



Open Access publishing at the KTH Royal Institute of Technology

Statistics for 2011-2021

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1 Introduction

In 2011, KTH Royal Institute of Technology adopted a policy on scientific publishing geared towards creating full accessibility of research output. The main objective of this report is to assess the long-term effects of this policy. To that end, we collected and analysed publishing data at KTH, along with related expenditures. More specifically, we track changes in counts and shares in open access publishing over the past decade, as well as describe trends at multiple levels of analysis, ranging from conference proceedings to journal article publishing at KTH and its affiliated schools. Additionally, we provide insight into both the past and present state of open access publishing, and briefly discuss the future of open access publishing at KTH. This report is aimed towards all interested in publishing practices at KTH. Throughout this report, we use concepts and definitions derived from prior year documentation and analysis of open access publishing at KTH.¹

2 Definitions and concepts

Open Access (OA) takes many forms and thus encompasses a plethora of definitions. In its most common form, open access refers to the unrestricted online access (i.e. free to read and reuse) to journal articles and other related publications.² In this report we use OA definitions reminiscent of those provided by the online service Unpaywall.³

The concept of OA has gained popularity in many academic milieus as a means of enhancing the visibility of research and its impact.⁴ This stands in contrast to the conventional subscription-based option, mediated via toll-access journals that for the longest time dominated the academic publishing landscape. These are by definition less accessible to a wider audience, and regularly incur additional costs for readers. More favourably, OA broadens the playfield, allowing authors, readers, funders and other stakeholders to benefit from the latest research.

OA status can be achieved in two different ways. The first route is known as ‘green OA’ and entail self-archiving of published or pre-publication works in a public repository (e.g. DiVA, a publication database/repository used by several Swedish institutions of higher-learning, including KTH). The second path is ‘gold OA’ and refers to articles published in an all-OA journal (i.e. a journal with no subscription barriers and free for all to read). Gold OA-designated articles are therefore distinct from articles made openly available in a subscription-based journal through payment (i.e. APC’s, article processing charges). This type of publishing is commonly referred to as ‘hybrid OA’. To clarify, the point of demarcation between the aforementioned OA subtypes is whether or not the journal is OA in its entirety.

Our assessment of OA publishing at KTH, rely on data sourced via Unpaywall — a database of open access status for scientific publications with links to full-text articles. Procedurally, an article’s OA status is determined by identifying credible online locations and then assigning an OA subtype based on a ‘better-than-rule’. For example, the publication is considered gold OA if both gold and green are available. Unpaywall considers a publication ‘closed’ if it cannot detect a location. The method used by Unpaywall to classify OA status is therefore empirical and thus amenable to future change (e.g. a closed publication turns green as a full-text is being added to an institutional repository).

As in the previous year’s report, we also consider the diamond OA subtype (also known as platinum OA). Uniquely, this OA model is non-APC based (i.e. entirely free for authors)⁵, and is treated in this

¹ Dubus & Fathli 2021.

² Piwovar et al. 2018

³ <https://unpaywall.org/>

⁴ Brainard 2021.

⁵ Fuchs & Marisol Sandoval 2013.

report as a subtype of gold OA. To determine diamond affiliation, we used the Directory of Open Access Journals (DOAJ: a database with >18 337 peer-reviewed OA journals)⁶ to collect journal APC data. At present, not all OA publication outlets as classified by Unpaywall can be found in DOAJ. As such, the actual coverage of diamond OA is likely underestimated.

Unpaywall recognizes an additional OA category referred to as 'bronze OA'. This type of publication is free to read online, have ambiguous license policies, and can be withdrawn unilaterally by the publisher.⁷ In the context of this report, we opted to treat bronze-classified publications as non-OA. We consider the lack of appropriate license to violate the consensus framework for OA publishing. Consequently, we treat gold (including diamond), hybrid, and green as 'Total OA', and bronze and closed as 'Not OA'.

3 Results

In the following section we present descriptive statistics for KTH OA publishing of theses (student, licentiate, and PhD), journal articles, conference proceedings, and book chapters. To accommodate for data heterogeneity and the 2018 organizational re-structuring at KTH, we used multiple time intervals in order to track changes in OA shares at KTH and its schools.

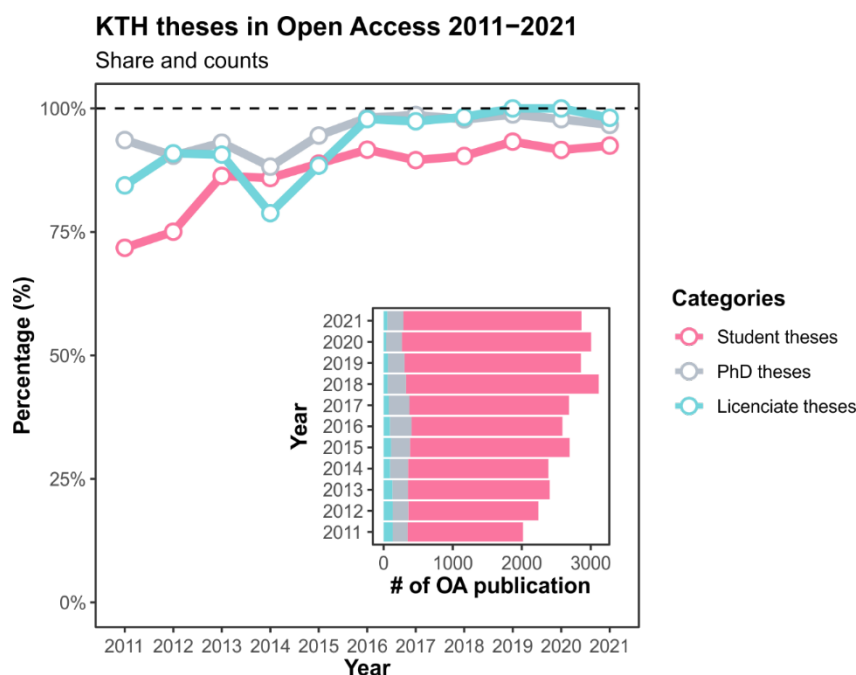


Figure 1. KTH theses in open access 2011–2021. Line graph depicts the development of student, licentiate and PhD theses shares in OA. Inset graph (stacked bar chart) shows the number of annual publications for each thesis category.

3.1 Doctoral and licentiate theses presented at KTH 2011–2021

KTH's current publishing policy, implemented in 2011, mandates all theses and reports to be freely accessible in DiVA.⁸ Consequently, we expect theses by KTH researchers and students to approach 100% OA. In Figure 1, we show the percentage of OA in student, licentiate, and doctoral theses at KTH during the period 2011–2021.

