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Successful implementation of Open Access strategies at Universities of Science & Technology

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- Aalto University
- Czech Technical University in Prague
- Gdansk University of Technology
- Lund University
- RWTH Aachen University
- *Politecnico di Milano*
- Technion – Israel Institute of Technology
- TIB Leibniz University Hannover
- TU Delft
- TU Wien
- *Universitat Politècnica de Catalunya*
- University of Strathclyde
- University of Stuttgart

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Executive Summary

While the [CWTS Leiden ranking](#) has been available since 2011/2012, it is only in 2019 that a first attempt was made at ranking institutions by Open Access-related indicators. This was due to the arrival of [Unpaywall](#) as a tool to measure openly available institutional research outputs – either via the Green or the Gold OA routes – for a specific institution.

The CWTS Leiden ranking by percentage of the institutional research output published Open Access effectively meant the first opportunity for institutions worldwide to be ranked by the depth of their Open Access implementation strategies brushing aside aspects like their size. This provided an interesting way to map the progress of CESAER Member institutions that were part of the Task Force Open Science 2020-2021 Open Access Working Group (OAWG) towards the objective stated by [Plan S](#) of achieving 100% Open Access of research outputs.

The OAWG then set out to map the situation of the Member institutions represented in it on this Open Access ranking and to track their evolution on subsequent editions of this ranking. The idea behind this analysis was not so much to introduce an element of competition across institutions but to explore whether progress was taking place in the percentage of openly available institutional research outputs year on year.

The results of this analysis – shown in figures within this paper for the 2019, 2020 and 2021 editions – show strong differences across Member institutions that are part of the OAWG. From internal discussions within the group, it became evident that these differences could be explained through a number of factors that contributed to a successful Open Access implementation at an institutional level. This provided the basis for this work.

The document identifies four key factors that contribute to a successful OA implementation at institutions, and hence to achieving a good position on the CWTS Leiden ranking for Open Access. These factors are:

- **Open Access policies.** This aspect is highlighted as the key driver for a successful OA implementation: high-ranked institutions typically implement strong OA policies, whereas low-ranked ones often lack a specific policy beyond the (common) one issued by the European Commission for its framework programmes.
- **Institutional system configuration** (repositories and/or current research information system (CRIS) systems). The way institutional systems support OA implementation are configured is also a critical element for a high ranking. High-ranked institutions within the OAWG often have an interconnected institutional repository and a CRIS. Other institutions only operate a repository and some have neither.
- **Institutional research support staff.** A strong OA policy and an adequately configured set of institutional systems may not be enough to guarantee a successful OA implementation if the research support staff behind such work is not numerous or well-trained enough.
- **Open Access advocacy strategies.** One of the key areas of activity for such staff is the communication with researchers to highlight the relevance of Open Access implementation at a given institution and to provide the required support workflows.

Having identified and characterised these four key aspects, we then investigated their realisation at specific Member institutions within the OAWG. This was achieved via the

preparation of three institutional case studies analysing how each of these four factors was specifically addressed at several high-ranked Member institutions. Case studies were produced for the University of Strathclyde Glasgow in the United Kingdom, the *Universitat Politècnica de Catalunya* in Barcelona, Spain and Aalto University in Helsinki, Finland.

Institutions for these case studies were chosen for having experienced large climbs in the ranking between its 2019 and 2020 editions. The rationale for the selection was to check whether the specific institutional approach to each of these key factors for a successful OA implementation could explain the substantially improved result achieved by these institutions so that other institutions could be inspired by any best practice approaches that emerged.

The OA implementation landscape keeps shifting with the arrival of new Open Access strategies like Plan S, and these three case study institutions were not necessarily the ones experiencing the largest progress between the 2020 and 2021 editions of the CWTS rankings. This is partially due to the methodology applied by the ranking whereby the number of institutions worldwide featured in it keeps expanding. The key aspect however is that regardless of how many positions they climbed in the ranking, all case study institutions have seen further progress in their percentage of openly available research outputs between 2020 and 2021.

Taken together, this paper presents evidence for how the successful implementation of specific institutional open access strategies directly impact on the share of open access for an institution, providing guidance for universities of science & technology (S&T) who may wish to boost their open access publications in line with their own strategies and with existing and new mandates from research funding organisations.

Table of contents

Authors	2
Contact	2
Executive Summary	3
Table of contents	5
Scope	6
1. Introduction	6
1.1. The CWTS Leiden Open Access Ranking	8
2. Factors that contribute to a successful institutional Open Access implementation	10
2.1. Open Access policies: the key factor	10
2.2. Institutional system availability and configuration	14
2.3. Institutional Research Support Staff	19
2.4. Open Access advocacy	20
3. Institutional case studies	22
3.1. University of Strathclyde in Glasgow, UK	22
3.1.1 Open Access Policy	22
3.1.2 Institutional system configuration	25
3.1.3 Institutional research support staff	26
3.1.4 Open Access advocacy strategies	28
3.2. <i>Universitat Politècnica de Catalunya</i> (UPC) in Barcelona, Spain	30
3.2.1 Open Access Policy	30
3.2.2 Institutional system configuration	32
3.2.3 Institutional research support staff	32
3.2.4 Open Access advocacy strategies	34
3.3. Aalto University Helsinki, Finland	34
3.3.1 Open Access Policy	34
3.3.2 Institutional system configuration	36
3.3.3 Institutional research support staff	37
3.3.4 Open Access advocacy strategies	38

Scope

This paper produced by the Open Access Working Group (OAWG) within the Task Force Open Science 2020-2021 aims to raise awareness of the relevance of several strategic factors for successful institutional Open Access implementation. The paper is addressed to:

- Rectors, Vice-Rectors of Research (and equivalent) and decision-makers at universities of S&T and beyond, who may want to evolve their institutional Open Access implementation strategies to make them more successful, and;
- Institutional Open Access teams at universities of S&T who wish to assess their own performance.

The OAWG has identified strong differences in several of the criteria listed in the document within the group itself, so potential future work could include a broader survey to confirm to what extent these strong differences within the OAWG are replicated for various geographic areas.

1. Introduction

University rankings have been around for a long time now, but they have traditionally not focused on aspects like Open Access implementation, partly due to the difficulty of measuring such an indicator. The always challenging accurate estimation of 'Green' Open Access (via repository deposits) specifically made it difficult to assess how institutions were doing in this domain. However, the emergence of tools like [Unpaywall](#) that make feasible such estimations have enabled university rankings, like the one annually produced by the CWTS Leiden Institute, to add this Open Access implementation indicator to a wider set of criteria used to produce their institutional rankings.

Following the release of the May 2019 CWTS Leiden ranking of European institutions by percentage of openly available research outputs for the period 2014-2017, the OAWG analysed the results for Member institutions of CESAER. The results are listed in the figure below and show large variations across institutions and countries. Keeping in mind the wide representation of institutions, countries and European regions in the group, the main objective of this analysis was to try to identify the factors that contribute to a successful ranking on this classification.

After developing the first analysis, the OAWG then took the opportunity to test our hypotheses against a new edition of this CWTS Leiden Open Access ranking by percentage of institutional research outputs. The 2020 edition, which analysed the Open Access status for research outputs published in the period 2015-2018, did not see large changes in the standing of universities represented in the OAWG – although a few of them experienced significant improvements. Some of these were selected for putting together institutional case studies in section 3 of this paper, as best practice examples.

Moreover, the 2021 edition of the CWTS Leiden ranking covering the period 2016-2019 was released in June 2021 when this document was being drafted. The results of this new edition are discussed in an annex to this paper.

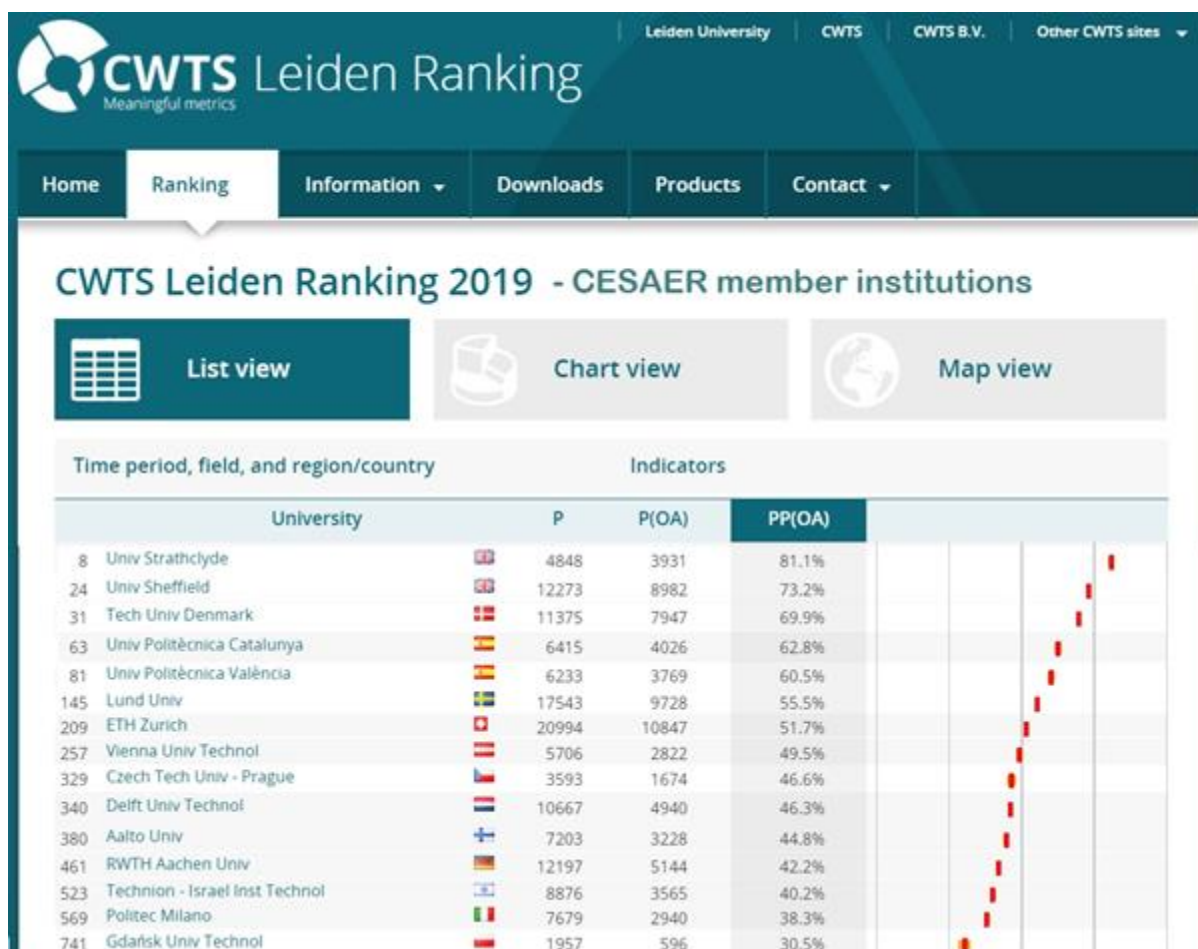


Fig 1. CWTS Open Access Ranking 2019: CESAER Member universities ranked by percentage of openly available institutional research outputs (2014-2017) (list only showing part of membership, full [Member list](#))

The general objective of efforts behind OAWG is to raise awareness of areas where further work needs to happen in the Open Access domain within universities of S&T. A separate paper is also being prepared for conference papers in the engineering disciplines. The current paper explores a number of key areas for a successful institutional Open Access implementation. Some of these areas include (institutional and national) Open Access policies, institutional system availability and configuration, number of institutional staff devoted to Open Access implementation and intensity of the Open Access advocacy activities carried out by institutional Open Access teams.

