financial strategy on open access publishing?	Financial investment in open access publishing in 2021 (in million Euros)
Romania	-	-
Slovakia	Yes	3.70
Slovenia	No	4.00
Spain	Yes	20.00
Sweden	No	
Norway	Yes	3.77
Switzerland	Yes	
United Kingdom	-	

Table 6: Existence of financial strategy on open access publishing and total financial investment in open access publishing in 2021 (in million Euros), as reported by EU member states and other countries in Survey on National Contributions to EOSC 2022 (source: O'Neill & Martziou, 2023)

2.2.4. Funder open access policies

While the EOSC Survey 2022 provides an overview of the existence of national open access policies, the aspects addressed therein and the existence of open access policies at the level of institutions and funders, no specific information was collected on funder open access policies. As explained above, centrally collected information on both national and funder open access policies does exist in various places (including SherpaJuliet, ROARMap and various surveys), but this information is not always up to date or complete.

For funder policies specifically, the most recent comprehensive survey of European funders was done in 2019 (therefore pre-pandemic) by SPARC Europe. The report and accompanying dataset (Fosci et al. 2019a,b) provide information not just on OA requirements, but also, to some extent, on financial policies regarding OA publication costs. It comprises information on 27 national funders in 22 countries in scope of this report. Funders in all but four countries (Croatia, Greece, Poland and Romania) included in the survey and in scope of this report reported to have an open access policy at the time (Table 7). For all but three of the funders with an open access policy, the policy was mandatory – the exception being the national funders of the three Baltic states: Estonia, Latvia and Lithuania.

Asked whether the funder supports open access publication costs, specifically APCs, all but one funder (Independent Research Fund Denmark) indicated that they did, including funders without an open access policy.

Country	National funder	Funder policy on open access?	Funder supports APCs?
Austria	Austrian Science Fund (FWF)	Yes, mandatory	Yes
Belgium	Research Foundation Flanders	Yes, mandatory	Yes
Belgium	F.R.S.-FNRS	Yes, mandatory	Yes
Bulgaria	-	-	-
Croatia	Croatian Science Foundation	No	Yes
Cyprus	-	-	-
Czech Republic	-	-	-
Denmark	Independent Research Fund Denmark	Yes, mandatory	No
Estonia	Estonian Research Council	Yes, not mandatory	Yes
Finland	-	-	-
France	The French National Research Agency	Yes, mandatory	Yes
Germany	-	-	-
Greece	General Secretariat of Research & Technology	No	Yes
Hungary	-	-	-
Ireland	Health Research Board	Yes, mandatory	Yes
Ireland	Science Foundation Ireland	Yes, mandatory	Yes

Country	National funder	Funder policy on open access?	Funder supports APCs?
Latvia	Latvian Science Council	Yes, not mandatory	Yes
Lithuania	Research Council of Lithuania	Yes, not mandatory	Yes
Luxembourg	Fonds National de la Recherche	Yes, mandatory	Yes
Malta	-	-	-
Netherlands	Netherlands Organisation for Scientific Research (NWO)	Yes, mandatory	Yes
Poland	National Science Centre	No	Yes
Poland	Foundation for Polish Science	No	Yes
Portugal	Fundação para a Ciência e a Tecnologia (FCT)	Yes, mandatory	Yes
Romania	UEFISCDI-Executive Agency for Higher Education, Research, Development and Innovation Funding	No	Yes
Slovakia			-
Slovenia	Slovenian Research Agency ARRS	Yes, mandatory	Yes
Spain	Spanish Research Agency	Yes, mandatory	Yes
Sweden	Swedish Research Council for Health, Working Life and Welfare	Yes, mandatory	Yes

Country	National funder	Funder policy on open access?	Funder supports APCs?
Sweden	The Foundation for Baltic and East European Studies	Yes, mandatory	Yes
Sweden	Research Council Formas	Yes, mandatory	Yes
Sweden	Swedish Research Council	Yes, mandatory	Yes
Norway	The Research Council of Norway	Yes, mandatory	Yes
Switzerland	Swiss National Science Foundation	Yes, mandatory	Yes
United Kingdom	UK Research and Innovation	Yes, mandatory	Yes

Table 7: Existence of national funder open access policies and funder coverage of APC (source Fosci et al. 2019b)

Looking more in detail at funder support of APCs (Table 8), the majority (20 out of 27) of funders that cover APCs did so by treating APCs as eligible costs of grant funding. Five funders paid APCs directly, either exclusively, or in additional to having APCs be eligible costs of grant funding. Such direct payment can be through publisher agreements in which the funder participates, as is the case for FWF in Austria. Finally, four funders (Luxembourg, Norway, Romania and the UK) supplied dedicated grants to RPOs from which APCs can be paid.

The survey did not ask about specific conditions for support of APCs, such as immediate open access, licensing requirements, or any special conditions on the journals, e.g. whether financial support was restricted to publications in full open access journals or also available for open access publications in subscription journals (hybrid open access). In addition, as mentioned, the data reported here were collected in 2019, and funder policies may have changed since then, especially for funders that have committed to Plan S principles (see section 3.2.5).

Country	National funder	Eligible cost of grant funding	Directly at publication level	Dedicated grants to RPOs
Austria	Austrian Science Fund (FWF)	-	Yes	-
Belgium	Research Foundation Flanders	Yes	-	-
Belgium	F.R.S.-FNRS	Yes	Yes	-
Bulgaria	-	-	-	-
Croatia	Croatian Science Foundation	Yes	-	-
Cyprus	-	-	-	-
Czech Republic	-	-	-	-
Denmark	Independent Research Fund Denmark	-	-	-
Estonia	Estonian Research Council	Yes	-	-
Finland	-	Yes	-	-
France	The French National Research Agency	Yes	-	-
Germany	-	Yes	-	-
Greece	General Secretariat of Research & Technology	Yes	-	-
Hungary	-	Yes	-	-

Country	National funder	Eligible cost of grant funding	Directly at publication level	Dedicated grants to RPOs
Ireland	Health Research Board	Yes	-	-
Ireland	Science Foundation Ireland	Yes	-	-
Latvia	Latvian Science Council	Yes	-	-
Lithuania	Research Council of Lithuania	Yes	-	-
Luxembourg	Fonds National de la Recherche	-	-	Yes
Malta	-	-	-	-
Netherlands	Netherlands Organisation for Scientific Research (NWO)	Yes	-	-
Poland	National Science Centre	Yes	-	-
Poland	Foundation for Polish Science	Yes	-	-
Portugal	Fundação para a Ciência e a Tecnologia (FCT)	Yes	-	-
Romania	UEFISCDI-Executive Agency for Higher Education, Research, Development and Innovation Funding	Yes	-	Yes
Slovakia		-	-	-

Country	National funder	Eligible cost of grant funding	Directly at publication level	Dedicated grants to RPOs
Slovenia	Slovenian Research Agency ARRS	Yes	Yes	-
Spain	Spanish Research Agency	Yes	-	-
Sweden	Swedish Research Council for Health, Working Life and Welfare	Yes	-	-
Sweden	The Foundation for Baltic and East European Studies	Yes	-	-
Sweden	Research Council Formas	-	Yes	-
Sweden	Swedish Research Council	Yes	-	-
Norway	The Research Council of Norway	-	-	Yes
Switzerland	Swiss National Science Foundation	-	Yes	-
United Kingdom	UK Research and Innovation	-	-	Yes

Table 8 Mechanism(s) of support of APCs by national funders (source: Fosci et al. 2019b)

Finally, the SPARC Europe survey also asked funders about their financial support for open access publishing other than through APCs, specifically financing of APC-free or subsidised Open Access platforms and journals (e.g. Wellcome Open Research, e.g. Hrcak, OLH, SciPost) and of Open Access repositories (e.g. EuropePMC, OAPEN, arXiv). Only five national funders reported supporting such initiatives at the time (Table 9).

Country	National funder	APC-free or subsidised OA platforms and journals	OA repositories
Austria	Austrian Science Fund (FWF)	Yes	Yes
Ireland	Health Research Board	Yes	-
Netherlands	Netherlands Organisation for Scientific Research (NWO)	-	Yes
Norway	The Research Council of Norway	Yes	-
United Kingdom	UK Research and Innovation	-	Yes

Table 9 Financial support of open access publication other than through APCs by national funders (source: Fosci et al. 2019b)

2.2.5. Plan S

A specific funder policy approach is Plan S, announced in 2018 and since implemented by 15 European national funders, as well a by a number of other national funders and charitable funders which together constitute Coalition S. Based on Plan S principles, coalition funders have out strict requirements for open access publishing by their grantees, mandating that publications are made available in open access immediately upon publication and with an open license (CC-BY, CC-BY-SA or, by exception CC-BY-ND). This can be achieved either through publication in full open access journals included in DOAJ, open access articles in subscription journals that are part of transitional agreements (with the aim of converting to full OA), or by making the peer-reviewed version of the manuscript available in open access via a repository.

In parallel to these requirements, Coalition S funders provide financial support for open access publishing in various ways: first, all funders commit to funding APCs in full open access journals; seconds, funders may participate in transformative agreements with publishers via which their grantees can publish open access in subscription journals, and third, funders may cover APCs in so-called transformative journals, which have committed to making a transition to full open access. It should be noted that, as part of Plan S, financial support for open access publishing in subscription journals will end by December 31, 2024, this only directly affects those funders that participate in publisher deals (transformative agreements) or pay for APCs in transformative journals.

Finally, a number of Coalition S funders have adopted Plan S' rights retention strategy, enabling authors to retain the right to make the peer reviewed version of their manuscript available in a repository immediately and with a CC-BY license.

Table 10 shows the national funders participating in Coalition S that are from the countries in scope of this report, together with their current policies adopting Plan S principles and Rights Retention policies/strategies (source: Implementation Roadmap of cOAlition S Organisations'). Of the 30 countries in scope of this report, 14 have (national) funders explicitly following Plan S principles.

Country	National funder	Start date Plan S-aligned policy applies date	Adoption of RRS	Support for TJs
Austria	Austrian Science Fund (FWF)	1st January 2021	Adopted	Yes, but only when part of Transformative Agreement
Belgium	-	-	-	-
Bulgaria	-	-	-	-
Croatia	-	-	-	-
Cyprus	-	-	-	-
Czech Republic	-	-	-	-
Denmark	-	-	--	
Estonia	-	-	-	-
Finland	Academy of Finland (AKA)	1st January 2021	Adoption to follow	Yes
France	French National Research Agency (ANR)	1st January 2021	Adopted	Yes
Germany	-	-	-	-
Greece	-	-	-	-

Country	National funder	Start date Plan S-aligned policy applies date	Adoption of RRS	Support for TJs
Hungary	-	-	-	-
Ireland	Science Foundation Ireland (SFI)	1st January 2021	Adopted	Yes
Italy	National Institute for Nuclear Physics (INFN, Italy)	1st January 2021	Adoption to follow	Yes
Latvia	-	-	-	-
Lithuania	-	-	-	-
Luxembourg	Luxembourg National Research Fund (FNR)	1st January 2021	Adopted	Yes
Malta	-	-	-	-
Netherlands	Netherlands Organisation for Scientific Research (NWO)	1st January 2021	Adopted	No
Poland	National Science Centre, Poland (NCN)	1st January 2021	Adopted	Yes
Portugal	Foundation for Science and Technology of Portugal (FCT)	TBA (OA policy under review)	Adoption to follow	No
Romania	-	-	-	-
Slovakia	-	-	-	-
Slovenia	Slovenian Research and Innovation Agency (ARIS)	1st January 2021	Adoption to follow	Yes

Country	National funder	Start date Plan S-aligned policy applies date	Adoption of RRS	Support for TJs
Spain	-	-	-	-
Sweden	Formas (Sweden)	1st January 2021	Adopted	Yes
Sweden	FORTE (Sweden)	1st January 2021	Adopted	No
Sweden	Vinnova	1st January 2021	Adoption to follow	N/A
Norway	Research Council of Norway (RCN)	1st January 2021	Adopted	Yes
Switzerland	Swiss National Science Foundation (SNSF)	1st January 2023	Adoption to follow	No
United Kingdom	United Kingdom Research & Innovation (UKRI)	1st April 2022	Authors are required to assert licensing and immediate OA at submission when using Route 2 of the UKRI policy, this aligns with the Rights Retention Strategy	Yes. UKRI, however, does so only when a transformative journal meets the criteria set out by Jisc, on behalf of the UK research and higher education sector.

Table 10 National funders participating in cOAlition S with the launch date for implementing Plan S-aligned OA policy by the funder, adoption of the Rights Retention Strategy (RRS) and whether or not the funder supports APCs in 'transformative journals' (TJs) (source: Implementation Roadmap of cOAlition S Organisations, last updated: 14 October 2022)

While current financing mechanisms in Plan S are aimed at APC-based open access (either directly or through transformative agreements), Coalition S also participates in the European DIAMAS project aimed at supporting institutional publishing, co-developed the Action Plan for Diamond Open Access. In October 2023, Coalition S presented a draft proposal 'Towards Responsible Publishing' suggesting, among other points, that research funders and research institutions financially support diamond publishing models and infrastructure for a scholar-led communication system, and over time decrease funding to traditional publishing models, for example, by phasing out agreements that include hybrid or subscription journals.

2.3. Discussion

Collecting information on current national policies and national funder policies, including policies for financing open access costs, is complicated due to the lack of up to date, centralised and harmonised information – as the policy landscape is constantly evolving and different sources collect different parameters about different sets of countries and/or funders. The recent EOSC 2022 survey provides a starting point for further analysing national open access policies by looking in detail at requirements around publication routes, embargo times, licenses and rights retention, as well as modes and conditions for financial support. Finally, national policies and national funder policies should not be considered in isolation, as they might complement and depend on each other (e.g. where national policies outline a national strategy, which is further implemented through funder and institutional policies) or potentially contradict each other (where there are e.g. different requirements regarding immediacy and licensing). Open access policies determine the context in which researchers operate, influencing their publication choices both through requirements and mandates and through financial support of open access publication costs.

3. Existing national (consortium) and institutional publisher deals and other forms of open access financing

3.1. Introduction

Parallel to policies and mandates, an important instrument RPOs and RFOs have to stimulate and enable open access is to financially support open access publishing options. Importantly, the choices made as to what publishing options to support and how this is organised not only directly affects the possibilities researchers at a given institution or in a given country have for open access publishing, but more broadly shapes the open access publishing landscape.

Traditionally, RPOs and their libraries (either individually or in consortia, often nationally) have been paying commercial publishers and scholarly societies for access to scientific literature through licenses, often for a publisher's entire portfolio in the form of so-called 'big deals'. One prominent way of pivoting towards open access publishing (both for publishers and for institutions) has been to reshape contracts for reading access into contracts that cover open access publishing by researchers at institutions covered by the contract, often in combination with reading access to subscription content. Building on the idea that there is 'enough money in the system' put forward by Schimmer, Geschun and Vogler (2015) in their Max Planck Digital Library Open Access Policy White Paper, and heavily championed by initiatives as OA2020 (https://oa2020.org/), this model aims at maintaining existing journals and publishers, but converting their financing model and making more articles available open access.

In Plan S, this model (called 'transformative agreements' and now commonly known under that name) has been championed as one of the routes to make research articles meet the requirements of Coalition S funders (Coalition S, n.d. a), and through that, as a mechanism towards the goal of Plan S to 'remove all publication paywalls' (Coalition S, 2018).

Transformative agreements have received a lot of attention as a mechanism of transitioning to open access, including the registration of existing transformative agreements in the ESAC Registry of Transformative Agreements (https://esac-initiative.org/about/transformative-agreements/agreement-registry/. This allows a detailed analysis of these agreements, including some of their financial details. However, not all publisher agreements with an open access component are included in the registry – either because they might not satisfy the ESAC guidelines for transformative agreements or because institutions and/or consortia have not registered them for other reasons.

Even more importantly, transformative agreements are not the only financial model to enable and support open access publishing. Some publishers are employing the 'Subscribe2Open' model to transition their journals to open access based on retaining existing subscription income (https://subscribetoopencommunity.org/). In contrast, full open access journals, especially from full open access publishers, have no 'transformation' to achieve, but nonetheless do rely on financial support to be viable. Multiple full open access publishers using the APC-model are entering into their own agreements with institutions and/or consortia to cover publication costs for authors falling under these agreements.

Non-APC based open access publishing (also known as diamond open access), operates on a variety of funding models and in-kind support, including from institutions (Bosman et al., 2021b), and a number of consortia also have organised support for non-profit publishing infrastructure.

3.2. Transformative agreements in the ESAC Registry

3.2.1. Number of agreements, publishers and articles

In June 2023, 600 transformative agreements with 59 publishers were registered in the ESAC registry from the 30 countries included in this study (27 EU countries plus Norway, Switzerland and the United Kingdom). Of these, 337 agreements with 56 publishers are currently active. When looking at the number of current agreements, number of publishers involved as well as of the number of open access articles covered under these agreements (based on the data supplied by institutions and consortia to the ESAC registry), it is clear that there are large differences across countries and regions in the use of such agreements (see Table 11, Fig 5A-B).