⁶ <https://doaj.org/>

⁷ <https://unpaywall.org/>

⁸ KTH president's decision, 2010

We observe relative high rates of OA in all three theses categories (72% student, 84% licentiate and 94% PhD) at the onset of our time-series. Parsimoniously, such levels are likely a reflection of the enacted policy, although we cannot reject that the proportion of theses in OA were significantly lower before 2011. A notable decline in OA levels affected PhD and licentiate theses in 2014, the reason for which is unknown, but may be attributed to a short-lived negligence of the policy. In response to this decline in OA shares, the KTH library performed a new information drive, which saw the subsequent resurgence in OA proportions. Our data show that licentiate theses reached 100% OA in 2019 and 2020, while doctoral theses have maintained levels between 96–98% since 2016, yet to reach 100%. Student theses in OA have also yet to reach 100%, but reached a record-high in 2021 of 92% OA.

3.2 Student theses presented at KTH 2011-2021

In this section we examine how student theses, both Master and Bachelor, at KTH have evolved over time. Student theses are equally required to be registered in DiVA as doctoral and licentiate theses at KTH (see remarks on the 2011 policy in the previous section). The observed trajectory for student theses corroborate a gradual increase in OA shares since the implementation of the policy, reaching >90% in 2021 (Figure 1).

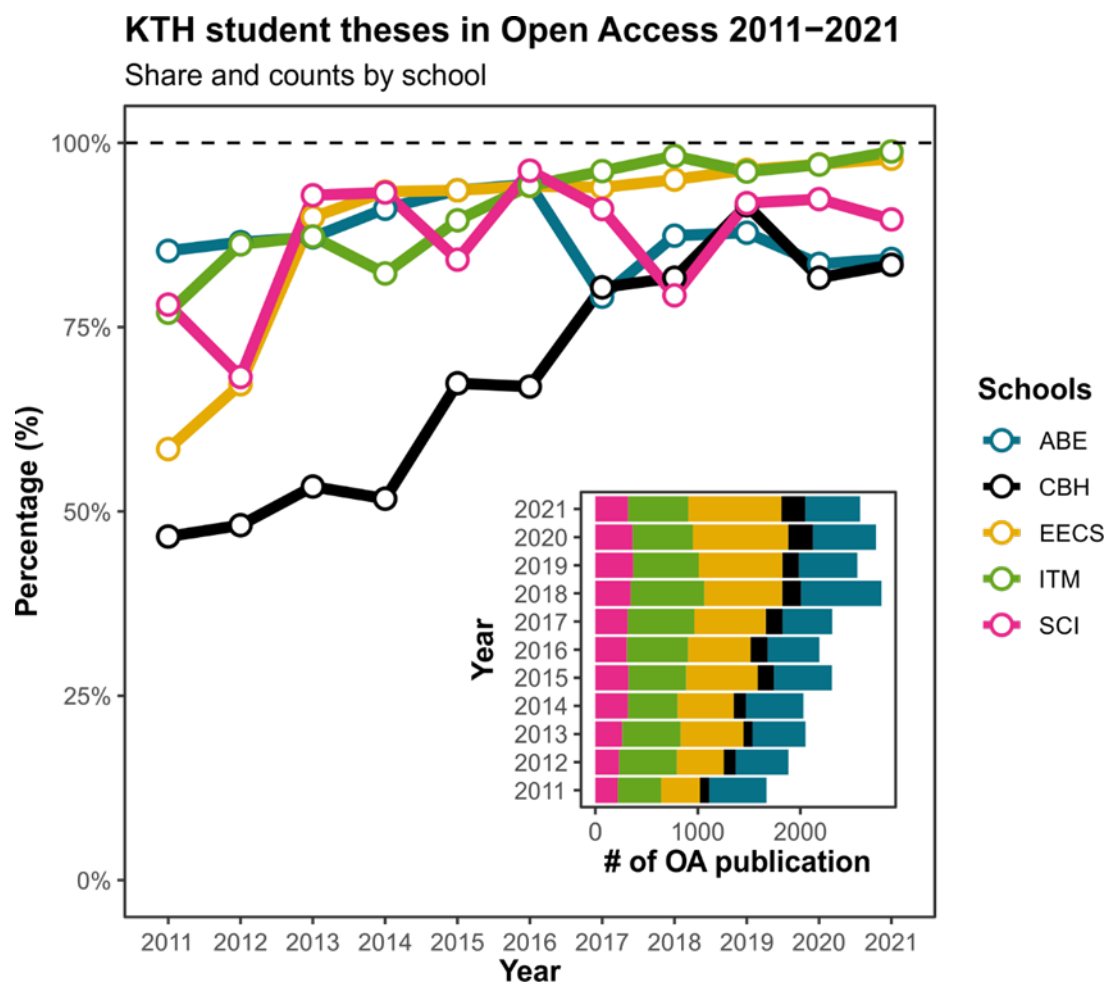


Figure 2. KTH student theses in open access 2011–2021. Line graph depicts the development of OA shares by school. Inset graph (stacked bar chart) shows the number of annual publications of student theses by school.

In Figure 2, we show the development of OA shares for all KTH schools from 2011–2021. In collecting the data we mapped all student theses published prior to the organizational changes at KTH to their current schools to ensure consistent data entries. More specifically, student theses associated with the former schools BIO, CHE and STH were mapped to CBH (School of Engineering Sciences in Chemistry, Biotechnology and Health), and theses from CSC, EE and ICT were assigned to EECS (School of Electrical Engineering and Computer Science).

Generalized across all schools we see a tendency towards higher OA shares over time. However, when considered one by one, we see different publishing patterns emerge. The OA shares of student theses at the CBH school have historically been lower than other schools at KTH (Figure 2). Many student theses at the CBH school are often connected to patents, which could explain the hesitance and/or reluctance in making such documents accessible online. Notwithstanding, the share of OA at the CBH school have increased rapidly since 2011, and even risen to comparable levels to the SCI (School of Engineering Sciences) and ABE (School of Architecture and the Built Environment) schools in 2021. The EECS school is also seen to have started at a comparably low-level (~60%). Nevertheless, only two years after the policy implementation at KTH, the OA share at the EECS school increased to ~90%, and successively reached 98% OA in 2021.

Aside from a small decline in 2014, the OA share trajectory for the ITM (School of Industrial Engineering and Management) school shows steady growth throughout the considered timeframe, reaching 96% in 2021. In general, OA levels are high at both ABE and the SCI school, but have fluctuated intermittently over time. Such volatility appears to have stabilised in the last three years, and may be explained by the decision to delegate the responsibility of registration in DiVA to administrative staff at KTH. As in the previous year's report, we once again call for a renewed information campaign aimed at schools to maintain high OA levels for student theses.