While the main emphasis of this paper is on free (i.e., zero article processing charges) 'Green' Open Access as a means to bridge the significant gaps the OAWG has identified across the CESAER membership (see figure below), Gold Open Access utilising article processing charges will also be part of the analysis.

The document examines how institutions represented in the OAWG are addressing the key areas identified by the group. This includes the above-mentioned section 3 on best practice institutional case studies provided by member institutions whose evolution in the rankings have seen substantial improvement. The need to cover institutional case studies for different regions and circumstances has been kept in mind when designing this specific section.

Also worth highlighting is the fact that given the remarkable progress achieved in the global implementation of Open Access, even institutions where the key areas identified are not too effectively addressed, now are obtaining significantly improved results in the ranking. The paper argues that these institutions, where the conditions for Open Access implementation are less successfully addressed, may have it easier to bring their practice in line with the most advanced institutions in the membership thanks to the synergy effect provided by the intensive research collaborations across the CESAER membership.

The strategies for Open Access implementation keep constantly evolving and have recently expanded to include for instance the deposit of pre-print versions of institutional publications in a range of pre-print servers. Furthermore, the release of [Plan S by the cOAlition S](#) group of research funding organisations has resulted in a dramatic increase in the number of so-called transformative agreements that aim to integrate the 'Read and Publish' side of scholarly communications into a single thread making article processing charge-based Gold Open Access the default choice for research publications. Plan S also supports the [Rights Retention Strategy](#) (RRS) aiming for a more effective implementation of the Green Open Access route via institutional repositories. All these multi-folded Open Access strategies are being simultaneously pursued, albeit in a fragmented way, and this paper aims to provide a context for the institutional approaches to Open Access implementation in relation to the results captured by the CWTS ranking.

1.1. The CWTS Leiden Open Access Ranking

As mentioned in the introduction, the [CWTS Leiden ranking](#) of universities is the first one to ever have included Open Access implementation as a ranking criteria. This is particularly useful for Open Access teams at institutions since it allows them to examine their year-on-year evolution in the ranking. But the ranking criteria offered by the CWTS Institute are much wider than that, also including for instance the analysis of research impact, collaboration, and gender indicators. Each of these broad areas are divided in several subcategories, which in the case of Open Access comprise the total number and the percentage of openly available publications at a given institution. Further detail may be obtained on the number and percentage of Green, Gold, Bronze and Other Open Access publications. For the analysis carried out in this paper the focus has been the percentage of openly available institutional publications, an indicator that allows to leave out the significant differences in scale across the CESAER member institutions that have been analysed.

There have been numerous previous editions of this CWTS Leiden ranking – the first one was released for 2011/2012 – but the 2019 edition marked the first time Open Access implementation was included as a ranking indicator. This is due to the emergence and consolidation of the [Unpaywall](#) service that allowed openly available publications for a given university to be identified and counted. The CWTS Leiden ranking methodology for measuring Open Access involves matching these openly available institutional publications against a wider list of publications (covering just research articles and reviews) indexed in the Web of Science Core Collection. The [section](#) on the ranking website devoted to its methodology describes the challenges associated with the identification of publications authored by a specific institution and the limitations arising from the selected range of publications for the analysis. Some degree of inaccuracy notwithstanding, the CWTS Leiden Open Access ranking is a first of its kind.

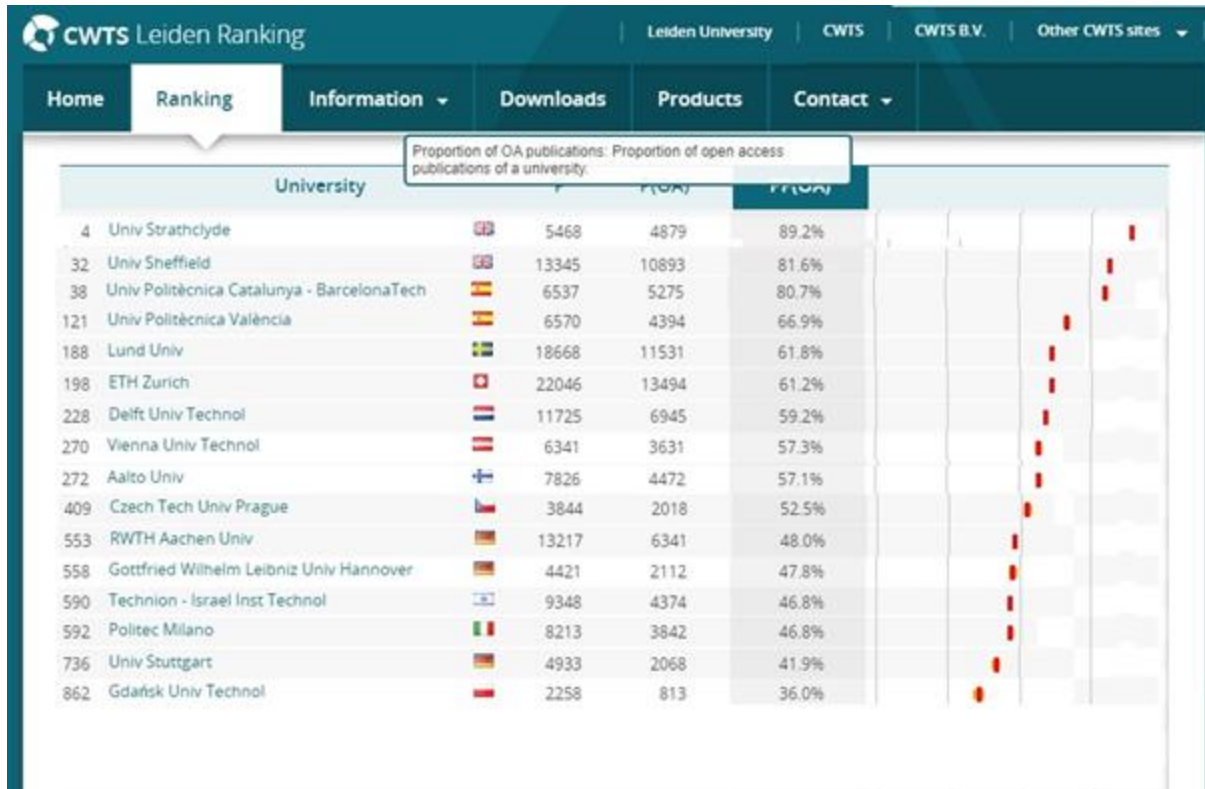


Fig 2. CWTS Open Access Ranking 2020: Selected CESAER Member institutions ranked by percentage of openly available institutional research outputs (2015-2018)

The main criteria for an institution to be included in this ranking is the number of institutional publications indexed in the Web of Science ([WoS](#)) for a given period, usually a three-year period ending two years before the current one, i.e. 2014-2017 for the 2019 ranking and 2015-2018 for the 2020 ranking. To increase the coverage of the ranking, the minimum number of publications indexed in the WoS required for an institution to feature in it has gradually become lower: the threshold for the 2019 edition was 1,000 WoS-indexed publications in 2014-2017, which resulted in **963** universities from 56 different countries being ranked. The 2020 edition required 800 publications in 2015-2018, yielding **1,176** universities from 65 different countries. This threshold has been kept for the 2021 edition, which has nevertheless seen an increase in the number of ranked institutions, which is now **1,225** universities from 69 different countries.

The expansion in the coverage of the CWTS Leiden ranking allows to at least partially address some of the inevitable linguistic and geographic biases introduced by the choice of an English-language international literature database as a data source. Especially from a disciplinary-based approach, these biases are bound to be significant, but it may be less relevant for an analysis of the research outputs of universities of S&T as S&T publishing is largely English-language focused.

2. Factors that contribute to a successful institutional Open Access implementation

This section aims to identify and describe several factors that ensure a successful Open Access implementation at universities of S&T. The set of factors listed below arise from discussions held among members of the OAWG and aim to capture the main areas where a solid institutional strategy would be required for a successful Open Access implementation. A summary showing how specific factors are addressed at the institutions represented in the OAWG is provided by means of tables included in several sections below.

An assessment on how specific Member institutions outside the OAWG are doing within these areas might subsequently become the objective of a follow-up survey to explore the Open Access implementation landscape across the full CESAER membership.

The factors that will be examined in the following sections include:

- Open Access policies
- Institutional system availability and configuration: repositories and CRIS systems
- Staff devoted to Open Access implementation
- Open Access advocacy strategies

2.1. Open Access policies: the key factor

The main factor for a successful implementation of an Open Access strategy identified in the analysis is *an adequate Open Access policy*. Such a policy should not just place the required deposit workflows at the core of the scholarly communications activity within an institution but should also critically promote the consolidation of an institutional team – usually within the research library – to support its implementation. It is the task of such institutional staff to raise awareness among the researchers of their expected behaviour, and the support available, regarding meeting the policy objectives.

The most important policy in the current landscape is the European Commission mandatory policy regarding Open Access to research publications and data stemming from EU-funded projects (e.g. under the EU Framework Programme for Research and Innovation). This policy has been expanded to projects funded by the EU under the new 2021-2027 [Horizon Europe](#) programme. The Open Access policy for Horizon Europe is furthermore intended to align with the requirements of Plan S released by the [cOAlition S](#) group of funders in September 2018 with the support of the European Commission.

The high relevance of the Commission's Open Access policy is due first and foremost to the fact that all CESAER Member institutions take part in a significant number of such EU-funded projects. This means they are subsequently obliged to meet the requirements of the EU policy on Open Access regardless of whether there may be additional national- or institutional-scope policies in the domain. The existence of such a common policy provides a much welcome harmonisation into an otherwise very complex area where the policy wording – meaning terms

like "recommendation" or "encouragement" – does not always offer a guarantee for its compliance.

Subject: Horizon 2020 Framework Programme
Project: FET4OPEN-01-010000
Open access to scientific publications (Article 29.2)

Dear Madam/Sir,

Our records show that, for the project in reference and of which you are coordinator, the following peer-reviewed publications are reported as not available in open access:

- **"An effective framework for life cycle and cost assessment for marine vessels aiming to select optimal propulsion systems"**

I would like to remind you that, each beneficiary must ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results generated in a Horizon 2020 action, in accordance with the conditions set out in Article 29.2 of Horizon 2020 Grant Agreement. If a beneficiary breaches this obligation, the grant may be reduced (see Article 43 of the Grant Agreement). Such a breach may also lead to any other measures described in Chapter 6 of the Grant Agreement.