Country	Current TAs	Publishers with current TAs	Annual number of articles in TAs
Austria	26	21	5,838
Belgium	2	2	35
Bulgaria	0	0	0
Croatia	0	0	0
Cyprus	0	0	0
Czech Republic	13	13	2,305
Denmark	2	2	4,110
Estonia	0	0	0
Finland	19	14	5,533
France	2	2	3,665
Germany	54	32	26,443
Greece	9	9	1,597
Hungary	1	1	727
Ireland	24	24	3,952
Italy	10	9	9,757
Latvia	0	0	0
Lithuania	0	0	0
Luxembourg	2	2	59
Malta	0	0	0

Country	Current TAs	Publishers with current TAs	Annual number of articles in TAs
Netherlands	48	32	18,583
Poland	8	7	2,360
Portugal	0	0	0
Romania	8	8	3,207
Slovakia	0	0	0
Slovenia	0	0	0
Spain	7	7	825
Sweden	11	10	16,177
Norway	24	23	13,937
Switzerland	19	17	8,914
United Kingdom	48	41	45,193

Table 11: Overview per country of number of transformative agreements (TA's) currently in place, number of publishers with whom TA's are currently in place, and estimated number of articles.covered by TAs. Source: ESAC Registry of Transformative Agreements

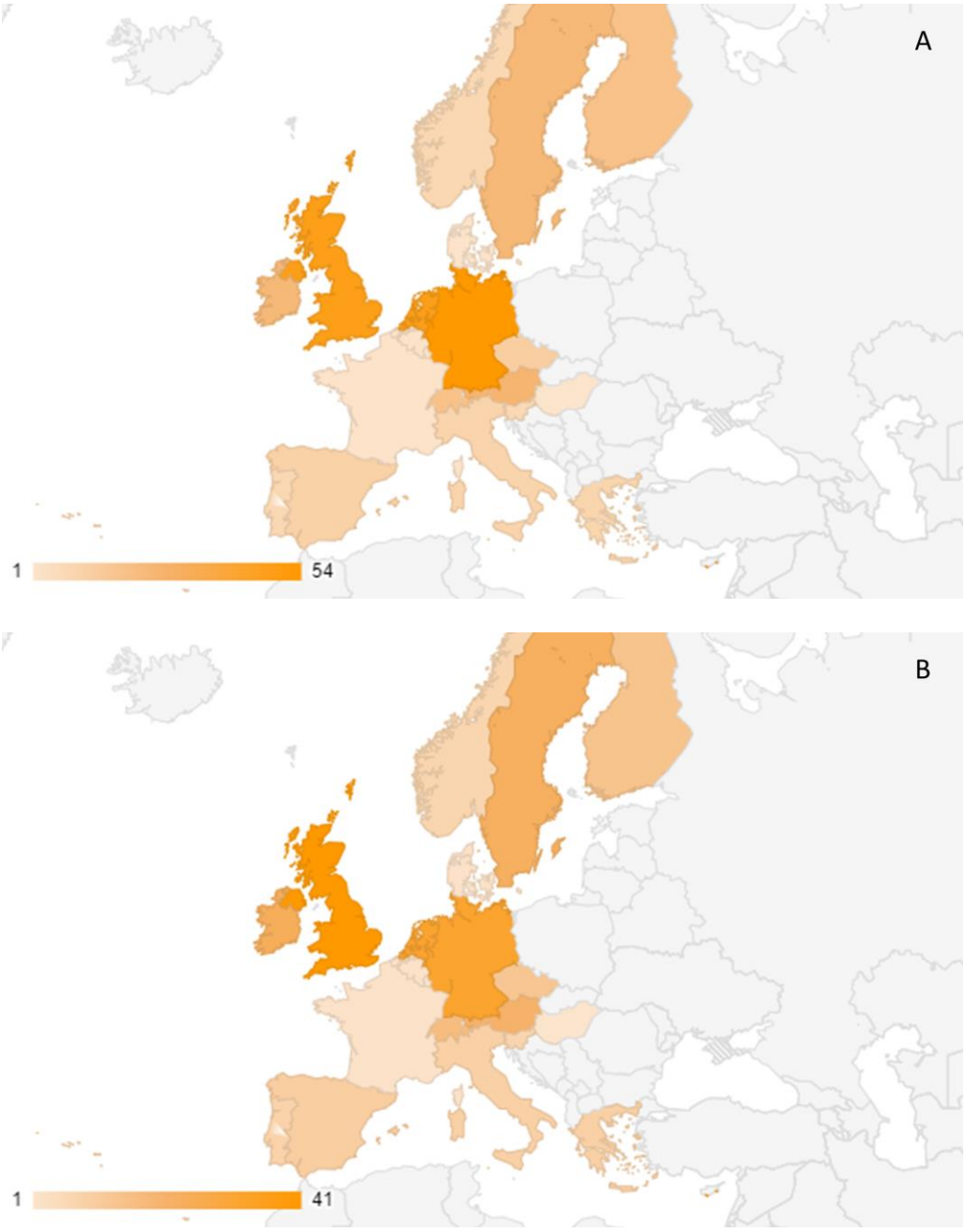


Figure 5A-B. Number of currently active transformative agreements (A) and publishers with whom active transformative contracts are in place (B), per country (source: ESAC Registry)

Only 20 of the 30 countries included in this study currently have one or more transformative agreements registered with ESAC, with Germany, the United Kingdom and the Netherlands topping the list, followed by Austria, Ireland, Sweden, Finland and Switzerland. The United Kingdom not only has the most registered transformative agreements (n=54), but also has agreements with the most individual publishers (n=41).

Most countries without active transformative agreements in ESAC are in Eastern Europe (Bulgaria, Poland, Romania and Slovakia). Other countries without ESAC-registered transformative agreements are the Baltic countries (Estonia, Latvia, Lithuania). In Southern Europe, Croatia and Malta have no active transformative agreements in ESAC.

Looking at the number of agreements, publishers and annual number of articles involved across regions (Tables 12-14), it becomes apparent that Western and Northern Europe (the regions with the highest average R&D expenditure), also have the highest number of transformative agreements, both in total and on average per country. They also have the highest annual number of articles covered by transformative agreements – although the value of this as absolute number is limited, as it is can be influenced both by total article output as well as by level coverage of that output by transformative agreements.

Geographic region	R&D expenditure as % of GDP	Number of TAs	
		Total	Average per country
Western Europe	2.68	153	21.9
Northern Europe	2.03	125	13.9
Southern Europe	1.45	45	6.4
Eastern Europe	1.20	14	2.3

Table 12. Total and average number of active transformative agreements (TAs) by geographic region (source: ESAC Registry)

Geographic region	R&D expenditure as % of GDP	Number of publishers	
		Total	Average per country
Western Europe	2.68	40	15.4
Northern Europe	2.03	48	12.3
Southern Europe	1.45	18	6.1
Eastern Europe	1.20	14	2.3

Table 13. Total and average number of publishers with whom active transformative agreements (TAs) are in place, by geographic region (source: ESAC Registry)

Geographic region	R&D expenditure as % of GDP	Annual number of articles under TAs	
		Total	Average per country
Western Europe	2.68	63,537	9,077
Northern Europe	2.03	75,085	8,343
Southern Europe	1.45	31,563	4,509
Eastern Europe	1.20	3,032	505

Table 14. Total and average annual number of open access articles covered under active transformative agreements (TAs) by geographic region (source: ESAC Registry)

It should be noted that not all transformative agreements in the ESAC registry are national (consortium) agreements – a considerable number are agreements by individual RPOs or smaller consortia. This is particularly relevant in Germany, where only two agreements (with SpringerNature and Wiley) are national agreements negotiated with Projekt DEAL (a third agreement with Elsevier was announced in September 2023). Most other ESAC-registered transformative agreements in Germany have been concluded at the state level or at the level of the larger research performing organisations (Helmholtz Associaton, Leibniz Association, Max Planck Society), or at the level of individual institutions.

Together, the active transformative agreements in the 30 countries in scope for this study cover 56 individual publishers. Of these, 26 have 5 or more agreements in place. As seen in table 15, most publishers have multiple agreements in at least one country, with individual research institutions in addition to agreements with (national) consortia. The publisher with agreements in most countries (n=16) is Wiley, followed by Elsevier, Springer Nature, ACS and IOP Publishing with agreements in 13 countries each.

Publisher	Number of TAs	Number of countries
Company of Biologists	22	12
Association for Computing Machinery (ACM)	20	12
IOP Publishing	18	13
Springer Nature	17	13
American Chemical Society (ACS)	16	13
Oxford University Press (OUP)	16	12
Wiley	16	16
Elsevier	15	13
Cambridge University Press (CUP)	14	11

Royal Society of Chemistry (RSC)	13	12
AIP Publishing	11	9
Taylor & Francis	11	10
Emerald	9	9
John Benjamins	9	6
Microbiology Society	9	6
The Royal Society	8	5
Walter de Gruyter	8	8
IEEE	7	7
Rockefeller University Press	7	7
SAGE	7	7
Karger	6	6
SPIE	6	2
Brill	5	4
Portland Press	5	4
Geological Society London	5	4
Thieme	5	4

Table 15. Publishers with 5 or more active transformative agreements in place in the countries covered in this study (source: ESAC Registry)

3.2.2. Development of transformative agreements over time – by country and publisher

While the first publisher agreements combining reading access and open access publishing date back to 2014 (with Austria and the Netherlands being the first countries to try out these arrangements with publishers), there has been a rapid growth in transformative agreements in recent years (Table 16). It could be hypothesised that Plan S has at least partly driven this growth, by putting transformative agreements forward as an option for authors to be able to publish open access in subscription journals and be Plan S compliant, and by urging RPOs to enter into such agreements as a way to accelerate the transition to open access.

Year	Total number of active Tas
2014	2
2015	4
2016	9
2017	18
2018	30
2019	70
2020	144
2021	278
2022	354
2023	337

Table 16. Total number of active transformative agreements (Tas) by year (source: ESAC Registry)

When plotting the number of ESAC-registered transformative agreements active in any given year between 2014-2023 per country (Fig 6, y-axis optimised for each country), a number of distinct patterns can be observed. There is one group of countries in which the number of transformative agreements has grown steadily over the past 8-10 years (Austria, Germany, the Netherlands, Sweden). Another group of countries (including Czech Republic, Finland, Greece, Hungary, Norway, Poland, Slovenia, Switzerland and the UK) started transformative agreements later, between 2017 and 2019, but still before a potential drive by Plan S. A third group of countries (including Ireland, Italy, Portugal and Spain) only started to have transformative agreements from 2020 onwards, potentially reflecting a driving effect of Plan S. In addition, in a number countries where a sizeable number of transformative agreements were in place prior to 2020, and uptick in the number of agreements can be observed from 2020 onwards – examples are Austria, Germany and Greece. It should be stressed that any relation with Plan S is hypothetical, and not all countries where a correlation is observed have a national funder that is part of Coalition S. There are multiple drivers for open access in general and transformative agreements as a particular tool to achieve this, and, similarly, multiple ways to enable Plan S compliance beyond transformative agreements. The general picture that emerges is that transformative agreements have seen a considerable increase over the last years, but they are not universally adopted as a mechanism across all countries and regions. Finally, the levelling off of growth, or even decline in number of TAs observed for some countries in 2023 could be due to agreements either not being renewed, negotiations for renewal or for new agreements taking longer, or due to delays in registering recent agreements in ESAC.

Looking at the number of active transformative agreements in the ESAC registry per publisher (for the countries included in this study) over the same time period (2014-2023), similar patterns can be observed (Fig 7, y-axis optimised for each publisher). Among publishers with more than 5 active agreements at any given time during this period, there is a small group of publishers who started early with transformative agreements and have seen their uptake grow steadily since (IOP, Springer Nature, Taylor&Francis), publishers who started this practice a bit later (2017-2019), including ACS, Elsevier, CUP and OUP, and publishers who only entered into transformative agreements from 2020 or later, like ACM, Brill, Company of Biologists, Microbiology Society and The Royal Society. The latter group includes a number of smaller publishers and/or society publishers, who may have benefitted from the models developed as part of the Society Publishers Accelerating Open access and Plan S (SPA-OPS) project (Wise & Estelle, 2019) (although this work was not solely aimed at developing models for transformative agreements). For publishers, too, the levelling off of growth, or even decline in number of TAs observed in some cases in 2023 could be due to agreements either not being renewed, negotiations for renewal or for new agreements taking longer, or due to delays in registering recent agreements in ESAC.

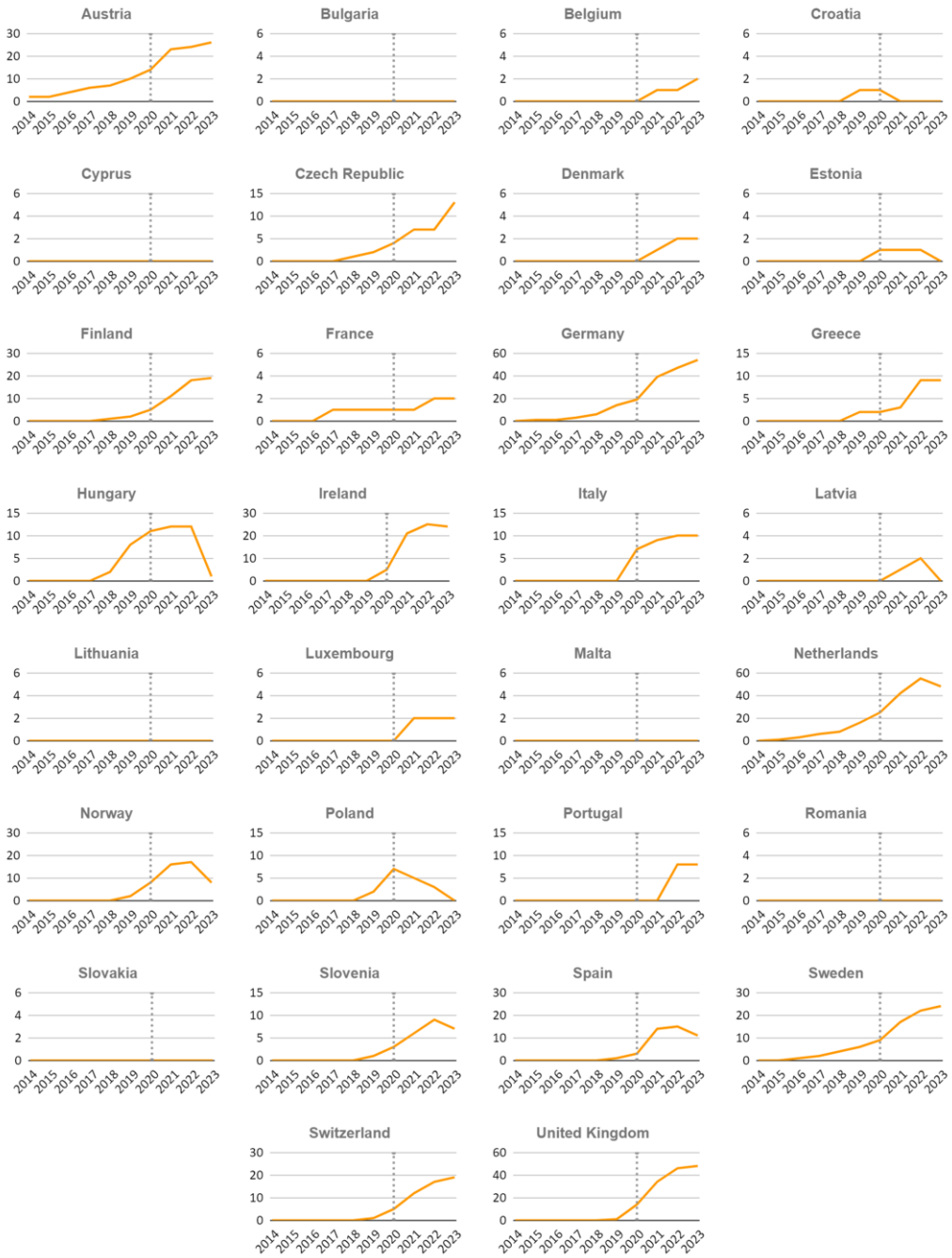


Figure 6. Active ESAC-registered transformative agreements between2014-2023 per country; y-axis optimised for each country; reference line: 2020 (source: ESAC Registry)

Figure 7. Active ESAC-registered transformative agreements between2014-2023 per publisher, for publishers with 5 or more active transformative agreements in 2023 in the countries covered in this study; y-axis optimised for each country; reference line: 2020 (source: ESAC Registry)

3.2.3. Beyond transformative agreements – other open access models

While the ESAC Registry is a valuable source of information enabling detailed analyses, it only covers transformative agreements, and only those entered into the registry by consortia or individual RPOs. Importantly, there are other open access models that get financial support from RFOs and RPOs. These include publisher deals that lack a clear transformative component (such as the 2019 Couperin deal with Elsevier in France, that focuses on cost savings through subscription access and embargoed green open access, with optional publisher OA at a reduced APC rate) (Rabesandratana 2019), deals with full open access publishers, Subscribe2Open, and support for diamond open access and non-profit publishing infrastructure and services.

To provide a broader overview of financial support across the variety of open access models in the countries included in this study, both publisher websites and websites of national consortia were checked for listings of institutional or consortial agreements (where these could be found). Only a limited number of publishers/publishing initiatives was checked (both larger publishers and smaller publishing initiatives), and support was noted at country level, irrespective of whether it was provided through consortia or at the level of individual RPOs. Table 17 and 18 give an overview of organisations (both consortia and publishing organisations) checked, and Table 19 provides a cross-matched table with the mentions of institutional or consortial support on consortium websites and websites of publishing/infrastructure (support) organisations, respectively.

