

An evolving business model for scholarly publishing: exploring the payment of article processing charges (APCs) to achieve open access

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Abstract

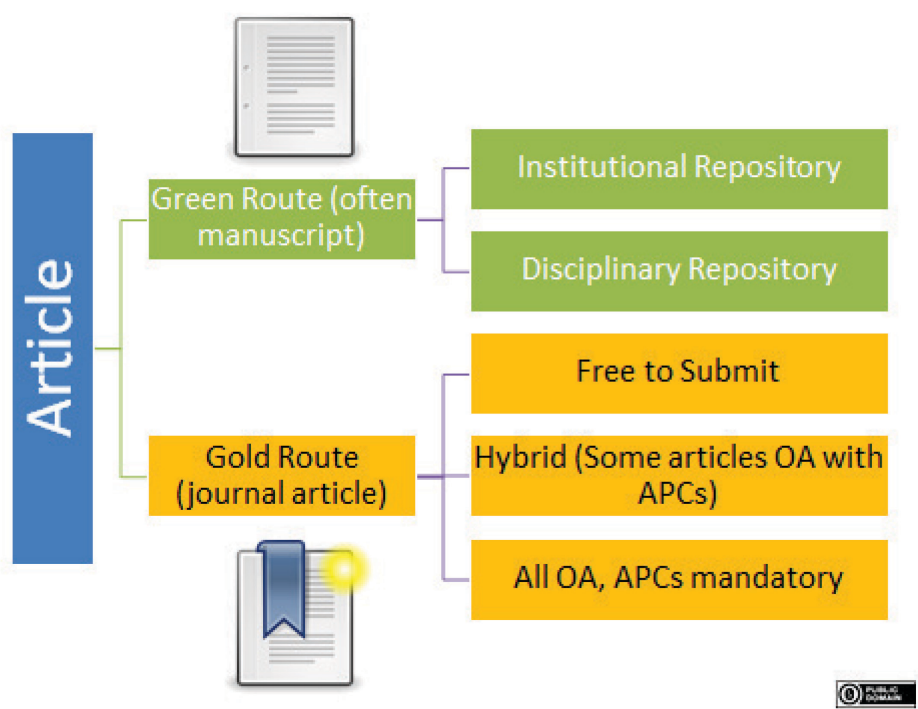
In terms of scholarly publishing the academic library's role in Kaitiakitanga is changing. Open access is growing in importance as library budgets contract. There are two main routes to open access: the green route through submission of manuscripts to institutional and subject repositories and the gold route which may require authors to pay article processing charges (APCs). Research Councils in the UK now provide UK universities with a block grant to help UK researchers publish using gold open access. So how are researchers in New Zealand responding to the availability of the gold open access road without similar support? Is this business model working in New Zealand, why are researchers choosing this route and what are the trends? This paper will report the results of a current survey of University of Canterbury researchers publishing their outputs using gold open access. It also aims to uncover the motives for going gold and indicate the demand and costs to an institution of this publishing route, so providing a case study of gold open access publishing in New Zealand.

Introduction

Scholarly communication is undergoing a global revolution with many publications now being made freely available to the reader as open access. Open access publishing confers several advantages including greater citations and a wider dissemination of research. As Eysenbach notes, “OA (open access) is likely to benefit science by accelerating dissemination and uptake of research findings” (Eysenbach, 2006).

Open Access publication has led to the growth of alternative business models to that of traditional journal subscriptions. Two routes are available to achieve open access: green and gold (Suber, 2012). With the green route, a copy of a research output is made available in a subject or institutional repository. All eight New Zealand universities have institutional repositories and, where copyright permissions allow, this route provides widespread open access to some of the universities’ outputs especially as the papers can be easily found through bibliographic databases and Google Scholar.

In the gold route, open access journals make the articles they publish openly available. Some journals, about 28% of those listed in the Directory of Open Access Journals, require the author to pay to have their journal article published (Kozak and Hartley, 2013). These author payments are commonly known as Article Processing Charges (APCs).