I would therefore like to invite you to take immediate action to ensure that the beneficiary(ies) concerned provide(s) open access to the peer-reviewed article mentioned above.

Fig 3. Extract from the reminder about Open Access requirements sent to a H2020 project coordinator in 2019 ([source](#))

Besides this key contribution to levelling the Open Access playing field across institutions and countries, the EU-funded FP7 framework programme included the PASTEUR4OA project for *Open Access Policy Alignment Strategies for European Union Research* (February 2014 to July 2016). Following a thorough analysis of the factors that make an Open Access policy effective, this [PASTEUR4OA project](#) identified the Commission Open Access policy as the most suitable approach and recommended its replication at a national policy level.

The national-level Open Access policy landscape across European countries is a very diverse and complex one, but the CWTS Open Access ranking results show a certain degree of correlation between the existence of such a policy in a country and the position that institutions from such country have in the ranking. The United Kingdom is the best example for such a correlation: the current national-level REF policy for mandatory deposit of full-text accepted manuscripts in institutional repositories within three months of acceptance strictly follows the PASTEUR4OA project recommendations in that (i) it is a mandatory policy and (ii) its compliance is linked to the eligibility of a given research outputs for the national-level research assessment exercise in the country, the UK Research Excellence Framework or REF. As a result of this, 25 out of the 30 top institutions in the CWTS ranking for 2019 are British ones, and the two CESAER Member institutions in the UK top the list in the table above.

Likewise, weaker or non-existent national-level policy frameworks tend to result in lower positions in the ranking for the institutions in such countries. It is worth noting however that the rates for Open Access availability of institutional research outputs are remarkably high even in contexts of an absence of a national- or an institutional-level policy stimulus. This is partially because the European Commission as a research funder for the FP7 and Horizon 2020 research framework programmes directly reached out to funded project coordinators to make the case for compliance with the mandatory deposit policy, see figure 2 above.

Also, the intensively international collaboration research networks result in a policy compliance spill over from countries and institutions with strongest Open Access policies to those with weaker or non-existent ones, since it is enough for the compliance to happen once in one specific place for it to cover the whole research collaboration (e.g. if one researcher is covered by a strong policy then collaborators usually follow that policy in any joint publications outcomes).

From an advocacy viewpoint, it is important for institutional research support staff in charge of the implementation of an Open Access strategy to bear in mind that even in the absence of the necessary mandatory policy requirements, the EU H2020 policy is also applicable to those researchers at their institution involved in EU-funded projects. This offers a potentially useful way forward in the design of a successful Open Access advocacy that could start by focusing on EU-funded researchers and research outputs. The analysis of the impact of the open availability of specific research outputs on indicators like the number of citations or the [Altmetric](#) scores may serve to make the case for openness before other institutional researchers not covered by mandatory policies from their research funders.

Producing a sufficiently detailed analysis of the national- and institutional-level Open Access policy landscape constitutes a key output for potential future work. This is a complex and swiftly evolving policy landscape, in which the recent emergence of Plan S or the increasingly widespread availability of so-called read-and-publish (also known as ‘transformative’) agreements with publishers introduce new elements of complexity often way beyond the researchers’ grasp. While any comprehensive policy analysis will risk becoming outdated just months after its publication, it is important for the different elements that make up a policy to be identified, described, and analysed within a given geographic context.

Table 1. A summary of Open Access policies at Member institutions represented in the OAWG. The latest date of update for this table was 10 November 2021.

Institution	Open Access policy
Aalto University	As the landscape of OA policies is advancing rapidly within Finland’s context, also Aalto University issued the new Open Science and Research Policy in 2020. The policy states that “Aalto University aims to publish all publication types according to Open Access principles and to do so by recommending publishing in Open Access channels or by parallel publishing (Green OA)“

Czech Technical University in Prague	There is no Open Access policy nor any other document concerning Open Access/IR issued at the university.
Gdansk University of Technology	The Gdansk University of Technology Open Access policy was introduced at the beginning of 2018. All research outputs from GUT's will be stored and archived in the MOST Wiedzy repository . The Open Access policy will have depository character and registration of scientific output and PhD thesis will be obligatory. Another types of publications include: monographs, working papers or conference proceedings. Open Access policy will address the green route by self-archiving as required route and gold route only if it will be possible. The "dark deposit" is created where all publications with embargo period restriction will be hold and make available after embargo ends. All publications will be published under open licenses such as Creative Commons.
Leibniz Universität Hannover	Updating OA Policy at the moment. Monitoring important.
Lund University	Publishing policy of Lund University (in Swedish), http://a0241.srv.lu.se/pmnmf/pm.php?visa=pm&pm_id=395
Politechnic University of Valencia - UPV	Updating OA Policy at the moment. Monitoring important
Politecnico di Milano	Politecnico di Milano Open Access Policy, http://www.biblio.polimi.it/uploads/media/Policy_Open_Access_ENG.pdf
RWTH Aachen	OA Policy: http://www.rwth-aachen.de/cms/root/Die-RWTH/Profil/~lkcc/Open-Access-Policy-der-RWTH-Aachen/?lidx=1
Technion – Israel Inst of Technology	https://library.technion.ac.il/open-access/

TU Wien	The Open Access policy was released in June 2018 and the English Version can be found under: https://www.ub.tuwien.ac.at/eng/TU_Wien_Open_Access_Policy_en.pdf
TU Delft	TU Delft Policy on Open Access Publishing available at https://www.openaccess.nl/sites/www.openaccess.nl/files/documenten/oa_beleid.pdf
Universitat Politècnica de Catalunya (UPC)	Institutional Open Access policy (2009) at UPC available at https://biblioteca.upc.edu/sites/default/files/pagines_generals/coneix/mandat-cas.pdf (Spanish language). In English: https://biblioteca.upc.edu/sites/default/files/pagines_generals/investigadors/politicainstitucional_english.pdf Institutional Open Access Mandate (2014) available at: https://biblioteca.upc.edu/sites/default/files/pagines_generals/coneix/punts-par-eng.pdf
University of Strathclyde	Pure is used as a one-stop-shop for the implementation of the REF Open Access mandate, https://www.ref.ac.uk/media/1228/open_access_summary_v1_0.pdf , which is linked to the UK Research Assessment Exercise (REF2021). Levels of compliance with the policy (which requires deposit of the accepted manuscript up to 3 months from acceptance) are monitored on a monthly basis and currently stand around 95%

2.2. Institutional system availability and configuration

The analysis of the institutional system configuration for the implementation of Open Access strategies at institutions represented in the OAWG is another one currently being explored by the members. This analysis mainly focuses on the availability of institutional repositories (IRs) as the default platform for the implementation of Green Open Access, but also on the possible existence of institutional Current Research Information Systems (CRIS) and the degree of [system interoperability between both sets of systems](#). A widespread institutional workflow for the implementation of Open Access these days involves the capturing of the bibliographic metadata for a specific institutional publication in the CRIS – either by importing such metadata from an external scientific literature database or by having a new record created by the authors – then having a full-text version of the publication (usually the full-text accepted manuscript or post-print) added to the metadata record. Both the metadata and the full-text file get then transferred to the institutional repository where the full-text is openly offered from once (if any) applicable embargo period has expired.

The hypothesis we explore here is that a sophisticated and smoothly-running institutional system configuration involving some kind of IR+CRIS arrangement may help achieving better results in terms of the Open Access implementation at a given institution. Available bibliography [suggest](#) that researchers are more at ease when depositing their full-text accepted manuscripts in a closed system like a CRIS that ensures that a member of the institutional Open Access team will have the opportunity to check for bibliographic record completeness and publisher permissions for the full-text version to be shared before the record gets validated and transferred to the IR.

A broad analysis of the Open Access infrastructure available at CESAER Member institutions shows a widespread availability of institutional repositories across the network, see table 2 below. Additional aspects being examined include areas like the compliance with the [OpenAIRE Guidelines for Literature Repositories](#) that allow repository contents to be ingested into the all-European aggregation provided by this initiative. The main area to explore in this section is however whether there may be specific system configurations in place at institutions with the highest level of institutional Open Access availability.

It is notoriously difficult to persuade researchers to directly deposit copies of their full-text accepted manuscripts in repositories, especially when such an action is not mandated by a national-level Open Access policy. Researchers tend to be wary of the drive to openness that repositories embody, both due to concerns about breaching the copyright restrictions imposed by publishers and – in certain disciplines – about possible plagiarism risks. The way a majority of institutions represented in the OAWG address this potential shortcoming is by running Current Research Information Systems or CRIS on top of their repositories and requesting authors to deposit their papers in the CRIS. These are not open systems by default, and the publications may be left in a closed or restricted status while a manuscript deposited upon acceptance gets formatted and released online by the publisher. Both the metadata and the full-text publication are automatically transferred to the institutional repository once the record is completed in the CRIS.

This CRIS+IR configuration tends to be very effective because institutions need to keep an internal record of their publications somewhere, and the CRIS has traditionally been the system used for this purpose. By coupling the Open Access deposit to the process of registering institutional publications, it is much easier to keep track of what gets published and to chase the full-text accepted manuscripts from the authors. Moreover, CRIS systems have advanced interoperability mechanisms in place that allow them to be used for reporting purposes to research funders, meaning that Open Access implementation workflows merge with higher-level policy requirements from funders.

Table 2. Summary of system configurations and workflows at Member institutions represented in the OAWG. The latest date of update for this table was 10 November 2021.