Country	Consortium name	Listing of OA support	URL
Austria	Kemö	Yes	https://www.kemoe.at/english/open-access
Belgium	Elektron / BICfB	not found	-
Bulgaria	Bulgarian National Consortium	not found	-
Croatia	National Academic Consortium	not found	-
Cyprus	CLC	not found	-
Czech Republic	CzechELib	not found	-
Denmark	Royal Danish Library	yes	https://pro.kb.dk/en/licensing
Estonia	ELNET	negotiations via EIFL	https://eifl.net/apcs

Country	Consortium name	Listing of OA support	URL
Finland	FineLIB	yes	https://finelib.fi/negotiations/using-oa/
France	Couperin	yes	https://www.couperin.org/category/negociations/accords-specifiques-so/
Germany	Projekt DEAL	yes	https://deal-konsortium.de/en/agreements
Greece	HEAL	yes	https://www.heal-link.gr/en/open-access-agreements/
Hungary	EISZ	yes	https://eisz.mtak.hu/index.php/en/open-access-english/open-access-agreements.html
Ireland	IreL	Yes	https://irel.ie/open-access/
Italy	CRUI / Bibliosan	via institutional website	https://www.sba.unimi.it/en/digital-library/13719.html
Latvia	Culture Information Systems Centre	negotiated via EIFL	https://eifl.net/apcs
Lithuania	Lithuanian Research Library Consortium (LMBA)	negotiated via EIFL	https://eifl.net/apcs
Luxembourg	Bibliothèque nationale (BnL)	not found	-
Malta	not found	-	-
Netherlands	UNL	yes	https://www.openaccess.nl/en/in-the-netherlands/publisher-deals
Norway	SIKT	yes	https://www.openscience.no/en/publisering/apen-publisering
Poland	ICM	not found	-
Portugal	FCT / b-on	yes	https://www.b-on.pt/en/open-access/

Country	Consortium name	Listing of OA support	URL
Romania	not found	-	-
Slovakia	SKeLIB / EIZ	not found	-
Slovenia	COSEC	yes (but deeplinks not working) + negotiated via EIFL	https://cosec.nuk.uni-lj.si/en/open-access-e-resources/ (deeplinks not working) https://eifl.net/apcs
Spain	CSIC	yes	https://bibliotecas.csic.es/en/open_access_publishing_support_program
Sweden	Bibsam	yes	https://www.kb.se/samverkan-och-utveckling/oppen-tillgang-och-bibsamkonsortiet/open-access-and-bibsam-consortium/bibsam-consortium/open-access-in-bibsam-agreements.html
Switzerland	CASL	yes	https://consortium.ch/vertraege-konditionen/?lang=en
United Kingdom	Jisc	yes	https://beta.jisc.ac.uk/our-role-in-open-access

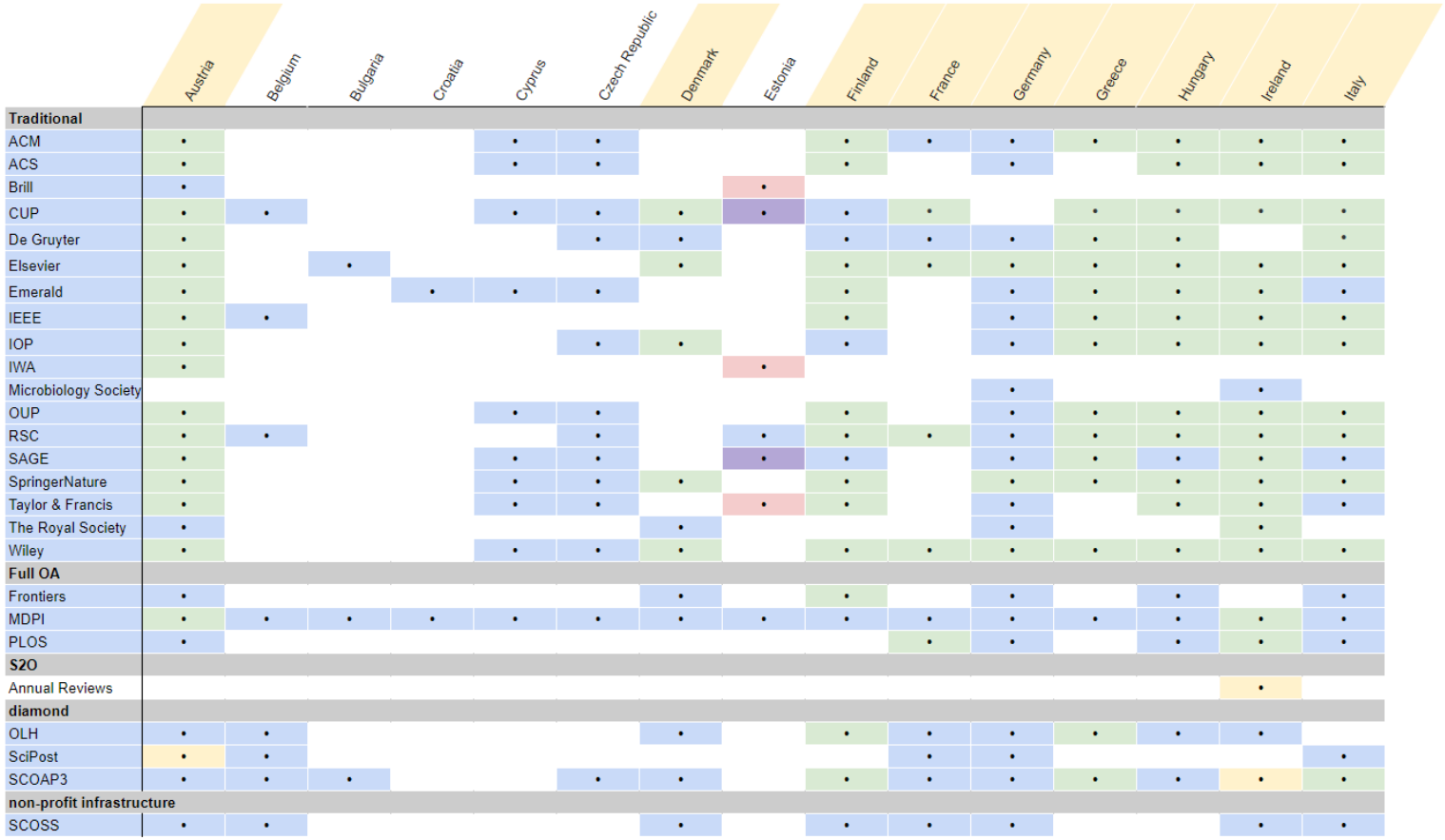
Table 17 Overview of national consortia with/without listings of publisher deals and other open access support

Publisher / organisation	Type	Listing of institutional support	URL
ACM	traditional, society	yes	https://libraries.acm.org/acmopen/open-participants
ACS	traditional, society	yes	https://acsopenscience.org/institutions/read-and-publish/#agreements
Annual Reviews	S2O	no	-

Publisher / organisation	Type	Listing of institutional support	URL
Brill	traditional, commercial	yes	https://brill.com/page/institutionaloa/institutional-open-access-agreements
CUP	traditional, society	yes	https://www.cambridge.org/core/services/open-access-policies/read-and-publish-agreements
De Gruyter	traditional, commercial	yes	https://www.degruyter.com/publishing/publications/openaccess/open-access-agreements?lang=en
Elsevier	traditional, commercial	yes	https://beta.elsevier.com/open-access/agreements?trial=true
Emerald	traditional, commercial	yes	https://www.emeraldgrouppublishing.com/publish-with-us/publish-open-access/open-access-publishing-agreements
Frontiers	full OA, commercial	yes	https://www.frontiersin.org/about/institutional-partnerships
IEEE	traditional, society	yes	https://open.ieee.org/for-institutions/institutional-partners/
IOP	traditional, society	yes	https://publishingsupport.iopscience.iop.org/questions/institutional-open-access-agreements/
IWA	traditional, society	yes	https://iwaponline.com/open_access/pages/institutional_agreements
MDPI	traditional, commercial	yes	https://www.mdpi.com/ioap
Microbiology Society	traditional, society	yes	https://www.microbiologyresearch.org/publish-and-read
OLH	diamond	yes	https://www.openlibhums.org/plugins/supporters/

Publisher / organisation	Type	Listing of institutional support	URL
OUP	traditional, society	yes	https://academic.oup.com/pages/open-research/read-and-publish-agreements/participating-journals-and-institutions
PLOS	full OA	yes	https://plos.org/resources/for-institutions/institutional-account-participants/
RSC	traditional, society	yes	https://www.rsc.org/journals-books-databases/open-access-publishing/read-and-publish/deals/
SAGE	traditional, commercial	yes	https://us.sagepub.com/en-us/nam/open-access-agreements
SciPost	diamond	yes	https://scipost.org/sponsors/
SCOAP^3	diamond	yes	https://scoap3.org/participating-countries/
SCOSS	Infrastructure support	yes	https://scoss.org/help-sustain-open-infra/whos-funded/
Springer Nature	traditional, commercial	yes	https://www.springernature.com/gp/open-research/oa-agreements
Taylor & Francis	traditional, commercial	yes	https://authorservices.taylorandfrancis.com/choose-open/publishing-open-access/oa-agreements/
The Royal Society	traditional, society	yes	https://royalsociety.org/journals/open-access/read-publish-agreements/
Wiley	traditional, commercial	yes	https://authorservices.wiley.com/author-resources/Journal-Authors/open-access/affiliation-policies-payments/institutional-funder-payments.html

Table 18 Overview of selected publishing / infrastructure organisations with listings of institutional deals



	Austria	Belgium	Bulgaria	Croatia	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy
Traditional															
ACM	•				•	•			•	•	•	•	•	•	•
ACS	•				•	•			•		•		•	•	•
Brill	•							•							
CUP	•	•			•	•	•	•	•	•		•	•	•	•
De Gruyter	•					•	•		•	•	•	•	•		•
Elsevier	•		•				•		•	•	•	•	•	•	•
Emerald	•			•	•	•			•		•	•	•	•	•
IEEE	•	•							•		•	•	•	•	•
IOP	•					•	•		•		•	•	•	•	•
IWA	•							•							
Microbiology Society											•			•	
OUP	•				•	•			•		•	•	•	•	•
RSC	•	•				•		•	•	•	•	•	•	•	•
SAGE	•				•	•		•	•		•	•	•	•	•
SpringerNature	•				•	•	•		•		•	•	•	•	•
Taylor & Francis	•				•	•		•	•		•		•	•	•
The Royal Society	•						•				•			•	
Wiley	•				•	•	•		•	•	•	•	•	•	•
Full OA															
Frontiers	•						•		•		•		•		•
MDPI	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PLOS	•									•	•		•	•	•
S2O															
Annual Reviews														•	
diamond															
OLH	•	•					•		•	•	•	•	•	•	
SciPost	•	•								•	•				•
SCOAP3	•	•	•			•	•		•	•	•	•	•	•	•
non-profit infrastructure															
SCOSS	•	•					•		•	•	•			•	•

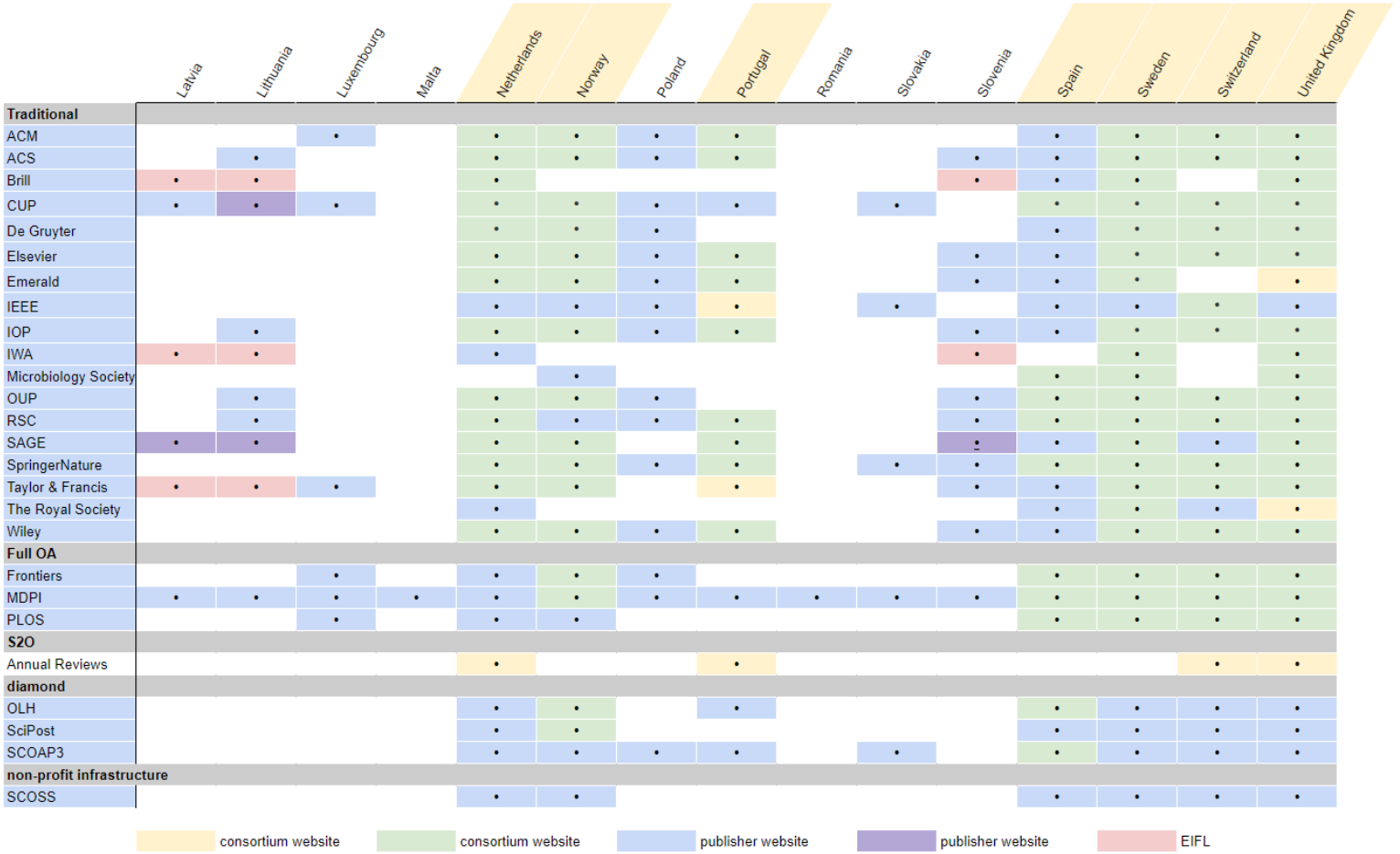


Table 19 Cross-matching of institutional/consortial support for open access publishing as listed on consortia websites (yellow), websites of publishing/infrastructure (support) organisations (blue) and EIFL (pink). Green and purple indicate overlap of mentions.

The results show that there are many more publisher deals in place than are listed on consortia websites (where found), often because these are deals with individual institutions, rather than consortia. In addition to deals with traditional commercial and society publishers that include open access, in many countries there is organised support for other open access models. The extent of this support is most apparent in countries that also have extensive contracts with traditional publishers for open access publishing in subscription journals (e.g. Austria, Germany, Netherlands, Norway, Spain, Sweden, Switzerland and the UK).

3.2.3.1. Full gold OA (APC-based)

Support for (APC-based) full gold OA journals through publisher deals is most often organised at the level of individual research performing organisations, rather than at national level. A few countries do organise support for full gold OA publishers at national level. These are predominantly Northern and Western European countries that also have a large number of transformative agreements at national level. Two exceptions are Spain (which does have less national-level transformative agreements but does have national level agreements with all three larger full gold OA publishers (PLOS, Frontiers and MDPI)) and France, which has very few national transformative deals but does have a national-level deal with PLOS.

Interestingly, MDPI is the only publisher among those investigated that on their website reports to have (institutional) deals in all 30 countries in scope of this report. Whether this reflects an effective marketing strategy and/or a perceived need by institutions, as compared to other publishers, would be an interesting topic for further investigation.

3.2.3.2. Subscribe2Open (S2O)

A number of national consortia list support for Subscribe2Open (S2O), including for Annual Reviews, Berghahn Anthro (through Libraria), the European Mathematical Society and Amsterdam University Press. Table 8 shows national support for Annual Reviews as an example. Like with national support for full gold OA publishers, consortial support for S2O so far seems limited to those countries that already participate in a large number of transformative agreements. It thus seems to represent an expansion of OA support, rather than a matter of preferentially supporting S2O over other models. Interestingly, Annual Reviews itself does not provide a list of supporters of their S2O model, so it was not possible to do a crosscheck of information, nor to identify additional support at institutional, rather than consortial level.

3.2.3.3. Diamond OA

Financial support for diamond OA can take many forms, including financing in-kind support, grant funding and collectively organised funding (Bosman et al., 2021b). A number of national consortia support diamond OA initiatives and organisations, such as the Open Library of Humanities (OLH), SciPost and SCOAP[3] (a collective agreement enabling open access publishing in high-energy physics journals from various institutional, commercial and society publishers). The website of these publishing initiatives also list more extensive support (often institutional) from a number of countries in scope for this study, including some that do not appear to have many transformative agreements (e.g. Bulgaria and Slovakia). It should be noted that the diamond OA landscape is highly dispersed and often nationally oriented, and much support will not have been picked up in this inventory. In addition, it is important to remark that for this report, diamond OA is considered to include all publishing initiatives that result in research articles being free to read and free to publish (without eligibility restriction based on affiliation or funding), but not limited to institutional, scholar-led and/or non-commercial publishing.

3.2.3.4. Non-profit publishing infrastructure

Apart from paying publishers directly, another way to financially support open access publishing is through support for publishing infrastructure that can be used by multiple publishing organisations, including for diamond OA. A number of non-profit publishing infrastructures rely on institutional support for their continued operations (often next to grant-based support for specific development projects). This included technical platforms for publishing (like Open Journal Systems from PKP), but also repository infrastructure (like Dspace from Lyrasis), preprint archives (like arXiv), non-profit services around metadata (like ROR and OpenCitations) and services around indexing (like DOAJ and SherpaRomeo). A number of these, and other, non-profit infrastructures have membership programmes or other ways to enable financial support, often linked to participation in community governance. A number of national consortia, specifically, support one or more of the infrastructures mentioned above through SCOSS, the Global Sustainability Coalition for Open Science Services (SCOSS). These includes consortia from Austria, Finland, France, Ireland, Sweden and the UK, as well as a number of individual institutions from various other countries in scope of this study.

3.2.3.5. EIFL

To support open access publishing in smaller countries with less research budget, EIFL (Electronic Information for Libraries) has been negotiating both reduced APCs as well as transformative agreements with a number of publishers on behalf of, and in collaboration with, library consortia in its partner countries, including Estonia, Latvia, Lithuania and Slovenia. This has resulted in reduced APCs in both hybrid and fully open access journals from a number of publishers for researchers in these countries. Recently, EIFL has also concluded four transformative agreements (with ACM, the Company of Biologists, the European Respiratory Society and IWA Publishing) on behalf of a number of developing and transition economy countries, but these do not include any of the countries in this study.

Finally, it should be noted that while on selected publisher websites all mentions of support from a country were noted (irrespective of whether this support was at consortium level or the level of individual RPOs), at country level only consortia websites were checked. This leads to some known omissions, and potentially many unknown ones. One notable omission regards Belgium, where no listing of open access support on consortia websites could be found, but where, at institutional level, KU Leuven supports many non-profit, community-led initiatives through their FAIR OA fund (KU Leuven, n.d., Verbeke & Mesotten 2022).

3.2.4. Direct funder support for open access publishing

As alluded to in Section 3 on national (funder) open access financing policies, funders can stimulate open access through mandates and evaluation criteria, but also directly through financial support. Funders differ in the extent to which they utilise this latter instrument. Many funders allow grantees to pay APCs from their grant budgets, often with limitations on the type of journals - e.g. whether hybrid journals are covered (and under which conditions) or only full OA journals (sometimes with the stipulation the latter should be listed in DOAJ). Other funders, specifically UKRI in the UK, instead provide funding to RPOs to finance open access publishing.

It should be emphasised that there is a difference between funder mandates (e.g. what a funder requires from it's grantees in terms of open access publishing), and the direct financial support a funder provides, and that both are ways through which funders can influence the publishing landscape.

Where funders do require open access but do not directly offer financing options, this can still be a stimulus for institutions to make compliance possible for their researchers through institutional or national publisher deals, and for publishers to tailor publication options to influence author behaviour in certain ways – one example being the explicit language some publishers use to steer authors away from the rights retention strategy and towards APC-based open access publishing to meet funder mandates (see Rumsey 2023 for an example).