Funding bodies worldwide are increasingly insistent that the research outputs they fund be made available open access. In the UK the Finch report (Working Group on

Expanding Access to Published Research Findings, 2012) and RCUK policy (RCUK, 2013) recommended gold open access and block grants be made available for researchers in UK universities for their payment. Open Access journals are becoming commonplace in many subject disciplines and the APC market is growing at a rate of 30% per year (Björk and Solomon, 2014).

In the traditional route to access scholarly publications payment is made by central library funded subscriptions, a new model is now evolving whereby individual authors source funds from government and private research grants, which are then paid to publishers to get the article published and it is then widely available as open access.. In a recent report for Jisc attempting to understand APCs the authors wrote, “One of the most significant issues which arose...was the fact that not one of the 24 universities involved in the project were able to tell the project the total number of APCs paid by their institution. “ (Woodward & Henderson, 2014). To complicate matters further, since one APC needs to be paid for an article and there may be multiple authors from multiple institutions, it is not just a matter of examining the affiliation of authors to estimate where the money is coming from.

Overall figures for APCs are therefore notoriously difficult to determine, but researchers are attempting to make estimates on the order of magnitude of the costs involved. APCs for research published in the Netherlands are reported to be about EUR4 million in 2013 (Gerritsma in Kingsley 2014). Individual articles can vary from the hundreds to the thousands of US dollars, mainly depending on the journal that is accepting the charge.

In spite of the complexity of the issue the authors sought to discover how researchers at University of Canterbury have responded to the availability of gold open access publishing and how much UC researchers are spending on APCs. This data will inform recommendations on ways in which the university can support researchers keen to publish in open access journals charging APCs.

Methods

Participants

Researchers who had possibly paid APCs were identified and invited to fill in an online questionnaire. Potential participants were identified by matching articles they had authored with data from the Directory of Open Access Journals (DOAJ), limited to those journals which charge APCs.

The first dataset was taken from Profiler, the University of Canterbury's Current Research Information System (CRIS), a dark archive of research outputs used for managing research funding grants and promotions. Researchers are highly motivated to submit their research outputs into the CRIS. Permission to access the metadata contained in the CRIS was obtained from the University of Canterbury Research & Innovation office. The dataset was limited to those who had submitted

an article for inclusion in their research profile from January 2012 to June 2014. This dataset is not licensed for redistribution.

The second dataset was drawn from the Directory of Open Access Journals, extracted in March 2014. The data is open in a Creative Commons ShareAlike (CC BY-SA) licence and is included as part of the data that has been made available from this research. This dataset includes an indication of whether or not the journal in question requires APCs.

The datasets were imported into a relational database management system (MS Access) and cross indexed on title, alternative title, ISSN and filtered for those that had potential APCs.

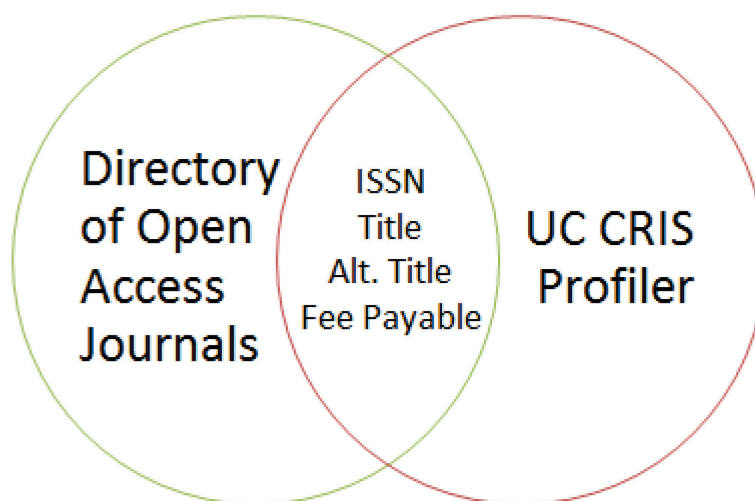


Figure 1 Datasets used in the study and criteria for matching them

The result was just over 100 University of Canterbury affiliated authors were identified, contributing to 286 separate research outputs from 21 separate publishers over the period sampled.

