Transformation: the future of society publishing

Authors:
Tasha Mellins-Cohen (ORCID 0000-0001-6229-9675)
Gaynor Redvers-Mutton

Affiliation: Microbiology Society (microbiologysociety.org), 14-16 Meredith Street, London EC1R 0AB, UK

Correspondence: t.mellins-cohen@microbiologysociety.org

1. Abstract
The release in September 2018 of Plan S has led many small and society publishers to examine their business models, and in particular ways to transform their journals from hybrids into pure Open Access (OA) titles. This paper explores one means by which a society publisher might transform, focused specifically on the institutional set-price Publish & Read package being developed by the Microbiology Society based on assessments of: the geographic diversity of our author and subscriber bases; trends in article numbers, article costs and revenues; the administrative complexity of the options; and the reputational and financial risks to the Society associated with the package. We outline the process we followed to calculate the financial and publishing implications of Publish & Read at different price points, and share our view that these kinds of packages are a stop on the way to new models of OA that do not rely on Article Processing Charges (APCs). Our hope is that in sharing our experience, we will contribute to a collective best practice about how to transform society publishing.

1.1 Keywords
Open Access; Plan S; Publish and Read; Society publishing; Subscribe to open; Transformative agreements

2. Transforming – the journey so far
The Microbiology Society is a membership charity for scientists interested in microbes, their effects on our world and their practical uses. It is one of the largest microbiology societies in Europe with a worldwide membership based in universities, industry, hospitals, research institutes and schools.

In 1947 the Society created Journal of General Microbiology, now known simply as Microbiology, followed by Journal of General Virology in 1967. Two additional subscription journals joined the portfolio over the following decades: Journal of Medical Microbiology and International Journal of Systematic and Evolutionary Microbiology, the latter in partnership with the International Committee on the Systematics of Prokaryotes. More recently we have launched two new Open
Access (OA) journals, *Microbial Genomics* and *Access Microbiology*. Throughout our 70-year history of publishing we have maintained our independence, which means our Publishing Committee and Council set the publishing agenda without needing to seek consent from an external publishing partner.

This independence has been key to our publishing activities and policies. For example, the Society’s vision is a world in which the science of microbiology provides maximum benefit to society, and this vision has set our approach to Open Access (OA) and Open Scholarship (in our case including data, algorithms, genome sequences, and so on). We offer our authors multiple routes to OA, with the twin goals of ensuring that authors who do not have access to publication funds are not disenfranchised, and that we offer the maximum possible reader access to research. With that in mind, our access initiatives include:

- Gold OA under a Creative Commons Attribution licence (CC-BY) for the Version of Record, in hybrid and OA journals, funded by Article Processing Charges (APCs).
- Embargo-free, CC-BY Green OA for Author Accepted Manuscripts, which authors may deposit in the repositories of their choice.
- Free access to our subscription archive, where all subscription content is made free to read 12 months after publication.
- We also encourage use of preprint servers such as bioRxiv [1] as well as Open Science tools like Figshare [2] and protocols.io [3].

The Society’s mission and membership are driving forces behind the development of our journal portfolio. 2015 saw the first new journal launch from the Society for decades, and its first full stride into OA publishing. Our newest offering, also a full OA journal, *Access Microbiology*, is designed to tackle issues of research reproducibility and incremental advances in microbial knowledge by publishing replication studies, negative results, additions to established methods, microbiological pedagogy, conference posters, and so on.

### 3. Avoiding the cliff edge

The release in September 2018 of Plan S by cOAlition S, a group of mostly European funders, was a clear statement of intent towards disrupting the publishing status quo [4]. With this in mind, the Microbiology Society collectively brainstormed a set of ten options for future business models (Figure 1), considering the geographic diversity of our author and subscriber bases; trends in article numbers, article costs and revenues; the administrative complexity of the options; and, critically, the reputational and financial risks to the Society associated with each option.
Our goal is to work towards an OA future so some of these options were rejected as retrograde steps, including ‘Revert to subscription’, ‘Submit & publish’ and ‘Do nothing’. Guidance on the Implementation of Plan S published in February 2019 and updated in May 2019 [5] helped us to exclude other options, such as ‘Sister OA titles’ (mirror journals), that we might otherwise have viewed as serious contenders for an OA future.

