

Accounting For the Cost of Open Access Publication

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Abstract: This commentary explores the option for a funding agency to provide its grantees with the funds required to publish their research in open access (OA). The benefits of OA, including the high visibility of articles from being freely available online immediately they are published and the increased citation rates that follow, are relevant to scientists and becoming of increasing interest to granting agencies. A small European granting agency reviewed all the publications generated in 2015 and 2016 from their research awards, and calculated the costs that would have been required for these to be OA in the journals that published them. The totals each year came close to 10% of the agency's annual funding budget. Larger agencies may have more leeway to adopt an OA funding policy. Meantime there is a growing trend for OA to become a requirement of funded research.

Keywords: impact factor, funding agency, open access publication, research grant

1. Introduction

There is a growing trend for scientists to publish their research using open access (OA). This is predicated, in part, both by the requirement of agencies funding research with public money that the results are made freely available on publication, and, the growth of on line publication as subscriptions to print journals decline [1]–[2]. The trend is also driven by scientists who believe that OA more effectively disseminates their work [3], and now funding agencies are seeing enhanced dissemination of research they fund as a factor of interest.

With analysis projecting that OA could account for 50% of the scholarly journal articles published in the next five years and 90% of them as soon as 2020 [1], the challenge for scientists and funders alike is the cost of the OA options offered by publishers. The range of options extends from all the papers in a journal being published in open access (conventionally termed “Gold” OA), through a hybrid option where selected papers are made open access for a fee, to the purchasing of some form of creative commons license, to the option to place selected work in a repository where it is accessible to the public (“Green” OA) [4].

The principal OA options cost a significant amount of money. This raises the question as to where the funds required are to be sourced from. Most work funded some years ago likely included no budget for OA. Those holding modest grants that would allow payment often find the proportion needed for the fee prohibitive. The experience of

many researchers writing grants recently is that they have had line items for publication reduced or eliminated, even when these stipulate OA. The end result is that either scientists find the fees required personally or generate them from another source, or fall back on conventional publication and have to accept the inherent delay in their results being openly available.

This commentary explores one solution to the funding shortfall experienced by many scientists - namely, for a granting agency to provide OA publication fees to the grantees they fund. The stated mission of ERAB: The European Foundation for Alcohol Research (ERAB) is “to support high quality research into a better understanding of the effects of alcoholic beverages in general and beer in particular on the behavior and health of individuals and society in general, and ensure the appropriate dissemination of the relevant results of research [5].”

To this end, the costs have been calculated that ERAB would have had to pay for open access publication of all the papers reporting research by their funded scientists for the years 2015 and 2016.

2. Material and Methods

All the publications for the last 2 years, where complete data are available (2015 and 2016) were analyzed. The individual websites of each journal title represented were accessed and current open access charges identified. The open access options available to authors provided by each

publisher and the impact factor of each journal were also noted.

3. Results

The data obtained are tabulated in Table 1.

In 2015, 21 papers were published by ERAB funded scientists in a total of 18 journals, and in 2016, 19 papers in

15 journals. The cost, had these been published using the journals' OA option, would have been US\$ 54,590 (€ 45,571)

for 2015 and US\$ 47,464 (€ 39,210) for 2016. The 2016 impact factor of the journals selected by ERAB funded scientists ranged from 0.451 to 14.176.

Table 1. Journal by title, impact factor, open access fee, and number of articles published and costs for 2015 and 2016.

