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OPENING ACADEMIC PUBLISHING

Development and application of systematic evaluation criteria

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Authors Anna Björk, Juho-Matti Paavola, Teemu Ropponen, Mikael Laakso, Leo Lahti	

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Authors

Anna Björk, D.Soc.Sc., Analyst, Oxford Research Oy

Juho-Matti Paavola, B.Soc.Sc., Analyst, Oxford Research Oy

Teemu Ropponen, M.Sc. (Tech.), Executive Director, Open Knowledge Finland

Mikael Laakso, D.Sc. (Econ.), Associate Professor, Hanken School of Economics

Leo Lahti, DSc., Docent, University of Turku, Department of Mathematics and Statistics & Open Knowledge Finland ry - Open Science working group

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Summary

This report summarizes the development of a standardized scorecard for evaluating the openness of academic publishers. The assessment was completed in January 2018 as part of the Open Science and Research Initiative of the Finnish Ministry of Education and Culture.

The project complements the previous reports published by the Open Science and Research Initiative and the Finnish Ministry of Education and Culture, which have covered (i) the openness of universities and polytechnics, (ii) the overall situation of OA publishing costs in Finland, and (iii) research organization and research funding organizations, including selected European research funders.

The project mapped and evaluated the openness of selected major academic publishers: Association for Computing Machinery (ACM), American Chemical Society (ACS), Elsevier, Institute of Electrical and Electronic Engineering (IEEE), Lippincott, Williams & Wilkins (LWW), Sage, Springer Nature, Taylor & Francis, and Wiley-Blackwell. The dimensions of publisher openness were summarized in a scorecard of seven key factors, providing a new tool for systematic and standardized evaluation. We used data from the publisher websites to compare the key factors of openness, and the publishers were given a chance to provide comments on the collected information. As complementary sources, we utilized data from commonly acknowledged, open databases: Directory of OA Journals (DOAJ), Gold OA Journals 2011-2016 (GOAJ2), Scopus (title list + Scimago), and Sherpa / Romeo.

The main results include the scorecard and the evaluation of openness of the selected major academic publishers. These are based on seven key factors: (i) Fraction of open access (OA) journals and their articles of the total publication output, (ii) costs of OA publishing (article processing charges, APC), (iii) use of Creative Commons (CC) licensing, (iv) self-archiving policies, (v) access to text and data mining (TDM), (vi) openness of citation data, and (vii) accessibility of information relating to OA practices. To take a look beyond the publisher level into journal level practices we also sampled individual journals. We use the samples to discuss the distribution of journals according to APCs, their licensing and three impact metrics (CiteScore 2016, Scimago Journal & Country Ranks (SJR) 2016, and Source Normalized Impact per Paper (SNIP) 2016).

The evaluation of the selected publishers with the scorecard indicates, for example, that the fraction of OA journals and their articles of the total publication output runs low within this group. In our sample of journals, the most expensive OA journals also seem to bear the highest impact metrics. A definite view on the matter, however, would require more extensive data and further research. We conclude by discussing key aspects and complexities in quantitative evaluation and in the design of a standardized assessment of publisher openness, and note also further factors that could be included in future versions of the scorecard.

1. Introduction

This report introduces a set of systematic evaluation criteria to assess the openness of academic publishers. The research was commissioned by Open Science and Research Initiative and the Finnish Ministry of Education and Culture. The need for information in this area is linked to a wider framework of investigating the current (2017) status of open access (OA) practices across the academic field in Finland within the Open Science and Research Initiative[1]. The related previous reports have scrutinized universities and polytechnics in 2015[2], the overall situation of OA publishing costs in Finland (2016[3]) and research organization and research funding organizations, including selected European research funders (2016[4]). This project complements these reports by assessing a key element of research infrastructure: international channels for publishing scholarly work.

We propose a consistently applicable scorecard that can provide a tool for standardized systematic evaluation, and benchmarking of the openness of academic publishers. Previously there has been similar initiatives focusing on assessing openness at the individual journal level[5], however, comprehensive assessment at the publisher level has been missing. Even though we can generally identify established practices in open science, such as self-archiving and Creative Commons (CC) licensing, there is considerable variance in the interpretation and implementation of such practices. Therefore, the standardized scorecard fulfills an important function: it supports the application of best open science practices among key industry actors, and informs potential authors and institutions who rely on their services. Our analysis focuses on the following key factors:

1. Fraction of OA journals and their articles of the total publication output,
2. Costs of OA publishing
3. Use of CC-licensing,
4. Self-archiving policies,
5. Text and data mining (TDM)
6. Openness of citation data,
7. Accessibility of information relating to OA practices

The premises for the factors are discussed in part three, where we introduce the core features of these seven dimensions of OA publishing their bracket values.

[1] In Finnish: Avoin tiede ja tutkimus ATT, see https://avointiede.fi/; In English, see https://openscience.fi/

[2] Avoin tiede ja tutkimus Suomessa. Toimintakulttuurin avoimuus korkeakouluissa vuonna 2015. The Open Science and Research Initiative. Ministry of Education and Culture. https://avointiede.fi/documents/10864/21345/Toimintakulttuurin+tilannekuva+2015/0eea9381-b049-489b-9cf6-ccb324fd05de

[3] Naukkarinen, Piia. *Avoimen julkaisemisen tuen malli.* Avoin tiede ja tutkimus -hanke, 2016. https://avointiede.fi/documents/10864/12232/Avoimen+julkaisemisen+tuen+malli/73838e9b-7924-446c-9c7a-cc8f759919bb

[4] Open Science and Research in Finland. Evaluation of Openness in the Activities of Research. Organisations and Research Funding Organisations in 2016. The Open Science and Research Initiative. Ministry of Education and Culture. http://urn.fi/URN:NBN:fi-fe2016111829246

[5] http://www.oaspectrum.org/

The list of academic publishers commissioned to be reviewed in the project included a set of major international academic publishers. These publishers vary in the size of their journal portfolios, diversity of research disciplines, business logic, and existing efforts to support open science. The evaluated publishers were:

1. Association for Computing Machinery (ACM),
2. American Chemical Society (ACS),
3. Elsevier,
4. Institute of Electrical and Electronic Engineering (IEEE),
5. Lippincott, Williams & Wilkins (LWW),
6. Sage,
7. Springer Nature,
8. Taylor & Francis,
9. Wiley-Blackwell.

The report is based on openly available and easily accessible online information sources, mainly the publishers' own websites. We did include exceptions: the number of OA journals and total number of journals were gathered by using freely available data from the Directory of OA Journals (DOAJ)[6] and Scopus title list[7][8] to supplement the numbers gathered from the websites. Also, the data on Sherpa/Romeo[9] was used as a supporting reference for evaluating self-archiving, but not as a primary source. Similarly, Scopus title list and GOAJ2[10] were used as supplementary databases for assessing the costs of OA publishing.

In addition to assessment at the publisher level, we also wanted to shed some light on OA practices at the individual journal level. For this we constructed a sample of OA journals from each publisher.

We provided the publishers a chance to comment on the preliminary report, delivered in November 2017. We sent two emails that included our tentative evaluation results and a request to give us feedback on the data, sources and the project in general. Out of the list of nine publishers, only Elsevier and SpringerNature replied to our enquiry. In addition, we solicited public suggestions and feedback on the key factors through social media, both Twitter and Facebook. The responses included most of the key factors that were already included in our scorecard, but other propositions for focal points of assessing openness were also vocalized (see part 4 in this report).

The proposed scorecard is the first systematic attempt to summarize a variety of aspects into a well-defined set of evaluation criteria. Future efforts should consider additional criteria, and possible weighting schemes, to emphasize certain criteria over others. For example, one of the public commentators suggested that open licensing should be considered as the primary factor because it would have a considerable impact on the other evaluation criteria (e.g. self-archiving, TDM). We emphasize, however, that a variety of complementary factors should be considered in order to appropriately reflect aspects of openness in academic publishing.