Publisher	Number of outputs	% of total
Public Library of Science (PLoS)	76	26.6%
BioMed Central	75	26.2%
Hindawi Publishing Corporation	33	11.5%
MDPI AG	18	6.3%
Springer	17	5.9%

Table 1 Top Five Publishers Identified. (Angelo, A., Lund, P. 2014)

Survey

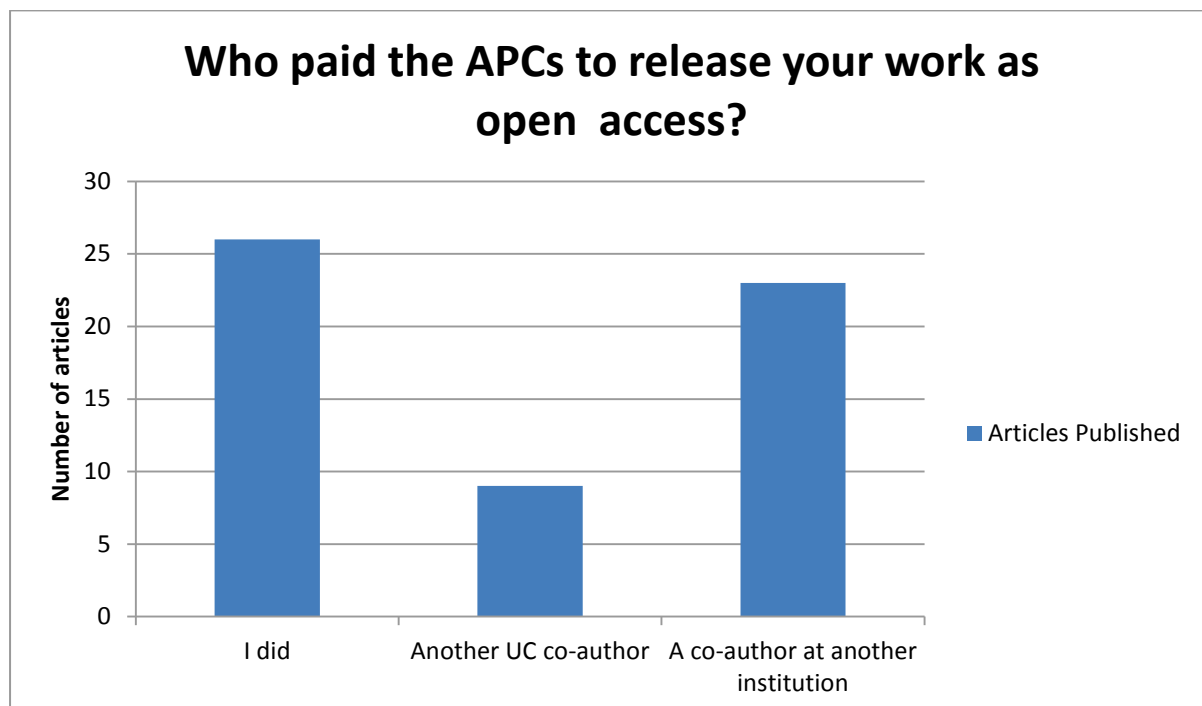
100 UC researchers identified as having published in journals that had potential APCs payable were invited to participate in a short survey run on Qualtrics software. The survey had been granted ethics approval, as well approval for the publication of anonymised data, (Approval 2014/07/LR-PS). Raw, anonymised data is available in Figshare.