Looking specifically at Plan S, while all Coalition S funders have committed to financially support publication fees in full OA journals, they can, but do not have to, contribute financially to open access publishing under transformative agreements – and as we will see below, this seems to be the exception rather than the rule.

Coalition S funders also consider publishing OA in transformative journals (journals that have committed to transforming to OA but which do not need to be part of transformative agreements) to be compliant with Plan S requirements, but vary as to whether they will cover APCs for these journals (see Table 10 in Section 3.2.5). Out of 16 Coalition S funders in countries in scope for this report, four do not cover these costs, and two have additional requirements for these journals. Similarly, not all funders have adopted the rights retention strategy (enabling authors to reserve the right to deposit the accepted version of their articles in a repository without embargo and with a CC-license), as an alternative to publishing open access in the journal.

As mentioned, while Coalition S funders will (have to) cover any APCs their grantees incur for publication in full OA journals, they do not have to financially support transformative agreements, which are most commonly entered between publishers and RPOs or their consortia. Few funders do, in fact, participate in these agreements – one notable exception being FWF in Austria that does participate in 8 transformative agreements and 2 agreements with full OA publishers (FWF, n.d. a). In general, where financial support for open access publishing is partly covered by the funder, and partly by institutions/consortia (either in a joint agreement or through separate mechanisms), it will require coordination at the national level to distribute costs in a fair way.

While funders can and do cover open access publications costs for their grantees, it is often more complicated to fund diamond open access and non-profit publishing infrastructure, other than through temporal grant funding, e.g. for specific development projects. Nonetheless, some funders in the European region do have specific support for such initiatives. Here again, FWF is an example, funding a number of open access infrastructures (FWF, n.d. b), as does NWO in the Netherlands, either directly or through SCOSS (NWO, n.d.).

A number of European funders have also signed the Action Plan for Diamond Open Access Plan (Ancion et al, 2020) with the aim of developing develop common resources for the diamond OA ecosystem, including financial mechanisms that will enable the full range of operational costs of diamond OA publishing to be carried by a network of institutions including RFOs, RPOs and their libraries, and governments. This action plan, developed by Science Europe, cOAlition S, OPERAS, and the French National Research Agency (ANR), has been endorsed by a number of funders as well as library consortia in the European region (Science Europe, 2022), including from Southern and Eastern Europe. Examples of non-Coalition S funders and other organisations that have signed for endorsement are the Research Foundation Flanders (FWO) in Belgium as well as the Bulgarian Academy of Science.

A special example of long-term support of open access infrastructure by a group of national funders and charitable funders is the support of EuropePMC (used by these funders both as a repository and as an indexing and discovery service), which has been financed through a series of long-term grants administered by the Wellcome Trust, to which all funders involved contribute.

Finally, funders are exploring the establishment of dedicated platforms to publish research outcome resulting from their funding at no direct cost for authors (Johnson 2022, Ross-Hellauer, Schmidt & Kramer, 2018). First pioneered as a model by charitable funders as the Gates Foundation and Wellcome Trust, the European Commission has made Open Research Europe (ORE) a flagship in their support of open access. While originally commissioned to F1000Research for development and operations, and available to publication only for recipients of EC funding, current plans are for a transition to an collective non-profit publishing service run on an open source platform, supported by a wider range of funders and potentially open to authors independent of eligibility criteria regarding funding (Johnson 2023, Kouis 2023).

4. Available information on open access publication costs

4.1. Introduction

Obtaining a good overview of the costs RPOs and RFOs currently incur for open access publishing is challenging due to the lack of available information and the comparability of that information across organisations, let alone countries. In principle, three types of information are required:

- the number of publications, by OA model;
- who is responsible for paying OA costs for each publication (if any);
- the OA costs associated with each publication (if any).

The first and second parameter requires bibliographic information on authors (including corresponding authors), affiliations and funders, and journal-level information on coverage under institutional or (national) funder funding policies, including participation in publisher agreements. The challenges in the availability of this information will be covered in Chapter 6.

The third parameter involves at least an estimation of the cost per publication that is accrued to the institution or funder, or covered by authors through other means. To a large extent this is complicated by the limited availability and transparency of detailed financial information, particularly for publisher contracts that combine reading and publishing, as well as to the distributed nature of financing – with costs sometimes borne by the institution though publisher deals or institutional open access funds, sometimes directly by the funder, and other times by authors themselves, e.g. through departmental budgets or other means ('APCs in the wild'). Added to that, support for diamond open access and open access infrastructure (including repository infrastructure and operations) can be organised through different financial streams within an organisation, making obtaining a complete overview difficult at the level of the organisation itself, let alone publicly. Finally, costs and pricing are two different concepts, and institutions and funders would benefit from knowing how the prices they are charged related to the actual costs of the services they wish to obtain.

Here, we will focus on an analysis of the available information on open access publication costs from publicly available sources, both for transformative agreements (using the information available in the ESAC registry) as for other models of open access publishing.

4.2. Transformative agreements in the ESAC Registry

With transformative agreements, that are intended to facilitate a transition from subscription journals to full open access publishing, participating institutions often pay for both reading rights and open access publishing in all or a selection of journals from a particular publisher. The financial model underlying each agreement is often opaque, making an estimation of actual publishing costs difficult. The ESAC registry includes a questionnaire accompanying each entry, that asks a number of basic questions on the nature of the agreement. In addition, the registry contains link to the full-text contract, if that has been made available. Together, these data enable a closer look at the nature of these transformative agreements and the availability of financial information, including notable differences between agreements from the same publisher with different institutions, and agreements the same institution or consortium concludes with different publishers.

Fig 8A-E show the distribution of active transformative agreements in the ESAC registry across a number of different characteristics, ranging from public availability of the contracts, inclusion of full OA journals in the contract, to financial details on total cost, share of access (reading) related costs and the extent to which the contract shifts financing from subscription to open access publishing. Below, these aspects will be considered more in detail.

4.2.1. Public availability of contracts and inclusion of prices

Of the 337 agreements in scope, 166 (50%) are indicated as being (fully) disclosed and published (Fig 8A). Looking at the distribution across both countries and publishers (Fig 9A-B), it becomes apparent that some countries (like the UK, Ireland, Sweden and the Czech Republic) manage to negotiate public sharing of contracts with all or almost all publishers, while other countries can or do share only part of their contracts, or none at all – Austria being an example of the latter case. Similarly, on the publisher side, looking at publishers with 5 or more registered agreements in ESAC, there are none for whom all contracts are available. Public availability of contracts might thus be an element of negotiation (with different results being achieved by different institutions), and/or might be dependent on institutions actually making the contracts available and adding that information to the ESAC Registry.

4.2.2. Public availability of contract costs and cost breakdown

Not all available contracts also include detailed financial information. For the contracts that were publicly available, it was checked whether they contained the total costs of the contract (either for the entire contract period or by year) as well as a breakdown of the costs into reading and publishing (Fig 10A-D). From these results, it seems like for most publisher agreements, public availability of the contract includes public availability of (total) costs, which is good in terms of transparency. Here again, the subset of contracts that are publicly available but do not include (total) costs might be a consequence of negotiated terms and conditions between a specific publisher and institution/consortium – often reflected in blacked-out costs in the public contract. However, it might also depend on the specific nature of the contract.

For instance, contracts with unlimited publishing with a set per-article fee might not include a (projected) total costs (as is the case with the recently concluded Elsevier-Projekt Deal contract, not yet included in the ESAC Registry at time of sampling). Another special case is contracts negotiated by JISC in the UK, where quotations for each prospective participating institution are not included in the shared contract, and only available in a separate webportal behind a login.

While many contracts do indeed include the total cost of the contract, far fewer include details on the split between reading and publishing costs. Many publishers (including ACM, ASC and Elsevier) do not include this in any of their contracts, and those that do, only have it in a subset of contracts. Where total publishing costs are regularly seen to be blacked out or removed from shared contracts – depending on the conditions for public sharing negotiated by the publisher and institution or consortium – the presence of information on the read/publish actually seems to vary between contracts even from the same publisher. This could be a reflection of different types of contracts, or again depending on negotiations.

Taken together, while the information available in publicly available contracts provides a rich source of analysis of the nature and type of contracts (which will be explored in more detail below), there are too many gaps in the available information to build a comprehensive total picture of publishing costs under transformative agreements for a given country, or compared between countries.

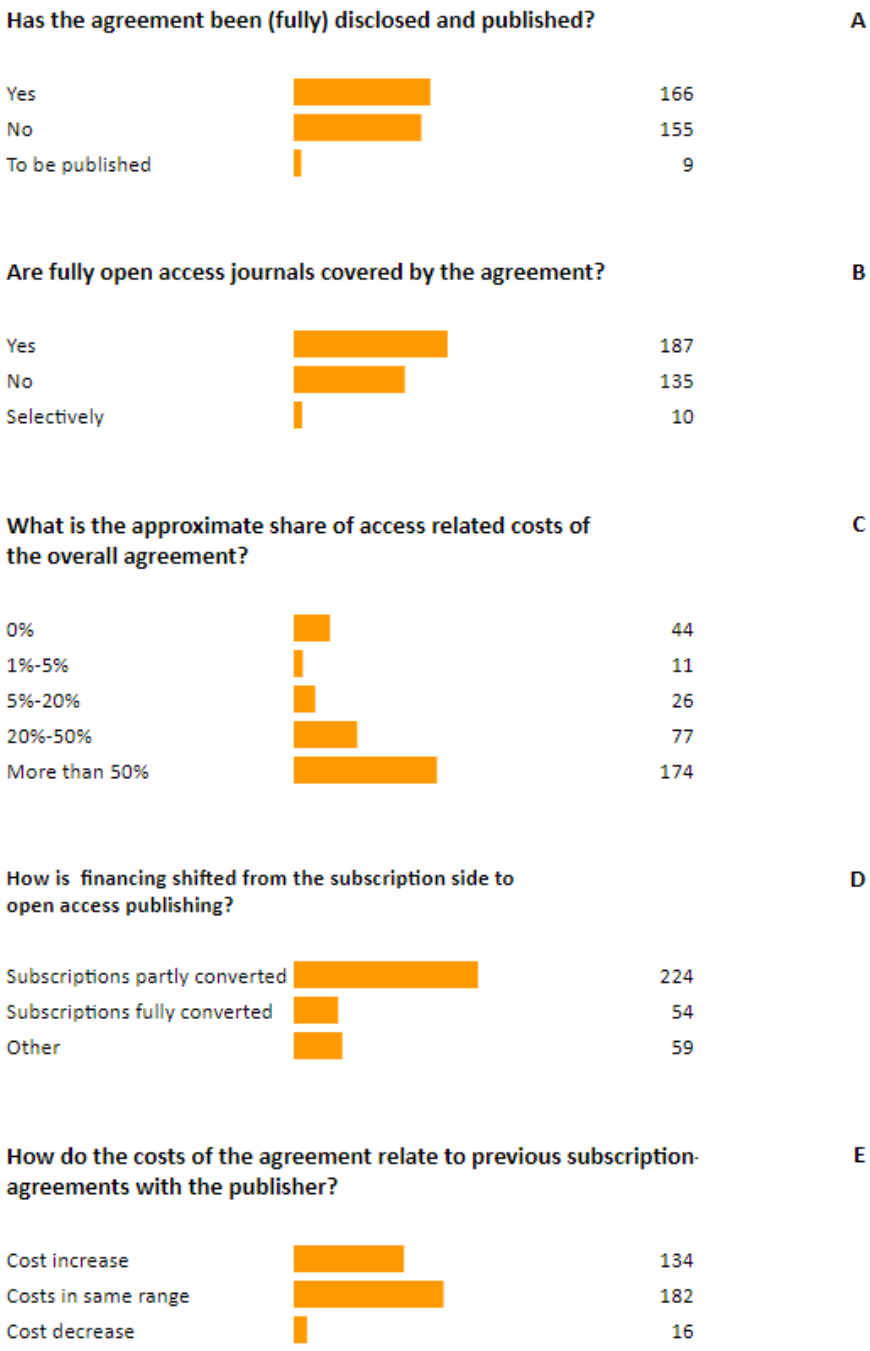


Figure 8A-E Characteristics of active transformative agreements in scope of this study (N=337, including non-responses) (source: ESAC Registry)

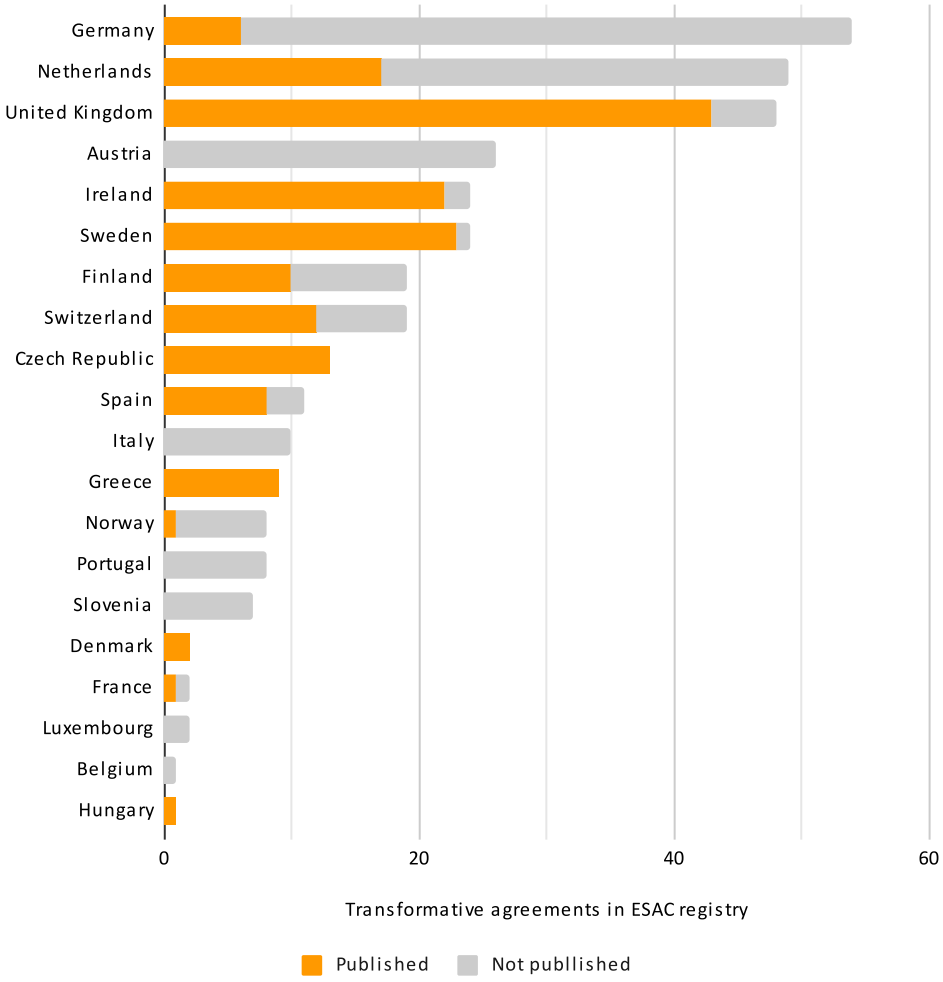


Figure 9A Characteristics of active transformative agreements by country – Has the agreement been (fully) disclosed and published? (source: ESAC Registry)

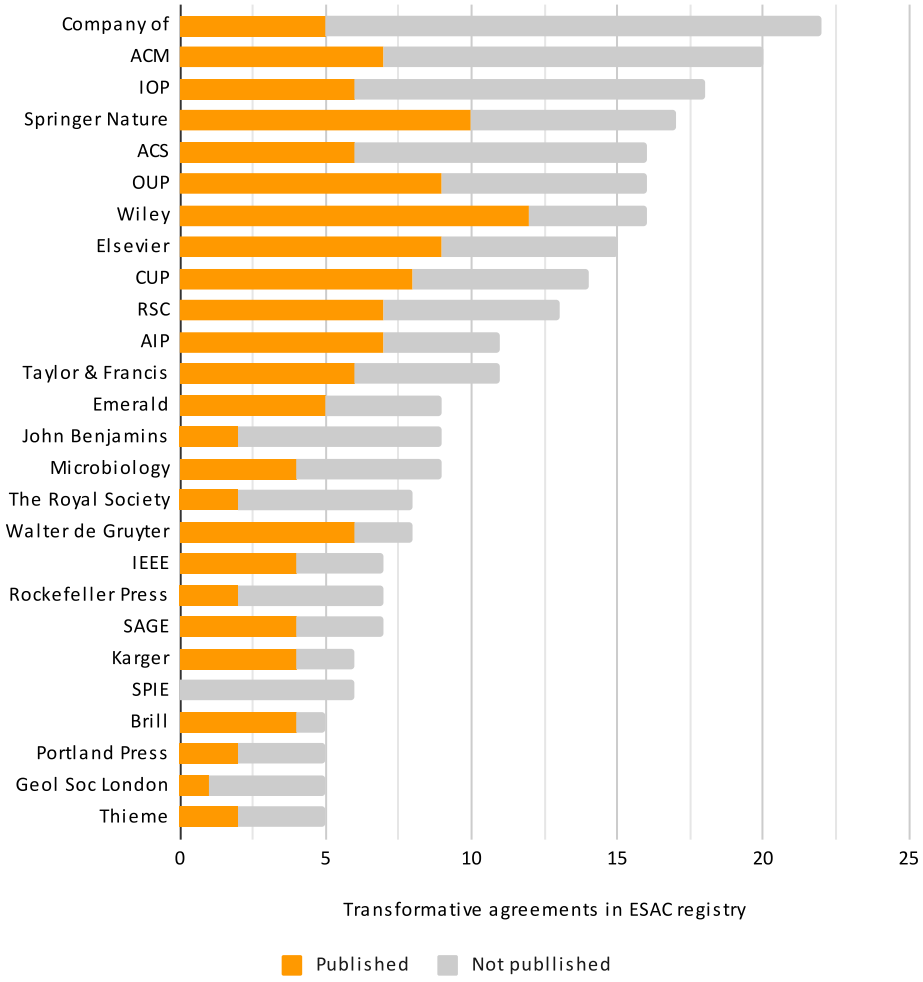


Figure 9B Characteristics of active transformative agreements by publisher – Has the agreement been (fully) disclosed and published? (source: ESAC Registry, publishers with more than 5 current agreements registered)