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[6] https://doaj.org/csv

[7] https://www.elsevier.com/__data/assets/excel_doc/0015/91122/ext_list_October_2017_2.xlsx

[8] http://www.scimagojr.com/

[9] http://www.sherpa.ac.uk/romeo/index.php

[10] https://figshare.com/articles/GOAJ2_Gold_Open_Access_Journals_2011-2016/5023256

2. Evaluation Methods

2.1 Key factors for the evaluation of publisher openness

We initiated the assessment by identifying a set of "lowest common denominators" from a heterogeneous selection of publishers. We chose factors which can be benchmarked using examples from the current OA developments in academic publishing. Most of such factors are also commonly regulated through publishing policies, making them relatively comparable. We use the traffic light rating system to indicate our evaluation of each key factor. ***Table 1*** shows a summary of the key factors and their bracket values:

Table 1 *Summary of key factors and their bracket values*

Factor	**0**	**1**	**2**	**3**
Fraction of OA journals	0%	<50%	50-99%	100%
Costs	>2000e	1000e-2000e	500-1000e	<500€
Licensing	Publisher's own licenses only	CC-licenses + publisher's own licenses	CC-licenses only (incl. more restrictive CC)	CC-BY
Self-archiving	No support or lack of policies offer self-archiving	Post-print self-archiving allowed with embargo for most of publisher's journals	Pre- and post-print self-archiving allowed in all publishers journals within 6 months, STM to 12 months HSS embargos	Pre- and post-print self-archiving allowed in all publisher's journals without embargos
TDM	No metadata available for download	Data available to be used on **publisher's server**	Substantial data available for **download**	Metadata, abstracts, full texts contents available for **download and automated data mining with any software**
Open Citation	Not promoting open citation			Promoting open citation
Accessibility to information	Data completely missing	Data partly missing	Data unclearly presented	Data in one location and easily available

Fraction of OA journals and their articles of the total publication output

The evaluated publishers vary considerably in regard to the size of their journal portfolios and publication volumes. The number of OA journals alone, then, only means the number of OA journals without giving any indication about their role as part of the publisher's complete offering or wider strategy.

Below, the numbers for OA journals per total number of journals are based on a combination of freely available sources, as explained in the previous section. The number for OA journals cited at the publisher website has been referred to, when such a number has been provided. As for the number of OA journals and articles per total publication output, openly accessible data concerning Elsevier's Scopus title list database has been consulted.

The highest score has been reserved to publishers that have 100 percent of journals published as gold OA:

0	1	2	3
0%	<50 %	50-99 %	100 %

Costs of OA publishing

The publishing costs primarily refer to the APCs paid by the authors. In practice, the affiliated institutions and funders may compensate the costs. The state of these costs and their monitoring mechanisms have been assessed by Naukkarinen (2016)[11], who evaluated the main Finnish universities and research institutions alongside the main science funding mechanisms. In some cases, discounts for certain groups may also be available.

Below, we list the price range at the publisher websites and provide additional relevant details where possible. The average APCs were weighted by the number of articles published at different pricing levels. Here we used the previously mentioned free sources: Scopus title list (with associated publisher information) for title identification, Scimago data to augment the titles with total document numbers published in 2016. Matching the titles to DOAJ data provided the APC pricing information.

The price brackets for OA publishing, below, indicate the level of payment with each publisher and across the field. The aim has been to present the prices as they are listed at the website. The prices include both gold OA pricing (APC) and hybrid pricing, when available.

The highest score has been reserved to publishers that have priced their APCs below $500 USD:

[11] http://www.doria.fi/handle/10024/121865 (Report only in Finnish)

0	1	2	3
>2000	1000 < -2000	500-1000	<500

Use of CC-licensing

CC-licenses are standardized copyright licenses, with which the author allows others to share and reuse their work, while being given due credit for it. CC-licenses are an established part of OA publishing. In addition to them, publishers may have designed their own license as an option for authors. Licensing concerns both full OA journal publishing and hybrid OA publishing, and the issue of costs is embedded in this key factor as well: the publisher may have different ratings for different forms of licenses. In our scorecard, we focus on the range of licenses offered by the publisher.

CC-licenses have been designed to address different possible uses of digitized work, guided via distinctive types of licenses. Variations occur between commercial and non-commercial use, to what extent the author allows derivative work, or if the author wishes to ensure that any derivative work is licensed under the same CC license as the original one. The combinations of CC-licenses are issued by the CC Community and listed at their website[12].

The highest score has been reserved to publishers that have CC-BY as default choice. If there are extra costs of CC-licenses in comparison to publisher's license available, this is pointed out in the evaluation:

0	1	2	3
Publisher's own licenses only	Mix of CC-licenses + publisher's own licenses	CC-licenses only (including more restrictive CCs)	CC-BY

Self-archiving policies

Self-archiving means that the publishing party defines, if the author can deposit a free sample of their published work outside the official channel of publication. There are two main elements to be determined in regard to the conditions for self-archiving: the point of the publication process where self-archiving is allowed, and the forum, where a version of the publication can be archived.

Self-archiving is also commonly referred to as green OA. This refers to the process where the author can deposit a version of the article manuscript published in a journal to a location on the web where it can be accessed by anyone for free. This differentiates the green OA from gold OA, in which the journal automatically allows free downloading of the published articles directly from the journal website.

[12] https://creativecommons.org/licenses/

For green OA the publisher determines, where the author may deposit the article, and which version of the article can be deposited: the publisher can allow a pre-accepted, non-reviewed version of the article ("pre-print archiving); an accepted, peer-reviewed version that does not include the final copyediting by the publisher ("post-print archiving"); or even in some cases the final, published PDF to be archived. It is common to have the final PDF excluded from self-archiving.

Depositing a manuscript version of an article can also include a requirement of embargoes. This means that a version of the accepted and published article can be self-archived after a set period of time. The shortest embargoes are usually six months, while some journals require a delay as long as 24 months.

The most comprehensive database keeping track of self-archiving policies is Sherpa / Romeo[13]. This database has here been used as background material, but the primary source for collecting the data is the publisher websites.

The highest score has been reserved to publishers that have extensive self-archiving rights without embargoes:

0	1	2	3
No support or lack of policies for self-archiving	**Post-print self-archiving allowed with embargo for most of publisher's journals**	**Pre- and post-print self-archiving allowed in all publisher's journals within acceptable embargos (6 months STM, 12 months HSS)**	**Pre- and post-print self-archiving allowed in all publisher's journals without embargoes**

Text and data mining

TDM is a key point in assessing the usability and accessibility of data at the publisher websites, including article metadata, abstracts, and full text contents. Here, we assess if data for TDM is easily accessible and available for download and automated mining. We focus on data which can be openly downloaded for data mining purposes and rule out any data behind paywalls or registration requirements.

Besides facilitating research and innovation based on large-scale literature mining, publishers catering for TDM need to provide journal- and article-level metadata that would improve the publisher's performance in regard to other openness criteria as well; i.e. costs, which could be clearly displayed per journal / license if not standardized; and the percentage of gold OA journals in their respective fields for an overview of the publisher's stand on openness.

The highest score has been reserved to publishers that have a clear text data mining policy with free data available for download in one location:

[13] http://www.sherpa.ac.uk/romeo/index.php

0	1	2	3
No metadata available for download	**Data available to be used on the publisher's server**	**Substantial data available for download & on publisher's server**	**Metadata, abstracts, full texts contents easily accessible and available for download and automated data mining with any software**

Openness of citation data

This recent feature of the debate on openness is also included as a factor in our evaluation. As an exception to the rule, we have restricted the scoring of this factor to 0 points / 3 points. The discussion on the openness of citation data is just picking up, and the scoring can be revised in the future to reflect the overall practices in more comprehensive ways. As for the purposes of this evaluation, the factor here refers to membership in *The Initiative for Open Citations*, a consortium promoting openness in the case of references[14]. The consortium includes scholarly publishers and researchers and lists the members on the website.

The highest score has been reserved to publishers that promote open citation via The Initiative for Open Citations:

0	1	2	3
Not promoting open citation			**Promoting open citation**

Accessibility of information related to OA practices

The score is based on the analysis we did while collecting data from the publisher websites: how readily information of OA is available on the website and how easily a researcher interested in OA publishing can locate and access basic information of the publisher's OA policy. Our premise here is that relevant information should be centrally located without the need to contact the publisher for more details. This would also mean that the practices are displayed as transparently as possible.

[14] https://i4oc.org/

The highest score has been reserved to publishers that have the basic information on OA practices in one location:

0	1	2	3
Data only on request	**Data partly missing**	**Data unclearly presented**	**Data in one location and easily available**

2.1.1. Data sources for publisher evaluation

The primary information sources for evaluating openness of academic publishers were the publisher websites. These were critically assessed to gather as much information as possible from openly accessible primary sources. We did not, for example, consult personnel or info desks, but rather collected the data ourselves before contacting the publishers. This helped us to assess the accessibility of relevant information, which we consider one of the evaluation criteria. However, the information at the publisher websites was not always standardized or comprehensive. Therefore, in order to find out the total amount of OA journals and their fraction of the entire publisher journal portfolio, we additionally utilized a selection of openly accessible databases. In particular, the number of OA journals, hybrid journals and subscription journals were often not indicated in a standardized way. Hence, information from freely available databases, Directory of OA Journals (DOAJ)[15] and Scopus (title list + Scimago)[16], were combined with the data found on the publisher websites. The same method was used in the publishing costs analysis, although the costs of OA publishing were more clearly documented on the websites.