3.3 Journal publishing by KTH researchers 2011-2021

The access demand to scholarly literature has transformed scientific publishing. Today, many funding agencies, such as the European Commission, require their grantees to publish their work openly.⁹ Funder requirements such as Plan S — an initiative geared towards creating fully open access content¹⁰, represents a new phase in OA publishing and a serious challenge to subscription-based models.¹¹

Read and publish deals are increasingly popular, and gold open access is on its way.¹² However, for all the advantages that comes with full OA models, they constrain the ability of many researchers from poorer nations to publishing on equal-terms. Naturally, many opinions exist on what is the preferred OA road. For example, the green and diamond OA options are viewed favourably by many in the research community. The latter is a particularly interesting subtype that have also become increasingly popular both generally and among KTH researchers (e.g. the number of KTH publications in Scipost has grown).¹³

Since 2018, the KTH library has signed several Read and Publish agreements. These agreements now form the basis of most journal publishing at KTH. Additionally, the KTH library covers the APC costs, which are not included in any deal, as long as the corresponding author is from KTH. It is possible that this is one reason why hybrid OA has increased so significantly at KTH in recent years.

⁹ https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf.

¹⁰ <https://www.coalition-s.org/why-plan-s/>

¹¹ Else 2018, 2021.

¹² Brainard 2021.

¹³ <https://scipost.org/>.

3.3.1 Share of OA in journal publishing 2011-2021

In Figure 3, we show the proportions, counts, and trends in OA and non-OA journal publishing at KTH from 2011–2021. Our data show that non-OA publishing was more prevalent at KTH before 2017, but have since then shifted in favour of OA. The gradual rise in OA publishing at KTH is well attested (both in terms of shares and absolute counts), and was also noted in our previous year's report.¹⁴ This time we also computed the average growth rate of total OA journal publishing which revealed a 13% successive increase (or 183.4 articles per year). Conversely, non-OA publishing at KTH, which has substantially decreased, demonstrates an opposite trend. For example, 795 non-OA journal articles were published in 2021, down 52.3% from 2014 when non-OA was at its peak.

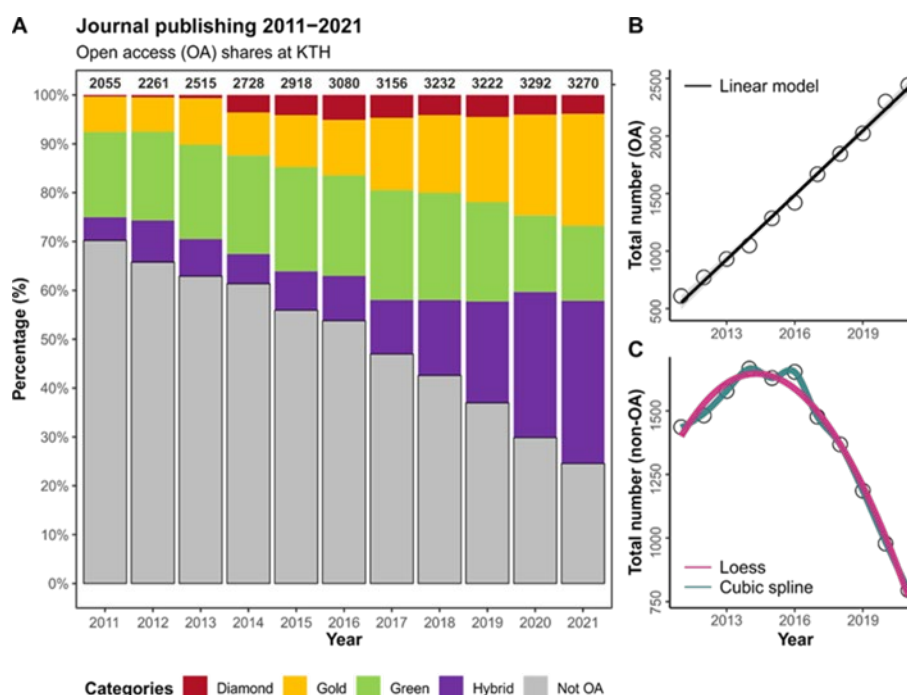


Figure 3. Journal publishing at KTH 2011–2021. A. Stacked percent bar-chart showing OA and non-OA shares between 2011 and 2021. Each bar provides the total article count. B. Growth trajectory for total OA journal publishing at KTH. C. Growth trajectory for non-OA journal publishing at KTH. Fitted lines are based on OLS linear, loess (span = 0.5) and cubic spline regression models.

Publications of journal articles reached an all-time high of 3292 in 2020. Conversely, 3270 articles were published in 2021, of which 2443 (74.7%) were OA. This is more than double the OA share registered in 2011 (29.6%), and coincide with an increase in both gold (including diamond) and hybrid OA publishing at KTH. Together, the aforementioned subcategories accounted for 79.7% of OA in 2021. The share of green OA contribution to total OA publishing at KTH during 2011–2016 ranged from 60% to 40%, and ~30% to 20% during 2017–2021. A literal reading of our results indicate a notable decline in green OA publishing at KTH in the last two years (2020–2021). In the previous year report we suggested that this might be explained by possible publication delays (e.g. journal embargoes). However, it is presently unclear from the data whether green OA publishing (i.e. parallel publishing) at KTH is on the decline. This is because Unpaywall determines OA status using a 'better-than-rule', so articles with multiple OA status, such as green, may be excluded in favour of gold or hybrid articles. This has also been referred to as shadow-effect.¹⁵

¹⁴ Dubus & Fathli 2021.

¹⁵ Piwowar et al. 2018.

On the whole, we see that the number of journal articles (OA and non-OA) at KTH has plateaued the last four years. Yet, total OA publishing at KTH show a steady linear growth, whereas, non-OA show an early increase (2011–2016) followed by a protracted decline (2017–2021).