With several options eliminated we assessed the feasibility of the remaining models. Gold OA accounted for 13% of articles published across the Society’s portfolio in 2018 but represented less than 7% of our journal revenue. To complicate things further, the distribution of OA across the portfolio was not even: two of the journals are pure Gold, publishing 100% OA content, while four of the journals are hybrid, publishing between 1.4% and 17.5% OA content. This variability meant that some options, such as ‘Flip’, carried excessively high risks. Every scenario that we modelled resulted in uneven progress towards OA, with two of our hybrid journals reaching 50% OA five or more years before the others.

For the moment publishers will continue to operate in a mixed economy. They will do so because there is a lack of consensus among funders and institutions globally on the subject of OA; because their imperative is to publish the best research in the fields in which they operate, regardless of provenance or ability to pay; and because an overnight flip to a radically different business model is an untenable risk to any publishing model, whether charitable or for-profit.

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| Do nothing               |
|--------------------------|
| Institutions pay a single fee allowing unlimited OA publication in any Society title, plus unlimited usage of paywalled content. |

| Flip (APC-funded OA)    |
|--------------------------|
| Institutions pay a two-part fee comprising a fee for subscription content, and a fee that allows authors to publish OA in hybrid journals. |

| Freemium                 |
|--------------------------|
| Read-only HTML is freely available, while institutions can opt to subscribe to premium services. |

| Institutional membership |
|--------------------------|
| Offer discounts against APCs for pre-payment of OA costs, as well as institutional access to the Society magazine. |

| Publish & read           |
|--------------------------|
| Institutions pay a single fee allowing unlimited OA publication in any Society title, plus unlimited usage of paywalled content. |

| Read & publish           |
|--------------------------|
| Sell institutional subscriptions; if an income threshold is reached, the journal is made OA for the subscription year. |

| Revert to subscription   |
|--------------------------|
| Convert our hybrid journals back to a pure subscription state, eliminating the gold OA option from these journals. |

| Sister OA titles         |
|--------------------------|
| Protect subscriptions by offering authors an OA-only venue, leveraging existing branding, editorial boards, workflows, etc. |

| Submit & publish         |
|--------------------------|
| Introduce submission fees to recoup some of the costs associated with submitted articles, thus permitting reduction in the APC. |

| Subscribe to open         |
|--------------------------|
| Sell institutional subscriptions; if an income threshold is reached, the journal is made OA for the subscription year. |

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**Figure 1. Models discussed internally following release of Plan S (in alphabetical order).**
It therefore became clear that in our case, at least, any sustainable transition towards OA would require a continuum of business models\(^1\). We mapped out one possible version of the continuum (Figure 2), which is the version that we deem most appropriate for us as the landscape stands today. It is probable that changes in funder mandates, institutional purchase arrangements and researcher demand will affect our future position; we will also take into account the experiences of other publishers who trial new business models.

![Figure 2. A continuum of business models](image)

While the Society is clearly an enthusiastic participant in the drive for an OA future, the nature of small society publishing limits the resources we have to enter into many-to-many negotiations or to administer complex transitionary arrangements such as those exemplified by the agreement between Wiley and Projekt DEAL [6]. As a pragmatic first step, therefore, we have engaged with transforming to OA on multiple fronts:

- The Microbiology Society is a founder member of the newly formed Society Publishers’ Coalition [7], a group of likeminded, not-for-profit learned societies, community publishers and membership charities who publish as part of their charitable objectives and who re-invest the surplus from their publishing into the disciplinary communities they serve. Members share a common ambition to see an orderly and sustainable transition to open scholarship and to improve the efficiency of the scholarly communication ecosystem for the benefit of researchers and society at large in a fair and sustainable way.
- One of us (TMC) was invited to join the working group for the Wellcome, UKRI and ALPSP funded Society Publishers Accelerating Open access and Plan S (SPA-OPS) project led by Information Power [8]. The project was commissioned to help learned society publishers successfully transition to OA and align with Plan S

\(^1\) We define sustainability across two criteria: finances, and the ability of all authors to publish in our titles without financial barriers. A shift to a pure APC-driven OA model would be considered unsustainable under the second criterion.
• We framed, market researched and have offered an institution-level set-rate Publish & Read (P&R) package that is simple for both the Microbiology Society and our institutional customers to manage.

The collective and consortia initiatives involve other parties and much negotiation, and reporting these falls outside our remit. This paper instead focuses on the set-rate Publish & Read licence, outlining the modelling process we used in developing it. We hope that it will provide insight and interest in a pragmatic and methodical response to a critical moment in our publishing history.