[15] https://doaj.org/

[16] https://www.elsevier.com/__data/assets/excel_doc/0015/91122/ext_list_October_2017_3.xlsx

2.2 Sample of journals

Calculating averages on publisher level is useful for assessing the general level of openness. Yet it does not reveal variance within publishers different OA journals and leaves some questions unanswered: Are there big differences in costs of publishing in the same publisher's different OA journals? And if there indeed is such variance, do the journals with higher APCs have more articles or better impact? How does licensing work in each journal? Are the articles in OA journals actually accessible?

The scientific quality, impact, and subject of the journals are important aspects to consider besides the mere number of OA publications. There has also been reports of articles that should be OA but are not actually accessible without subscription fees.[17] These questions are important for assessing how the publishers promote OA as they show to what extent these can be taken as serious alternatives to the subscription journals.

To have an insight into these questions we decided to look openness at the level of individual journals. This requires going through each journal's web pages, so to have a manageable workload we decided to take a sample from each publisher instead of examining all of the journals. An in-depth scrutiny of the impact and scope of the OA journals would provide valuable extra information on publisher openness, and our sample is an example of how such an assessment could work.

2.2.1 Data sources for the sample of journals

To have a representative number of journals we aimed at a selection of 20 percent out of the total number of journals per publisher listed in the gold OA Journals 2011-2016 (GOAJ2) dataset[18], or a minimum of 10 journals per publisher. As we wanted to look at the number of articles published in and impact metrics of the sampled journals, we utilized data from the Scopus title list.

It turned out that many of the journals listed in GOAJ2 were not found in Scopus title list, and in practice we needed to settle for less than the targeted 20 percent or at least 10 journals (IEEE, LWW and Taylor & Francis). ACM and ACS did not have any entries in DOAJ (and hence also the GOAJ2 dataset which is based on DOAJ journals) and hence were omitted from the sampling of journals from the beginning.

Overall, the selection comprised a total of 158 journals. Springer Nature (77) was the largest publisher sample of journals, with Elsevier (37) and Taylor & Francis (16) as the third largest.

[17] http://www.paywallwatch.com/

[18] https://figshare.com/articles/GOAJ2_Gold_Open_Access_Journals_2011-2016/5023256

Table 2 *The sample of journals, fraction of journals per publisher*

	ACM	ACS	Elsevier	IEEE	LWW	Sage	SprNat	T&F	Wiley
Subscription journals	47	48	2157	164	288	748	1871	2158	1382
OA journals	0	0	182	5	95	24	385	112	41
Sample size	**0**	**0**	**37**	**4**	**4**	**10**	**77**	**16**	**10**
Total									**158**

We collected the data for:

- the publisher's imprint, journal website, the number of articles published in 2016, APC, subject and URL (GOAJ2);
- print-ISSN, CiteScore 2016, Scimago Journal & Country Ranks (SJR) 2016, and Source Normalized Impact per Paper (SNIP) 2016 (Scopus title list);
- online-ISSN, accessibility to articles, and license (journal website)

Once the data was collected, we used our bracket values for costs of OA publishing to group the journals into green, yellow, red and grey categories. Furthermore, the averages were seeked for:

- The number of articles per journal per year (2016) published within each category
- The impact factors listed in Scopus title list; CiteScore, SJR and SNIP for each category

We thus created a datatable, where the sample journals are divided into four price categories and each category is given average number of articles and impact factors. We analyze this data to see the variance within each publishers OA journals and present summary of results below evaluation.

3. The Results

Below, the collected data is summarized per publisher, which are presented in alphabetical order. The detailed data with references is displayed in Appendix I. The publisher evaluation is summarized in ***Table 3***:

Table 3 *Summary of the evaluation the selected publishers*

Publisher	OA Journals	Costs	Licensing	Self-archiving	Open Citations	TDM	Access to info	Total
ACM	0	1	1	3	3	1	3	**12**
ACS	1	0	1	0	0	1	3	**6**
Elsevier	1	0	2	2	0	2	2	**9**
IEEE	1	1	1	3	0	2	3	**11**
LWW	1	2	2	2	0	0	2	**9**
Sage	1	1	2	1	3	2	3	**11**
SpringerNature	1	1	2	2	3	2	3	**14**
Taylor and Francis	1	1	2	3	3	1	3	**14**
Wiley-Blackwell	1	0	1	1	3	2	3	**11**
Max. points								**21**

As the overview shows, SpringerNature and Taylor & Francis got the highest scores with fourteen points out of the maximum of 21. ACM finishes third with twelve points, followed by IEEE, Sage and Wiley-Blackwell with the total of eleven points. Elsevier and LWW scored nine, and finally ACS six points.

The overall performance was strongest with the accessibility of information of OA practices. The fraction of OA journals and articles from total publication output, however, was left with only 0- or 1-point evaluations.

3.1 Association for Computing Machinery (ACM)

ACM, established in 1947 as the Eastern Association for Computing Machinery at Columbia University in New York, is an association for computing educators, researchers and professionals. [19] The association's grassroots functions are based on volunteering members and non-members, who build up the network. Forms of publication include journals, magazines, newsletters, books and conference proceedings.[20]

ACM's performance adds up the total of twelve points. There are no gold OA journals listed on the ACM website or Scopus title list. The prices for hybrid OA publishing of journal articles vary from $1700 (No ACM or SIG members) to $1300 (At least 1 ACM or SIG member). Those choosing to grant ACM a non-exclusive permission to publish may also choose to display a CC License on their works. ACM supports pre-and post-print self-archiving and is a member of Initiative for Open Citations. It is not allowed to automatically download articles or harvest metadata from ACM Digital Library. Basic information is easily available at the website. ACM had no entries in GOAJ2 and was hence excluded from the sample of journals.

Table 4 *Scoring of key factors, ACM*

Key factor	Points
OA Journals	0
Costs	1
Licensing	1
Self-archiving	3
Open Citations	3
TDM	2
Access to basic info	3
Total	**12 / 21**

3.2 American Chemical Society (ACS)

ACS was founded in 1876 as a non-profit, congressionally chartered organization[21]. The forms of publication include journals, eBooks and C&En Global Enterprise, a source for the scientific news in the field.[22] ACS facilitates OA publishing through its AuthorChoice programme, where authors can assess and choose an OA licensing and pricing alternative according to their preference[23].

[19] https://www.acm.org/about-acm/acm-history

[20] https://www.acm.org/about-acm/about-the-acm-organization; https://www.acm.org/publications/about-publications; Publishing policy: https://www.acm.org/publications/policies/toc

[21] https://www.acs.org/content/acs/en/about/history.html; https://www.acs.org/content/acs/en/about/governance.html

[22] http://pubs.acs.org/cgeabj/about

[23] http://pubs.acs.org/pb-assets/documents/4authors/authorchoice_flowchart.pdf

In our evaluation, ACS reached the total of seven points. It lists two gold OA journals at the website, but none are found in Scopus title list. Prices for gold OA and hybrid OA journals vary from $750 - $4000. Pricing depends on licensing or embargo. ACS offers CC-licenses through four options and supports pre- and post-print self-archiving. ACS is not a member of Initiative for Open Citations and does not display downloadable metadata at the website. Basic information of OA practices and policies is easily available. ACS had no entries in GOAJ2 and was hence excluded from the sample of journals.

Table 5 *Scoring of key factors, ACS*

Key factor	Points
OA Journals	1
Costs	0
Licensing	1
Self-archiving	0
Open Citations	0
TDM	1
Access to basic info	3
Total	**6 / 21**

3.3 Elsevier

Founded in 1880, Elsevier is one of the biggest publishing houses in the academic field[24]. The Netherlands based corporation publishes across all academic disciplines and lists the latest developments with regards to openness at its website.[25] It hosts a variety of databases and research tools, as they are called on the website.[26] The forms of publication include books and journals.

Elsevier scored a total of nine points in our evaluation. The number of gold OA journals at the website was 622, and in Scopus title list 182, but to get a clear view of the number of gold OA journals proved difficult. Costs for OA publishing range between $500-$5000. Several CC-license options. Pre- and post-print is allowed with restrictions. Elsevier is not a member of Initiative for Open Citations and supports TDM via registration. Information of basic OA policies is generously displayed at the website, up to a point where the amount of information is making it difficult to maintain focus on the essentials.

[24] https://www.elsevier.com/about/our-business
[25] https://www.elsevier.com/about/open-science
[26] https://www.elsevier.com/publisher-relations

Table 6 *Scoring of key factors, Elsevier*

Key factor	Points
OA Journals	1
Costs	0
Licensing	2
Self-archiving	2
Open Citations	0
TDM	2
Access to basic info	2
Total	**9 / 21**

3.3.1 Sample journals

Elsevier's sample was the second largest on the list. The listed pricing was mostly in line with online pricing, which in Elsevier's case was immediately detectable on the websites and thus also listed in our data. The calculations are based on the listed APCs in GOAJ2 to maintain consistency.