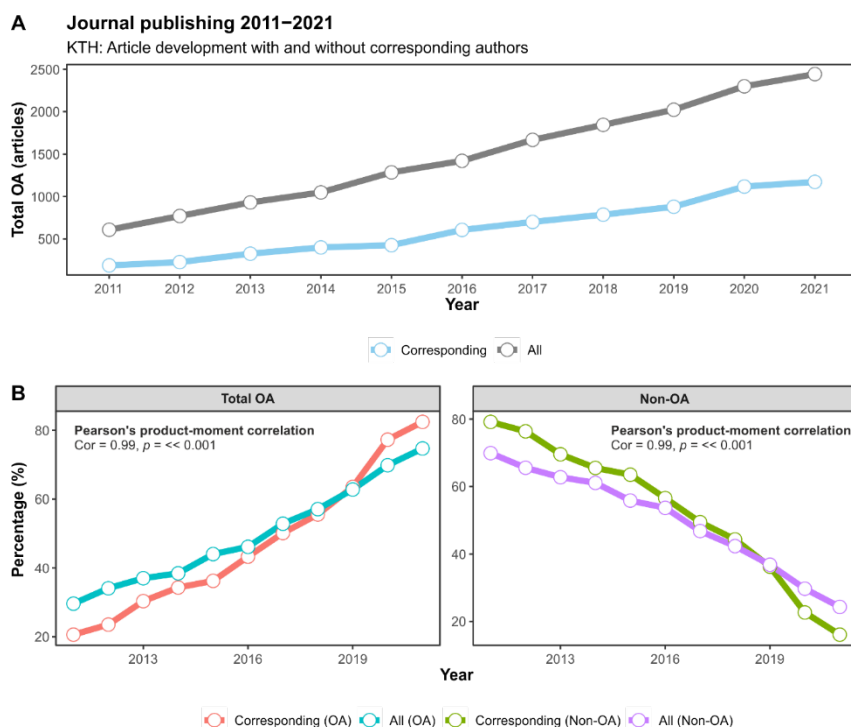


Figure 4. Journal publishing at KTH 2011–2021. A. Time-series of total OA articles at KTH at the level of corresponding author and general affiliation. B. The development of shares (total OA and non-OA) over time for corresponding versus non-corresponding author publishing at KTH. Coefficient and p-value statistics are based on Pearson's product moment correlation.

As an addition to the previous year report, we also examine the development of total OA shares based on corresponding authors affiliated with KTH Royal Institute of Technology. Figure 4 illustrates the comparative growth trajectory of KTH-associated publishing versus those limited to corresponding authors. We observe a concordant pattern in total OA counts over time, both generally (i.e. KTH affiliated) and at the level of corresponding author. Furthermore, our data evince a highly correlated relationship between general and corresponding author publishing of total OA and non-OA. We also find that OA publishing shares at the level of corresponding author have been higher than the general trend (turquoise curve in Figure 4B) over the last two years. Equally, non-OA shares based on corresponding author publishing is noted to have dropped slightly more (olive-green curve in Figure 4B).

3.3.2 Share of OA in journal publishing at KTH schools 2018-2021

In Figure 5, we show the development of OA versus non-OA journal publishing between 2018 and 2021 among KTH's five schools. As in the previous report, we observe both overlapping and distinct patterns in OA publishing. For example, hybrid and gold OA is seen to dominate OA publishing at ABE and CBH. ABE, however, has seen its green OA share decline during the past few years, while CBH has maintained a steady level over this period. Anomalously, the EECS school, show higher green OA shares compared to other OA categories. This pattern does appear however to shift in favour of hybrid OA, which have more than doubled since 2018. At ITM, the share of gold OA has increased since 2018 from ~15% to 27% in 2021. Equally, hybrid OA has increased over time, and by 2021 increased to 35% which is higher than gold (including diamond) and green OA shares combined. Similar to ABE and CBH, the share of green OA has been on decline at ITM – reaching a record-low of 5% of total OA by

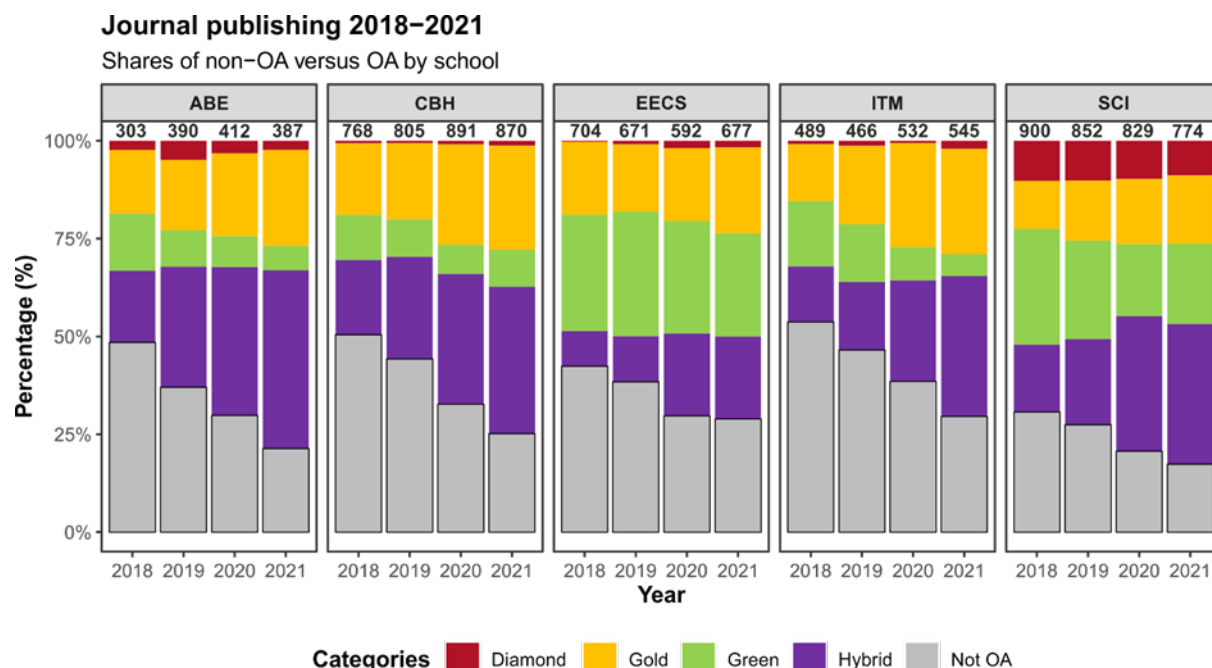


Figure 5. Journal publishing at KTH's five schools 2018–2021. Stacked percent bar-chart showing OA and non-OA shares between 2018 and 2021. Each bar provides the total article count.

2021. At the SCI school, the share of diamond OA is comparably higher than all the remaining schools. This is because more diamond OA journals exist within the broader research areas (e.g. physics) at SCI. Worthy of note, in 2018–2019, diamond OA shares were at a similar level to gold OA, but yet lower than hybrid and green OA. As with the EECS school, we see a slow decline in green OA shares over time at SCI, while hybrid OA shares increases. For non-OA publishing, we observe a joint declining pattern across all schools, which is consistent with patterns reported for KTH as a whole.

3.4 Conference publishing by KTH researchers 2011-2021

OA definitions are mainly applicable to journal articles, and therefore not easily extended to other publication outputs, including conference proceedings. According to Unpaywall, most OA conference publications by KTH researchers are classified as green, while others are gold or hybrid. The importance, role and publication procedure of conference proceedings are known to vary depending on research fields. As an example, proceedings make up a substantial portion of the literature in the computer and engineering sciences¹⁶ and less so in other scientific fields. Consequently, we have decided here and as in the last year report not to measure the relative contribution of different types of OA (e.g. gold and green), but instead evaluate the total proportion of conference publications classified as either OA and non-OA at KTH and its respective schools.