Institution	Repository	CRIS	Comments
Aalto University	DSpace 5.4, https://aaltodoc.aalto.fi/	Pure, https://research.aalto.fi	
Czech Technical University in Prague	DSpace, https://dspace.cvut.cz/	In-house-built software called V3S	Currently working on the new CRIS-IR interconnection: the output metadata format for OpenAIRE is under reevaluation and will be updated based on OpenAIRE 3.0 guidelines. Submitting full texts will be possible through an interface implemented into the CRIS system. At the moment only manual input done by the library staff is possible.
Gdansk University of Technology	In-house-built, https://mostwiedzy.pl/	Moja PG	Document submission to the GUT repository supervised by the Department of Scientific Matters (DSM). DSM is responsible for scientific publications registration and data transfer to the Polish CRIS system – POL-on . GUT's employees are mandated to register their research outputs on "Moja PG", which includes an Open Access module. The DSM team checks and validates provided metadata. Employees may add publication full-text, which is sent to the Library Repository Service team to check publisher's policy, file formatting and editing. If publication does not have any copyright restrictions, then it is submitted to the open repository MOST Wiedzy and made available online.
Leibniz Universität Hannover	DSpace 5.8, https://repo.uni-hannover.de	Pure (as of 2018)	

Lund University	Librecat, https://lup.lub.lu.se/	Pure	
Politechnic University of Valencia	DSpace 5.6, https://riunet.upv.es/	In-house-built	Repository linked to CRIS. Version of Record deposit mandatory in the CRIS. Recommendation for deposit of author version. If there is no voluntary deposit, it is pursued by the University Library
Politecnico di Milano	DSpace 4.0, https://re.public.polimi.it/		Authors deposit metadata in repository themselves, in some cases with support of scientific assistants. Authors also deposit full-text files. Copyright law permitting, full-text files are made available open access. Otherwise, it is reserved. Responsibility lies with the author. An expert team monitors archived publications in open access. No prior validation is applied. At Polimi there are two repositories, RE.PUBLIC@POLIMI, for institutional research publications, and POLITESI, for full-text post-graduate theses (from 2010) and PhD theses (from 2012)
Technion – Israel Institute of Technology	DSpace (pilot, 2018); 2020 - National repository initiative	Pure (2020: implementation stage)	National CRIS-IL project. Technion is one of 4 universities that have started to implement Pure in March 2020 (In total the national CRIS will include 9 Israeli universities). There is a national repository initiative, A Pure-based option is under discussion
TU Wien	DSpace http://repositum.tuwien.ac.at	In-house-built	Implementation of new CRIS system (DSpace-CRIS) is on the way (Winter 2020). The Repository is now integrated in the DSpace environment and the new system will be available with July 1st 2020

RWTH Aachen	Invenio 1.1, http://publications.rwth-aachen.de/		RWTH Publications is both a repository and a publication database, so it contains nearly the whole institutional research output for RWTH Aachen (metadata). Metadata is submitted either by authors themselves, by secretariats or scientific assistants or via import from external systems (Web of Science, Publication databases of the Faculty of Medicine and the Faculty of Economics) by University library staff. If university library staff identifies metadata to a Gold OA article with a licence that allows posting the publisher version to a non-commercial repository without asking the rights holder, the university library staff add the full text to the metadata and release the article open access. If an author wants to self-archive his or her article, in general the metadata already exists in RWTH Publications and the full-text (accordingly to publisher regulations) is only added to the metadata. RWTH Publications Policy and Terms of Use: http://www.ub.rwth-aachen.de/cms/UB/Forschung/Wissenschaftliches-Publizieren/RWTH-Publications/~jeuy/Policy-des-Dokumentenservers-RWTH-Publi/?lidz=1
TU Delft	Fedora, http://repository.tudelft.nl	Pure	
Universitat Politècnica de Catalunya	DSpace 6.3, http://upcommons.upc.edu	DRAC/ Futur	
University of Strathclyde	Eprints 3.3.13, https://strathprints.strath.ac.uk/	Pure	The Strathprints repository is connected to the Pure CRIS, with the latter one presently acting as the 'master' platform. Metadata and full-text files provided by the authors into Pure get automatically transferred to the repository

2.3. Institutional Research Support Staff

The analysis of the Open Access-related workflows at Member institutions represented in the OAWG described in table 2 above reveal that a successful implementation of an institutional Open Access strategy strongly relies on the availability of the appropriate staff, generally at the research library. Tasks regularly carried by such research support staff include among others:

completion and validation of the publication records created by researchers in the institutional CRIS;

checking the copyright restrictions and permissions issued by publishers with regard to the open release of the appropriate full-text versions via the institutional repository;

identification of Gold Open Access publications whose full-text may easily be offered from the repository if published under the appropriate licence; and

implementation and operation of the workflows to support Gold Open Access publishing by the institutional researchers, including the mechanisms for covering the payment of Open Access publishing fees or article processing charges from the library if/where applicable, and the dissemination and application of an increasing number of so-called transformative agreements with publishers.

In order to effectively carry out these tasks, the Open Access staff needs to be properly trained in the steps that make up the publishing process, the required tools to check publisher permissions and the policy framework that governs Open Access implementation at a given institution in a specific country. Most of these skills are acquired by training on the job. There is also an important Open Access advocacy work involved in letting researchers know about specific Open Access policy requirements they are usually not familiar with. It is key for the Open Access staff involved in conversations with authors to have a solid knowledge of the regulations and processes in order to generate trust among researchers.

The activity for having Open Access publishing fees or article processing charges for Gold Open Access publications paid from the library is worth a specific mention here, as this is one of the few workflows – perhaps the *only* such workflow for information exchange between the scholars and the library – where it is researchers who contact the Open Access team at the library instead of the other way round. This specific support service – which offers interesting opportunities for a wider information exchange with researchers in concomitant areas like research data or Data Management Plans – is a labour-intensive activity and requires dedicated staff with a deep awareness of the ever-changing Open Access publishing landscape and of the institutional funding eligibility rules and the specific mechanisms each publisher has in place for pursuing Gold Open Access publishing. This specific area is also covered by the next section on Open Access advocacy, as an appropriate dissemination of the workflows to be followed by researchers interested in Gold Open Access publishing is a key aspect for its successful implementation.

The number of staff involved in Open Access tasks tends to vary across institutions and countries and is strongly dependent on the size of the institutional research output. As the

Open Access implementation landscape became more complex with the arrival of Plan S and the Read & Publish (aka "transformative") agreements with publishers, the deepest expertise tends to become concentrated in a small institutional research support team, while a widely distributed network of library and research office professionals is able to guide researchers towards the core team when asked. A reasonably ambitious Open Access implementation strategy should in any case be backed by a sufficiently large team at the library. An analysis of the Open Access team numbers and structure for Member institutions represented in the OAWG shows that while it is hard to identify a direct correlation between the size of these teams and the success of the institutional Open Access strategy, these teams need to be available for any such strategy to succeed.

There is more information on the available institutional research support staff and the workflows they operate in the section devoted to institutional case studies below.

2.4. Open Access advocacy

Institutional Open Access advocacy is another key factor for the implementation of a successful Open Access strategy, and it should ideally be delivered according to some pre-established plan or strategy. Dissemination activities on the area of Open Access tend to be integrated in a wider advocacy work addressing Open Science as a whole, which will feature Open Access alongside other domains such as research data management or research impact. There are multiple, usually overlapping, mechanisms to raise awareness of Open Access policies and mandates among researchers. Some of these include:

- A dedicated website explaining the policies and the workflows researchers are expected to follow in order to meet their requirements;
- An Open Access mailbox for researchers to send in their queries regarding the requirements for a specific research funder or publication;
- Face-to-face training sessions on Open Access for researchers. These tend to be more successful when addressed to Early Career Researchers rather than senior ones, both due to their availability and their interest on the topic. It is useful to programme these along disciplinary lines, e.g., targeting specific departments or research groups;
- Dissemination materials such as factsheets, library guides, brochures or checklists that can be shared either online or in printed versions;
- One-to-one communications with researchers, either on the phone or via email, to discuss their specific publishing profiles, opportunities and requirements;
- Meetings with funded project teams to discuss their publishing prospects and opportunities (covering both publications and research data);
- Reporting on how research groups or departments are doing on complying with the institutional Open Access requirements for their publications.

Given that the Open Access policy framework tends to be common across institutions based in the same country, it is frequent to find coordination mechanisms across institutional Open Access teams involved in the implementation of the same policy. This coordination may happen via Open Access Groups, such as the OAWG, but also via mailing lists and other means. Open Access meetings and conferences constitute a key area for this purpose, since

they also allow institutions and their Open Access team to present their initiatives and the results achieved with the subsequent opportunities for networking.

These conferences and meetings are part of the Open Access advocacy work that involves staying up-to-date with a very quickly shifting landscape.

As mentioned in the previous section, the advocacy work around the available institutional mechanisms to have a specific publication published Gold Open Access is a key area within the effort on Open Access advocacy, as researchers will often be interested in the higher visibility and impact that Gold Open Access publishing will offer them. It is thus very important to offer clear information on what the Open Access funding eligibility mechanisms are or on what specific journals may be covered by a so-called transformative agreement that allows researchers affiliated with the university to have their accepted manuscripts published Gold Open Access at no additional cost for the authors. It is good practice to summarise this information on an Open Access funding website so that references to it can be included when answering queries from researchers, and also to provide a summary of the Gold Open Access publishing options available whenever a dissemination session is staged for academics.

A specifically recommended practice in this regard is to provide lists of the most frequent journal titles by discipline or department – put together with the support from the appropriate researchers within departments – in which additional information is offered for each title on the mechanisms available to publish Open Access in them. This is particularly important to gradually move away from the Journal Impact Factor (JIF) as sole and/or main criteria for early career researchers looking for a home for their first publications. Early career researchers will often listen to their senior colleagues' recommendations on where to submit, but their place in the ['research evaluation food chain'](#) may call for extra visibility rather than for a high-JIF.

3. Institutional case studies

A number of institutional case studies are offered below as a complement for the practical application of the key factors outlined above for a successful institutional Open Access implementation. The institutions covered by these case studies have been chosen among those represented in the OAWG, meaning they are all Universities of S&T. The Open Access implementation practices described in these case studies are to some extent country-specific given that they will critically depend on aspects like the Open Access policy landscape or the availability of specific Gold Open Access funding and/or so-called transformative agreements with publishers.

3.1. University of Strathclyde in Glasgow, UK

This case study for the institutional Open Access implementation at the University of Strathclyde will first examine the position the institution has had in the CWTS Leiden Open Access rankings for 2019 and 2020, then try to explain it by looking into how the various factors for a successful institutional Open Access implementation are addressed by the Strathclyde Open Access Team.

Figures 1 and 2 on chapter 1 above show the results of the CWTS Leiden Open Access ranking for 2019 (publication period for institutional outputs: 2014-2017) and 2020 (publication period 2015-2018). In the classification of percentage of openly available institutional research outputs for such periods, the University of Strathclyde was ranked 5th in the world for 2019 then 4th in the world for 2020. This makes a case study focused on the Strathclyde Open Access implementation practices highly relevant for the purpose of identifying successful strategies and workflows. The case study will follow the factors analysed in the previous chapters looking at the specifics of their implementation at Strathclyde University.

3.1.1 Open Access Policy

Open Access policies are highlighted in section 2.1 above as the key factor for the implementation of a successful Open Access strategy. It is easy to see why when checking the distribution of the top CWTS ranking entries by country: roughly 25 out of the 30 top ranked institutions in the Open Access rankings for both 2019 and 2020 are British universities, see figure 4 below.

The reason for that – potential linguistic biases notwithstanding as analysed in section 1.1 above – is the national-level "REF Open Access policy" that is mandatory in the United Kingdom. This policy requires the deposit of a full-text version of the accepted author manuscript (AAM) for journal articles and conference proceedings in the appropriate institutional system (usually the institutional CRIS but potentially in the institutional repository instead) no longer than three months since manuscript acceptance.