In the sample, the green category (i.e. the lowest APCs) formed the largest group of journals, 40,5 percent, while the grey category (i.e. the most expensive ones) was left thinnest with 8,1 percent. Based on the average number of article output, these groups were the two largest ones, one of the three journals in the grey group being the one with a significant number (255 / year) of articles and thus raising the average. The grey group also had the highest averages of CiteScores, SJRs and SNIPs. Three sample journals listed CC-BY as the only available license, while the majority offered CC-BY-NC-ND or a combination of these as their choice.

Table 7 *Sample summary, Elsevier (N=37)*

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	40,5	131	2.081	0.970	1.002
$500-1000	18,9	123	0.856	0.378	0.519
$1000-2000	29,7	71	2.353	1.198	0.967
$2000+	8,1	128	2.59	4.095	3.204
Hybrids	2,7				

3.4 Institute of Electrical and Electronic Engineering (IEEE)

IEEE is a non-profit professional organization founded in 1963.[27] It describes itself as being "dedicated to advancing innovation and technological excellence for the benefit of humanity"[28], and is set to serve as a network for promoting research communities, conferences and education[29]. Forms of publications include journals, magazines and books[30].

IEEE got a total of ten points in our evaluation. It lists seven gold OA journals at the website and five entries in Scopus title list. The costs for hybrid OA articles is $1950 and for gold OA, APCs range from $1350 to $1750. IEEE offers CC-BY license and supports pre-and post-print self-archiving. It is not a member of the Initiative for Open Citations. IEEE permits non-commercial TDM of articles published OA with either the OA Publishing Agreement or CC-license. Metadata not for download. Basic information of OA practices is easily available.

Table 8 *Scoring of key factors, IEEE*

Key factor	Points
OA Journals	1
Costs	1
Licensing	1
Self-archiving	3
Open Citations	0
TDM	1
Access to basic info	3
Total	**10 / 21**

3.4.1 Sample journals

IEEE was listed initially as having five OA journals as a sample, but only four ended up fulfilling our database criteria. The overall picture looks straightforward, as 100 percent of the total sample fell into the yellow pricing category. The prices were convergent in both GOAJ2 and the websites with one exception, but even the website-based price there was marked yellow in our scale.

[27] https://www.ieee.org/about/today/at_a_glance.html
[28] https://www.ieee.org/about/ieee_history.html
[29] https://www.ieee.org/about/vision_mission.html
[30] https://www.ieee.org/publications_standards/index.html

Table 9 *Sample summary / IEEE (N=4)*

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	0				
$500-1000	100	364	3.188	0.834	1.552
$1000-2000	0				
$2000+	0				

3.5 Lippincott, Williams & Wilkins

LWW is an imprint of Wolters Kluwer N.V, the Netherlands-based information services company[31]. Lippincott and co. was acquired to expand the company's influence on the U.S. health market[32]. LWW's core areas are medicine, nursing and allied health[33].

LWW's points added up to nine in total. Fourteen gold OA journals were listed at the website, with 95 entries in Scopus title list. Prices range from $600 to $4700. depending on the journal and the type of license. CC-licenses available, mainly CC-BY, CC-BY-NC-ND and CC-BY-NC. Pre- and post-print self-archiving allowed with 12 months embargo (post-print). Wolters Kluwer is not a member of the initiative for Open Citations and does not provide data for automated TDM. There is a link to OA practices at the LWW website, yet exact information of OA practices is not clearly presented.

Table 10 *Scoring of key factors, LWW*

Key factor	Points
OA Journals	1
Costs	2
Licensing	2
Self-archiving	2
Open Citations	0
TDM	0
Access to basic info	2
Total	**9 / 21**

[31] http://wolterskluwer.com/company/about-us/our-heritage
[32] http://wolterskluwer.com/company/about-us/our-heritage
[33] https://shop.lww.com/#

3.5.1 Sample journals

Despite Wolters Kluwer's magnitude, the listed journals in GOAJ2 and Scopus were left at four examples. 50 percent of these were listed with $0 APCs and no confirmation of further pricing, which meant that they ended in the green category. The remaining two occupied the yellow and grey categories. In the yellow category, the pricing at the journal's website was listed $1550 for the more restricted CC-licenses and $1950 for CC-BY, as opposed to the $1750 listed in GOAJ2. The two green journals only offered CC-BY-NC-SA. All exemplary impact factors in all three categories were considerably low.

Table 11 *Sample summary / LWW (N=4)*

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	50	53	0.230	0.256	0.581
$500-1000	25	3,380	1.630	0.597	0.684
$1000-2000	0				
$2000+	25	116	0	0.125	0

3.6 Sage

Out of the three groups listed at its website (Social Sciences and humanities, Health, life and biomedical sciences, and Engineering and physical sciences), Sage's publications are most numerous in the field of Social Sciences and humanities[34]. Sage was founded in 1965, and is based in Los Angeles, London, New Delhi, Singapore, and Washington, D.C[35]. Types of publications include books, journals, reference books and Digital Library Products.

Sage collected a total of thirteen points in our evaluation. There are 168 OA journals listed at its website with 95 entries in Scopus title list. The costs for gold OA are not standardized, and the price range for hybrid OA publishing is $1000-$3000. Author can choose a CC-license for their article, and Sage has "Sage Choice" option for hybrid journals. Pre- and post-print self-archiving are partly supported but variations occur. Sage is a member of the Initiative for Open Citations. There is no downloadable metadata available without request. Basic information on OA practices and policies is easily available at the website.

[34] https://uk.sagepub.com/en-gb/eur/company-information
[35] https://uk.sagepub.com/en-gb/eur/company-information

Table 12 *Scoring of key factors, Sage*

Key factor	Points
OA Journals	1
Costs	1
Licensing	2
Self-archiving	1
Open Citations	3
Data Mining	2
Access to basic info	3
Total	**13/21**

3.6.1 Sample journals

At Sage, the yellow group forms the largest category with 40 percent, but the differences between the yellow and red categories, measured by the average article output, remain modest. Three journals (30 percent out of the sample) provided CC-BY as their default choice, whereas the remaining listed CC-BY-NC (5) or CC-BY-NC-ND (1) as available license. The average CiteScores, SJRs and SNIPs have only minor differences between them in different categories, the scores in the grey category being the lowest.

Table 13 *Sample summary / Sage (N=10)*

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	10	68	unavailable	unavailable	unavailable
$500-1000	40	155	1.218	0.638	0.748
$1000-2000	30	132	1.360	0.446	0.781
$2000+	10	17	1.200	0.422	0.366
Hybrids	10				

3.7 SpringerNature

SpringerNature was formed in 2015, as an outcome of a merger of Nature Publishing Group, Palgrave Macmillan, Macmillan Education and Springer Science+Business Media [36] . The publisher's key brands are Springer, NatureResearch, BioMed Central (BMC)[37]. Forms of publication, or products, include journals, books, databases, solutions and platforms[38]. Springer Nature contacted us before enquiries were sent and responded to our request for comments subsequently. The response included elaborations and explications to our initial data.

In our evaluation, SpringerNature finished with fourteen points in total. The number of OA journals listed at the website reads 604, whereas Scopus title list suggests 385 gold OA journals. The listed APCs for OA journals vary from $585 to $3975. The standard fee for hybrid OA journals is $3000. SpringerNature offers mainly CC-BY license, but also CC-BY-NC. Self-archiving policies vary between imprints. SpringerNature is a member of the Initiative for Open citations. Lists of OA journals and hybrid journals with information of the supported CC-license per journal can be downloaded from the website for TDM. Basic information of OA practices is easily available at the website.

Table 14 *Summary of SpringerNature's evaluation*

Key factor	Points
OA Journals	1
Costs	1
Licensing	2
Self-archiving	2
Open Citations	3
Data Mining	2
Access to basic info	3
Total	**14/21**

3.7.1 Sample journals

Due to SpringerNature including Palgrave MacMillan and Nature Publishing Groups into its organization in 2015, GOAJ2 is not fully up to date in regard to the publishers' gold OA journals. Hence, a significant number of journals which were listed in GOAJ2 were excluded from Scopus title list. The red (37,66 percent) and green (35,07 percent) categories are dominant in total number of journal output, whereas article output was heavily emphasized in the red category, followed up by the grey group. The CiteScore, SRJ and SNIP of the greys marked the top ones. The default license in was CC-BY with only two exceptions, where the journals

[36] http://group.springernature.com/gp/group/aboutus/our-history
[37] http://group.springernature.com/gp/group/research
[38] http://www.springernature.com/gp/products

provided CC-BY-NC as the only licensing choice. SpringerNature also uses CC0 1.0 for data in certain cases.