4. Publish & Read

As Figure 2 shows, from 2020 we will be offering a P&R package designed to deliver a frictionless OA experience for authors together with maximum value for institutions:

• Unlimited OA: any article published in a Society journal where the corresponding author is from a P&R institution will be OA by default.
• Unlimited Usage: any user associated with a P&R institution can access the entire archive of Society content, back to 1947, for reading and for text and data mining.

We decided to make our P&R package available both to single institutions, via a flat-rate package with set terms that can be purchased through institutions’ preferred agents, and to consortia around the world. At the time of writing, consortial P&R deals are being proposed and under negotiation, running alongside the SPA-OPS efforts to develop a set of principles covering consortia model transformative agreements for Society publishers – a welcome effort if it can achieve standard practice and reduce lengthy discussion.

For both consortial and institutional P&R, we have committed to allowing corresponding authors to opt out of OA without requiring permission from their administrator, and (where technology permits) to reporting on OA publications covered by the package on a regular basis. We believe this offers the best balance between minimal friction – we do not need to seek permission for each article published – and individual choice on the part of the authors.

4.1 Pricing & modelling

The data presented in this section are for the purposes of illustration and do not reflect actual Microbiology Society numbers.

Several pricing principles guided us in developing our P&R package: we needed to be able to provide transparent, cost neutral pricing to encourage our institutional customers to take up the package; we needed to back up prices we were recommending with rigorous modelling and analysis; and any pricing had to be sustainable over at least a five-year period.
One of our goals in offering single-institution P&R packages is to allow institutions to continue purchasing through their preferred agents. Maintaining existing sales channels removes friction for our library customers and, given agency sales account for over 85% of our subscriptions, means we need not redesign our entire sales channel. To do this we needed to set a flat rate using current pricing as our starting point, and to have simple terms that would not require additional paperwork on the part of the agents.

4.1.1 Step one: identify the market
Our first P&R package is focused on institutions in our Academic 1 and Academic 2 tiers, meeting two criteria: (1) subscribing to any of the hybrid journals and (2) with faculty who publish in any of our journals including the OA titles. We did not factor in our subscription tiering or typical distinctions between academic institutions of different sizes versus corporates or government agencies; while this simplification is a constraint in our work it does enable us to model the effects of P&R at a high level.

Having decided on our market we extracted information about total publishing revenues from those institutions in the form of total spend (subscription plus APC) with the OA spend averaged across the years 2016, 2017 and 2018. As different institutions spent very different amounts, we subdivided the group into quartiles (Table 1).

Table 1. Annual spend among engaged institutions, given a hypothetical 125 engaged institutions per quartile.

| Description                                      | Total revenue | Mean spend per institution |
|--------------------------------------------------|---------------|----------------------------|
| Quartile 1 One or two subscriptions plus one or two APCs | £375,000      | £3,000                     |
| Quartile 2 Three subscriptions plus APCs or four subscriptions | £875,000      | £7,000                     |
| Quartile 3 All hybrid journals plus one or two APCs | £1,125,000    | £9,000                     |
| Quartile 4 All hybrid journals plus three or more APCs | £1,375,000    | £11,000                    |

4.1.2 Step two: test pricing
With our market identified, our next step was to examine the impact of different P&R package prices on revenues in 2024 (i.e. in the fifth year of offering P&R). To keep calculations as simple as possible we made the following assumptions, which we acknowledge to be limitations to accurate modelling:

- No change in the numbers of engaged institutions.
- No change in the mean spend of engaged institutions not taking up P&R package.
- No change in the price of the P&R deal.

As part of the modelling we created rules to account for different levels of uptake of P&R packages, with uptake dependent on the variance between current mean spend per institution and the P&R package price (Table 2).

Table 2. Rules for uptake of P&R packages depending on how much the price varies from current spend.

| Variance from current spend | Uptake |
|-----------------------------|--------|

With these rules in place we started assessing potential uptake of P&R packages and the associated revenue implications compared with current spend (Table 3). We modelled a P&R package priced at the level of spend in each quartile of engaged institutions, as well as at £8,000.