The key aspect of the policy together with its mandatory character is that it is linked to the national research assessment exercise or [REF](#), meaning that if the full-text AAM is not

deposited within three months of acceptance, the publication will not be eligible for its submission to the REF as evidence for the excellent research conducted at the institution.



Fig 4. Overwhelming number of UK institutions in top positions at the CWTS OA Ranking for 2020.

This linking of the Open Access policy to the research assessment exercise for the whole country is directly taken from the recommendations of the FP7-funded PASTEUR4OA project mentioned in section 2.1 above. Together with an effective institutional dissemination strategy for the REF policy requirements and the joint work across UK institutions whenever researchers move among them, its effect is a remarkable boosting of the levels of policy compliance. The University of Strathclyde Open Access Team is regularly monitoring these levels of compliance with the REF Open Access policy across departments and schools and for the whole institution, and the results usually hover around 95%. Given that the REF policy effectively became operational in 2016 and covers any manuscript accepted from the 1st of April 2016 onwards, it is little surprise that Strathclyde has even seen a slight improvement in its CWTS Open Access ranking for 2020 where the publication period analysed was 2015-2018 with regard to the 2019 ranking which was based on institutional publications in the period 2014-2017. The more fully this analysis period aligns with the start of the REF policy in 2016, the higher the levels of compliance is expected to be.

This REF Open Access policy based on a Green Open Access approach (i.e., deposit of accepted manuscripts rather than paying article processing charges for Open Access

publishing) critically underpins the institutional Open Access implementation strategy at UK universities, but it is far from being the only applicable policy in them. The table below provides a summary of these policies as described in the 2018 journal article [The Role of Current Research Information Systems \(CRIS\) in Supporting Open Science Implementation: the Case of Strathclyde](#).

Table 3.- A summary of applicable Open Access policies at the University of Strathclyde. Latest update March 2021.

Research funder	Open Access flavour	Brief policy description
Research England (now part of UK Research & Innovation, UKRI)	Green OA	Applies to journal articles and conference papers whose manuscripts were accepted from Apr 1 st , 2016. Requires mandatory deposit of the full-text accepted author manuscript (AAM) in an appropriate institutional system no longer than three months from manuscript acceptance. Linked to the UK Research Assessment Exercise (REF2021 Research Excellence Framework).
UK Research and Innovation (UKRI, Research Councils UK or RCUK prior to 01/04/2018)	Green & Gold OA	Mandatory open availability for research outputs stemming from UKRI-funded projects, either via the Green (deposit into institutional repository) or the Green Open Access route. Block grant funding delivered to research-intensive universities to fund Open Access publishing fees for eligible publications (those that acknowledge UKRI-funded projects). Publish side of Read & Publish (aka transformative) agreements with publishers may also be funded via these block grants.

<p>Charity Open Access Fund (COAF): coalition of UK biomedical charities led by the Wellcome Trust</p>	<p>Green & Gold OA</p>	<p>Mandatory open availability for research outputs stemming from COAF-funded projects, either via the Green or the Green Open Access route. Block grant funding delivered to research-intensive universities to fund Open Access publishing fees for eligible publications (those that acknowledge COAF-funded projects). Green OA publications must be deposited in EuropePMC. Publish side of Read & Publish (aka transformative) agreements with publishers may also be partially funded via these block grants.</p> <p><i>Note.- COAF was disbanded as of 30th September 2020 but its Gold Open Access funding policy has been taken over by individual charities like the Wellcome Trust, Cancer Research UK or the British Heart Foundation. The updated Wellcome Trust Open Access policy as of 1st January 2021 is aligned with Plan S requirements and includes the Rights Retention Strategy (RRS) for manuscripts accepted in hybrid journals not underpinned by a transformative agreement</i></p>
<p>European Commission – H2020 framework programme</p>	<p>Green & Gold OA</p>	<p>Mandatory deposit of full-text accepted author manuscripts for all publications (and research datasets) arising from H2020-funded projects. Open Access publishing fee may be claimed from H2020 project grant by project coordinator</p>

Given the complexity of the Open Access policy landscape at the institution, an adequate implementation for such policies is tightly related to the availability of a research support service able to guide institutional researchers across the appropriate policy compliance route in each case. Open Access policy implementation becomes thus a driver for the establishing of an effective institutional Open Access Team (section 3 in this case study) able to discuss funding streams with the scholars. Moreover, the availability of very early full-text accepted manuscripts in the institutional CRIS (see section 2 below) allows the Open Access Team members at Strathclyde to reach out to specific authors in order to let them know about specific policy requirements they must meet or potential opportunities for publishing Gold Open Access papers they may be eligible for either via dedicated funding for article processing charges or via Read & Publish deal eligibility.

3.1.2 Institutional system configuration

As shown in table 2 above, the institutional system configuration for Open Access implementation at the University of Strathclyde includes a CRIS+IR setup. The Open Access Team at the library manages the EPrints-based [Strathprints](#) institutional repository where all available full-text publications produced at Strathclyde are openly offered to any external user. These Green Open Access workflows may occasionally involve embargo periods during which

the availability full-text file will be restricted as per the publisher's requirements, but even in those cases there is a built-in Strathprints request-a-copy feature that allows users to request a copy of the AAM for private use.

The Strathprints institutional repository is fed both for bibliographic metadata and full-text files from the Pure institutional CRIS at Strathclyde. Pure is in fact the one-stop shop for Strathclyde scholars: not only it is the default system for them to create or import their publication records but also to create and store their research datasets and to record various aspects of their research activity such as a personal profile, their funded project information, their supervised students and PhD works or their public outreach activities, awards and instruments and research facilities they use among many others. The CRIS – which is maintained by a set of institutional units led by the Research Office and to which the library research support team have access to – becomes thus a "treasure chest" of the institutional research activity that allows a comprehensive research support activity from the library and specifically in the realm of Open Science and Open Access implementation.

The system interoperability between the Pure institutional CRIS and the Strathprints institutional repository at Strathclyde University is achieved by means of a connector that allows the bibliographic metadata and the full-text files to be transferred to the repository as soon as the records have been validated by a member of the Open Access Team at the library. Even with EPrints being one of the most widespread repository software solutions, the implementation and operation of this "connector lite" are not always problem-free as shown in the presentation delivered by the Strathprints repository manager George Macgregor at the Open Repositories 2019 workshop devoted to system interoperability and/or integration between repositories and CRIS systems. Specific metadata like funding information are particularly hard to transfer to the repository, which may raise occasional issues when trying to aggregate publications stemming from an international project coming from project partners in different countries and stored across a range of institutional repositories, but a constant effort is being devoted to improving the way this system interoperability works⁷.

The value of asking researchers to deposit their manuscripts in a 'closed' institutional CRIS system like Pure has already been mentioned in section 2.2 above but it is worth reiterating it here: the fact that scholars can rely on their full-text peer-reviewed manuscripts (often deposited in the CRIS before they get released by the journal where they have been accepted) *not being made openly available* until a member of the institutional Open Access Team at the library has reviewed and validated it applying the adequate embargo period to them if/when appropriate means an efficient trust-building mechanism whose impact on a mid-term Open Access implementation strategy can easily be identified.

3.1.3 Institutional research support staff

The research support unit at the University of Strathclyde Library is called the Scholarly Publications & Research Data (SPRD) team. As it is frequently the case at research-intensive universities in the UK, it is a rather large team with a specific remit for Open Science implementation – including mainly (but not only) Open Access to publications and Research

Data Management. Because the research support activity mainly includes these two closely interconnected areas, the SPRD team at Strathclyde has produced an integrated workflow for Open Access to publications and their associated datasets published as supplementary information, see figure 5 below. This integrated workflow allows a *single conversation* – with contributions to it coming from different sides of the research support team – to be held with authors aiming to receive support for a specific publication, making it much more effective.

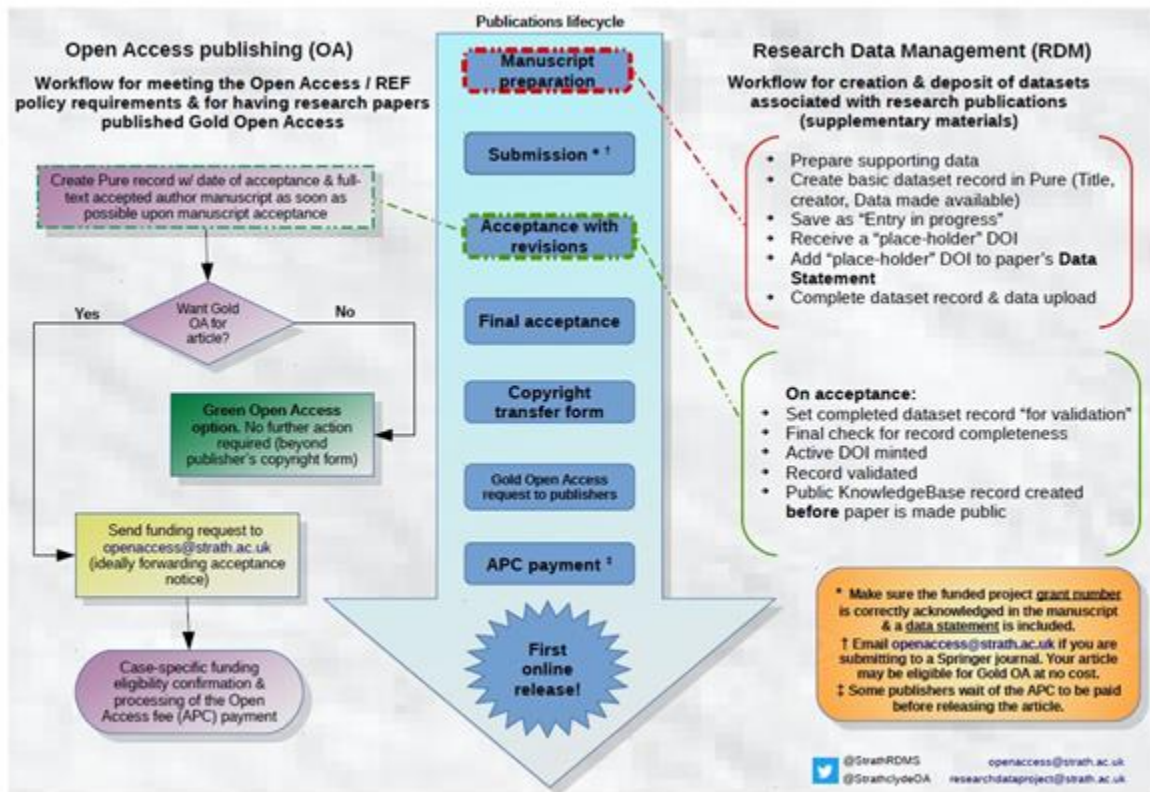


Fig 5.- Integrated workflow for Open Access and Research Data Management implementation at Strathclyde (see <https://strathprints.strath.ac.uk/65503/> for more information)

The core SPRD Team at Strathclyde is composed of seven full-time equivalents – three leading officers for institutional repository management, Open Access advocacy and Research Data Management besides a Team Manager plus three Institutional Repository Support Assistants or IRSAs in charge of (among others) bibliographic record completion and validation for institutional publications and communications with the researchers for collecting missing full-text files. The core team is often complemented on a part-time basis with 'guest' library cataloguers that help with the publication record completion and validation tasks and with faculty librarians in each of the key areas – Engineering, Sciences, Economics, Law and Social Sciences and Humanities – that act as entry points to the provision of research support by forwarding the scholars' queries related to their publishing activity to the core team. Additional institutional staff at units like the Research Office or Corporate Communications are aware of the kind of work carried out by the research support team at the library and will also forward the occasional queries they directly receive from Strathclyde researchers.