Table 15 *Sample summary /SpringerNature (N=77)*

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	35,1	125	2.256	1.001	1.173
$500-1000	7,8	117	1.52	0.453	1.168
$1000-2000	37,7	793	2.168	0.936	1.190
$2000+	13,0	465	5.114	2.007	1.610
Hybrids	6,5				

3.8 Taylor & Francis

Taylor & Francis group publishes in the fields of Humanities, Social Sciences, Behavioural Sciences, Science, Technology and Medicine[39]. Its imprints include Cogent OA, CRC Press, Garland Science, Routledge, and Taylor & Francis – a list, which is the outcome of the merger of Taylor & Francis and Informa in 2004[40]. Taylor & Francis have recently acquired two full OA publishers: Dove Press & Co-Action Publishing[41]. The forms of publications include scholarly journals, books, eBooks, textbooks and reference works[42]. Cogent OA is an imprint dedicated to fully OA journals[43].

Taylor & Francis collected a total of 14 points in our evaluation. While there were 145 gold OA journals listed at the website, 112 were available in Scopus title list. The standard APC is $2950 and the author can choose a CC-license out of four options. Pre- and post-print self-archiving is allowed. Taylor & Francis is a member of the Initiative for Open Citations. There are journal pricing lists, reports and surveys available as PDFs at the website, but no extensive metadata available for download. Basic information of OA practices and policies is easily available in one location.

[39] http://taylorandfrancis.com/about/

[40] http://taylorandfrancis.com/about/history/

[41] http://newsroom.taylorandfrancisgroup.com/S=480e33bf37630ea6f8a8c980cbc1aacfdb8a407b/news/press-release/dove-medical-press-joins-taylor-francis-group?hootPostID=0122ff487f13edc5b94b10b8becb2087; http://taylorandfrancis.com/co-action-message

[42] http://taylorandfrancis.com/about/

[43] http://www.tandfonline.com/openaccess/cogentoa

Table 16 *Scoring of key factors, Taylor & Francis*

Key factor	Points
OA Journals	1
Costs	1
Licensing	2
Self-archiving	3
Open Citations	3
Data Mining	1
Access to basic info	3
Total	**14/21**

3.8.1 Sample journals

Due to the requirement to have entries both in Scopus title list and GOAJ2, Taylor & Francis performed in our data with 16 journals instead of the anticipated sample of 25. The yellow category formed the single majority of journals (56,3 percent) and the average article output. The average CiteScores, SJRs and SNIPs are on the lower side compared to the examined publishers' ratings, with the SJR in yellows falling to 0.3000. The CiteScore, SRJ and SNIP in the green category perform well in comparison to the yellow and grey categories. The default license for these OA journals was a selection between CC-BY or CC-BY-NC, which were offered as options for each journal without exceptions, based on the general Taylor & Francis license agreement.

Table 17 *Sample summary / Taylor & Francis (N=16)*

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	6,3	25	1.910	0.655	1.049
$500-1000	56,3	52	0.947	0.300	0.668
$1000-2000	37,5	47	1.298	0.668	0.918
$2000+	0				

3.9 Wiley-Blackwell

Wiley-Blackwell is the publishing brand within Wiley, a company combining research business, publishing business and "Workplace Learning Solutions business"[44]. In 2007, Wiley bought Blackwell Publishing (holdings) Ltd., a U.K. Based publishing house[45]. The products include online tools, journals, books, databases, reference works and laboratory protocols[46], hosted by Wiley Online Library[47]

Wiley-Blackwell got a total of 11 points in our evaluation. The website suggests 87 gold OA journals, whereas Scopus title list identifies 41. Prices for OA publishing range between $500 and $5000 (both gold OA and hybrids). Author can choose a CC-license or the publisher's own license for OA publishing. Pre-and post-print self-archiving is supported with 12-24 embargos. Wiley is included in the Initiative for Open Citations. The list of prices and licenses for OA publishing can be downloaded for automated TDM. Access to basic information is easily available at the website.

Table 18 *Scoring of key factors, Wiley-Blackwell*

Key factor	Points
OA Journals	1
Costs	0
Licensing	1
Self-archiving	1
Open Citations	3
Data Mining	2
Access to basic info	3
Total	**11/21**

3.9.1 Sample journals

Wiley-Blackwell compares to Sage with its sample of 10 journals. 70 percent out of these occupied the grey category in pricing and also contained the highest average of articles per journal in 2016. The average CiteScore in the grey group topped in 5.107, falling just behind the average CiteScore of the grey category of Springer Nature (5,114). The average CiteScores, SJRs and SNIPs were notably higher in the more expensive group. The journals mostly favoured CC-BY licensing, but CC-BY-NC and CC-BY-NC-ND were also listed. Differences between article and data licensing also occurred, with data being licensed with CC0 1.0.

Table 19 *Sample summary / Wiley-Blackwell (N=10)*

[44] http://eu.wiley.com/WileyCDA/Section/id-301695.html
[45] http://eu.wiley.com/WileyCDA/Section/id-301697.html
[46] http://eu.wiley.com/WileyCDA/Section/id-301695.html
[47] http://olabout.wiley.com/WileyCDA/Section/id-404508.html

Variable	Percentage of journals	Articles average	CiteScore average	SJR average	SNIP average
< $500	0				
$500-1000	0				
$1000-2000	30	56	1.167	0.506	0.469
$2000+	70	154	5.107	2.973	1.270

3.10 Summary of the evaluation

An overview of our results indicates that the fraction of OA journals and articles out of the total publication output is modest. Furthermore, the costs for OA publishing remain expensive with most publishers. While CC-licenses seem to be mostly available and even default options in most cases, it seems that it is the more restrictive licenses that are mostly promoted. To say the least, to have CC-BY as the sole default option for OA publishing is not a popular policy according to our data. Self-archiving had most variance between the publishers, but the majority fell into green and yellow categories, suggesting that self-archiving policies are relatively permissive among the publishers listed here. Five out of nine publishers were members of the Initiative for Open Citations. As for TDM, none of the publishers landed green as even those with downloadsable data did not provide extensive article metadata for automated TDM to fulfil our criteria. They mostly did, however, provided an easy access to OA practices and policies at their websites.

Our sample of journals suggests that there is a tendency for the most expensive journals to also bear higher impact metrics, but to have a more comprehensive view on the matter would require more extensive data. The sample of journals also supports our publisher level observation that, in some cases, there is notable variation of costs for OA publishing at journal level even between the same publisher's journals. In terms of journals whose publication was suspended, Elsevier's titles occurred on the list more than others. The number of suspended journals did not, however, form a significant group in the sample, nor did hybrid journals mislisted as OA in GOAJ2.

4. Discussion

Our results represent the current status of openness with our selected list of publishers and do not give any indication of the development of openness over time with these publishers. Hence the development of the level of openness cannot be assessed based on our data. Gold OA is often complemented or replaced by other open practices, such as hybrid OA, self-archiving and accessibility to various types of data. While these can arguably provide ways to incrementally expand and enforce open practices, establishing these practices is also problematic as it can introduce ambiguity of definitions and slow down the progress towards more open practices.

Hybrid OA as an alternative to gold OA might shift attention away from the small number of fully OA journals. In our data for publisher openness, Sage and Wiley-Blackwell used these well-defined terms in a potentially misleading manner by using the term "hybrid 'gold' OA choice", which essentially refers to the standard hybrid model. Furthermore, in their comments Elsevier interpreted our "number of OA journals" to include self-archiving and hybrid journals, instead of full OA. Whereas our expression "OA journals" allowed this interpretation, Elsevier's subsequent claim that "100%" of their journals are OA demonstrates the potential and willingness of the publishers to make misleading interpretations when the evaluation criteria are not well-defined and standardized.

The total costs of OA publishing are an example of the complexity of the evaluation and the variety of pricing policies makes direct comparisons difficult. There are often several categories of APCs and discounts, and variance in the pricing of different licenses or embargoes. At ACS, for example, the author pays double prices for immediate OA as opposed to 12 month embargoes. In this report, we try to tackle the complexity, ambiguity, and lack of transparency of those policies in order to have comparable results.