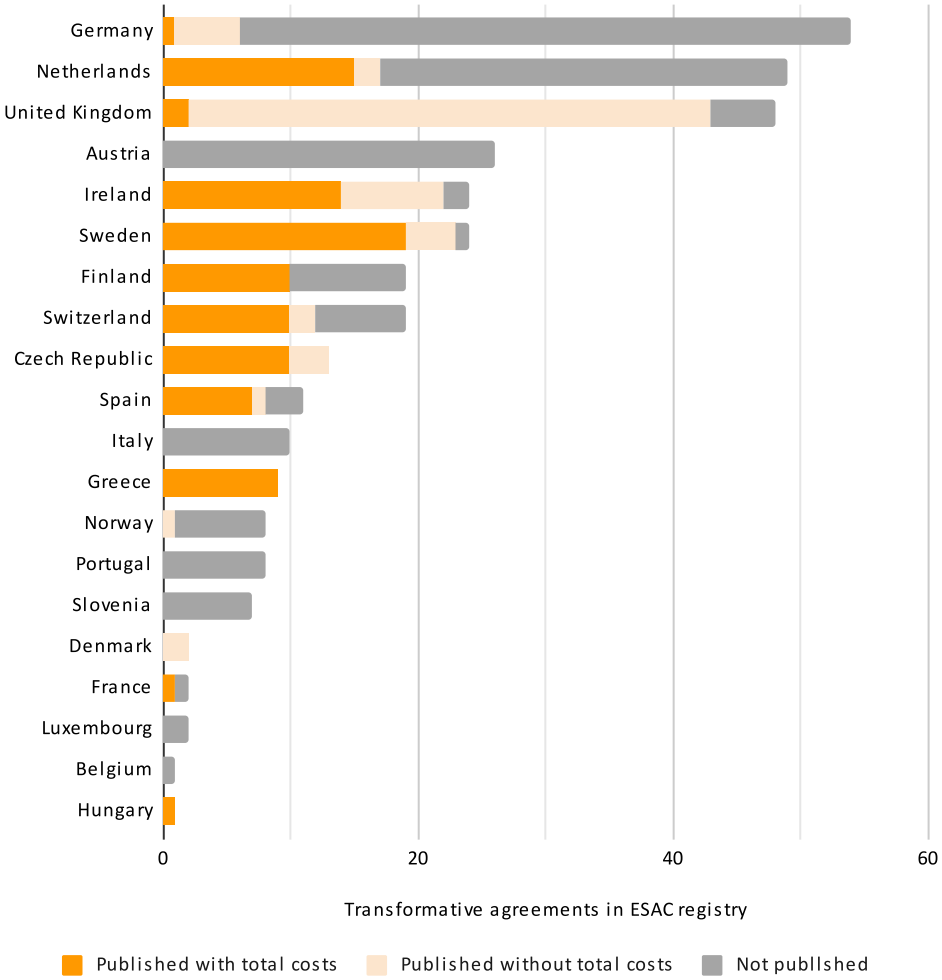


Figure 10A Characteristics of active transformative agreements by country – Does the published agreement include the total costs? (source: ESAC Registry)

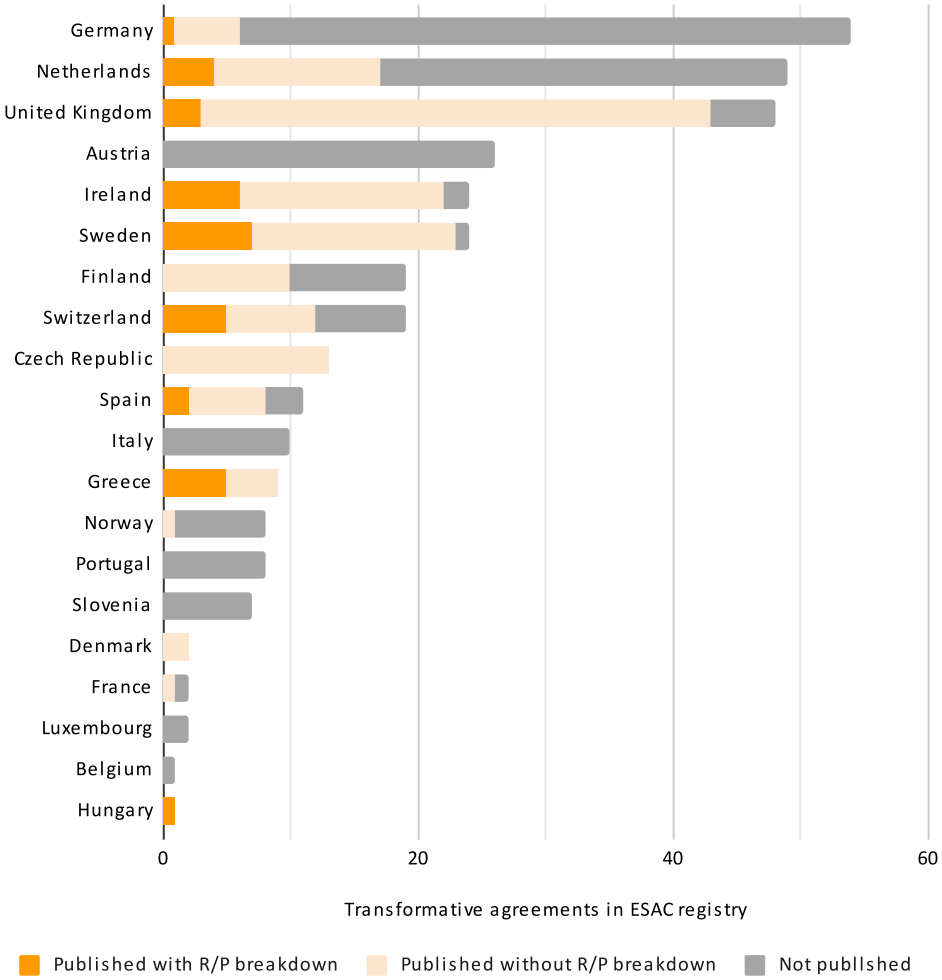


Figure 10B Characteristics of active transformative agreements by country – Does the published agreement include the Read/Publish breakdown?? (source: ESAC Registry)

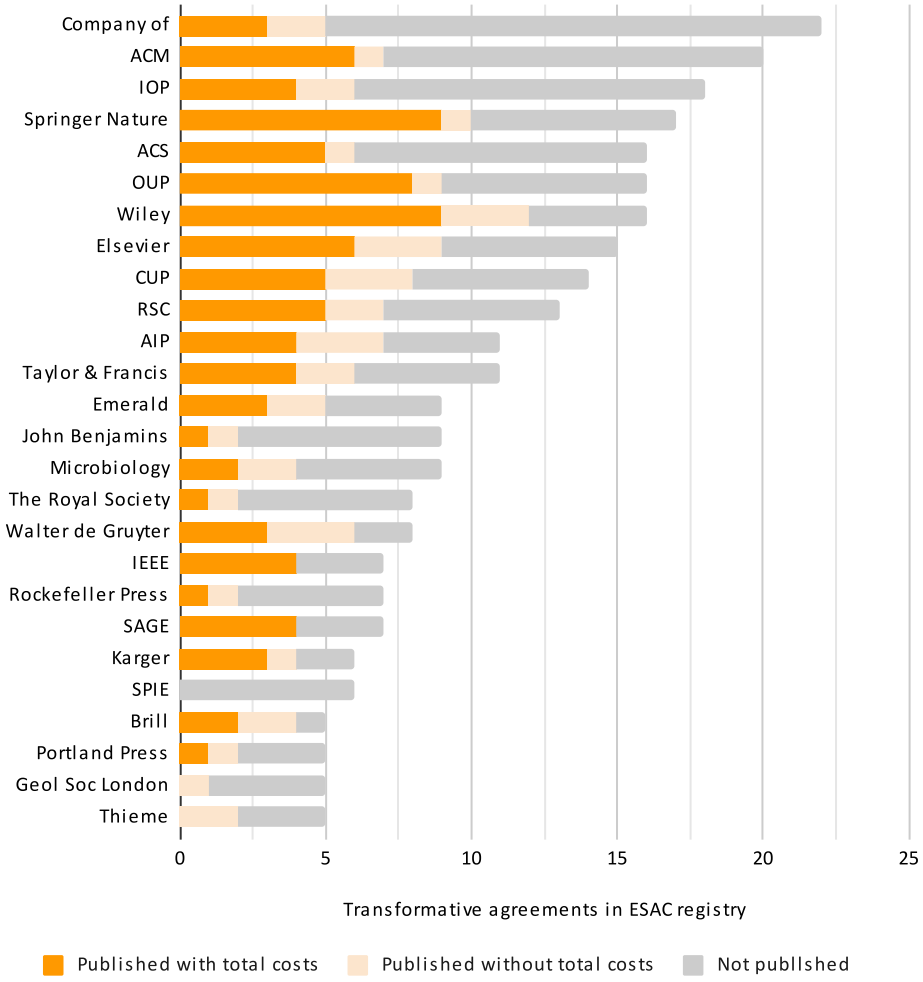


Figure 10C Characteristics of active transformative agreements by publisher – Does the published agreement include the total costs? (source: ESAC Registry, publishers with more than 5 current agreements registered)

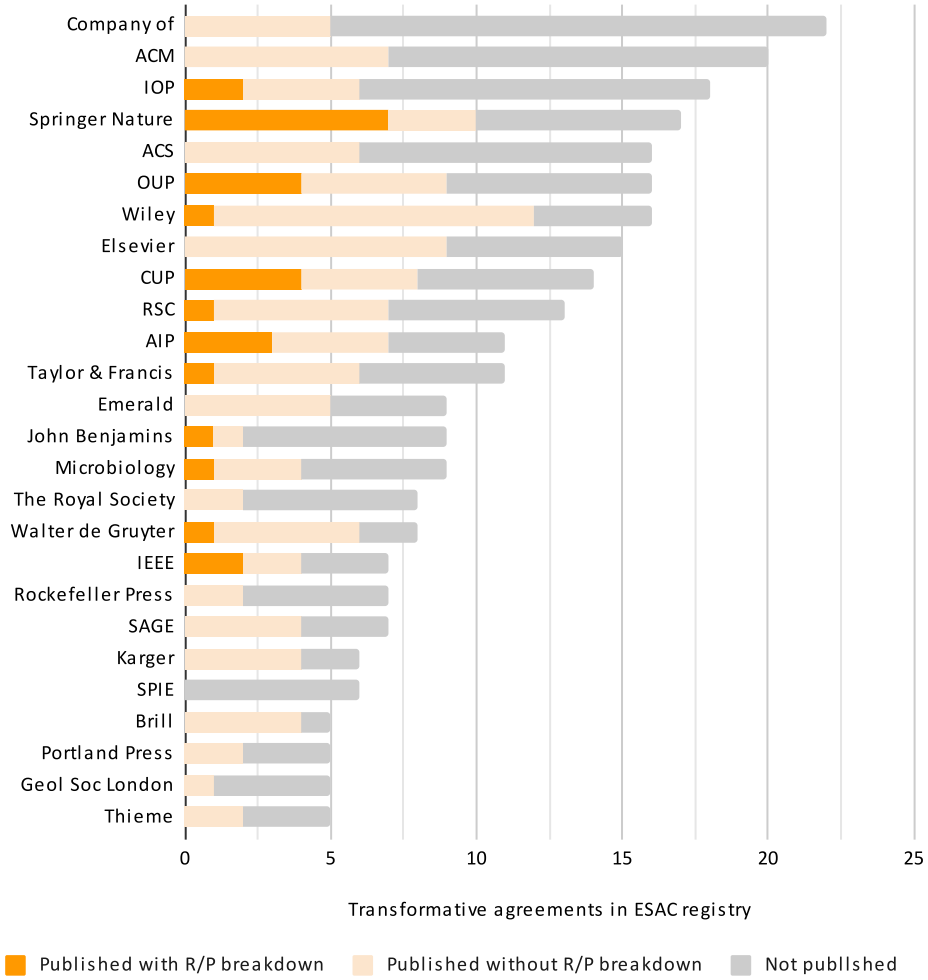


Figure 10D Characteristics of active transformative agreements by publisher – Does the published agreement include the Read/Publish breakdown?? (source: ESAC Registry, publishers with more than 5 current agreements registered)

4.2.3. Types of contracts

While individual contracts provide information on the nature of the contract, and can be compared between institutions and publishers, not all contracts contain the (financial) information required for a detailed analysis. Fortunately, the questionnaire accompanying all ESAC contracts, including free-text comments, provides a high-level overview of the differences among contracts in terms of the inclusion of full OA journals in addition to subscription journals, the approximate share of access-related costs compared to publishing-related costs, and to what extent the contract shifts partly or fully from subscription to publishing, and whether the contract represents a cost increase or decrease compared to a subscription-only contract (Fig 8B-E).

4.2.3.1. Inclusion of full OA journals

Transformative contracts vary in the extent to which they include full OA journals or not. Across the 337 current contracts in the ESAC registry covering the countries included in this study, 56% include full OA journals, and an additional 10 contracts from a variety of publishers (3%) have full OA journals selectively included (Fig 8B). Where full OA journals are included, the way they are included varies – sometimes no difference is made between publishing in subscription or full OA journals, sometimes a separate part of the contract deals with full OA journals – either with a separate per-article fee or only offering a reduction in APCs. Where full OA journals are included as integral part of the contract, it is (even) harder to make a split between the reading and publishing part of the contract. On the other hand, including publishing in full OA journals does provide greater choice for authors and does not make it financially more attractive for authors to publish in subscription journals vs full OA journals.

4.2.3.2. Shift of financing from subscription to open access publishing

Transformative contracts vary considerably in the extent to which they shift financing from subscription (reading access) to open access publishing, as well as in how this shift is calculated. The questionnaire accompanying the ESAC registry has two questions on this shift (Fig 8C-D). The first of these asks about the approximate share of access related costs of the overall agreement. Perhaps surprisingly, slightly more than half of the contracts in scope for this study reports that access-related costs still make up over 50% of the contract, and only 55 (16%) of contracts reporting less than 5% of costs going to subscription access. This is in line with the second question, asking whether subscriptions are partly or fully converted to fees for open access publishing with only 54 respondents answering that subscriptions are fully converted to OA fees, with access costs representing 5% or less of the total costs of the contract.

For 59 contracts, institutions provided other, free text answers to this question, revealing both the variety in models employed, as well as ambiguity in how this question was interpreted – or different views on cost distribution in transformative agreements in general. Some answers elaborated on whether the contract takes previous subscription spend as a starting point, or is based on a combination of previous subscription and OA spend, or fully based on expected OA publishing. Other answers instead focused on whether in the mechanism of the contract there is a split between costs for reading and publishing or not (e.g. whether APCs are offset against subscription costs, whether subscription costs are fully converted to APCs, or whether there is a flat fee with no distinction.

Closer inspection of individual contracts also reveals a great variety both in the actual split (where given), what this split is based on and examples where the split shifts over time towards more open access costs and less subscription costs. Interestingly, for the same publisher there can be similar variety in both reading/publishing split and (where given) resulting per article costs. For instance, for Oxford University Press (OUP) the publishing part of the contract is given as 85% in the Netherlands and 59% in Ireland, both for 2021. The calculated per article fee (based on article caps given in the contract) would be € 1105 and € 1724, respectively when based on publishing costs alone, and € 1300 and € 2905, respectively, when based on total contract costs.

While such differences might at least partly be explained by differences in expected OA output, differences in (historical) subscription spend, journals included in both the reading and publishing part, and/or different negotiation strategies, they make comparisons between contracts, and consequently comparisons of open access spend between countries, much more complicated, even when financial information is included in all contracts.

4.2.3.1. Overall cost development

As shown above, the total costs of an agreement can be based on different calculations, with many different models in use. It can be fully based on historical subscription spend, on expected OA output, or a mixture of both. In addition, it can be capped (either linked to a maximum number of open access articles published, or with an unlimited number of open access articles for a set total cost), or open-ended, with the final costs (partly) determined by the number of articles eligible to be published open access under the contract. In addition, total costs are also influenced by the selection of journals included in the contract (both for reading and publishing), the inclusion of full OA journals (and the financial model used for these), the inclusion of other products or services in the contract, and finally, the negotiation strategies and success of both parties in the contracts. All these factors make it hard to compare contract costs between publishers, institutions and countries.

Across the transformative agreements in the ESAC registry that are in scope for this study, 40% report that the contract represents a cost increase compared to previous subscription-based contracts with the same publisher (Table 8E). 55% indicate that the costs are comparable, while only 5% reports a decrease in overall costs. At a high level, these results do not unequivocally support the idea that ‘there is enough money in the system’, but rather point to a danger of transformative agreements representing increasing costs for at least a considerable part of institutions/consortia.

Looking at the free text answers accompanying this question, institutions ascribe the increase in costs to various factors, including more participating members, more journals included (for reading and/or publishing), the inclusion of full OA journals, and the fact that costs are now based on publication output, resulting in higher costs for research intensive organisations. For some contracts, higher costs are explained by additional services and workflow adaptations on the part of the publisher. Some institutions also remark that the increased costs are comparable to previous subscription spend and separately invoiced APCs. Also, inflation correction is mentioned as a reason for higher costs, which is irrespective of the type of contract.

Institutions with contracts that come at a comparable cost compared to previous subscription-only contracts attribute this to agreed upon cost constraints, total costs being within the range of previous spending (including APCs), reduced or waived reading fees to compensate for increasing publishing fees. For agreed upon costs constraints, this sometimes take the form of a cost-neutral agreement based on prior subscription investment only, and is sometimes achieved by limiting the number of articles that can be published under agreement, covering only part of the expected publishing output.

Finally, decreased costs are sometimes achieved when institutions with high publication output do not (yet) participate in the agreement, when full OA journals are taken or left out of the agreement, or when the agreement is limited to output that needs to cover funder requirements. In some cases, when costs are comparable to previous subscription spend but now include open access publishing, this is also considered a decrease.

4.3. Beyond transformative agreements – financial details of other open access models

4.3.1. Reduction in APCs or repository deposit

Not all publisher contracts that include open access publishing are considered transformative agreements, in that they convert subscription costs to publication costs. Some contracts, like the Couperin contract in France with Elsevier and the arrangements made by EIFL on behalf of partner countries, only cover a reduction in APCs, not the full costs of OA publishing. In the case of Couperin, this is accompanied by a reduction in overall costs of the agreement.