While this may look like a very large team just for the purpose of Open Access implementation, this is in fact the average size of a – fairly distributed – Scholarly Publications unit. Moreover, the ever growing workflows for Gold Open Access implementation – involving not only the coverage of Open Access publishing fees from the library but also the dissemination, implementation and monitoring of so-called transformative agreements with publishers – on top of a constantly ongoing support activity on concomitant areas such as open licences, software publishing, pre-print publishing or research impact via alternative metrics to mention but a few makes the team occasionally feel overstretched.

It is worth mentioning in this section the very effective collaborative work that Open Access teams perform across UK institutions. This is mainly because all these teams share the same policy framework and are thus aware of what the regular requirements are for meeting a specific Open Access policy. If we add to this the unprecedented researcher mobility these days and the fact that research publications are more often than not co-authored by researchers from several UK institutions all of which are expected to secure and deposit a copy of the full-text accepted manuscript for a given paper, it is little wonder that a wide cross-institutional conversation is constantly taking place to check if the full-text file that was never deposited in our repository by an author that may have left the institution before a given manuscript was accepted may perhaps have been deposited in the repository for our fellow Open Access Team at the co-authoring institution. This cross-institutional collaboration for Open Access implementation is very important and creates a valuable sense of a collective task that helps bringing teams together.

3.1.4 Open Access advocacy strategies

As mentioned in previous sections, the Open Access advocacy effort at the University of Strathclyde is tightly coupled to the OA policies that institutional researchers need to be made aware of as well as to the available research support staff for conducting such dissemination activities. Some of the areas where this advocacy regularly takes place are summarised below:

- **Dissemination of the mandatory [REF](#) policy** (see table 3 above) to Strathclyde scholars, especially newly arrived ones. Because the advocacy around the critical REF policy started a couple of years before it became effectively operational in April 2016, those Strathclyde researchers who have been at the institution for some time now tend to already know about the policy requirements for creating bibliographic records for all their publications which include the full-text accepted author manuscript in them. However, PhD students and Early Career Researchers are often less aware of such requirements, and newly arriving scholars, especially from abroad, will usually need some guidance on how to proceed in this regard. Training courses are [monthly held](#) on how to manage a personal profile in Pure, which includes short briefings on Open Access to publications and research data management. A comprehensive [Open Access website](#) is also kept up to date by the library in which all the information is provided in a way that can easily be referenced when contacting the researchers via email.
- **General Open Access advocacy sessions** for researchers and students. These sessions are usually offered on demand to students or to researchers at a given

department or school. They tend to be tailored for a specific discipline and provide a summary on the mandatory Open Access policies and on the available Gold Open Access funding opportunities in the field, making emphasis on the relevance of funded projects for the purpose of Open Access. Sometimes the request for an Open Access advocacy session arrives directly from a project coordinator and involves a meeting with the project staff at Strathclyde where lots of additional topics are discussed in the domain of publishing. Finally, some researchers who organise sessions on publishing for their PhD students occasionally invite the library to deliver a presentation on Open Access as part of the activity. All these dissemination efforts – often addressing research data management besides Open Access – are of the utmost importance for building trust with the end-users of a research support service.

- **One-off sessions on Open Access-related topics.** Requests do occasionally arrive from researchers or students for a specific, one-off session on topics linked to publishing such as the [posting of pre-prints](#) on pre-print servers or the dangers of [predatory publishing](#). These sessions allow the Open Access Team to establish itself as an authoritative source of information on practically any topic related to publishing, which although it will increase the range of topics for queries received via the Open Access mailbox below, will also offer interesting opportunities for spotting best practice case studies for the implementation of Open Science at an institutional level. Externally delivered presentations at [conferences](#) and working group meetings are also part of this wider dissemination activity for Open Access implementation practices at Strathclyde.
- **Open Access mailbox.** The communication with researchers via a dedicated OA mailbox at Strathclyde – a feature shared with most institutions out there, certainly in the UK but also abroad – is perhaps the most intensive research support service provided by the Open Access team. Queries received via this channel will usually involve Gold Open Access funding requests from researchers but may cover a very wide range of topics, from automated notifications from publishers for eligible accepted manuscripts under a specific Read & Publish agreement to queries from fellow Open Access team members at other UK institutions about a given co-authored publication through requests from Directors of Research on how good their departments and schools are doing with regard to REF Open Access policy compliance. For the very frequent queries on eligibility of a given accepted manuscript for Gold Open Access funding, the Strathclyde Open Access Team maintain a specific ["Open Access Funding" website](#) where all the information is summarised. Because of the ever growing complexity of this area – that has recently seen the addition of lists of eligible journals where Strathclyde researchers can publish Gold Open Access at no additional cost under the so-called transformative agreements with publishers or even more recently the Rights Retention Strategy as a specific policy element for research funders who have signed Plan S – researchers will usually need a clarification on how the various routes to Open Access may apply to a specific manuscript of theirs that has been accepted in a given journal title. In fact the Open Access mailbox is seeing an increasing number of queries from researchers before they submit their manuscripts, often checking where it could make sense for them to publish in order to become eligible for Gold Open Access. The opportunities that these frequent questions on

where to submit a manuscript offer in terms of promoting sensible practices from an Open Science perspective should not be underestimated.

- **Open Access monitoring.** A specific Open Access monitoring activity is permanently being carried out in the background for the purpose of providing updates on the levels of expenditure of the available Gold Open Access funding, the uptake of specific Read & Publish deals at Strathclyde or the levels of compliance with the multiple Open Access policies. These reports are usually delivered on a monthly basis to internal forums – such as to the Directors of Research at institutional departments and schools or to the Library Finance Committee – or externally to research funders like UK Research and Innovation. One important specific trend in this regard is the ever increasing relevance of the input from the institutional Open Access Team into the consortia negotiations for new Read & Publish deals: while traditionally these negotiations were an area for the Acquisitions/Licensing team at the library, the inclusion of the 'Publish' side of the equation in such dealings with publishers requires the input from a unit that is aware of how often Strathclyde researchers are publishing with a given publisher and how often the Open Access publishing fees for such papers are being covered by the library budget. This is gradually bringing both areas within the library ever closer to each other and giving Open Access teams a say in the economics of Open Access implementation at the institution.

3.2. *Universitat Politècnica de Catalunya (UPC) in Barcelona, Spain*

The progress achieved by UPC on the CWTS Leiden Open Access ranking between its 2019 and 2020 editions has been one of the most remarkable ones for any institution represented in the OAWG, see figures 1 and 2 above: while in the 2019 edition the UPC was ranked **63** with a **62.8%** of openly available institutional research outputs, the university was ranked **38** in the May 2020 ranking, with an **80.7%** of its publications available Open Access. This case study will examine the institutional Open Access implementation practices at UPC and will try to ascertain what actions may have driven such a dramatic improvement on its Open Access ranking.

3.2.1 Open Access Policy

Universitat Politècnica de Catalunya (UPC) has a strong institutional Open Access policy in place since 2015. The policy – which amounts to an Open Access mandate – requires the deposit of accepted author manuscripts into the institutional repository as a precondition for the evaluation of faculty members' research, research groups/departments. The [approval for awarding research activity points solely for open access publications](#) was passed by the University Governing Council in September 2014 and kicked-in as of January 2015.

In line with the categorisation of Open Access policies above as the most important factor for a successful institutional Open Access implementation, it is safe to assume that it was the coming into force of this mandatory policy early in 2015 which drove the UPC up the CWTS Leiden Open Access ranking: while the May 2019 CWTS OA ranking aimed to measure the

percentage of openly available institutional research outputs **for the period 2014-2017**, the 2020 ranking shifted the period under analysis to **2015-2018**, meaning the four years were all of a sudden fully covered by this strong institutional Open Access policy. While other factors may also have been at play to explain an almost 20% increase in Open Access availability in just one year, this is bound to have been a critical one behind such a remarkable improvement.

The UPC had in fact had an institutional Open Access policy since 2009, when the document [Access, visibility, impact and preservation of the UPC's academic output online](#) was passed by the institutional Research Council. Besides including references to the European Commission's and the European Research Council's Open Access policies at the time, this 2009 document also mentioned the by then forthcoming 'Spanish Science Law'. This national-level legislation would end up becoming the Act 14/2011, of June 1, on Science, Technology and Innovation, whose [article 37](#) urged researchers to deposit the final digital version of their publicly-funded contributions to journals in an Open Access repository.

Article 37. Open access dissemination:

1. Public workers of the Spanish Science, Technology and Innovation System will drive forward the development of own or shared open access repositories for the publications of their researchers, and will establish systems allowing their connection to similar national or international initiatives.
2. Researchers whose research is financed mostly with funds from the General Budget of the State will make public a digital final version of the contents that have been accepted for publication in research journals, as soon as possible and no later than twelve months after the official date of publication.
3. The electronic version will be made public in open access repositories recognised in the field of knowledge of the research or in open access institutional repositories.
4. The public electronic version may be used by public administrations in their assessment procedures.
5. The Science and Innovation Ministry will facilitate centralized access to repositories and their connection to similar national or international initiatives.
6. The above is understood without prejudice of the agreements by virtue of which rights over the publications have been conferred or transferred to third parties, and will not be applied when the rights over the results of research, development and innovation are liable to protection.

Fig 6. Full wording of Article 37 in the Spanish Act 14/2011 on Science, Technology and Innovation

There are no annual compliance statistics for this early Open Access policy, but the 2014-2016 EU-funded [PASTEUR4OA FP7 project](#) on Open Access policies showed that in order for a policy to be truly game-changing, it needed to be coupled to research assessment. By linking the deposit of accepted author manuscripts mandated in its 2015 Open Access policy to internal institutional promotion and research budget distribution, the UPC made sure the appropriate instruments were in place that would guarantee compliance. An annual evaluation has been taking place ever since to assess the levels of policy compliance and to allocate the associated research funding to institutional departments.

Open Access implementation at the UPC is nowadays governed by several policy layers issued by the various research funding administrations:

- A. European Commission** – H2020 framework programme: Green and Gold OA policy. Mandatory deposit of full-text accepted author manuscripts for all publications (and

research datasets) arising from H2020-funded projects. Open Access publishing fee may be claimed from H2020 project grant by project coordinator.