3.4.1 Share of OA in conference publishing 2011-2021.

The ratio of total OA to non-OA shares have been near-constant throughout the considered timeline (Figure 6). Viewed separately, our data show that the total OA share has fluctuated between 30% and 45% since 2011, with a slight upward trend. However, we also observe an overall decline in the total number of conference publications, reaching a record-low in 2021. Relatedly, the lagged differences in conference proceedings (total OA and non-OA) are also indicative of yearly reductions in total counts exceeding 100.

¹⁶ Larsen & von Ins 2020.

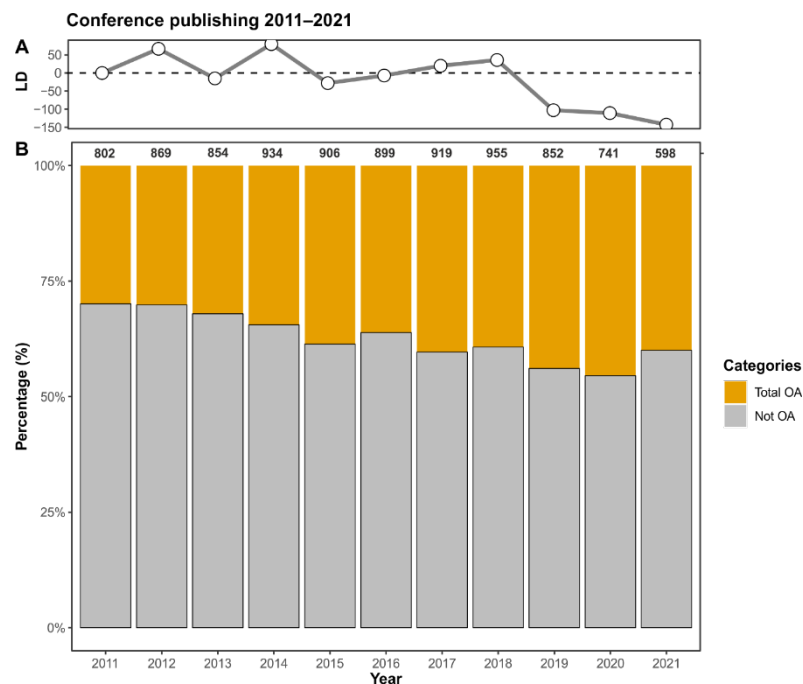


Figure 6. Shares of conference contribution at KTH 2011–2021. A. Lagged difference. B. Stacked percent bar-chart showing total OA and non-OA shares between 2011 and 2021. Each bar provides the total article count.

The opportunities for publishing conference papers in OA is not the same as for journal articles. This is because the KTH library Read and Publish agreements only apply to journal articles and not conference papers and book chapters (see section 3.5).

3.4.2 Share of OA in conference publishing at KTH schools 2018-2021

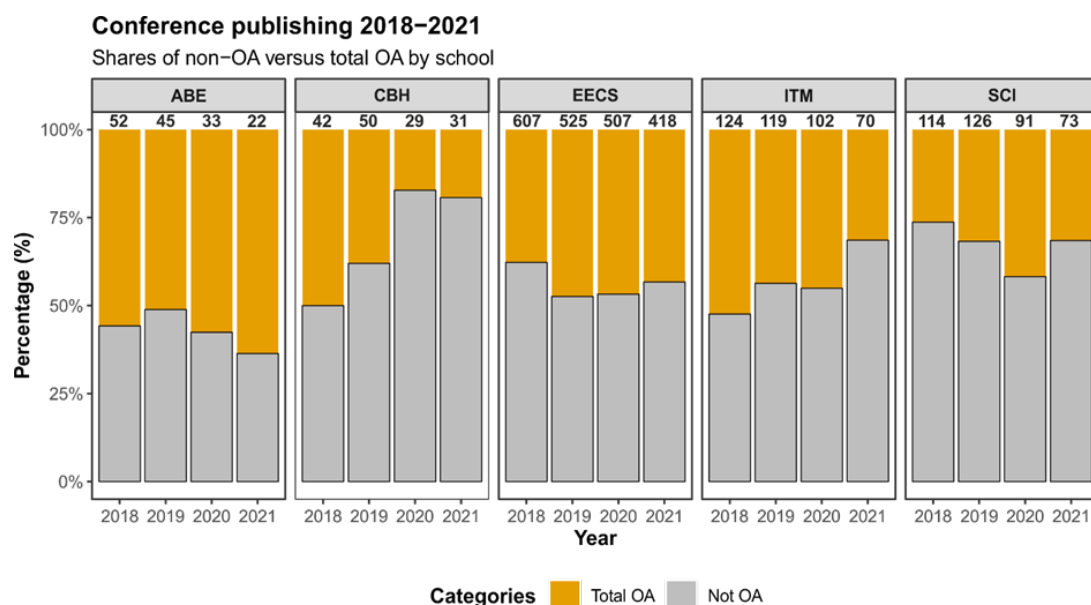


Figure 7. Conference publishing 2018–2021. Shares of non-OA and total OA conference publishing by school. Each bar provides the total article count.

Here we examine the development of conference proceedings (total OA and non-OA shares) by school for 2018–2021 (Figure 7). We have decided to interpret school-wise OA changes with caution given the narrow timeframe. In terms of absolute numbers, the ABE and CBH schools have fewer conference

proceedings than EECS, ITM, and SCI. The EECS school publishes more conference proceedings than any other school. At the ABE school, we observe a slight increase in total OA shares over time, reaching ~64% in 2021. Both CBH and ITM show a slight decreasing pattern in OA shares, while the EECS and SCI schools show no distinct pattern at all.