Another problematic point is the comparison of business models. Publishers are also inventing and launching new products, such as libraries, databases, or tools for researchers available for users. Research infrastructures, such as Elsevier's Mendeley[48] challenge openness also by anchoring standard parts of the research process into a more limited set of tools. Openness of business models could be one way to shed light to the logic and choices of publishers of differing compositions. Corporate social responsibility (CSR) is also a potential factor to be included in the scorecard if publishers have included principles of openness in their CSR policies or participate in such initiatives. Research4Life, for instance, is a united effort of public and private sectors to reduce the knowledge gap between high-income countries and low- and middle-income countries[49]. Of the evaluated publishers, Elsevier, LWW, Sage, SpringerNature, Taylor & Francis, and Wiley-Blackwell are partners in this project[50].

[48] See also docent Emilia Palonen's comment http://politiikasta.fi/tiedejulkaisemisen-infrastruktuuri-vanhentunut-tarvitaan-kokonaisvaltainen-uudistus/

[49] http://www.research4life.org/about/

[50] http://extranet.who.int/hinari/en/partners.php?category=publisher; see also publishers' CSR policies; https://www.elsevier.com/about/corporate-responsibility http://www.sage.com/company/about-sage/corporate-social-responsibility; http://group.springernature.com/gp/group/responsible-business; http://taylorandfrancis.com/about/corporate-responsibility/; http://eu.wiley.com/WileyCDA/Section/id-827516.html

As responses to our social media enquiries about key factors of open access publishing, propositions were made that the question of copyright waivers should be considered, and that the percentage of citations to openly licensed content could be used to weight the impact of openness. Furthermore, it was suggested that the transparency of the organization could be used to evaluate publisher openness.

The citation criterion is problematic since the citation counts primarily reflect scientific relevance rather than aspects of openness. Transparency is challenging to quantify but it is worth pointing out that certain new OA publishers, such as eLife[51], have released considerably more detailed information on their business model and publishing cost structure than other publishers, and such efforts could arguably be acknowledged in evaluating publisher openness. Moreover, it remains an open question whether for-profit and non-profit organizations should be evaluated based on same or different criteria.

We were also considering the publisher's activities to promote open science; for instance, guidelines on methods and data availability, as a possible factor. For example, quite recently (December 2017), the FinELib consortium, which negotiates the agreements on subscription journal prices between scientific publishers and libraries in Finland, announced that IEEE has refused to negotiate with FinELib[52], preferring bilateral negotiations with individual libraries. A central goal of FinELib negotiations has been to support transition towards OA publishing, which the IEEE's recent decision does not appear to support. It is currently unclear whether IEEE will seek to compensate this by other means. Moreover, contracts made between publishers and customer organizations such as libraries and national consortia are confidential, and even the subscription price information has been unknown to the public until recent Freedom of Information requests in various countries.

Evaluating the publisher's activities to promote open science proved to be a task that would require more extensive analysis because of inconsistency of available data. Open review is an example, where some journals already allow reviewers and authors to make the reviews open on voluntary basis. Licensing and subjects of OA journals would also warrant more thorough investigation. Most of Elsevier's journals in our sample favoured CC-BY-NC-ND, even largely excluding CC-BY from the available options. CC-BY was offered as an option, even as the sole option, in other journals. A more representative data set would be needed to confirm the distribution of licenses in Elsevier's journals; in their response to our initial results, Elsevier's representatives mentioned that they offer "a choice between two CC-licenses" (the CC-BY is the standard open license recommended in many open science guidelines[53]).

SpringerNature[54] and Wiley-Blackwel[55] made a difference between licensing articles and licensing data. As for the latter, both indicated CC0 1.0 as the option for data. The commonality of this practice and possible variations could be assessed in a more systematic way with more extensive data to take part in the debate on data licensing, its openness and the status of its standardization.

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[51] https://elifesciences.org/inside-elife/b6365b76/setting-a-fee-for-publication

[52] http://finelib.fi/ieee-refuses-to-negotiate-with-finelib/

[53] http://libraryguides.helsinki.fi/oa/lisenssit; https://avointiede.fi/www-kasikirja

[54] https://www.springeropen.com/get-published/copyright/copyright-and-license-agreement

[55] for example, http://msb.embopress.org/about#openaccess

Our selection of exemplary journals was predominantly from the subject fields of natural science. Whether this is a question of database selection, or a more accurate reflection of the current situation of OA publishing, is a matter of speculation. In the case of SpringerNature their own list of OA journals, downloadable from the website[56], indicates that this is indeed the case; Palgrave, which represents the humanist and social science emphasis at SpringerNature, has only one gold OA journal on its list[57]. Furthermore, even though Taylor & Francis had some variation in its listed OA publications with history and sociology, there is more room for OA publishing in the humanities and social sciences.

***

We have presented results on the openness on a selection of major academic publishers. We have highlighted some key aspects and complexities in such evaluation, and provided a systematic step towards standardized assessments with suggestions for further development and extensions.

[56] https://www.springernature.com/gp/librarians/licensing/journals-price-list/
[57] http://www.palgrave.com/gb/journal-authors

5. Appendix I DATA AND REFERENCES

1. The data and sources for ACM

Fraction of OA journals and their articles of the total publication output[58]

	Website	Scopus
OA journals	**0**	**0**
Subscription journals		**47**
Total number of journals	**49**	
Subscription documents		**1987**
OA documents		**0**
OA / total journals		**0%**
OA / total documents		**0%**

Costs of OA publishing Information from the website: The hybrid OA fee structure applies only to full papers and guarantees perpetual OA through ACM Digital Library.

Journal Articles: $1700 No ACM or SIG members, $1300 At least 1 ACM or SIG member

Additional publication forms: Proceedings article ($900 No ACM or SIG members, $700 At least 1 ACM or SIG member); Proceedings of the ACM Article ($900 No ACM or SIG members, $700 At least 1 ACM or SIG member)[59].

APCs weighted by document-volume (using Scopus title list & DOAJ): No OA journals included in Scopus title list.

Use of CC-licensing Three options: 1. ACM's traditional copyright transfer agreement, 2. exclusive licensing agreement, and 3. CC. Those choosing to grant ACM a non-exclusive permission to publish may also choose to display a CC License on their works[60].

Self-archiving policies Pre-and Post-print self-archiving (Final Draft; publisher's pdf. excluded)[61].

Openness of citation data ACM has joined the Initiative for Open Citations and has agreed to deposit and open up citation data as of September 7, 2017.

[58] https://dl.acm.org/pubs.cfm?CFID=826749157&CFTOKEN=9579034
[59] http://authors.acm.org/main.html
[60] http://authors.acm.org/main.html
[61] http://www.acm.org/publications/policies/copyright-policy#requirements copyright

TDM Publications listed on the website[62], ACM Digital Library available for members, subscribes etc.[63] Article metadata available at the publisher's website: Abstracts, author information, citation data, article citations, index terms, comments, table of contents (article).[64] It is not allowed to automatically download articles or harvest metadata from ACM Digital Library[65].
Accessibility of information related to OA practices Basic information on OA practices is available through one link at the ACM website.[66] Also Frequently Asked Questions listed as additional points via the same link.[67]

2. The data and sources for ACS

Fraction of OA journals and their articles of the total publication output[68]

	Website	Scopus
OA journals	**2**	**0**
Subscription journals		**48**
Total number of journals	**52**	
Subscription documents		**40 573**
OA documents		**0**
Open / total journals		**0%**
Open / total documents		**0%**

[62] https://dl.acm.org/pubs.cfm
[63] https://dl.acm.org/;
https://dl.acm.org/understanding.cfm?coll=DL&dl=ACM&CFID=834654432&CFTOKEN=86717811
[64] For example:
https://dl.acm.org/citation.cfm?id=2594408&dl=ACM&coll=DL&CFID=834654432&CFTOKEN=86717811
[65] https://libraries.acm.org/digital-library/policies#h-archival-and-perpetual-use-rights
[66] https://www.acm.org/open-access
[67] http://authors.acm.org/main.html
[68] http://pubs.acs.org/page/4authors/openaccess/index.html ;
https://www.acs.org/content/dam/acsorg/policy/publicpolicies/science-policy/highqualityscience/high-quality-science.pdf?

Costs of OA publishing Prices vary from $750 - $4000[69]. Pricing depends on licensing or embargo[70]: Gold OA journals: 1) No APC fee for AuthorChoice[71] license; $500 for CC-BY (ACS members) or $1000 (Non-ACS members); 2) $2000. Authors wishing or being obliged to opt for CC-BY, are charged additional $500.Hybrid journals: $4000 (immediate OA) or $2000 (12 months embargo). Authors wishing or being obliged to opt for CC-BY, are charged additional $500.There are also discount groups for institutions.

APCs weighted by document-volume (using Scopus & DOAJ): No OA journals included in Scopus title list.