Results

Raw data for this study is available from
<http://dx.doi.org/10.6084/m9.figshare.1157870>

Question 1

We understand you are connected with outputs which have been published as open access in journals that charge article processing charges (APCs). Who paid the APCs to release your work as open access?



As researchers may have paid for multiple articles (see question 5) respondents were allowed to choose more than one option. Of those that had paid APCs (41 respondents from the sample of 100) most had paid APCs to publish an article with an Open Access licence, or a co-author somewhere other than UC had paid.

Question 2

How many papers have you paid APCs for?

Total papers per respondent that had papers with APCs	
138	3.4

The 41 respondents had published a total of 138 papers for which they had paid APCs

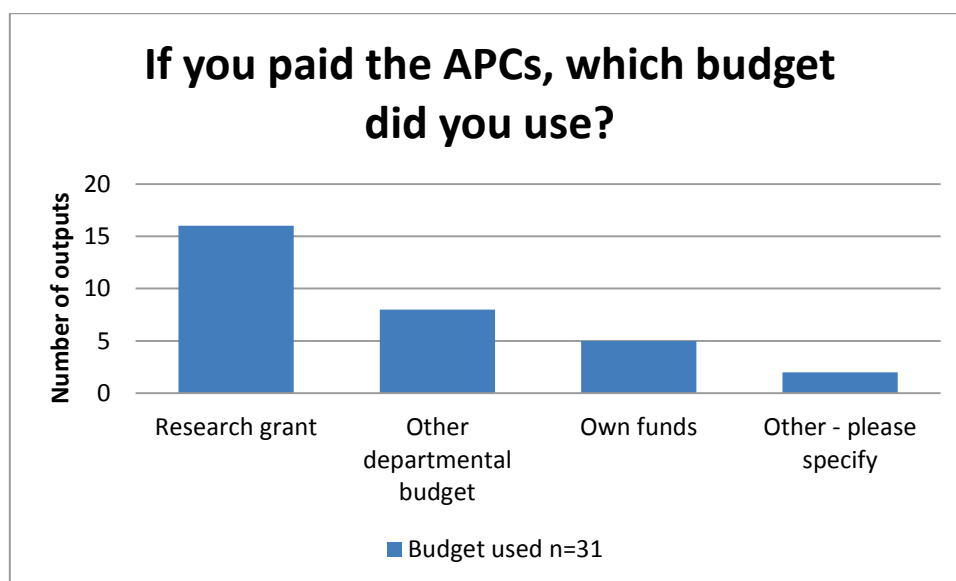
Question 3

Please estimate how much you paid for APCs overall (in \$NZ)?

Total	mean per paper
\$ 188,480.00	\$ 1,365.80

Question 4

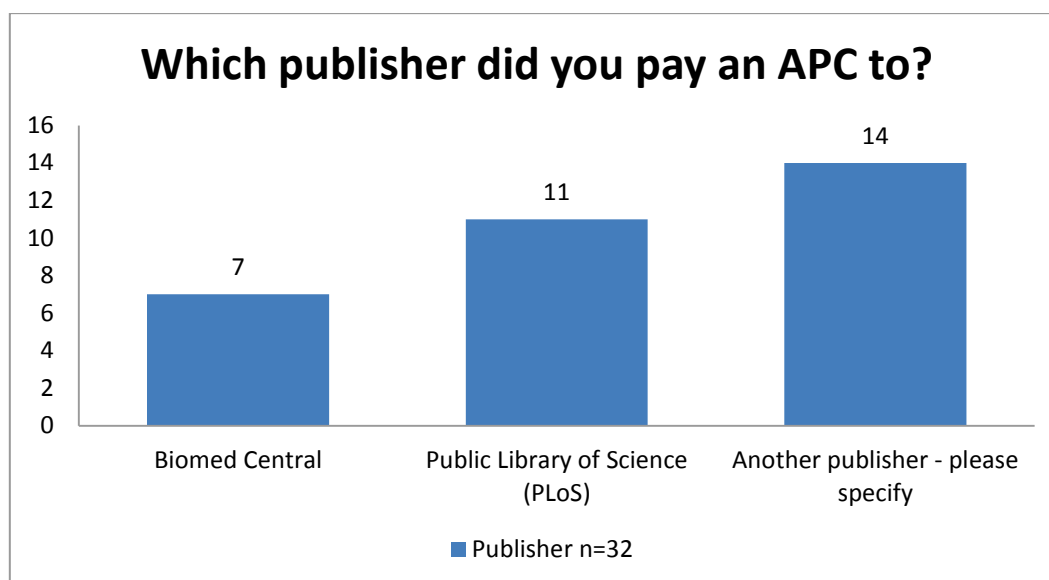
If you paid the APCs, which budget did you use?