- B. Spanish legislation and public funding:** *Plan Estatal de Investigación Científica y Técnica y de Innovación 2017-2020*. Green OA policy. Article 37.1 in the Spanish Science Law (see above).
- C. UPC Institutional Mandate 2014.** Green OA. Approval for awarding research activity points solely for open access publications (see above).
- D. Private research funders** like 'La Caixa' also have their own [Open Access policies](#), usually for Gold and Green OA.
- E.** From 2021 onwards, the **Catalan Government** '[Catalan Agreement on the Knowledge Society](#)' is also expected to add to this policy layer.

3.2.2 Institutional system configuration

The institutional system configuration to support Open Access implementation at *Universitat Politècnica de Catalunya* (UPC) features the same CRIS and repository architecture shown in the other two institutional case studies for the University of Strathclyde in the UK and Aalto University in Finland. The [UPCommons](#) Open Access institutional repository at UPC is based on DSpace and includes the following communities: E-prints (53 549 documents), Theses and Dissertations (4 717 documents), Research data (26 datasets), Journals (12 830 articles) and Congresses (8 393 papers).

The institutional CRIS system at UPC is an in-house-built solution called [DRAC](#) – a Catalan language-acronym for "Descriptor of the Research and the Academic Activity". Since its implementation back in 2009, the system interoperability between DRAC and the UPCommons repository was [guaranteed](#), meaning that URLs for the UPCommons records from which Open Access were provided to institutional research outputs were stored as an additional metadata element in the bibliographic description for publications in the CRIS.

In 2014 the UPC launched the [FUTUR](#) research portal. FUTUR is the openly available website for the scientific production of UPC researchers and it contains comprehensive information on institutional researchers, affiliations, research projects and research outputs, including patents and spin-offs besides research publications. The research information hosted in FUTUR, DRAC and UPCommons is interlinked and there are mechanisms in place for automatically exchanging it across institutional systems.

3.2.3 Institutional research support staff

There are 12 libraries at UPC. In each library, at least one librarian provides publishing advice to researchers and oversees reviewing the scientific publications that researchers introduce in the CRIS: this involves checking the journals' OA policy in [SHERPA RoMEO](#) or other resources, metadata curation and publishing in the UPCommons repository.

On top of this, from 2019 onwards librarians provide support (in the areas of Open Access, Open Data and Data Management Plans) to all research projects in which UPC researchers are involved (see 'Services to research projects' below).

The book chapter [Library research support services: the Universitat Politècnica de Catalunya-BarcelonaTech case](#) published in the book "Cases on research support services in academic libraries" by IGI Global in 2021 describes the wide range of research support services provided by the UPC library:

"The UPC libraries, due to their versatility, decentralized structure, and their links with the schools and departments, have been seen as agents with a remarkable ability to actively participate in management processes through alliances with other units of the University (...). In 2015, with the creation of FUTUR, the UPC Research Production portal, data from other University information systems were also connected (Doctoral School, Personnel Service, Project Office, etc.). These successful collaborations opened the door to further alliances with UPC units on research project management, patentability, and training of research staff".

Services to research projects

Assistance is provided to help comply with Open Access requirements. The main focus of this range of services to projects is on research data, Data Management Plans (DMPs), conditions and possible embargoes of Open Access journals, and the dissemination of research results.

A great majority of university researchers take part in research projects funded by organisations that require Open Access for both articles and research data resulting from their projects. Following the guidelines of the Office of the Vice-Rector for Science Policy, and in collaboration with the Research and Innovation Support Service, libraries provide Open Access to publications and research data in accordance with the institutional policies approved by the governing bodies of the University on the initiative of the Vice-Rector. For instance, the Library collaboration with the Research and Innovation Support Service results in a service where research librarians take part in kick-off meetings to give advice to the research team on informational issues. The aid provided in these initial meetings includes:

- a. Basic information:** General guidance on the publication of papers and data for each project.
- b. List of journals:** An arranged list of acknowledged journals and conferences on the topic of the project, their conditions for publication, Open Access publishing (Green and Gold OA routes), Article Processing Charges (APCs), embargoes required by publishers, and Creative Commons licenses.
- c. Research data information:** Information about managing and publishing research data in UPCommons or other data repositories. Help is provided to create a DMP, elaborate on research data, revise citations, and disseminate results for facilitating the publication of documents and data in UPCommons.

- d. Dissemination information:** Information on dissemination mechanisms on social networks run by libraries of papers published in the framework of research projects.
- e. Other information:** Support for the production of educational videos, article publication in social media sites, and availability of library spaces for meetings or exhibitions showcasing the results of their research.

3.2.4 Open Access advocacy strategies

The Open Access advocacy activities conducted at the UPC library include:

- Open Access advocacy sessions for researchers (including early career researchers and doctoral students);
- Open Access mailbox where queries are received from researchers;
- Open Access website: information at the UPC Library website [Bibliotecnica](#) includes a series of FAQs on Open Access routes, policies and publishing strategies.

Open Access monitoring: the Catalan [Open Access Observatory](#) was launched in 2018 by UPC in collaboration with *Universitat de Barcelona* to monitor the rate of Open Access publications at different universities in Catalonia. Since 2019, all Catalan universities are participating in it.

3.3. Aalto University Helsinki, Finland

The third institutional case study examines the implementation of Open Access (OA) at Aalto University, Finland. In general, Finnish universities have performed well in the CWTS Leiden OA ranking. The University of Helsinki and The University of Jyväskylä are among the top 100 in the 2020 edition, for example. Aalto University's own CWTS Leiden OA ranking saw a significant improvement between the 2019 and 2020 editions (from position 380 with 44.8% OA in 2019 to position 272 in 2020 with 57.1%). The following case study provides an overview on how the various factors for a successful institutional OA implementation are addressed at the national level, by the university management and by the team responsible for open science and CRIS services at the university. The OA team of the Aalto University is called the Open Science and ACRIS (OSA) team, where ACRIS is an acronym for Aalto University research information management system.

3.3.1 Open Access Policy

Finland has been active in developing national Open Access policies in recent years. With the Federation of Finnish Learned Societies (TSV) acting as national coordinator, the [Open Access to scholarly publications – National policy and executive plan by the research community in Finland for 2020-2025](#) was published in 2020, in which the Finnish research organisations agree on the following objectives:

1. No later than 2022, all new scientific articles and conference publications will be immediately openly accessible.
2. The total cost of scholarly publication channels and individual publications is transparent and publicly available.
3. By 2022, a CC-license is applied to all new research publications to provide Open Access and to protect researcher's rights.
4. The research community creates a jointly funded publishing model that enables immediate Open Access to research articles published in Finland

Besides the work on a national OA policy led by the TSV, another important development in the Finnish national context is the recent amendment to the universities basic funding model issued in 2019 by the Finnish Ministry of Education and Culture. The research outputs gain an additional 1.2 funding coefficient, if a peer-reviewed version of the work is available OA ([for the core funding model of Finnish universities](#)). This OA availability may take the forms of the final published version being available through the publisher's online platform (i.e. the Gold and Hybrid OA models) or the peer-reviewed accepted manuscript being available in either an institutional or a subject-specific repository.

The Aalto University's two main sources of external research funding are the National Academy of Finland and the EU's Horizon 2020 framework program. Both these funders are cOAlition S partners and they will implement the progressive OA principles laid out in Plan S during 2021 (see Table 4 below).

As the landscape of OA policies is advancing rapidly within Finland's context, Aalto University issued an [Open Science and Research Policy](#) in 2020. The policy states that Aalto University aims to publish all publication types according to Open Access principles and to do so by recommending publishing in Open Access channels or by parallel publishing (Green Open Access). Hybrid OA is acceptable only as a part of a transformative agreement. In addition to addressing Open Access publishing, the policy also promotes research data management, open data and open protocols and methods. Table 4 provides a summary of selected OA policies currently relevant at Aalto University.

Table 4. A summary of selected OA policies currently influencing publishing at Aalto University

Research funder	OA flavour	Brief policy description
Aalto University policy	Gold & Green OA	Applies to both articles and conference proceedings.

Finnish National policy	Gold & Green OA	From 2022 onwards, all new scientific articles and conference publications will be immediately openly accessible with open licenses.
Finnish Ministry of Education	Gold, Hybrid & Green OA	Research outputs gain an additional 1.2 funding coefficient, if a peer-reviewed version of the work is available OA.
The Academy of Finland	Gold & Green OA	The Academy of Finland requires OA publishing from the funded projects. Plan S principles will be implemented during 2021.
European Commission – H2020 framework programme	Green & Gold OA	Mandatory deposit of full-text for all publications arising from H2020-funded projects. OA publishing fee may be claimed from H2020 project grant by project coordinator. Plan S principles will be implemented during 2021.

The importance of the Open Access policy landscape as a driver of research service design has already been thoroughly discussed in the first institutional case study above (University of Strathclyde). Also within the context of Aalto University, researchers' questions regarding how to comply with the different OA policies generate demand for OSA team services. The institutional system configuration at the Aalto University allows different digital service designs to match these needs.

3.3.2 Institutional system configuration

The institutional system configuration for OA implementation at Aalto University is similar to the one presented in both previous institutional case studies, i.e., both CRIS and IR systems are utilised. The Research Services are responsible for administering the CRIS system with the help of IT services. The institutional repository is managed by the Learning Services and the IT Services.

The Aalto Current Research Information System ([ACRIS](#)) functions as the master record of all research outputs generated at Aalto University. Both internal and external research evaluations and publications-related basic funding from the Finnish Ministry of Education are based on the research outputs reported to ACRIS. In addition, the Aalto University's main website and the departmental websites integrate publication and prize information from ACRIS. ACRIS runs on the commercial Pure software provided by Elsevier. The majority of publication metadata is imported from international reference databases (mostly from Elsevier Scopus and Clarivate Analytics Web of Science). Both the imported metadata and metadata submitted by Aalto University researchers are curated and validated by the OSA team

members. This allows, e.g., the following service configurations to advance the implementation of Open Access:

- If the original work was not published OA, the validator may refer to either the Ministry of Education's additional funding co-efficient or the OA policy of an acknowledged research funder and ask the researcher to send the accepted manuscript to the email address operated by the OSA team.
- The content validator may search for manuscript versions uploaded to subject-repositories, such as arXiv. Once the document version is verified as the accepted manuscript, the persistent link may be added to ACRIS. This removes the duplicate effort of researchers uploading their manuscripts into several repositories.
- To facilitate the mandatory repository deposit of all publications funded by the Horizon Framework Programme and ensure that the metadata requirements are met, the content validators upload all OA outputs published with an open license (e.g. CC-BY).
- The validator checks the funder and infrastructure information in the acknowledgement section and adds the information to the publication.

The content curation done by the OSA team's validators ensure high quality metadata for monitoring research outputs produced by the university including the publication's OA status and type (Gold, Hybrid or Green OA). In Finland, the metadata originating from universities' CRIS systems is aggregated into the national [Research.fi](#) portal that allows the monitoring of OA implementation at a national level. In addition to providing a view into the publications generated by the Finnish universities, the Research.fi portal will also showcase, e.g., information about research projects, open research data and research infrastructures.