Use of CC-licensing Author pays OA-access: ACS AuthorChoice/ACS Editors' Choice. ACS offers creative common licenses through four options: ACS AuthorChoice CC-BY, ACS AuthorChoice CC-BY-NC-ND, ACS AuthorChoice +12 CC-BY, and ACS AuthorChoice + 12 CC-BY-NC-ND[72]. Immediate OA or 12 months embargo[73].

Self-archiving policies Pre- and postprint allowed. Postprint after 12 months embargo as default; less than 12 months after online publication requires a waiver from the authors supporting institution. Alternatively, "the Author(s) may sponsor the immediate availability of the final Published Work through participation in the ACS AuthorChoice program"[74].

Openness of citation data ACS is not a member of Initiative for Open Citations.

TDM Article metadata available at ACS website: Abstracts, author information, impact factor, table of contents[75]. Details for APCs and the level of openness (hybrid / fully OA) are provided as journal based list[76].

Accessibility of information related to OA practices Access to basic information is easily available through a single link[77]. The journal based list presents journal-based information clearly in one document.[78]

[69] http://acsopenaccess.org/
[70] http://pubs.acs.org/page/4authors/openaccess/index.html
[71] http://pubs.acs.org/page/policy/authorchoice/index.html
[72] http://pubs.acs.org/page/4authors/authorchoice/understanding_options.html#order
[73] http://pubs.acs.org/page/4authors/authorchoice/options.html#optiona
[74] http://pubs.acs.org/userimages/ContentEditor/1285231362937/jpa_user_guide.pdf; http://pubs.acs.org/page/policy/authorchoice/index.html
[75] For example: http://pubs.acs.org/doi/pdf/10.1021/acs.jcim.7b00298
[76] http://pubs.acs.org/page/4authors/openaccess/index.html
[77] http://acsopenaccess.org/
[78] http://pubs.acs.org/page/4authors/openaccess/index.html

3. The data and sources for Elsevier

Fraction of OA journals and their articles of the total publication output

	Website	Scopus
OA journals	**622**	**182**
Subscription journals		**2157**
Total number of journals	**3790**	
Subscription documents		**459 460**
OA documents		**16 334**
Open / total journals		**8%**
Open / total documents		**3%**

Because of the listing on Elsevier's website, an alternative interpretation of the fraction of OA journals is possible. In that case, there are 1937 "contains OA" listed, including 622 OA journals. This implies 1312 hybrid journals in total[79]. There are also 108 journals opened after an embargo (archived journals)[80].

Costs of OA publishing Fees range between $500 and $5,000 depending on the journal[81]: APCs weighted by document-volume (using Scopus & DOAJ): APC information available for 182 journals: Just among journals with APC $1727; including free journals $1082. The costs of each journal available in pdf[82].

Use of CC-licensing Currently 3 promoted options: CC-BY 4.0, CC-BY-NC-ND & Elsevier User License (especially used for archives)[83]. Other variations also in use[84].

Self-archiving policies Pre-print supported. Post-print supported after embargoes for non-commercial hosting platforms. Hosting guidelines for non-commercial and commercial platforms[85].

Openness of citation data Elsevier is not a member of the Initiative for Open Citations.

TDM Elsevier provides digital databases for online searches and materials[86], especially via ScienceDirect[87]. Data mining is possible through API key, which is available for register on the publisher's website[88]. Another option is to Using the

[79] http://www.sciencedirect.com/science/journals/all/contains-open-access
[80] http://www.sciencedirect.com/science/jrnlallbooks/all/open-access
[81] https://www.elsevier.com/about/open-science/open-access; https://www.elsevier.com/__data/promis_misc/j.custom97.pdf
[82] https://www.elsevier.com/__data/promis_misc/j.custom97.pdf
[83] https://www.elsevier.com/about/our-business/policies/open-access-licenses/user-licences
[84] https://www.elsevier.com/about/our-business/policies/open-access-licenses; https://www.elsevier.com/about/our-business/policies/open-access-licenses/user-licences
[85] https://www.elsevier.com/connect/elsevier-updates-its-policies-perspectives-and-services-on-article-sharing
[86] https://www.elsevier.com/solutions
[87] https://www.elsevier.com/solutions/sciencedirect/features
[88] https://dev.elsevier.com/

DOI retrieval function which the automated script can run on. TDM are available for different groups; e.g. by request.[89] Price list / journal is available as a pdf[90]. List of embargoes for each journal available as a pdf[91].

Accessibility of information related to OA practices Basic data easily at the website[92]. The amount of data and the links dedicated to various dimensions of OA practices are distracting at times, but licensing, pricing, journal lists and policies are clearly presented.

4. The data and sources for IEEE

Fraction of OA journals and their articles of the total publication output

	Website	Scopus
OA journals	**7**	**5**
Subscription journals	**"100+ hybrid journals"**	**164**
Total number of journals		
Subscription documents		**35 573**
OA documents		**1544**
Open/ total journals		**3%**
Open/total documents		**4%**

Costs of OA publishing For fully open topical journals, the APC is $1,350. Some journals charge additional fees (e.g. over-length and color page charges). For IEEE Access, the multidisciplinary mega journal, the article processing fee is $1,750[93]. As of January 1, 2017, the APC for hybrid journals is $1,950. Some journals charge additional fees (e.g. over-length and color page charges).

APCs weighted by document-volume (using Scopus & DOAJ): APC information available for 5 journals: Just among journals with APC $1610; including free journals $1499.

Use of CC-licensing Author pays OA (waivers can be requested): CC-BY 3.0[94]. The OA Publishing Agreement (OAPA): Signing the OAPA transfers the author's copyright to IEEE but allows for universal free online access and protection from commercial use.[95]

[89] https://www.elsevier.com/about/our-business/policies/text-and-data-mining
[90] https://www.elsevier.com/__data/promis_misc/j.custom97.pdf
[91] https://www.elsevier.com/__data/promis_misc/external-embargo-list.pdf
[92] https://www.elsevier.com/about/open-science/open-access/surprising-facts; https://www.elsevier.com/about/open-science/open-access
[93] http://open.ieee.org/index.php/for-authors/author-processing-charges/
[94] https://www.ieee.org/publications_standards/publications/rights/oatermsconditionsfull.html
[95] http://ieeeauthorcenter.ieee.org/?s=open+access

Self-archiving policies Pre-and Post-print self-archiving (Final Draft; publisher's pdf excluded)[96].
Openness of citation data IEEE is not included in the Initiative for Open Citations.
TDM IEEE permits non-commercial TDM of articles published OA with either the OA Publishing Agreement (OAPA) or the CC license (CC-BY). No permission is required for non-commercial mining of OA articles. Mining for commercial purposes or mining of non-OA content requires permission from IEEE.[97] Basic data is listed as available for articles at the IEEE Xplore Digital Library, including abstract, authors, figures, references, citations, keywords and metrics[98], not for download.
Accessibility of information related to OA practices Basic information on OA practices is clearly presented and mainly on one location[99].

5. The data and sources for LWW

Fraction of OA journals and their articles of the total publication output

	Website	Scopus
OA journals	**14**	**95**
Subscription journals		**288**
Total number of journals		
Subscription documents		**42 693**
OA documents		**13 110**
Open/ total journals		**25%**
Open/total documents		**23%**

Costs of OA publishing Charges vary from $600 to $4700, depending on the journal and the type of license[100]. Immediate OA after publication also in hybrids.

APCs weighted by document-volume (using Scopus & DOAJ): APC information available for 95 journals: Just among journals with APCs $1041; including free journals $459.
Use of CC-licensing Author pays APCs: CC-BY-NC-ND, CC-BY, CC-BY-NC mainly, varieties amongst journals[101].

96 https://www.ieee.org/publications_standards/publications/rights/rights_policies.html
97 http://ieeeauthorcenter.ieee.org/?s=open+access
98 http://ieeexplore.ieee.org/document/8050200/
99 http://ieeeauthorcenter.ieee.org/?s=open+access
100 http://wkauthorservices.editage.com/open-access/hybrid.html
101 http://download.lww.com/wolterskluwer_vitalstream_com/PermaLink/LWW-ES/A/LWW-ES_2017_03_27_LTP_1_SDC1.pdf ; http://journals.lww.com/md-journal/Pages/OpenAccess.aspx

Self-archiving policies Pre-print self-archiving; Post-print with 12 embargo (Publisher's pdf excluded).[102]
Openness of citation data Wolters Kluwer is not included in the Initiative for Open Citations.
TDM No clear data mining possibilities easily available.
ccessibility of information related to OA practices There is a link on OA policies on LWW's website[103], but exact information on practices is not clearly presented. Based on this, practices appear to be non-standardized and varying per journal. There is a chat opportunity with "client manager" but, when approached with a question about OA practices, we were encouraged to contact the given journal rather than pointed to another link at the website.