3.5 Book chapter publishing by KTH researchers 2011-2021

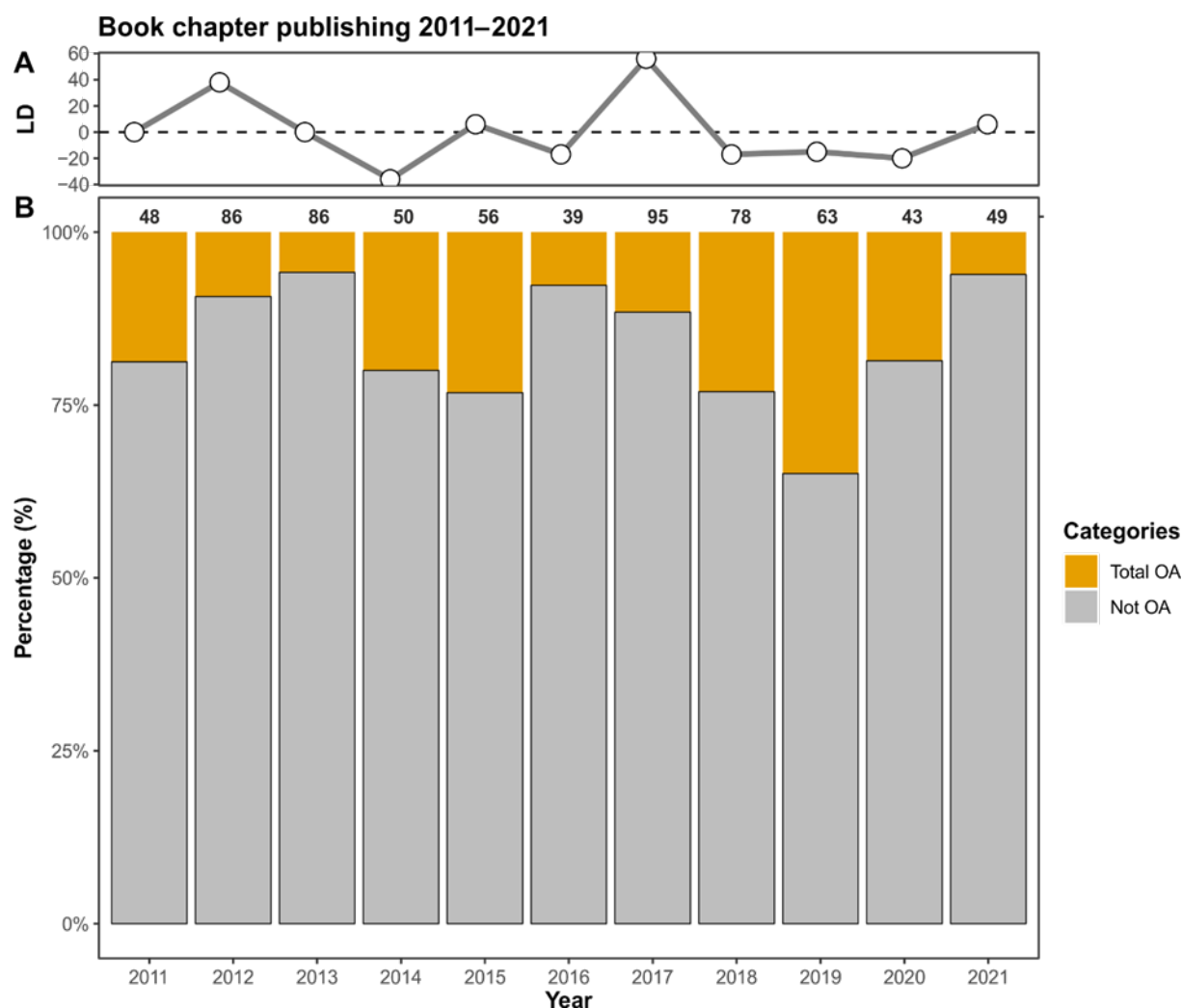


Figure 8. Book chapter publishing 2011–2021. A. Lagged difference. B. Stacked percent bar-chart showing total OA and non-OA shares between 2011 and 2021. Each bar provides the total article count.

Here we examine the development of OA chapter publishing at KTH from 2018–2021 (Figure 8). As with conference proceedings, we have decided to only explore changes in book chapters based on the shares of total OA and non-OA. As a standalone category, book chapter publishing constitutes only a small percentage of all output produced by KTH researchers. Moreover, the proportion of book chapters in OA is generally quite low, at 19% on average. This is because 1) publishers rarely offer OA options for book chapters and 2) book chapters are currently excluded from all library agreements. This also applies to single book chapters. For now, we are only able to offer a tentative perspective on how OA has evolved for book chapter publishing at KTH.

3.6 Venues for journal publishing

Presented in this section are the publication venues (i.e. journals) used most frequently by KTH researchers in 2021. It is well established that the publishing rate is uneven between scientific fields.

This can be attributed to a myriad of contributing factors including the time spent acquiring data and completing experimental analyses, to mention a few. In the context of this report, not accounting for such difference would both skew and erroneously elevate some venues above others as a consequence of school-specific publishing practices. Accordingly, we have decided to summarize the top-10 journals in 2021 by school, and not for KTH as a whole.

In Tables 1–5, journals are rank-ordered by number of articles published. The column header % OA articles show the proportion of OA articles (including green OA) published in each journal. Worthy of note, for gold and hybrid journal publishing it is the institution of the corresponding author that pays the APCs for OA. The corresponding author of the articles included in the lists below are not always affiliated to KTH, thus these results are not directly related to the extent to which the KTH authors really take advantage of the possibility to choose OA in hybrid journal publishing.

3.6.1 Top journals at the ABE school

As in previous years, *Sustainability* (an OA journal) ranked highest with the most articles published by ABE researchers (Table 1). *Water*, *Ecology and Society*, and *Land* are also OA journals, while the other top journals are subscription-based. Among the listed subscription-based journals, all offer hybrid OA options. For that reason, a large portion of published articles by ABE researchers are OA despite the subscription-based status of a given journal.

Table 1. Top 11 journals for publishing at the ABE school in 2021

Rank	ISSN	Journal name	Number of articles	% OA articles	OA journal
1	2071-1050	Sustainability	27	100	Yes
2	0959-6526	Journal of Cleaner Production	8	50	No
3	0048-9697	Science of The Total Environment	7	29	No
4	2352-801X	Groundwater for Sustainable Development	6	17	No
5	2073-4441	Water	5	100	Yes
	0950-0618	Construction and Building Materials	5	40	No
	1088-1980	Journal of Industrial Ecology	5	80	No
	1708-3087	Ecology and Society	5	100	Yes
9	1468-0629	Road Materials and Pavement Design	4	75	No
	0044-7447	AMBIO	4	50	No
	2073-445X	Land	4	100	Yes

3.6.2 Top journals at the CBH school

The top-10 journals at CBH include both subscription-based hybrid OA journals and gold OA journals (Table 2). *ACS Applied Materials & Interfaces* ranked first in both 2020 and 2021, and has consistently been a choice of publication for CBH researchers since 2015. CBH has the second highest share of hybrid OA in 2021 (eclipsed somewhat by the ABE school: Figure 5). The share of OA for hybrid journals is notably high — ranging from 43–88%.

Table 2. Top 12 journals for publishing at the CBH school in 2021.