Table 3. The impact of P&R on revenues at different package price points.

| Institutional uptake* | P&R revenue | Non-P&R revenue | Total revenue | Variance from current revenue |
|-----------------------|-------------|-----------------|---------------|-----------------------------|
| P&R at £3,000         | 420 (84%)   | £1,256,250      | £356,250      | £1,612,500                | -£2,137,500 |
| P&R at £7,000         | 288 (58%)   | £2,012,500      | £1,050,000    | £3,062,500                | -£687,500   |
| P&R at £8,000         | 232 (46%)   | £1,850,000      | £1,468,750    | £3,318,750                | -£431,250   |
| P&R at £9,000         | 188 (38%)   | £1,687,500      | £1,887,500    | £3,575,000                | -£175,000   |
| P&R at £11,000        | 82 (16%)    | £893,750        | £2,893,750    | £3,787,500                | £37,500     |

*Numbers of institutions opting for P&R were calculated for each quartile of spend, with the number rounded down to the nearest integer.

A one-price-fits-all approach will not be suitable for all our customers, but given the size of the Society and our limited resources we are not able to implement tiered pricing during the initial trial period of P&R. The revenue implications associated with pricing P&R at £3,000 were too significant for us to consider moving forward with that as our single fixed price point, so while it is included here for completeness, we eliminated it from further consideration. From a purely financial perspective a price of £11,000 – equivalent to the mean spend of engaged institutions in quartile 4 – was the only option predicted to return a positive financial performance. As most such institutions are corporate or government customers, less affected by Plan S than academic institutions, this price point is not likely to have the desired effect of moving us towards an OA future. Should the P&R trial prove successful we will consider introducing additional tiers of P&R packages to accommodate a greater range of institutions.

4.1.3 Step three: check P&R against subscription

Having identified the revenue implications of P&R, we turned our attention back to subscription attrition modelling undertaken during 2017. This applied the average attrition rate from the period 2010 to 2016, by quartile, and projected those trends forwards to 2024. We were thus able to compare estimated revenues under a subscription model with the P&R modelling described in this article. The potential reduction in revenue for the different models is compared in Figure 3.
4.1.4 Step four: publishing impact

Referring to our mission, finances are not the be-all and end-all of society publishing: we publish so that the science of microbiology provides maximum benefit to society, meaning that we should be aiming to publish more work as openly as possible. This led us to examine the rates of publication of paywalled as well as OA articles from our engaged institutions. We anticipated that we would find a correlation between average spend per quartile and publication rate but in fact there was a difference of only one published article per year between quartiles 1 and 4, though engaged institutions in quartiles 3 and 4 were more likely to be publishing two or more of these papers OA through payment of APCs. This led us to propose a baseline of two additional OA papers per year per P&R package. If one assumes that the additional OA articles follow the current distribution of OA across our portfolio, there are two journals which could conceivably reach 50% OA by 2024, unless there is an increase in publication rates for paywalled articles (Table 5).

Table 5. The impact of P&R on the proportion of OA in the four hybrid journals in the Microbiology Society portfolio.

| Journal | OA % in 2018 | £3,000 | £7,000 | £8,000 | £9,000 | £11,000 |
|---------|--------------|--------|--------|--------|--------|---------|
| Journal 1 | 16.95% | 72.32% | 49.72% | 40.11% | 32.20% | 14.12% |
| Journal 2 | 22.48% | 94.95% | 65.14% | 52.75% | 42.66% | 18.35% |
| Journal 3 | 5.41% | 23.17% | 15.83% | 12.74% | 10.42% | 4.63% |
| Journal 4 | 1.38% | 5.91% | 3.99% | 3.30% | 2.61% | 1.10% |
4.1.5 Step five: price recommendations

Taken together, the financial and publication implications of the different P&R pricing scenarios led us to recommend a price of £8500 per institution to our Council, allowing us to offer discounts to consortia while maintaining a sustainable level of journal revenue. This was accepted as offering a good balance between fairness to our engaged institutions, increased OA publications and manageable implications for our finances in 2024. There are of course caveats – for example in April 2019 we launched a new OA journal, Access Microbiology. We will monitor publications in this journal by institutions which purchase P&R and adjust pricing accordingly from 2021.

4.2 Market reaction

Before launching the P&R package we needed to test the market by speaking to some of our target institutions. At the time of writing (August 2019) feedback indicated that:

- Half of institutions are familiar with P&R and many have transformative deals, usually via consortia; transformative deals including P&R are reported to be rare outside of Europe.
- 37% of respondents were positive towards the P&R model we described, and only 13% of respondents were not interested at all. Most felt that the combination of flat rates with unlimited publication and removal of payment barriers for authors was likely to encourage a rapid transition towards OA.
- Interested institutions requested more information about corresponding authors from their institutions, who would benefit from P&R. Over the period 2016 to 2018, corresponding authors from interested institutions had published an average of four articles in Society journals, with an average of seven additional articles as co-authors.
- 16.7% of respondents mentioned specific budget obstacles, including a split between their subscription and OA budgets, while only 22.2% said that they did not anticipate any budgetary obstacles to P&R.