6. The data and sources for Sage

Fraction of OA journals and their articles of the total publication output

	Website	Scopus
OA journals	**168**	**95**
Subscription journals		**288**
Total number of journals	**"More than 1000"**	
Subscription documents		**37 430**
OA documents		**2562**
Open/ total journals		**3%**
Open/total documents		**6%**

Costs of OA publishing Gold OA costs: non standardized. For Sage Choice (hybrid): $3000 (standard)[104]. The exceptions for Sage Choice pricing (discounts), and journals not allowing hybrid OA at all are listed on the website.[105] Discount prices vary between $1000 and $1500, and £400 - £800. Waivers can be requested[106].

APCs weighted by document-volume (using Scopus & DOAJ): APCs information available for 24 journals: Just among journals with APCs $1429; including free journals $1156.

[102] http://edmgr.ovid.com/apjo/accounts/copyrightTransfer.pdf ; http://www.wkopenhealth.com/inst-fund.php
[103] http://wkauthorservices.editage.com/open-access/
[104] https://us.sagepub.com/en-us/nam/author-information
[105] https://uk.sagepub.com/en-gb/eur/sage-choice-journal-and-pricing-exceptions
[106] https://uk.sagepub.com/en-gb/asi/gold-open-access-article-processing-charge-waivers

Use of CC-licensing Author chooses one of the CC-options (gold OA): CC-BY, CC-BY-ND, CC-BY-NC, CC-BY-NC-ND. [107]**.** Also hybrid (Sage Choice hybrid "gold" OA offering"[108]; immediate OA in hybrids) model with CC's.
Self-archiving policies Pre-and Post-print self-archiving (Final Draft; publisher's pdf excluded); multiple variations of practices[109].
Openness of citation data Sage is a member of the Initiative for Open Citations.
TDM Sage has information and products, such as statistics[110], research tools[111], and data collections[112], on the website. Access is subscription based, which means that the resources can be used via institutional access, for example. No downloadable metadata available without request.
Accessibility of information related to OA practices The basic information for OA practices can be found in one location[113], including a link to Sage's OA position statement[114].

7. The data and sources for SpringerNature

	Website	Scopus
OA journals	**604**	**385**
Subscription journals		**1871**
Total number of journals	**2454**	
Subscription documents		**226 524**
OA documents		**66 338**
Open/ total journals		**17%**
Open/total documents		**23%**

Costs of OA publishing APCs for OA journals: Listed prices vary from $585 to $3975[115]. Hybrid journals: Standard fee $3000[116]

APCs weighted by document-volume (using Scopus & DOAJ): APC information available for 358 journals: Just among journals with APCs $1834; including free journals $1584.

107 https://us.sagepub.com/en-us/nam/re-use-of-open-access-content%20
108 https://uk.sagepub.com/en-gb/eur/faqs
109 https://us.sagepub.com/en-us/nam/journal-author-archiving-policies-and-re-use
110 https://uk.sagepub.com/en-gb/eur/sage-stats
111 https://uk.sagepub.com/en-gb/eur/sage-research-methods
112 https://uk.sagepub.com/en-gb/eur/primary-source-collections
113 https://uk.sagepub.com/en-gb/eur/open-access-at-sage
114 https://uk.sagepub.com/en-gb/eur/open-access-position-statement%20
115 http://www.springernature.com/gp/librarians/licensing/journals-price-list
116 http://www.springernature.com/gp/librarians/licensing/journals-price-list

Use of CC-licensing Most commonly used (fully OA journals & hybrids): CC-BY & CC-BY-NC[117]

Self-archiving policies Post-print self-archiving supported, final copyedited draft excluded [118]. Also ShareIT option for research papers to be archived to academia.edu ect..[119] Nature publishing group: Pre-print self-archiving; Post-print with 6 embargo (Publisher's pdf excluded); multiple variations of practices[120].

Openness of citation data Springer Nature is a member of the Initiative for Open Citations.

TDM A list of OA journals and hybrid journals with pricing can be downloaded from the website. Includes also info on CC-licenses per journal [121]. Databases for researchers[122]. Also open data promotion[123]

Accessibility of information related to OA practices Basic information OA practices is gathered in one location[124]. Also, further openness related policies and practices at display[125].

8. The data and sources for Taylor & Francis

Fraction of OA journals and their articles of the total publication output

	Website	Scopus
OA journals	**145**	**112**
Subscription journals	**"More than 2500 each year"**	**2158**
Total number of journals		
Subscription documents		**124 894**
OA documents		**7313**
Open/ total journals		**5%**
Open/total documents		**6%**

117 http://www.springernature.com/gp/open-research/policies/journal-policies
118 http://www.springernature.com/gp/authors/how-to-share
119 http://www.springernature.com/gp/open-research/open-data
120 http://www.nature.com/authors/policies/confidentiality.html
121 http://www.springernature.com/gp/librarians/licensing/journals-price-list
122 http://www.springernature.com/gp/products/database
123 http://www.springernature.com/gp/open-research/open-data
124 https://www.springernature.com/gp/open-research/about
125 http://www.springernature.com/gp/open-research

Costs of OA publishing Standard article publishing charge (APC): $2950 (excluding tax)[126]. Waivers can be requested[127].

APCs weighted by document-volume (using Scopus & DOAJ): APC information available for 112 journals: Just among journals with APCs $1913; including free journals $1535.

Use of CC-licensing Author pays OA (waivers and discounts may be requested): Author chooses license (CC-BY, CC-BY-ND, CC-BY-NC, CC-BY-NC-ND[128]).

Self-archiving policies Pre-and Post-print self-archiving (Final Draft; publisher's pdf excluded)[129].

Openness of citation data Taylor & Francis group is a member of the Initiative for Open Citations.

TDM There are journal price lists, reports and surveys available on the website as pdfs[130]. Author information, basic article information and abstracts available on tandonline.com[131].

Accessibility of information related to OA practices Basic information is easily in one location, also additional information sheets for key information[132].

9. The data and sources for Wiley-Blackwell

Fraction of OA journals and their articles of the total publication output

	Website	Scopus
OA journals	**87**	**41**
Subscription journals	**1381**	**1382**
Total number of journals		
Subscription documents		**179 047**
OA documents		**6952**
Open/ total journals		**3%**
Open/total documents		**4%**

126 http://authorservices.taylorandfrancis.com/publishing-open-access-with-taylor-francis/

127 http://www.tandfonline.com/openaccess/faqs

128 http://authorservices.taylorandfrancis.com/publishing-agreements-your-options/

129 http://authorservices.taylorandfrancis.com/sharing-your-work/

130 E.g. http://www.tandfonline.com/openaccess/opensurvey; http://taylorandfrancis.com/journals/price-lists/

131 E.g. http://www.tandfonline.com/doi/ref/10.1080/13621025.2017.1406456?scroll=top

132 http://authorservices.taylorandfrancis.com/publishing-open-access-with-taylor-francis/; http://authorservices.taylorandfrancis.com/custom/uploads/2015/11/Publishing-open-access-the-basics.pdf
http://authorservices.taylorandfrancis.com/custom/uploads/2015/11/; Open-access-and-funding-the-basics.pdf

Costs of OA publishing Author / institution pays OA publishing: Prices range from $500 to $5000 (fully OA & hybrid).[133] Waivers can be requested[134].

APCs weighted by document-volume (using Scopus & DOAJ): APC information available for journals 41: Just among journals with APCs $2254; including free journals $1689.

Use of CC-licensing Author pays OA: CC-BY, CC-BY-NC, CC-BY-NC-ND. Also no CC-license OA publishing option available.[135]

Self-archiving policies Pre-print self-archiving; Post-print after 12-24 embargo.[136]

Open Openness of citation data Wiley is included in the Initiative for Open Citations.

Data-mining Price for OA publishing can be downloaded as an Excel-file with journal – and license based differentiation. Also price list for hybrid (OnlineOpen, "Wiley's hybrid gold OA option")[137].

Accessibility of information related to OA practices Access to basic information in one location[138].

133 https://authorservices.wiley.com/author-resources/Journal-Authors/licensing-open-access/open-access/article-publication-charges.html

134 http://www.wileyopenaccess.com/details/content/13707a1ddf6/Waivers-and-Discounts-on-Article-Publication-Charges.html

135 https://authorservices.wiley.com/author-resources/Journal-Authors/licensing-open-access/licensing/open-access-agreements.html

136 https://authorservices.wiley.com/author-resources/Journal-Authors/licensing-open-access/open-access/self-archiving.html

137 https://authorservices.wiley.com/author-resources/Journal-Authors/licensing-open-access/open-access/article-publication-charges.html

138 https://authorservices.wiley.com/author-resources/Journal-Authors/licensing-open-access/index.html