Rank	ISSN	Journal name	Number of articles	% OA articles	OA journal
1	1944-8244	ACS Applied Materials & Interfaces	19	47	No
2	2045-2322	Scientific Reports	18	100	Yes
3	2168-0485	ACS Sustainable Chemistry & Engineering	14	43	No
4	2041-1723	Nature Communications	10	100	Yes
5	2073-4360	Polymers	9	100	Yes
	2072-6694	Cancers	9	100	Yes
	1433-7851	Angewandte Chemie International Edition	9	56	No
8	0144-8617	Carbohydrate Polymers	8	75	No
	0021-9606	The Journal of Chemical Physics	8	88	No
	1616-301X	Advanced Functional Materials	8	88	No
	2046-2069	RSC Advances	8	100	Yes
	0002-7863	Journal of the American Chemical Society	8	50	No

3.6.3 Top journals at the EECS school

Four IEEE journals make up the top-10 list for the EECS school. The *IEEE Transactions on Automatic Control* journal have moved up one position (i.e. rank) every year since 2016, becoming the EECS school's most popular publication venue in 2021. Two out of ten journals are classified as OA. Irrespectively, the EECS school stands-out in high shares of green OA publishing which is clearly reflected by the high percentage of OA articles in subscription-based journals (Table 3).

Table 3. Top 10 journals for publishing at the EECS school in 2021.

Rank	ISSN	Journal name	Number of articles	% OA articles	OA journal
1	0018-9286	IEEE Transactions on Automatic Control	21	81	No
2	0090-6778	IEEE Transactions on Communications	17	59	No
	2169-9380	Journal of Geophysical Research: Space Physics	17	76	No
4	0004-6361	Astronomy & Astrophysics	15	73	No
5	0029-5515	Nuclear Fusion	13	77	No
	1996-1073	Energies	13	92	Yes
7	0005-1098	Automatica	12	58	No
8	2169-3536	IEEE Access	11	100	Yes
9	0018-9545	IEEE Transactions on Vehicular Technology	10	40	No
10	0094-8276	Geophysical Research Letters	9	44	No

3.6.4 Top journals at the ITM school

ITM top-10 journals include five entirely OA venues. The first place is shared by two journals with opposing OA rates, namely *Journal of Manufacturing Systems* (21% OA) and *Metals* (100% OA). Both ABE and ITM-researchers publishes frequently in the MDPI-journal *Sustainability* (Tables 1 and 4). Apart from the *Journal of Manufacturing Systems*, all remaining subscription-based journals yield OA-levels on par with fully OA journals.

Table 4. Top 10 journals for publishing at the ITM school in 2021.

Rank	ISSN	Journal name	Number of articles	% OA articles	OA journal
1	0278-6125	Journal of Manufacturing Systems	14	21	No
	2075-4701	Metals	14	100	Yes
3	2071-1050	Sustainability	13	100	Yes
4	0360-5442	Energy	11	64	No
5	1996-1073	Energies	10	100	Yes
	1996-1944	Materials	10	100	Yes
	1359-6454	Acta Materialia	10	60	No
8	1359-4311	Applied Thermal Engineering	8	88	No
	0264-1275	Materials & Design	8	100	Yes
	1073-5615	Metallurgical and Materials Transactions B	8	88	No

3.6.5 Top journals at the SCI school

SCI top-10 journals include four entirely OA venues. *The journal Physical Review B* ranks first on the list, and despite its non-OA status, shows that 97% of articles were published as OA.

Table 5. Top 12 journals for publishing at the SCI school in 2021.

Rank	ISSN	Journal name	Number of articles	% OA articles	OA journal
1	2469-9950	Physical Review B	29	97	No
2	1029-8479	Journal of High Energy Physics	27	100	Yes
3	0022-1120	Journal of Fluid Mechanics	24	83	No
4	1434-6044	The European Physical Journal C	22	100	Yes
5	0031-9007	Physical Review Letters	13	100	No
6	0370-2693	Physics Letters B	12	100	Yes
	2469-9985	Physical Review C	12	83	No
8	0022-3115	Journal of Nuclear Materials	9	78	No
9	1094-4087	Optics Express	8	100	Yes
	0003-6951	Applied Physics Letters	8	75	No
	0004-637X	The Astrophysical Journal	8	50	No
	2470-0010	Physical Review D	8	100	No

3.6.6 Number of top-10 journals with a high percentage of Open Access

In this section we explore OA publishing at KTH from a different perspective. Here we counted the number of journals with $\geq 80\%$ OA articles from the top-10 journal lists, broken down by school and over time (Figure 9). While arbitrary, the 80% threshold does represent a reasonable level by which to track OA publishing progress.

The tables, although, intended to provide a summary of the top-10 journals chosen by KTH-researchers, do occasionally record more entries. This is because the ranking criterion is determined by the number of articles, the amount of which is sometime equal across several journals. For example, among the 12 journals listed in Table 5, the last four have the same number of articles, and of which two have $\geq 80\%$ OA content (*Optics Express* and *Physical Review D*). With two ranking positions being vacant we assign these journals an equal weight of 0.5 or $2/4$. Thus, the number of journals with $\geq 80\%$ OA articles in this example is: $7 + (0.5 * 2) = 8$.

At the school-level, we observe both random and increasing trends in the number of journals with $\geq 80\%$ OA articles from the top-10 list (henceforth denoted as OAL80%). More specifically, the ITM, ABE and SCI schools show an increase in OAL80% over time, while CBH and EECS appear more random. Evidently, the SCI school standout in having higher OAL80% counts than all other schools.