Journal Title	Impact Factor 2016	Publisher	Fee for immediate open access*		2015		2016	
			€**	\$ ***	no.	Cost €	no.	Cost €
Addiction Biology	4.603	Wiley	2,500	3,000	2	5,000	3	7,500
Addictive Behaviors	2.944	Elsevier	1,879	2,200	1	1,879	1	1,879
Alcohol	2.778	Elsevier	2,136	2,500	1	2,136	0	-
Alcohol and Alcoholism	2.757	Oxford Journals	3,050	3,570	2	6,100	3	9,150
Alcoholism: Clin. & Exp. Res.	3.392	Wiley	2,500	3,000	1	2,500	1	2,500
American Journal of Psychiatry	14.176	American Psychiatry Association	-	-	1	na	0	-
Biological Psychology	3.070	Elsevier	2,392	2,800	1	2,392	1	2,392
BMJ open	2.369	BMJ	1,375	1,609	0	-	1	1,375
Brain, Behavior, and Immunity	5.964	Elsevier	2,392	2,800	2	4,784	0	-
Bulletin UASVM Food Science and Technology	0.451	University Ag. Sci. Vet. Med. Cluj-Napoca	0	0	0	0	1	0
Critical Care Medicine	7.050	Wolters Kluwer	3,417	4,000	0	-	1	3,417
Critical Reviews in Food Science and Nutrition	6.077	Taylor & Francis	2,520	2,950	0	-	1	2,520
Current Addiction Reports	N/A	Springer	2,563	3,000	1	2,563	0	-
European Journal of Pharmacology	2.896	Elsevier	2,819	3,300	0	-	1	2,819
European Neuropsychopharmacology	4.239	Elsevier	1,709	2,000	1	1,709	0	-
Food Chemistry	4.529	Elsevier	2,265	2,650	1	2,265	0	-
International Journal of Neuropsychopharmacology	4.712	Nature Group	1,880	2,200	1	1,880	0	-
Journal of Adolescent Health	3.974	Elsevier	2,563	3,000	1	2,563	0	-
Journal of Health Psychology	2.182	Sage	1,299	1,500	0	-	1	1,299
Journal of Youth and Adolescence	3.562	Springer	2,200	3,000	1	2,200	0	-
Neural Plasticity	3.054	Hindawi	1,708	2,000	1	1,708	0	-
Neurochemical Research	2.581	Springer	2,200	3,000	1	2,200	0	-
Neuropsychopharmacology	6.403	Nature Group	3,200	3,500	1	3,200	0	-
PLOS ONE	2.806	Public Library of Science	1,276	1,495	0	-	1	1,276
Psychology and Health	2.225	Taylor & Francis	2,150	2,950	0	-	1	2,150
Psychopharmacology	3.308	Springer	2,200	3,000	1	2,200	1	2,200
Substance Use and Misuse	1.234	Taylor & Francis	2,150	2,950	0	-	1	2,150
TOTAL					21	€ 45,751	19	€ 39,210

LEGEND

* Without tax

** Exchange Rate used \$1 = €0.85

*** Exchange Rate used £1 = \$1.6 \$US

4. Discussion

This evaluation established that the costs which a small European funding agency would incur if they opt to cover the open access publishing costs for the scientists they fund will be between approximately €40,000 and 49,000 per year based on 2015/2016 output. The relevance of exploring this option includes the fact that refereed journal articles today are predominantly published in subscription journals, accessible only to subscribing institutions, but analysis suggests that full open access publishing could account for 50% of the scholarly journal articles published in the next five years and 90% of them as soon as 2020 [1]. Also, ERAB's mission includes ensuring "the appropriate dissemination of the relevant results of research" which they fund, and they are aware that one of the main concerns expressed by scientists about adoption of OA is the cost they currently must incur by doing so [2].

The benefits of OA publication are well recognized by many researchers [1]-[3], and are of increasing interest to granting agencies. They include: high visibility as all articles are made freely available online for everyone, immediately they are published; compliance with open access mandates from agencies such as the European Commission, Research Councils UK and the National Institute of Health; and, authors retain the copyright of their publication which can be reused and immediately deposited in any desired repository that provides public access [6].

The purpose of ERAB's evaluation was to examine the option for them to support their researchers and promote the benefits of OA publication by addressing the shortfall in funding faced by their grantees if they chose to pay the journals publishing their work for the OA option. This is in keeping with calls to investigate who is paying for OA as well as the economics of the overall OA publishing model [7].

Unfortunately, as ERAB's total annual funding budget is in the order of € 400,000.00, the provision of OA publication fees of the magnitude identified would effectively mean that one less investigator's research could be funded annually.

The option for larger agencies to support their grantees' OA costs remains however, as they have greater resources, and as the total value of each grant awarded will often be in 6 figures, which means that proportionally only a small part of the overall funding would need to be allocated. Many large national funding agencies have a requirement that grantees make their results available via open access immediately they are published, as these organizations see this as central to responsible use of the public money from which the their grants derive [6].