We continue to seek feedback from institutions and intend to offer institutional P&R from 2020, despite the updated cOAlition S implementation guidance pushing back the launch of Plan S to January 2021 [5]. With more customer feedback and experience of selling this concept, we expect development of variations and tiering that will permit us to bring in other categories of institution, from the largest corporate and government subscribers to the smaller academic and college hospital subscribers.

5. Subscribe to open

In Figure 2 we outlined our proposed continuum of business models, which suggested that a next step beyond P&R was Subscribe to open. When looking at the potential for P&R to reshape the profile of OA in our journals, we thought about how we might approach a situation in which one or more of the journals reached 50% OA – a point at which we deem it likely that many institutions not covered by a P&R package would be likely to cancel a subscription. As shown in Table 5 above, this may well occur for two of our titles in the next few years.
It is commonly assumed that publishers should flip journals from a subscription model to APC-driven OA, possibly in combination with P&R packages, but there are real risks associated with such a scenario, not least a substantial drop in submissions from authors who lack OA funds. One alternative is to ask subscribers to pledge to maintain their subscription, while the publisher commits to converting the journal to OA provided a base level of funding is achieved. We will be watching the Annual Reviews experiment with interest [9]. To use their explanation: “Subscribe to Open converts gated access journals to open access using existing library relationships and subscription purchases. Institutions that already know and value Annual Reviews content simply continue to subscribe—there are no APCs or other additional costs—and as long as subscription revenues are maintained, the year’s volume will be published open access and the back volumes made freely available. If subscription revenue is insufficient to cover costs, for example as a result of institutions deciding to “free ride”, the journals will remain gated access. Thus, Subscribe to Open is a subscription offering, but one that empowers libraries to maximize the impact of their collection budgets by supporting the open access publishing of highly valued content.”

By introducing cross-portfolio P&R followed by Subscribe to open for specific journals, we can match researcher, institutional and funder demands for OA while ensuring that no researcher is prevented from publishing by lack of OA funds.

6. The future for society publishers

Some of the largest commercial publishers no longer describe their principal goal as ‘publishing’. Elsevier is a ‘global information analytics business’; Wiley develops ‘digital education, learning, assessment and certification solutions’. Operating at this scale, companies can diversify their income by acquiring technology solutions and workflow companies. Society publishers are equally cognisant of the risk of over reliance on one source of income and many have mitigation strategies in place. With more modest means, the small to mid-sized society publisher cannot exploit the opportunities open to large, deep-pocketed corporate entities, even if they were minded to.

The research community is still growing, with new niche areas developing and giving rise to new journals on a regular basis. For many researchers, institutions, funders and publishers the Impact Factor still rules, recognising journal brands rather than rewarding the merit of individual articles or researchers. From an OA perspective many academics – the primary actors in journal publishing as authors, reviewers, and editors – are either disengaged, uninterested or bemused by the nuances of OA. It is not clear what influence institutions, funders and libraries will have on researcher behaviour as Plan S becomes operational.

What has changed with the release of Plan S is the impetus to re-evaluate change and the pace of change. Consortia, institutions, funders and other intermediary stakeholders are joining with publishers and with small societies as well as with other stakeholders to examine alternative routes to OA. Publishers are renewing attempts to develop new business models to protect revenue, in a world where the reality is that OA delivers less financial cushion and predictability than the traditional subscription model.
7.  The message, not the medium

Academic life will continue to rely on trusted publishing venues. Whether that is a traditional journal, a mega-journal like PLoS One [10], a platform like F1000 [11], or something completely different, societies have an opportunity to reclaim their place as trusted, valued players in the research communication space. To make the most of that position we will have to shift our focus in line with the goals of Open Scholarship, delivering services, not products.

We believe that OA is important, but that research culture and society mission are stronger drivers. We are OA advocates in so much as OA achieves the goal of enabling effective and collaborative Open Scholarship: we do not know what we should transform into, but we do need to respond to our environment. Darwin’s words are prescient as we seek ways to transform: *In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed.*

8.  Acknowledgements

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