[Aaltodoc](#) is the institutional repository of the Aalto University that functions as the digital archive of the full-text documents (e.g. theses, scientific articles, and conference proceedings). The repository runs on the DSpace open source software. The main source of documents to the Aaltodoc IR are the integrations with ACRIS (both full-text files and metadata of OA publications are transferred from ACRIS), with the Aalto theses' online management platform and with the Aalto University series publication platform. Most of the full-text materials are openly available to all external users, but sometimes the documents may be embargoed due to, e.g., publishers' embargo policies. Currently, Aaltodoc IR content is integrated into the European Commission's OpenAIRE portal to facilitate the reporting within the Horizon Framework funded projects.

3.3.3 Institutional research support staff

Within the Finnish context, Aalto University is pioneering an organisational structure where both the teams handling library resources and Open Science and the CRIS system are a part of the institutional Research Services (see figure 7 below). A key feature of this organisational framework is the school teams that include members from the Research Service subgroups, such as the Pre-Award team (grant writers), Post-award team (project administration specialists), OSA team, and from Legal Services. These school-specific teams allow both close

networking of different experts and joint efforts to tailor service solutions for researchers representing the individual Schools of the Aalto University.

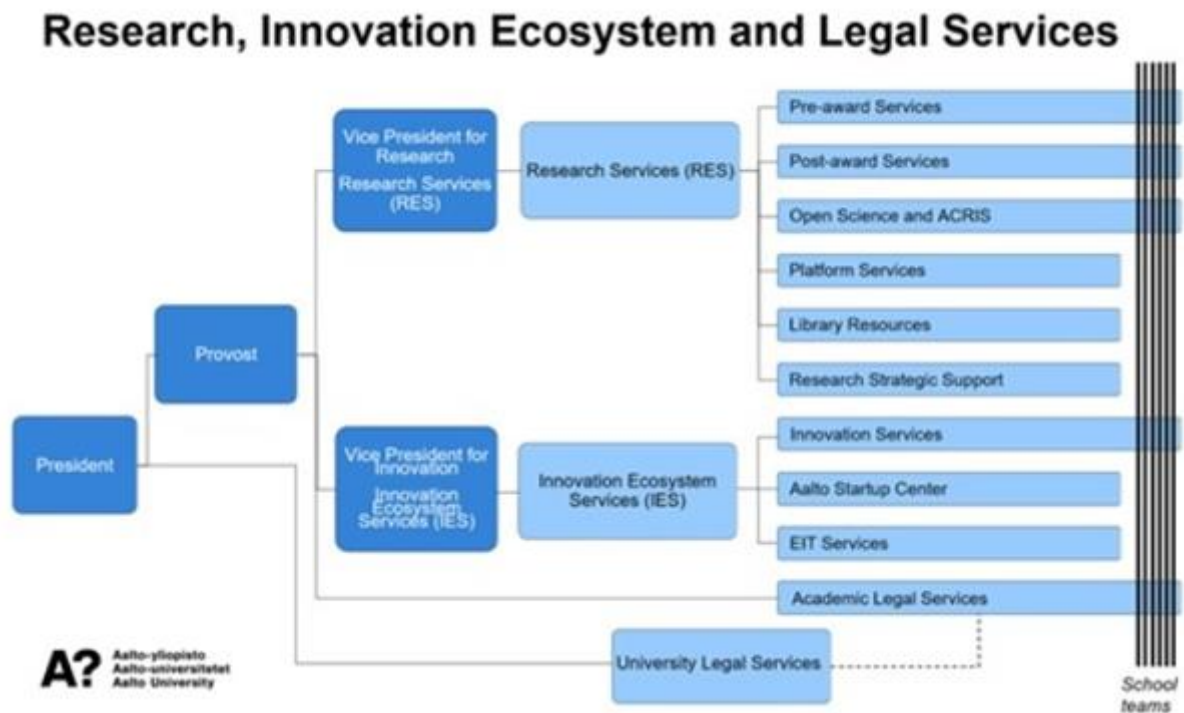


Fig 7. Organisation of Research, Innovation Ecosystem and Legal Services at Aalto University (as of March 2021)

In general, the Open Science and ACRIS (OSA) team consists of a total of 14 staff incorporating different areas of expertise. Besides the OA- and CRIS-related responsibilities described above, team members also play important roles in the development and training of research data management services. The team’s Data Advisor coordinates the [Data Agent network](#) at Aalto University. Data Agents are researchers who support their colleagues in data management and Open Science, and their salary costs are partly compensated by the university). In addition, the school-liaisons of the OSA team partake in the development of research data management services.

Other OSA team responsibilities include bibliometric analysis for recruiting and assessments and teaching of information retrieval. The team members actively participate in both in national and international Open Science working groups, such as in the context of the CESAER and [EOSC](#) associations.

3.3.4 Open Access advocacy strategies

Similarly to previous case studies, the OA advocacy efforts at Aalto University are also driven by the policy landscape affecting the university. Aalto University’s Open Access and Open Science webpages and the ACRIS support mailbox, both administered by the OSA team, serve as the foundation for more specific advocacy strategies. The key OA advocacy strategies are summarised below:

- **Manuscript service.** The OSA team administers an email address where researchers are requested to send their accepted manuscripts. As mentioned above, the suggestion to provide a manuscript is often made as part of the workflow for validating publication metadata into ACRIS. The OSA team will upload the manuscript to ACRIS and it will be made Open Access according to the policy of the publisher. This saves researchers from the efforts of examining publishers' embargo policies or licence terms.
- **Transformative publishing agreements.** The Aalto University is a member of the FinELib consortium, which is responsible for negotiating the transformative Open Access agreements with scientific publishers for all Finnish universities and research institutions. The OSA team members communicate about the new agreements and provide guidance to researchers on how to use their Open Access benefits. Furthermore, the OSA team members administer the publishers' OA dashboards and accept the publications authored by Aalto researchers.
- **Open Science training sessions.** The OSA team members give general training in both OA publishing and research data management. The research data management training is done in collaboration with the [Data Agent network](#), the legal team and the IT services of Aalto University. Besides giving open training courses on the above topics, lectures are given to doctoral students and the Open Science content is being incorporated into Bachelor and Master students' course offerings. The Head of the OSA team chairs the national data training working group.
- **Consulting researchers and research projects.** Due to the novel organisational structure described in the prior section, the OSA team members have been working closely together with the other experts within the school teams. This has supported the inclusion of Open Science-related topics in different tasks of the team, such as for instance introductions given to new Aalto professors and at kick-off meeting for new research projects.
- **Open Science monitoring.** As discussed above, providing accurate statistics about the state of OA publishing to both research funders and to Aalto University departments is one of the key advocacy strategies of the OSA team. Without the comprehensive monitoring enabled by the ACRIS content validation workflows performed by the OSA team, the long-term planning of advocacy strategies would suffer. Besides statistics on OA publications, the OSA team is working to gather and showcase research data metadata in the ACRIS more exhaustively.

Annex. The 2021 edition of the CWTS Leiden Open Access ranking

As mentioned in the introduction, the 2021 edition of the CWTS Leiden ranking was released in June 2021, when the text for this document was already in an advanced draft status. Given the relevance of this new edition to further explore the evolution of the Open Access implementation at CESAER member institutions in general and specifically for those selected for institutional case studies in section 3, this annex has been added to the document as a means to analyse the outcome of this most recent ranking – which is just a couple of months old at the time of writing, and the most comprehensive one released by CWTS Leiden thus far.

This being a ranking, the strong temptation is to assess the progress of a given institution by comparing the position in last year’s ranking with the current one, whose outcome is displayed in figure 8 below. The results of these comparisons are not very flattering for most Member institutions represented in the OAWG, or even for those featured in the institutional case studies in section 3 above: the University of Strathclyde has dropped from 4th in the 2020 edition of the ranking to 9th in 2021, UPC-BarcelonaTech is now 49th after being ranked 38th in 2020 and Aalto University – the big exception together with TU Delft in a pattern of lower ranks for most Member institutions – has climbed from 272 in 2020 to 189 in 2021.

University	P	P(OA)	PP(OA)
9 Univ Strathclyde	6105	5520	90.4%
37 Univ Sheffield	14190	12081	85.1%
49 Univ Politècnica Catalunya - BarcelonaTech	6637	5507	83.0%
80 Univ Politècnica València	7078	5240	74.0%
106 Delft Univ Technol	12667	9019	71.2%
166 ETH Zurich	23081	15410	66.8%
183 Lund Univ	19377	12780	66.0%
189 Aalto Univ	7994	5255	65.7%
243 Vienna Univ Technol	6679	4161	62.3%
418 Czech Tech Univ Prague	4189	2315	55.3%
554 Politec Milano	8525	4354	51.1%
572 RWTH Aachen Univ	14242	7185	50.4%
609 Technion - Israel Inst Technol	9627	4776	49.6%
618 Gottfried Wilhelm Leibniz Univ Hannover	4834	2386	49.4%
742 Univ Stuttgart	5130	2316	45.1%
856 Gdańsk Univ Technol	2560	1037	40.5%

Fig 8. CWTS Open Access Ranking 2021: CESAER member institutions ranked by percentage of openly available institutional research outputs (2016-2019)

While being an important indicator, the position in the worldwide ranking is not really the key aspect though: the sensible way to approach such a classification is to check whether the percentage of institutional publications available Open Access has improved from the 2020 ranking (i.e. for the period 2015-2018) to the current one (2016-2018). When this indicator is assessed, all member institutions represented in the OAWG have experienced progress – often a significant one, see table 5 below.

It is worth bearing in mind when analysing the results that the number of universities included in the ranking keeps growing year-on-year and that all European countries are implementing reinforced strategies for Open Access compliance. These factors, which make the competition to get high rankings much tougher, are very good news for the global Open Access implementation: these results prove that in order to climb positions in the CWTS Leiden Open Access ranking it is not enough to improve the percentage of openly available institutional research outputs – the improvement needs moreover to be more significant than that at similarly ranked institutions. This should lead institutions to take the comparison of their positions in consecutive editions of this ranking with a pinch of salt – what really matters is the collective progress towards making Open Access the default scholarly communication strategy.

Institution	Rank'2021	% OA 2021	Rank'2020	% OA 2020
U Strathclyde	9 (-5)	90.4 (+1.2%)	4	89.2
UPC-BarcelonaTech	49 (-11)	83.0 (+2.3%)	38	80.7
TU Delft	106 (+122)	71.2 (+12%)	228	59.2
Aalto Uni	189 (+83)	65.7 (+8.6%)	272	57.1
Politec Milano	554 (+38)	51.1 (+4.3%)	592	46.8

Table 5. Selected compared results between 2020 and 2021 rankings for a few Member institutions represented in the OAWG.