Publisher contracts sometimes also include special clauses regarding deposit of accepted manuscripts in repositories to achieve open access. Again taking the example of the Couperin-Elsevier contract, here the publisher commits to depositing articles in the French national repository and making them free to read at the publisher website, albeit only after a 1 year embargo, which is longer than the permissions accorded by French copyright law. Interestingly, the French National Open Science Plan has used the savings achieved on the Elsevier contract to further invest in non-profit open science infrastructure, which could in itself be considered a transformation of sorts.

Some publisher contracts, for instance the JISC-Wolters Kluwer transformative agreement in the UK, include a stipulation that allow for repository-mediated open access without embargo period and with an open license (CC-BY), but only when the agreed upon article cap is exceeded and then only for articles subject to funder requirements.

In the case of reduced APCs, open access publishing costs should theoretically be more straightforward to calculate. For contracts relying on repository-based open access, publishing costs could be considered zero, although this does not account for the costs of repository infrastructure and workflows.

4.3.2. Full gold OA (APC-based)

Contracts with full OA publishers most often involve an agreed upon reduction in APCs, sometimes combined with central invoicing which reduced administrative burden for both authors, institutions and the publisher. Where the discount percentage, list price and number of published articles is known, calculation of publication costs is relatively straightforward.

PLOS has a more sophisticated approach to institutional agreements, offering varying institutional partnerships (PLOS, n.d.) including an option that covers unlimited publishing for affiliated authors for a flat fee, a version where agreements costs reflect regional economies (dependent on a country's World Bank lending tier) and the Community Action Program Cost where the cost for institutions is based on the contributions of both corresponding and contributing authors, and margins are capped, lowering costs for participation if more institutions participate.

In this case, while the target for each participating journal is communicated transparently on PLOS' website, the costs for participating institutions are only available to that institution, making assessment of actual publication costs across institutions and/or countries less straightforward.

4.3.3. Subscribe2Open (S2O)

As a model, S2O relies on existing library subscription procurement processes, converting existing licenses from subscription to supporting OA publishing, sometimes with a discount for institutions continuing their license under the S2O model (S2O Community of Practice, n.d.). There is less financial transparency in the costs involved, as subscription spending is generally not publicly available or shared between institutions (also depending on stipulations around disclosure in publisher contracts). In addition, while publishers can decide to put a cap on total revenue for a journal (for example, set at the level of current subscription revenue), lowering the cost of participation the more institutions join the S2O programme, they could also decide to keep the costs of participation constant, increasing revenue the more institutions join the programme.

Conceptually, as with support for non-profit publishing infrastructure and some forms of support for diamond OA, expenditure towards S2O cannot be converted to a 'per article' amount, as it is irrespective of an institutions research output in the publisher's portfolio.

4.3.4. Diamond OA

Institutional support for diamond OA can take multiple forms. On one hand, publishing organisations sometimes use membership tiers, with set contribution fees based on an institution's size and geographic location. An example is Open Library of Humanities, where membership fees are available on its website (OLH, n.d.). Secondly, institutions (and funders) can make one-time or recurring contributions, which are sometimes listed on the website of either the donating or the receiving institutions, but otherwise remain unknown. Thirdly, funders and institutions can contribute to diamond publishers based on the proportion of publishing output – a model implemented by SciPost (SciPost, n.d.) and proposed more widely as a way for funders to contribute to diamond open access publishing by Dufour et al (2023). This is also the approach taken by the Diamond OA Fund from University of Amsterdam (UvA, n.d.) which supports diamond OA journals on a per article basis for each article published by UvA researchers, at a rate of €500 per article

Finally, in-kind support from institutions, e.g. by providing institutional publishing infrastructure or staff labour, is harder to quantify financially and often remains invisible. This is unfortunate, as it often constitutes an important part of the operation of diamond publishing initiatives (Bosman et al., 2021).

4.3.5. Non-profit publishing infrastructure

Non-profit publishing infrastructure organisations often employ a membership model, with pricing tiers published on their websites. Support of non-profit infrastructure through SCOSS similarly used suggested tiers for contributions, with discounts offered to institutions participating through consortia. One-time or recurring contributions outside such membership models are sometimes made publicly available on the website of either the donating or receiving institutions. Similarly, support through grants can sometimes be derived from funders grant databases, or when made public by the infrastructure.

4.4. Other sources of financial information (specifically APCs)

Financial information on APCs outside (transformative) agreements can be obtained through various sources, each with their own limitations.

4.4.1. OpenAPC

OpenAPC provides an aggregation of institutional APC information supplied by a growing number of European research performing organisations. Average APCs are given by journal, publisher, and year, but can also be calculated directly from article-level data provided. OpenAPC asks institutions to report fees as gross values, with modifiers like taxes or discounts should be included into the amount (OpenAPC, n.d.).

4.4.2. DOAJ

For full OA journals charging fees, DOAJ documents the height of the fee based on self-reporting by publishers. Amounts are included in DOAJ in various currencies. Journal matching was done based on ISSN(s). Regarding the extent to which fees in DOAJ are up-to-date, larger publishers are approached yearly by DOAJ to update their APC information. For smaller publishers, DOAJ relies on the publisher to keep their record(s) up-to-date. DOAJ also acts on user-submitted feedback to review APCs for specific journals, and systematically reviews all records working from the oldest records forward (DOAJ, personal communication).

4.4.3. Historical APC prices

Various efforts have been made to collect historical APC prices. One example is the dataset of Butler et al., 2022, collected and used by Butler et al, 2023, with annual list prices for journals of the five largest publishers (Elsevier, Sage, Springer-Nature, Taylor & Francis and Wiley) This dataset is a combination of list price data previously collected by Mattthias (2020) and Morrison (2021) supplemented by retrieving archived list prices via the Internet's Archive Wayback Machine. Where multiple sources were available, a higher and lower boundary APC value is given for any journal for a particular year. The dataset covers information for 2015-2018, so is less useful as a proxy for current APC prices.

4.4.4. Current list prices

Current list prices for APCs can be retrieved from most publishers' website and can be a useful source of current information, either in themselves or combined with known discounts on APCs as part of existing publisher deals.

4.4.5. Bibliographic databases

A number of bibliographic databases contain information on APCs, usually taken from either DOAJ or OpenAPC. Two examples are OpenAlex, which included both listed prices taken from DOAJ and paid prices taken from OpenAPC, and OpenAIRE similarly includes APC information, taken directly from OpenAPC. The main benefit of using these databases is that information on publication output (including affiliations and – to a limited extent- funder information) can be directly linked to known information on APCs.

4.4.6. Limitations

There are various limitations on the availability, accuracy and reliability of APC information collected via the sources mentioned above. Publisher-supplied prices reflect official journal/publisher policy, but these amounts may be different from what is paid in practice by organisations or authors, due to: a) potential updates since information was last provided (e.g. for DOAJ), b) any discounts and waivers applied. In addition, current list prices from publisher websites require considerable effort to obtain (as opposed to using a centralised data source) and are subject to updates.

As for APCs reported by research institutions (such as in OpenAPC), while these reflect real, actual APCs paid, the number of institutions participating is limited, and while information from the most recent year may be scarce, information from previous years might deviate from current prices. Also, because APCs are likely not reported when waivers are supplied, there is a potential overestimation in the 'true' costs of APCs paid. Here too, although the expectation is to report APC including VATs, it is not clear this is always the case.

4.5. Prices vs costs

All the data sources mentioned so far provide information on what funders, research performing organisations or individual authors pay for open access publishing. While from the perspective of those stakeholders, this does represent costs, for publishing organisations, it does not represent the cost of providing services for open access publishing, but rather the revenue received for these services. In addition, the prices charged usually comprise full publishing services (and sometimes publishing and reading services combined). This makes it harder for RPOs and RFOs to meaningfully compare prices between publishers, and assess to what extent they relate to the individual elements of publishing services provided.

In an attempt to provide more transparency around prices, and enable RPOs and RFOs to meaningfully compare services provided by different publishers and the prices charged for these, two price transparency frameworks have been developed at the instigation of Coalition S – the Plan S Price Transparency Framework by Information Power and the Publication Services and Fees framework by the Fair Open Access Alliance (FOAA). Both frameworks define a number of categories of service. For each, publishers can indicate what percentage of the overall price relates to the different services provided.

cOAltion S has endorsed both frameworks and, in an attempt to both stimulate publishers to provide this information and research performing organisations to make use of it, has facilitated the development the Journal Comparison Service, a closed platform where the information provided by publishers can be accessed by RPOs and RFOs after authorisation. Authorisation is granted only to organisations (but not consortia) that already have open access agreements with publishers – excluding public scrutiny of information provided, and, presumably, access for organisations that do not currently have any open access agreements with publishers, but might be interested in exploring their value. The service was launched in 2022, with 15 publishers participating in the service and information available for just over 2000 journals (Table 20). Among participating publishers are traditional publishers (Wiley), open access publishers like PLOS and Frontiers, and society publishers like the Royal Society. Importantly, publishers that work via non-APC models (like Beilstein Institute and Open Library of Humanities) are also represented, recognising the importance of price transparency also for these publishing models.

Publisher	Number of journals included
AboutScience	5
Beilstein Institute	2
Common Ground Research Networks	66
Company of Biologists	5
Copernicus Publications	37
EMBO Press	4
European Respiratory Society	4

F1000	4
Frontiers	126
Hindawi	220
IWA Publishing	14
Institute of Slavic Studies, Polish Academy of Sciences	8
International Union of Crystallography	10
JMIR	29
Wiley	1470

Table 20 Publishers participating in cOAlition S' Journal Comparison Service, with the number of journals for which information is made available on the platform. Source : https://www.coalition-s.org/journal-comparison-service-resources-libraries-funders/

It is not known how many research performing organisations and funders have used the service so far, how they use the information provided and how useful they consider the information – this would be interesting to investigate. While in principle, price transparency provided useful context to assess publication fees and the value of publisher agreements, the information as currently provided through the Journal Comparison Service could be said to have a number of limitations.

First, as alluded to above, information on price breakdowns is not publicly available, and moreover, only available to institutions already involved in open access agreements with publishers. This limits the usefulness of information as part of a broader, public discussion that could benefit research performing organisations and funders more broadly. It is perhaps somewhat ironic that on one hand, the reason given for the decision to only provide access to authorised users is that legal advice was obtained that publishers should not be able to access each other's data (and thus be accused of anti-competitive behaviour, such as price collusion), but on the other hand publishers can and do share similar information on price transparency on their websites, and are encouraged by Coalition S to do so. It thus seems that the concern about potential accusations of price collusion are at least not universally shared among publishers.

A second limitation to the information available through, or based on, one of the price transparency frameworks is that it is, as the name suggests, information on price, not costs. While the FOAA framework has the option for a separate category for surplus/gross profit, use of this category is not obligatory, and the Information Power framework guidance is to spread surplus evenly over all categories. In effect, this means that surplus will often remain invisible. It could be argued that in general, what is relevant for a customer is to be able to compare prices when procuring services (also outside publishing). However, community discussions around publishing costs for open access are often about the surplus or profit margin incurred by publishers (a discussion often focused around large commercial publishers, but by no means only relevant to those), and around true costs of publishing scholarly articles (e.g. Grossman & Brembs, 2021). Both of these elements are relevant to assess prices asked.

While the Journal Comparison Service and its underlying frameworks provide useful transparency about price breakdown, and are important in promoting such transparency, its value is currently limited by the number of participating publishers, barriers to accessing the data (and using them in public discourse), and by the lack of information on surplus/gross profit and thus, on actual publishing costs rather than price.

5. Development and diversity of scientific publishing

5.1. Introduction

As mentioned in Chapter 5, obtaining a good overview of the costs RPOs and RFOs currently incur for open access requires three types of information:

- the number of publications, by OA model;
- who is responsible for paying OA costs for each publication (if any);
- the OA costs associated with each publication (if any).

The first and second parameter requires bibliographic information on authors (including corresponding authors), affiliations and funders, and journal-level information on coverage under institutional or (national) funder funding policies, including participation in publisher agreements.

There are a number of challenges in obtaining this information, including variation in definitions of OA models, unrestricted availability of bibliographic information, coverage and quality of the required variables in bibliographic databases, and the linking of publications to funding policies of RPOs and RFOs.

Here, we focus on an analysis of the development of open access publishing in the countries in scope of the report based on openly available data, including a discussion on the opportunities and current limitations in the use of open data. In addition, we will discuss the availability of information on funders in publication metadata as well as on coverage of publications under publisher agreements.

5.2. Development of open access publishing – data availability

Results of analysis of open access publishing (proportion of open access over time, proportion of different OA models) are dependent on the data sources used and various definitions (of publication type and OA models) either implemented in the data source or made during analysis. For example, analyses using Web of Science or Scopus are limited to the journals selected for inclusion in the database (which, for Web of Science also depends on the different section for which access is licensed, esp. the inclusion or exclusion of the Ermerging Sources Citation Index). Other proprietary databases, such as Dimensions, are less selective but limit themselves to publications with DOIs. Each database uses it's own definition of publication type (sometimes at journal level, sometimes at article level), which means that filtering on journal articles may or may not result in the inclusion of non-research articles such as editorials, letters to the editor and others. Most databases which include open access classification use information from Unpaywall (which is itself limited to articles with DOIs, although repository versions without DOI are included as OA versions), but databases often make their own choices on how to assign categories. This can include whether to show all repository-based OA or only where no publisher-based OA version is available, whether to only count accepted or published versions in repositories as green OA or also submitted versions prior to peer review, and whether and how to distinguish publisher OA with and without open license(s).

Finally, the availability and quality of affiliation information, and persistent identifiers determines which articles are included when doing analysis on the output of specific institutions, countries or regions over time.

All this means that the results of analyses of publication patterns, including open access patterns, will differ depending on the sources, definitions and methodology used, and there is no one 'ground truth'. What matters is that these choices need to be transparent, and ideally the underlying data are available to allow readers to verify the analysis, or modify the analyses to apply different choices and see the effects.

The growing availability of open bibliographic metadata makes it possible to conduct large-scale analysis of publication patters, including open access patterns, as the European Commission itself has shown in their commissioned analysis of open access of publications resulting from Horizon2020 funding (Monitoring Open Access Policy in Horizon 2020 (MOAP) (European Commission, 2021), based on OpenAIRE in conjunction with a number of other open data sources (Crossref, Unpaywall, DOAJ, OpenAPC). Another example are the Open Access dashboards for countries and institutions from Curtin Open Knowledge Initiative (COKI), which uses information from OpenAlex, Crossref, Unpaywall and ROR.

For this study, we used the underlying data and analysis infrastructure provided by COKI to generate a modified view on the data in the country dashboards for the 30 countries in scope for this study, using SQL queries in Google Big Query. Specifically, we limited our corpus to publication with a DOI and with type 'journal-article' in OpenAlex (which at time of sampling corresponded to Crossref's 'journal-article' type), published between 2012 and 2022, and with at least one affiliation belonging to the countries included in our study. We then matched DOIs back to Unpaywall and ISSNs back to DOAJ to get open access information and assign publications to one of the following categories:

- in full OA journal (in DOAJ, non-APC-based)
- in full OA journal (in DOAJ, APC-based)
- in full OA journal (not in DOAJ)
- open in subscription journal (open license)
- open in subscription journal (no open license)
- open in subscription journal (no open license) & in repository (accepted/published version)
- in repository only (accepted/published version)
- in repository only (submitted version)
- closed

The results give an approximation of the development over time of the use of different OA models in the various countries (Fig 11). It should be noted that, like most open access analyses, this is a retrospective view of current open access availability of publications from a range of publication years, not a reflection of open access availability at the time of publication. Currently available information in Unpaywall does allow for an analysis of embargo times (esp. for repository-based OA), but this was outside the scope of this study. As a final methodological remark, fractionalised counting of publications was not applied (i.e. a publication with one author from Spain and one from Austria is counted as one publication both Spain and Austria).

Code and aggregated data for this analysis are available on Zenodo (Kramer, B. 2024).

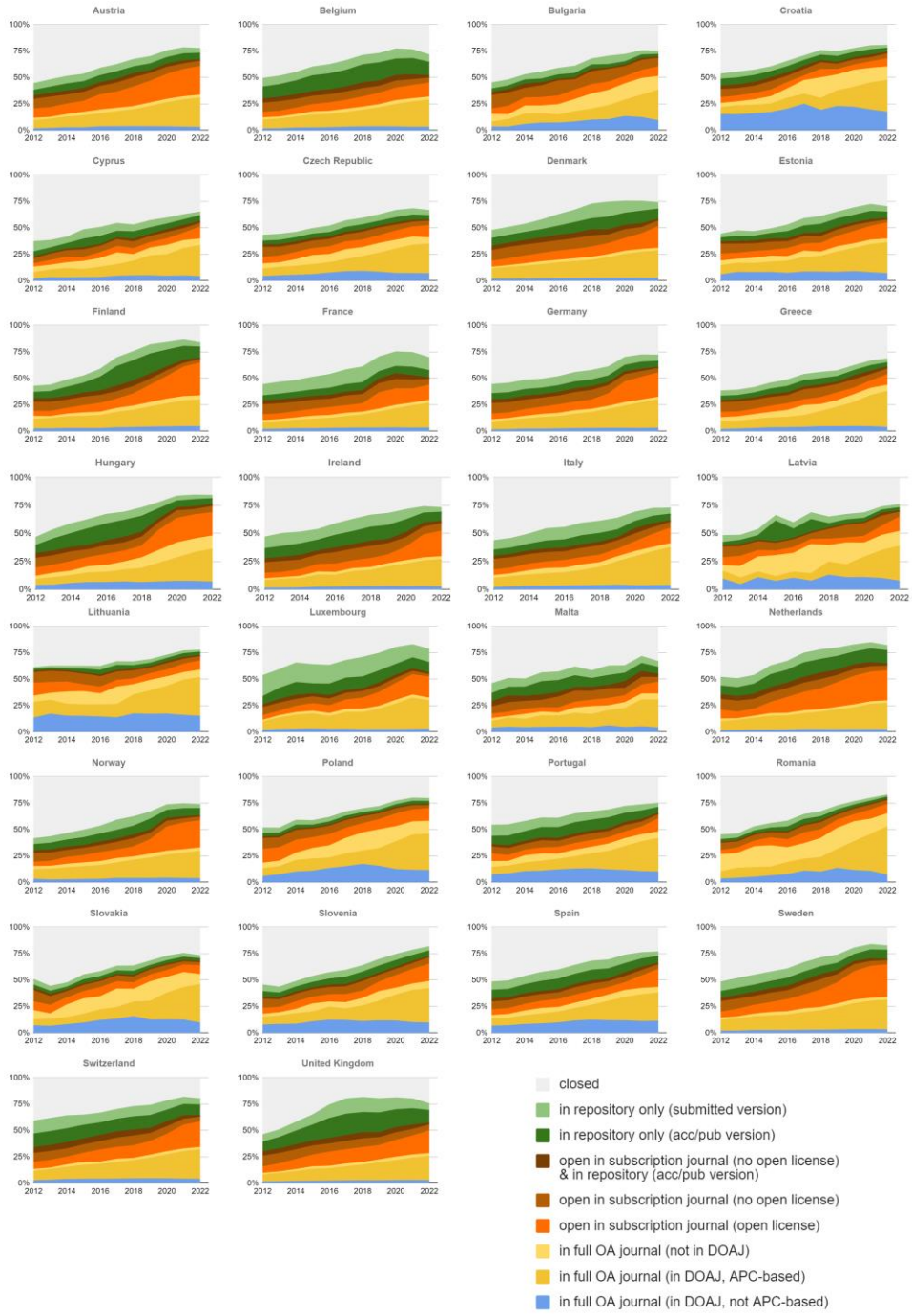


Figure 11. Proportion of open access availability, by open access model, of journal articles published between 2012-2022 per country (source: COKI)

5.3. Development of open access publishing – observed trends

The results as shown in Figure 11 allow a number of observations, both on the development of different open access models, as well as on differences between countries and regions (Figure 12A-D). For all countries in scope of this report, the proportion of open access availability has increased considerably over time, with a number of countries (Finland, the Netherlands, Hungary, Sweden and Luxembourg reaching over 80% of free-to-read articles for publication year 2021, and all countries reaching at least 60%. In general, a flattening or decrease of total OA proportion can be observed for the most recent publication years (which can at least partly be explained by the effect of embargoes for repository-based OA and moving walls for publisher-based OA without a license, also known as “bronze OA”). However, some countries defy this trend and show continuous OA growth also for the most recent years, most notably Slovenia and Romania.