Another perceived benefit of OA is that enhanced access to the research literature has the potential to accelerate recognition and dissemination of research findings [3]. In this context, following the overall citation impact factor of journals, as this ERAB survey did, or comparing the impact of OA and non-OA journals, provides limited information on the benefit derived from OA. The most effective way to use impact factor is to compare the citation counts of individual OA and non-OA articles appearing in the same (non-OA) journal. Such ongoing comparisons are revealing dramatic citation advantages for OA [8].

As an example, comparing OA with non-OA articles published in the Proceedings of the National Academy of Sciences in 2005, investigators found that OA research was

twice as likely to be cited in the first 4–10 months following publication, with the odds ratio increasing 10–16 months after publication. Also, immediately published OA articles on the journal site had higher impact than self-archived or otherwise openly accessible articles. There is additional evidence that even where a journal is widely available via libraries, OA articles are more immediately recognized and cited by peers than non-OA articles in the same journal. Hence, the growing recognition that OA benefits science by accelerating the dissemination of research findings [3].

The European Commission defines OA as the practice of providing on-line access to scientific information that is free of charge to the user and that is re-usable [6]. In the context of OA, 'scientific information' generally falls into one of two main categories: 1). Peer-reviewed scientific publications; these are primarily research articles published in academic journals; and, 2) Scientific research data: these are the data that underlie peer-reviewed publications and/or other data such as unpublished data sets or raw data.

Because the European Commission also recognizes that making research results more accessible across society contributes to better and more efficient science, and to innovation in the public and private sectors, it therefore supports open access at the European level, at the Member States level and internationally [6].

In the future, the current question of where open access fees come from may be moot. In May 2016, the Competitiveness Council conclusions called for full open access to scientific publications in Europe by 2020. They are not alone, with other similar calls coming from many countries elsewhere. Leading by example, the European Commission has already made OA an obligation for its Horizon 2020 grantees, but further steps are needed to make 100% open access possible to Horizon 2020 related publications [6]. Because of this, the Commission is investigating the possibility of funding a platform to enable all Horizon 2020 beneficiaries to publish OA, in addition to the current options that exist.

This initiative, underscores the relevance of ERAB's evaluation, and offers hope for the large body of researchers who want to adopt the OA route when publishing their research, but are currently precluded from doing so by the cost.

Limitations are recognized in this commentary. The evaluation on which it is based is of the anticipated costs for a small funding agency. Discussion is not included of the pros and cons of the options available to researchers to make their articles OA. These obviously include self-archiving on the web (by convention: "Green OA") or by publishing them in OA journals (generally termed: "Gold OA"). As the research funded by ERAB is in the biomedical field, full ("Gold") OA would be the option preferred, predicated by the organization's mission and based on the evidence of impact and efficacy of dissemination [4]. However, use of the "Green" self-archiving option would be supported. Such archiving is the requirement of many funding agencies, this option can be provided for all journals articles, and, perhaps of most relevance in the context of this commentary is that "Green" OA does not require paying extra 'Gold' OA publication fees.

Finally, surveys have been carried out to learn about authors' perceptions and use of OA publishing. Greater awareness among, and support for, scientists would likely increase OA publication [2]. In one survey, awareness of OA

journals among those who had not published in them was quite high, but awareness of the 'self-archiving' option was less. For those choosing to publish in an OA journal the most important reason was the principle of free access, while the main reason given by authors who had not published in an OA journal was unfamiliarity with such journals. Forty per cent of authors reported they had used a 'self-archive' option for their traditional journal articles, but almost twice as many say they would 'self-archive' if required to do so by the agency funding their research [2].

Interestingly, in the context of this commentary on ERAB's evaluation of the option to fund OA publication for their grantees, one of the main concerns expressed by researchers about the OA process was the related cost; hence the relevance of consideration of how to make specific funds to facilitate OA available.

6. Conclusion

Fees for OA publication are recognized to be a factor limiting the option to make research immediately freely available on line, in spite of the growing recognition of the benefits of doing so by scientists, and increasing awareness by funding agencies. Analysis by a European funder of what it would have cost them to provide the required OA fees for the scientists whose research it funded in 2015 and 2016 showed that with an annual budget of 400,000, 10% of the funds available would have had to be allocated for this purpose.

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Author Profile

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