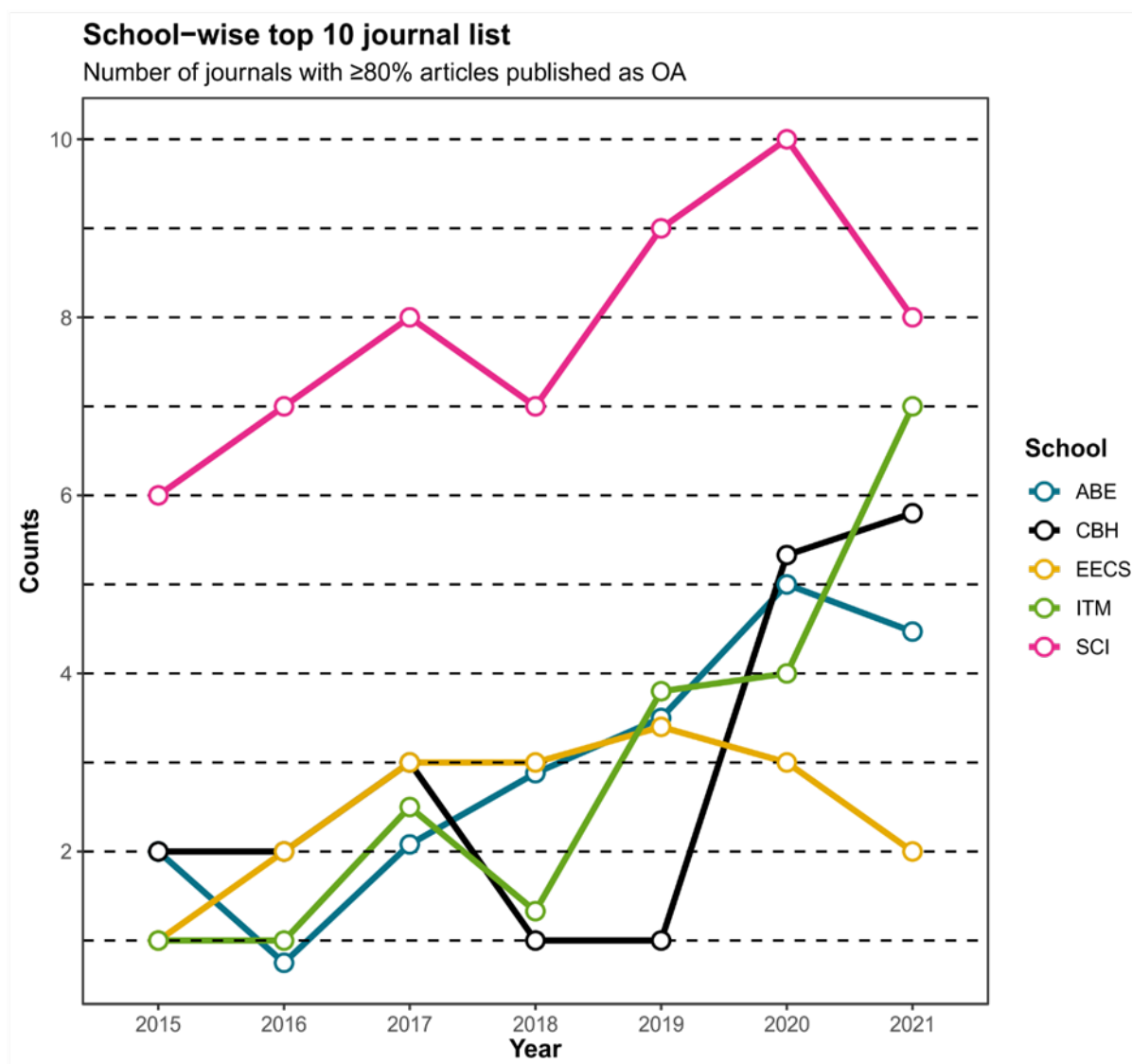


Figure 9. Number of journals in the top-10 list of each KTH school having more than $\geq 80\%$ articles in OA.

The SCI school shows that the OAL80% count has doubled from 2015 to 2020, but declined a bit in 2021.

3.7 Costs paid by KTH in article processing charges 2018-2021

To cover APC-related costs, all five schools started receiving 500 000 SEK each by KTHB in 2018. As mentioned in the previous year report, there was no separate tracking of APCs before that, making OA fees difficult to appraise. In 2019, the KTH library (KTHB) initiated the first Read and Publish deals and also started to pay for specific APCs from KTH researchers.

From 2018 to 2019, APC costs nearly doubled, followed by a considerable decline in 2020 and 2021 (Table 6). These cuts most likely reflect the various publisher agreements made by KTHB. From a school-level perspective, only EECS reduced their APC costs from 2018 to 2019. Compared to all the other schools, CBH have had consistently higher APC costs (only exception being in 2021).

In 2020–2021, all five schools reduced their APC costs, at the same time as the expenditure for the KTH library increased. Viewed separately, the total cost of single APCs by KTHB have declined substantially (Table 6). This is because the number of single APCs outside formal agreements are

becoming less common and are instead assimilated into the broader umbrella of agreements by KTHB. Conversely, the cost of OA within agreements is estimated to around 16 million SEK (data by the KTHB operational support). This costs is predicted to increase as KTH aims for total OA publishing.

See Hinders et al 2021 for a more detailed analysis of KTH's open access costs.

Table 6. Publishing costs per school 2018–2021 (in SEK). The tabulated costs relate to APCs outside publisher agreements and therefore do not represent the total OA payments made by KTHB.

School	2018	2019	2020	2021
ABE	182 692	907 112	191 797	87 542
EECS	745 033	470 983	179 062	197 052
ITM	129 504	462 092	98 353	14 579
CBH	1 820 985	2 811 164	842 440	168 472
SCI	353 638	726 042	172 983	47 064
KTHB		1 191 915	2 540 948	1 706 449
Total for KTH	3 231 852	6 569 308	4 025 583	2 221 158

4 Concluding remarks

In this report, we have adopted a data-driven approach that is comprehensive, up-to-date, and reproducible to analyse the current state of OA publishing at KTH. Some of the key findings described in this report are in line with previous year assessments on OA publishing at KTH. New to this report is the sensitivity analysis looking at how total OA shares have developed at KTH based on corresponding authors versus mere KTH-affiliated article authorship.

Our results confirm that OA publishing continues to increase at KTH. For journal publishing by KTH-researchers the increase is driven mainly by gold and hybrid OA, which goes hand-in-hand with KTHB services (i.e. APC coverage and publisher's agreements) and dictates from funding agencies to publish OA. These results are also corroborated by an analysis of OA shares by corresponding-authors from KTH. Incidentally, our results indicate that the OA share by corresponding-authors outperform or were higher than those observed for KTH affiliated total-OA shares.

As in the previous year, we found no notable change in diamond-OA publishing at KTH nor at the school level. Despite the appeal of diamond-OA as a completely free-of-charge option for authors and readers, it is difficult to predict how it will evolve. Parallel publishing (i.e. green OA) at KTH will require a more in depth evaluation to determine its relative growth over time. Mainly, the present concern relates to the 'shadow-effect'¹⁷ caused by co-occurring OA status (e.g. gold and hybrid). Future reports will hopefully be able to tease out the 'real' annual green OA proportion at KTH. For journal publishing as a whole, it remains to be seen if OA shares will reach 100% in the future or whether the trend reverses or plateaus.

For conference publications, we found that total OA shares have remained relatively stable over time. However, in terms of actual numbers, conference papers are noticeably on a declining path. Trends in book chapter publishing remain ambiguous, but we hope to see a future inclusion of book chapters within the domain of OA by publishers.

Subscription-based journals dominate the most popular venues for publication by KTH researchers. The vast majority of these journals offer hybrid OA options which results in high proportion rates of OA articles.

¹⁷ Piwowar et al. 2018.

The publishing policy at KTH has impacted the availability of full text theses, and the repeated information provided to doctoral students and administrators has proven successful. This is attested by our results that shows a steady increase of available full texts since administrators have been given the task of registering the theses. To date, however, only licentiate theses have reached 100% OA, although this level has not been maintained beyond 2020.

We reaffirm that the cost of single APCs outside agreements has decreased for each school, but also for KTHB. The reason for this is that more OA agreements are being signed, which lowers KTHB's overall costs. However, we have yet to determine whether the overall cost of OA has decreased – a matter that we aim to explore as part of our future analyses of open access publishing at KTH.

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