Looking more in detail, there are marked differences between countries in the development of publications in hybrid journals, in full OA journals (and within that, in the proportion of publications in non-APC based journals as well as full OA journals not indexed in DOAJ), and repository based OA.

5.3.1. Publications in hybrid journals

In line with the developments regarding transformative agreements described in Chapter 5, a number of countries show a marked increase in the proportion of articles made available as open access articles in subscription journals, while in other countries, the proportion of hybrid OA has remained modest. Examples of countries with a marked growth in hybrid OA are Finland, Norway, Sweden and Ireland in Northern Europe and Austria, Germany, The Netherlands and Switzerland in Western Europe. In contrast, across Southern and Eastern Europe, the proportion of hybrid OA remains modest, with the exception of Hungary, which has seen considerable growth of hybrid OA in recent years. In Spain, Italy and Slovenia, some growth in hybrid OA can start to be observed in most recent years, but the overall proportion of hybrid OA remains modest so far. In the Baltic states (nominally part of Northern Europe, but with markedly different OA patterns), the proportion of hybrid OA also remains modest to small.

5.3.2. Publications in full OA journals

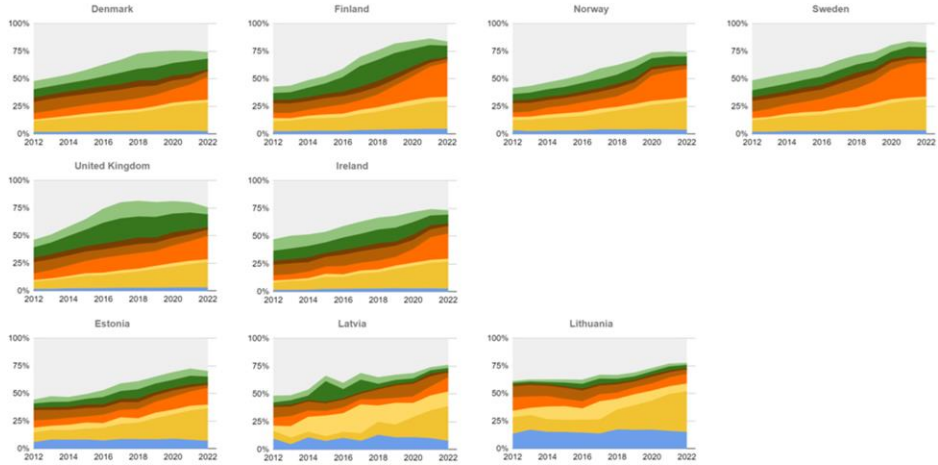
Observed patterns for publications in full OA journals are markedly different to those for hybrid OA. While in many countries with strong growth of hybrid OA, this model has now become the dominant model of OA (or is close to becoming so), many other countries, especially in Southern and Eastern Europe and the Baltics (especially Latvia and Lithuania), have instead seen a strong growth in publications in full OA journals. Interestingly, this is often accompanied by a sizeable proportion of publications in non-APC journals (diamond OA) as well as in journals not currently included in DOAJ. Countries demonstrating this latter pattern include Croatia in Southern Europe and most countries in Eastern Europe, in addition to Latvia and Lithuania that were already mentioned. The large proportion of publications in non-APC full OA journals and full OA journals not (yet) included in DOAJ points to the importance of local journals in these countries, including journals in local languages. A few countries in Southern Europe show a somewhat different pattern, with less pronounced growth in full OA, but nonetheless a marked contribution of publication in non-APC journals. These include Slovenia, Spain and Portugal. For the latter two, this is potentially attributable to publications in Spanish and Portuguese language journals published through SciELO and AmeliCA.

5.3.3. Repository-based OA

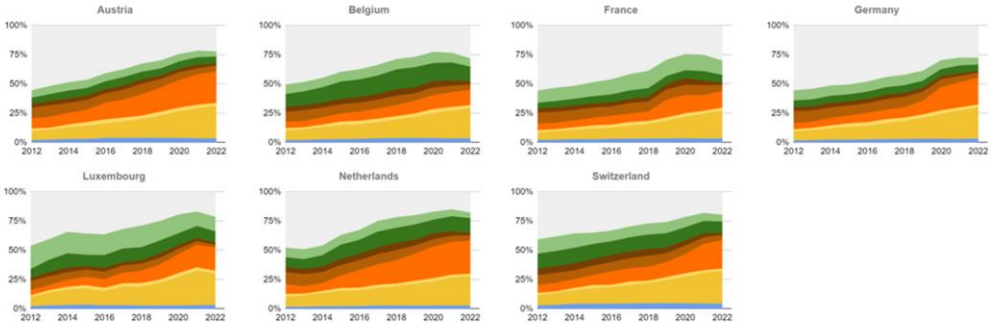
Across European regions, countries differ markedly in the proportion of OA achieved through repositories, and among these, whether this predominantly concerns article versions after peer review (accepted manuscripts) or submitted versions/preprints. Many open access policies and mandates, including Plan S, stress that the version to be made available in OA should be the peer-reviewed version, either as published version in the journal or as accepted version (or published version) in a repository. Similarly, where secondary publishing rights are included in copyright law, this also concerns sharing the accepted version of articles. Looking across Europe, some countries with a large proportion of OA realised (solely) through repositories are Denmark, Finland and the UK in Northern Europe; Belgium, France, Luxembourg, The Netherlands and Switzerland in Western Europe. In Southern Europe, Italy, Malta, Portugal and Spain have sizeable proportions of repository-based OA, while in Eastern Europe, it's mainly Hungary that stands out, though predominantly for its historically high proportions of repository based OA. In most recent years, this has decreased considerably, in parallel with the rise of hybrid OA. It is hard to say whether a similar pattern is emerging in other countries, like Finland, the UK, and Switzerland, as there is a parallel effect of embargoes that might at least partially cause any observed decrease in the proportion of repository-based OA in the most recent year. Most countries in Southern and especially Eastern Europe do not have large proportions of repository-based OA. Investments in repository infrastructure, support through policies and mandates, and harvesting of local repositories (affecting detection) might all play a role here.

Among countries with a sizeable proportion of repository-based OA, some, like Finland, the UK, France and Belgium, predominantly have peer-reviewed versions in repositories, while others, like France and Luxembourg, mostly have submitted versions (which often do not meet OA mandates of funders and institutions). In many cases, a correlation can be observed between either OA mandates that include green OA (e.g. in the UK), inclusion of secondary publishing rights in copyright law (Belgium, France, Netherlands), and a reticence towards concluding transformative deals for publisher-based OA in favor of repository-based OA (Belgium, Denmark, France). In some countries, like the Netherlands, multiple directions are at play in parallel – with universities actively pursuing repository based OA (built upon secondary publishing rights) in parallel to maintaining a large number of publisher agreements, with the goal of increasing OA through a combination of strategies. Finally, the rights retention strategy championed by cOAlitonS and adopted by an increasing number of institutions, particularly in the UK, might increase the proportion of repository-based OA notably with an open license and without embargo. The effects of these strategies can be expected to become visible in the coming years.

A – Northern Europe



B – Western Europe



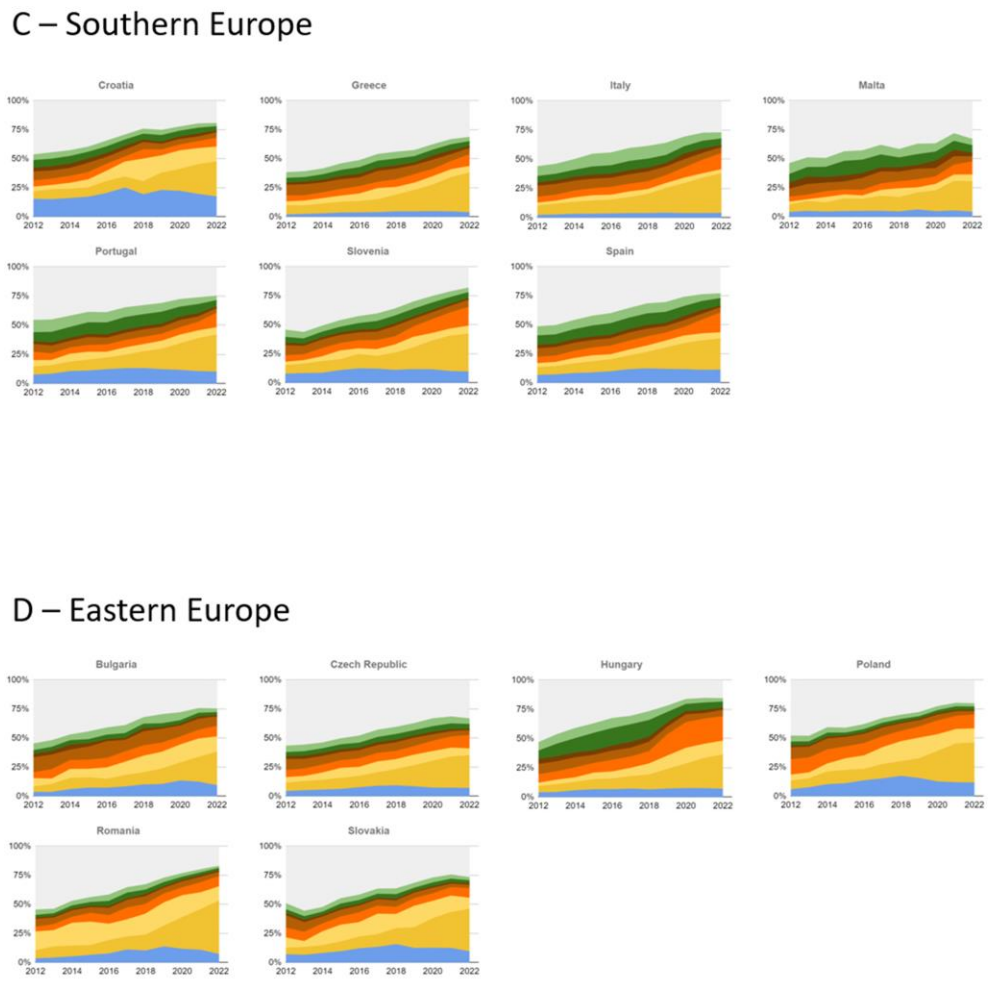


Figure 12. Proportion of open access availability, by open access model, of journal articles published between 2012-2022 per country and European region (A: Northern Europe, B: Western Europe, C: Southern Europe, D: Eastern Europe) (source: COKI)

6. Potential for modelling costs of open access publishing

Theoretically, by combining information on publication patterns (section 6) with information on costs for open access publishing (section 5), estimations can be made on total costs of open access publishing. This has been attempted, for example, by Blanchard et al (2022) in their study on the evolution of APC costs for French institutions, which estimated the total costs of APCs for to be 30,1M Euros in 2020, in addition to 87,5M Euros spent on subscriptions.

A recent article by Butler et al (2023) looked at historical APCs (2015-2018) to estimate total APCs paid to the five largest commercial publishers (Springer-Nature, Elsevier, Wiley, Taylor & Francis and Sage), estimating that total to be $335,6M in 2018.

The analysis by Butler et al. also provides a breakdown estimate by country, using fractionalised counting. The analysis did not take into account corresponding authors or the presence or absence of publisher deals. Total APC costs estimated to be more than $10M for three countries in scope of this report (United Kingdom, The Netherlands and Germany), over $5M for 7 countries (Austria, France, Italy, Poland, Spain, Sweden and Switzerland), and over $1M for a third group of additional 7 countries (Belgium, Czech Republic, Denmark, Finland, Ireland, Norway, Portugal) (Table 21). For the 13 remaining countries, estimated total APC spend for the 5 major commercial publishers was less than $1M in 2018.

Country	Estimated APCs paid to 5 major traditional publishers in 2018 (in million Euros)
Austria	5.63
Belgium	2.97
Bulgaria	0.08
Croatia	0.24
Cyprus	0.07
Czech Republic	1.05
Denmark	3.46
Estonia	0.17
Finland	2.69
France	8.06
Germany	18.53
Greece	0.71
Hungary	0.75
Ireland	1.04

Country	Estimated APCs paid to 5 major traditional publishers in 2018 (in million Euros)
Italy	9.26
Latvia	0.07
Lithuania	0.18
Luxembourg	0.20
Malta	0.02
Netherlands	19.49
Poland	6.98
Portugal	1.38
Romania	0.37
Slovakia	0.24
Slovenia	0.37
Spain	6.34
Sweden	9.56
Norway	3.41
Switzerland	5.34
United Kingdom	41.44

Table 21: Estimated total APCs paid to five major commercial publishers, for articles in Web of Science published in 2018 (source: Butler et al. 2023)

However, as was already alluded to in Section 5, there are important limitations to the information that is currently available to link publication output to publishing costs at the level of institutions, funders and countries.

These include the often opaque split between publishing and reading costs in transformative agreements, the varying models in use in these agreements regarding the number of publications covered (making an estimation of per-article costs especially difficult), the limited coverage of APCs included in initiatives like OpenAPC, the availability at scale of current and historical list prices, and the distributed nature of information on support of non-APC publishing initiatives and community-based publishing infrastructure.

In addition to the limitations listed above, it is not always clear who is responsible for meeting open access publishing costs, inside and outside publisher agreements. Two specific aspects deserve consideration in this regard: identifying output resulting from specific funding (e.g. specific national funders), and identifying eligibility of articles in publisher deals.

First, detection of output resulting from specific funding is not straightforward, as it depends on both the presence and detection of funder information in either the full text of articles and/or the article metadata. Coverage and quality of funder information in open metadata (e.g. Crossref, OpenAlex and OpenAIRE) is improving, though currently still less complete than coverage in proprietary databases (see also Kramer & de Jonge, 2022). Second, detection of eligibility of publications under transformative agreements (and thus, coverage of OA costs by the institution) depends both on journal-level information on the coverage of transformative agreements, and reliable information on corresponding author (and their affiliation) in open data sources.

A useful source of information in this regard is the Plan S Journal Checker Tool, which provides information on journals included in transformative agreements registered in ESAC, together with information on institutions participating in each agreement. This information can be extracted programmatically (see e.g. Jahn 2022, Kramer 2022) to be used for further analysis, e.g. to link publishing agreements to developments and diversity of scientific publishing. This would allow further assessment of the contribution of transformative agreements (and agreements with full OA publishers) to OA publishing across EU member states, correlated to open access policies and open access financial practices.

Known limitations are that journal-level information in the Journal Checker Tool is only available for the current transformative agreements, therefore no longitudinal analysis is possible. Also, information on participating institutions is not fully harmonised, and ROR Ids are not included for all institutions. Information on corresponding authors in OpenAlex is relatively new, and might not yet be stable regarding coverage and quality.

Working within these limitations, a number of current initiatives are plotting open access publishing in relation to publisher agreements (both for hybrid OA and full OA journals), and some do include a cost element as well. Examples are:

- ESAC Market Watch (ESAC) - plotting market share of publishers and (full/hybrid) OA by country, as well as APC price points – using open and proprietary data sources (including Web of Science)

- oa-monitoring.ch (Christian Gutknecht) – visualising use of specific publisher agreements and projected costs for Switzerland and a number of other countries – based on open data sources including information on APCs paid in Elsevier article metadata

- Hybrid Open Access Dashboard (SUB Göttingen) – visualising use of transformative agreements using open data sources only, with a special focus on Germany.

Taken together, while the information to map publishing developments to publishing agreements is increasingly available in ways that allow analysis at the level of institutions and countries (and to a lesser extent funders), linking this to publication costs is still fraught with problems due to the lack of consistency, transparency and completeness of information.

7. Negotiation principles

A number of organisations (most often RPOs and/or their consortia) have formulated principles for open access investments, particularly for negotiations with publishers. Such principles set out the goals to be achieved in deals with publishers and the requirements needed to achieve these goals. They often address both what organisations want to get from transformative agreements – which can include reining in the unchecked revenue stream of author fees for 'hybrid' open access publishing, repurposing their investment in subscription fees to support open access publishing instead of propagating paywalls, securing open access publishing entitlements for 100% of their institutions' research articles at no additional cost, overall cost reduction retention of author rights over their peer reviewed manuscripts (LIBER 2022). Principles for open access investments can also address intentions to support a diversity of open publishing venues (e.g. by engaging in negotiations with a spectrum of scholarly publishers across all disciplines, investing in a variety of open publishing venues and services and defining comprehensive strategies based not only on immediate financial and OA output goals, but also on their commitment to enabling a diversity of open publishing opportunities for authors).

Through such principles, organisations set out clear expectations both for themselves and for publishers, which can also be useful as a touchstone in communication with e.g. researchers and funders, and which organisations can be held accountable to.

Many negotiation principles include a clause on transparency, addressing non-disclosure agreements of contracts as a whole as well as transparency of costs and/or prices. Some examples are shown below, including from the original OA2020 declaration from 2016:

- Pricing of open access publishing services must be fair and transparent. Transparency and comparability of pricing is key to sustainability. Disallowing nondisclosure clauses in agreements with publishers is an important first step to creating a more transparent market. In order to compare pricing of different service providers, enable conversations on what the community considers to be fair pricing, and exert critical market pressure to help restrain costs and ensure sustainability, fees for OA publishing services must be transparent and comparable (LIBER 2022).

- Institutions will pay a fair and sustainable price to publishers for value-added services, based on transparent and cost-based pricing models (MIT 2019).

- Funders support the diversity of business models for Open Access journals and platforms. When Open Access publication fees are applied, they must be commensurate with the publication services delivered and the structure of such fees must be transparent to inform the market and facilitate the potential standardisation and capping of payments of fees (cOAlitionS 2019c)

- (...) we intend to re-organise the underlying cash flows, to establish transparency with regard to costs and potential savings (OA2020, 2016).

More detailed technical requirements for operationalising the call for transparency around costs and prices in publisher contracts are provided by some organisations, like JISC and ESAC. These also address the need for accurate and public metadata of publications (including funding information) to allow monitoring and analysis. For example:

- "Ideally notes acknowledging funding as provided by institutions/funders/consortia are automatically inserted into articles by the publisher" (ESAC 2021)

- "Where publishing services are based on eligibility of corresponding authors, the corresponding author designation must be provided in article metadata for discovery and indexing; Identify funders (and, when possible, proportion of funding by funder if multiple) of institutional research by populating metadata, including funding body and grant number, and the authors and institutions associated with them; register funding data on bodies such as Crossref Funder Registry, Publication Router, PubMed/EPMC and on the publisher site" (JISC, n.d.)

As the examples above show, transparency requirements address both open availability of publisher contracts as well as transparency around actual fees charged for open access publishing. Despite such requirements being in place for years, and despite initiatives such as the Journal Comparison Service to facilitate price transparency, the analysis of transformative agreements in section 4 has shown that actual provided transparency is in many cases still lacking.

The EUA 2019 Big Deals Survey Report (Morais et al, 2019) which surveyed 31 consortia included a question on national laws or regulations facilitate transparency in publisher contracts (for example, by requiring all contracts involving public funding to be made public, and national provisions overruling publisher non-disclosure agreements, NDAs). According to the report, 71% of consortia noted the existence of such national laws or regulations. Freedom of Information (FOI) laws were part of this national legal framework in 74% of cases.

8. Conclusions and recommendations

The Council of the European Union has emphasised the need to take concrete measures against the proliferation of insufficiently transparent contractual arrangements in interactions of institutions and funders with publishers, and together with member states work towards a high-quality, transparent, open, trustworthy and equitable publishing system including a variety of models that do not depend on article processing charges (Council of the European Union 2022, 2023).

National governments, (national) research funders and research institutions and their consortia can have different goals and mechanisms in how they mandate, facilitate and financially support open access publishing. These can range from overall cost reduction and repurposing subscription fees to support open access publishing for their authors and grantees, to supporting a diversity of open publishing venues for all authors independent of funding/institutional eligibility criteria, including not-for-profit scholarly open access publishing models and initiatives. Such diverse goals, coupled with a market-based economy for scholarly publishing, have resulted in different strategies regarding investments and different negotiation strategies with publishers, and contracts that are hard to compare on both conditions and financial aspects.

Increased transparency on both open access investments and contractual arrangements with publishers would enable a more open conversation between public parties about the costs of open access publishing and ways to promote more equity in the system of scholarly publishing, without compromising the autonomy of member states, (national) research funders and institutions to set their own goals depending on their specific national or institutional context. This would additionally be helped by the availability of comparable information on open access policies, including specific requirements regarding open access models and conditions for provision of financial support.

Based on the observations in this study, a number of recommendations are made to national governments, (national) research funders and research performing institutions to increase transparency around financial aspects of open access publishing. The recommendations focus on the availability of standardised information on open access policies, transparency of publisher contracts including financial information, availability of information on open access investments in general, public availability of publication metadata relevant to open access, and transparency on costs of open access publishing as supplied by publishers.

8.1. Standardised information on open access policies

Currently, centralised information on open access policies is fragmented, often not standardised and partially out of date. To be able to link national, funder and institutional open access policies to open access costs and investments, it is recommended to:

- When collecting information on open access policies (e.g. through the EOSC survey), include standardised information on both requirements for open access (including open access models, licensing, immediacy and rights retention) and opportunities and conditions for provision of financial support;

- Financially support the registries of standardised information on open access policies (e.g. through Sherpa services and ROARmap) so these initiatives can remain up to date both technologically and regarding content.

8.2. Transparency of publisher contracts including financial information

While publisher contracts increasingly are publicly available, in line with many organisations' negotiation principles, this is not true yet across the board. Also, even when contracts are made public, they do not always include financial information on total fees and/or standardised breakdown of those fees. To be able to meaningfully assess and compare publisher contracts, including financial aspects, it is recommended to:

- Include public availability of publisher contracts, including financial information, as a default condition, when negotiating publisher contracts.

- For member states, to require (through national laws or regulations) transparency in publisher contracts (for example, by requiring all contracts involving public funding to be made public).

- Collaboratively develop standardised terminology for the breakdown of open access fees in publisher contracts (especially in contracts for transformative agreements), so that costs and conditions can be compared meaningfully. This includes, but is not limited to: breakdown of read- and publishing component and relation of total fees to actual or expected article numbers.

- In collecting information on open access investments (e.g. through ESAC or OpenAPC), include standardised information on financial aspects of publisher contracts as outlined above.

8.3. Availability of information on open access investments in general

While information on deals with traditional publishers, especially transformative agreements, is increasingly made publicly available and centrally collected, investment in other forms of open access (including deals with full OA publishers and support for non-APC open access models) is often not available in the same way. To get a more complete picture of open access investments by national governments, funders and institutions and enable mutual learning and discussion, it is recommended to:

- For (national) funders and institutions/consortia, to make complete information available on all investments in open access initiatives in a standardised way, e.g. on the organisation's website, and ideally centrally collect this information.

- In collecting information on open access investments (e.g. through the EOSC survey), include standardised information on open access investments (including breakdown of different types of investment), so responses can be meaningfully compared, also over time.

- Contribute information on APCs paid at institutional level to OpenAPC, to further increase coverage and relevance of OpenAPC as an information resource.

8.4. Public availability of publication metadata relevant to open access

Analysing open access developments, including estimating total open access costs, requires reliable information on research publications, including information on responsibility for paying open access fees (where applicable). Ideally, this information (including license, affiliation and funding information) is made publicly available as part of article metadata. To this is, it is recommended:

- In publisher contract negotiations, include the provision of relevant article metadata (including license, affiliation and funding information) not just to the organisation(s) involved in the contract, but as part of open research information (e.g. through Crossref).

- In developing or using services for institutions, funders and/or publishers to improve open access workflows (like OA Switchboard, OA.Reports, ChronosHub and OAble), ensure that collected information (including license, affiliation and funding information) is not just provided to participating parties, but is also used to enrich open research information (e.g. by asking publishers to update article metadata in Crossref).

8.5. Transparency on costs of open access publishing as supplied by publishers

Financial information on open access publishing often is limited to fees, not actual costs of publishing activities. While some publishers provide breakdown of publication fees (either publicly or with restricted access through the Journal Comparison Service), this does not separate surplus/profit from costs. To facilitate assessment and comparison of both publication costs and fees, it is recommended to:

- For member states, to require (through regulation) transparency in publication fees (including separation surplus/profit) and remove barriers to public sharing of this information.

- Analyse use of Journal Comparison Service by participating institutions, including what information is deemed most valuable and how information on price transparency is used in practice.

9. References

Ancion, Z., Borrell-Damián, L., Mounier, P., Rooryck, J., & Saenen, B. (2022). Action Plan for Diamond Open Access. Zenodo. https://doi.org/10.5281/zenodo.6282403

Banks, C. (2019, Sept 24-26) Making full and immediate open access a reality – the role of the institutional policy. OASPA 2019 Annual Conference on Open Access Scholarly Publishing, Copenhagen, Denmark. https://ukscl.ac.uk/making-full-and-immediate-open-access-a-reality-the-role-of-the-institutional-oa-policy/

Blanchard, A., Thierry, D., & van der Graaf, M. (2022). Retrospective and prospective study of the evolution of APC costs and electronic subscriptions for French institutions. HAL. https://doi.org/10.52949/26

Bosman, J., de Jonge, H., Kramer, B., & Sondervan, J. (2021a). Advancing open access in the Netherlands after 2020: from quantity to quality. Insights: The UKSG Journal, 34(1), 16. https://doi.org/10.1629/uksg.545

Bosman, J., Frantsvåg, J. E., Kramer, B., Langlais, P.-C., & Proudman, V. (2021b). OA Diamond Journals Study. Part 1: Findings. Zenodo. https://doi.org/10.5281/zenodo.4558704

Butler, L.-A., Matthias, L., Simard, M.-A., Mongeon, P., & Haustein, S. (2022). Annual Article Processing Charges (APCs) and number of gold and hybrid open access articles in Web of Science indexed journals published by Elsevier, Sage, Springer-Nature, Taylor & Francis and Wiley 2015-2018 (Version v1) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.7086420

Butler, L. A., Matthias, L., Simard, M. A., Mongeon, P., & Haustein, S. (2023). The Oligopoly's Shift to Open Access. How the Big Five Academic Publishers Profit from Article Processing Charges. Quantitative Science Studies, 1-33. https://doi.org/10.1162/qss_a_00272

Coalition S (2018, September 4) Open Access is Foundational to the Scientific Enterprise. https://www.coalition-s.org/why-plan-s/

Coalition S (n.d. a) Guidance on the implementation of Plan S. Retrieved August 31, 2023 from https://www.coalition-s.org/guidance-on-the-implementation-of-plan-s/

Coalition S (n.d. b) Implementation Roadmap of cOAlition S Organisations. Retrieved August 31, 2023 from https://www.coalition-s.org/plan-s-funders-implementation/

Coalition S (n.d. c) Plan S Principles. Retrieved August 31, 2023 from https://www.coalition-s.org/plan_s_principles/

Council of the European Union. (2022). Council conclusions on Research assessment and implementation of Open Science. https://www.consilium.europa.eu/media/56958/st10126-en22.pdf

Council of the European Union. (2023). Council conclusions on High-quality, transparent, open, trustworthy and equitable scholarly publishing. https://data.consilium.europa.eu/doc/document/ST-9616-2023-INIT/en/pdf

Dufour, Q., Pontille, D. and Torny, D. (2023) Supporting diamond open access journals. Interest and feasibility of direct funding mechanisms bioRxiv 2023.05.03.539231. https://doi.org/10.1101/2023.05.03.539231

ESAC (2021) 2021 Enhancement to the ESAC Workflow Recommendations. Retrieved August 31, 2023 from https://esac-initiative.org/about/oa-workflows/

European Commission, Directorate-General for Research and Innovation, (2021). Monitoring the open access policy of Horizon 2020: final report, Publications Office. https://data.europa.eu/doi/10.2777/268348

Fosci, M., Richens, E., & Johnson, R. (2019a). Insights into European research funder Open policies and practices. Zenodo. https://doi.org/10.5281/zenodo.3401278

Fosci, M., Richens, E., & Johnson, R. (2019b). Insights into European research funders policies and practices - public dataset [Data set]. Zenodo. https://doi.org/10.5281/zenodo.3689285

FWF (n.d. a) Peer reviewed publications. Retrieved August 31, 2023 from https://www.fwf.ac.at/en/research-funding/fwf-programmes/peer-reviewed-publications

FWF (n.d. b) Open Access infrastructures. Retrieved August 31, 2023 from https://www.fwf.ac.at/en/research-funding/open-access-policy/open-access-to-peer-reviewed-publications/open-access-infrastructures

Grossmann A., Brembs B. Current market rates for scholarly publishing services [version 2; peer review: 2 approved]. F1000Research 2021, 10:20. https://doi.org/10.12688/f1000research.27468.2

Hinchliffe, L.J. (2019, April 29). Transformative Agreements: A Primer. The Scholarly Kitchen. https://scholarlykitchen.sspnet.org/2019/04/23/transformative-agreements/

Jahn, N. (2022). jct_data: Programmatically fetch JCT Transformative Agreement data. GitHub. https://github.com/njahn82/jct_data

JISC (n.d.) Requirements for transformative Open Access agreements. Retrieved August 31, 2023 from https://www.jisc.ac.uk/our-role-in-open-access

Johnson, R. (2022). Operationalising Open Research Europe as a collective publishing enterprise. European Commission Directorate-General for Research and Innovation, LU https://doi.org/10.2777/061886

Johnson, R. (2023). Scenario modelling for Open Research Europe. European Commission Directorate-General for Research and Innovation, LU https://doi.org/10.2777/15140

Kouis, D. (2023). Analysis of the requirements for the Open Source infrastructure of the Open Research Europe Publishing Platform. European Commission Directorate-General for Research and Innovation, LU https://doi.org/10.2777/13928

Kramer, B. (2022). JCT_Transformative_Agreements: Relational tables of JCT data on transformative agreements. GitHub. https://github.com/bmkramer/JCT_Transformative_Agreements

Kramer, B., & de Jonge, H. (2022). The availability and completeness of open funder metadata: Case study for publications funded by the Dutch Research Council. Quantitative Science Studies, 3(3), 583-599. https://doi.org/10.1162/qss_a_00210

Kramer, B. (2024). Development of open access publishing in EU member states [Dataset]. Zenodo. https://doi.org/10.5281/zenodo.10565148

KU Leuven. (n.d.). Open Science services supported by KU Leuven Libraries Retrieved August 31, 2023 from https://www.kuleuven.be/open-science/what-is-open-science/scholarly-publishing-and-open-access/open-access-kuleuven/OS-services#Publishing-initiatives

LIBER (2022) Four Urgent Recommendations for Open Access Negotiations with Publishers https://libereurope.eu/document/4-urgent-recommendations-to-publishers-2022/

MIT (2019) MIT Framework for publisher contracts https://libraries.mit.edu/scholarly/publishing/framework/

Morais, R., Stoy, L., and Borrell-Damián, L. (2019) 2019 Big Deals Survey Report - An Updated Mapping of Major Scholarly Publishing Contracts in Europe. European University Organisation (EUA). https://eua.eu/component/attachments/attachments.html?id=4282

NWO (n.d.) Open science infrastructure support. Retrieved August 31, 2023 from https://www.nwo.nl/en/open-science-infrastructure-support

OA2020 (2016) Expression of interest in the large-scale implementation of open access to scholarly journals https://oa2020.org/mission/

OLH (Open Library of Humanities) (n.d.) Library Sign up Step Two. Retreived August 31, 2023 from https://www.openlibhums.org/plugins/supporters/signup/banding/

O'Neill, G., & Martziou, S. (2023). Data of Survey on National Contributions to EOSC 2022 (Version V1) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10155993

OpenAPC. Data Submission Handout - Definition of costs. Retrieved August31, 2023 from: https://github.com/OpenAPC/openapc-de/wiki/Data-Submission-Handout

Peters, V. (in press) Monitoring National Contributions to EOSC. EOSC Future WP2 report.

PLOS (n.d.) How can we partner ? Partnership models. Retrieved Aug 31, 2023 from https://plos.org/resources/for-institutions/how-can-we-partner/

Rabesandratana, T (2019). Elsevier deal with France disappoints open-access advocates. Science News. https://doi.org/10.1126/science.aba5656

Ross-Hellauer, T., Schmidt, B., & Kramer, B. (2018). Are Funder Open Access Platforms a Good Idea? SAGE Open, 8(4). https://doi.org/10.1177/2158244018816717

Rumsey, S. (2023, May 4) Springer Nature doublespeak. cOAltion S blog. Retrieved August 31, 2023 from https://www.coalition-s.org/blog/springer-nature-doublespeak/

Schimmer, R., Geschuhn, K. K., & Vogler, A. (2015). Disrupting the subscription journals' business model for the necessary large-scale transformation to open access. MPG PuRe. https://hdl.handle.net/11858/00-001M-0000-0026-C274-7

Science Europe (March 2, 2022) Action Plan for Diamond Open Access. https://www.scienceeurope.org/our-resources/action-plan-for-diamond-open-access/

SciPost (n.d.) SciPost's Business Model. Retrieved August 31, 2021 from https://scipost.org/finances/business_model/#sponsorshipLevels

S2O Community of Practice (n.d.) Subcribe to Open. Retrieved August 31, 2023 from https://subscribetoopencommunity.org/

United Nations Statistics Division (UNSD). (2023). Standard country or area codes for statistical use (M49) – Geographic Regions. https://unstats.un.org/unsd/methodology/m49/

UvA - University of Amsterdam. Open Access Publishing - UvA Diamond Open Access Fund. Retrieved July 11, 2023 from: https://uba.uva.nl/en/support/research/open-access/open-access.html#8-UvA-Diamond-Open-Access-Fund

Verbeke, D., & Mesotten, L. (2022). Library funding for open access at KU Leuven. Insights: The UKSG Journal, 35(0), 1. https://doi.org/10.1629/uksg.565

Vooren, R. van der (2019). Introducing pay-to-publish in cost distribution models of 'The Bibsam Consortium Sweden' – the impact of transformative publisher contracts on cost distribution to consortium participants. Robert Consultancy for Bibsam Consortium. https://urn.kb.se/resolve?urn=urn:nbn:se:kb:publ-49

Wise, A., & Estelle, L. (2019). Society Publishers Accelerating Open Access and Plan S (SPA-OPS) project (Version 3). https://doi.org/10.6084/m9.figshare.c.4561397.v3

World Bank Data (2022). Research and development expenditure (% of GDP). https://data.World Bank.org/indicator/GB.XPD.RSDV.GD.ZS

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To support the Commission's policies on open access, and subsequent to Council Conclusions to take concrete measures against the proliferation of insufficiently transparent contractual arrangements with publishers, this study was commissioned to provide a deeper understanding of the issues around practices and costs of scholarly publications, offer an analysis of the situation, and propose advice for policy actions.

The report documents the pervasive lack of information on such contracts and deals with publishers and recommends specific actions, mostly required on the side of the member states, institutions and libraries to enhance transparency regarding the costs of publishing. These include, among others, publishing the contracts and working on making available structured information about them.

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