Finding out where the money to pay APCs came from, over half of the responses for this question said that it was paid by research grants. Other sources included other departmental budgets, as well as researcher's own personal funds.

Question 5

Which publisher(s) did you pay your APC to?

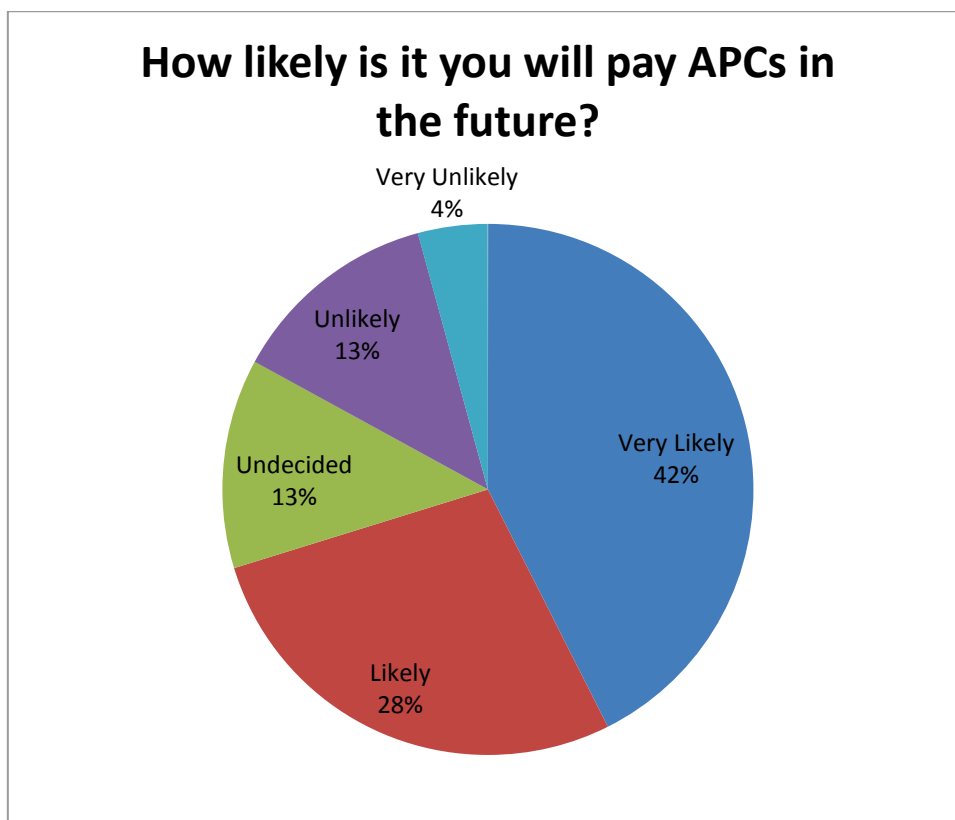


Over half of the research outputs reported were from two publishers, Biomed Central and the Public Library of Science (PLOS).

Of the other publishers four were not specified, and of the ones that were, none were represented more than once.

Question 6

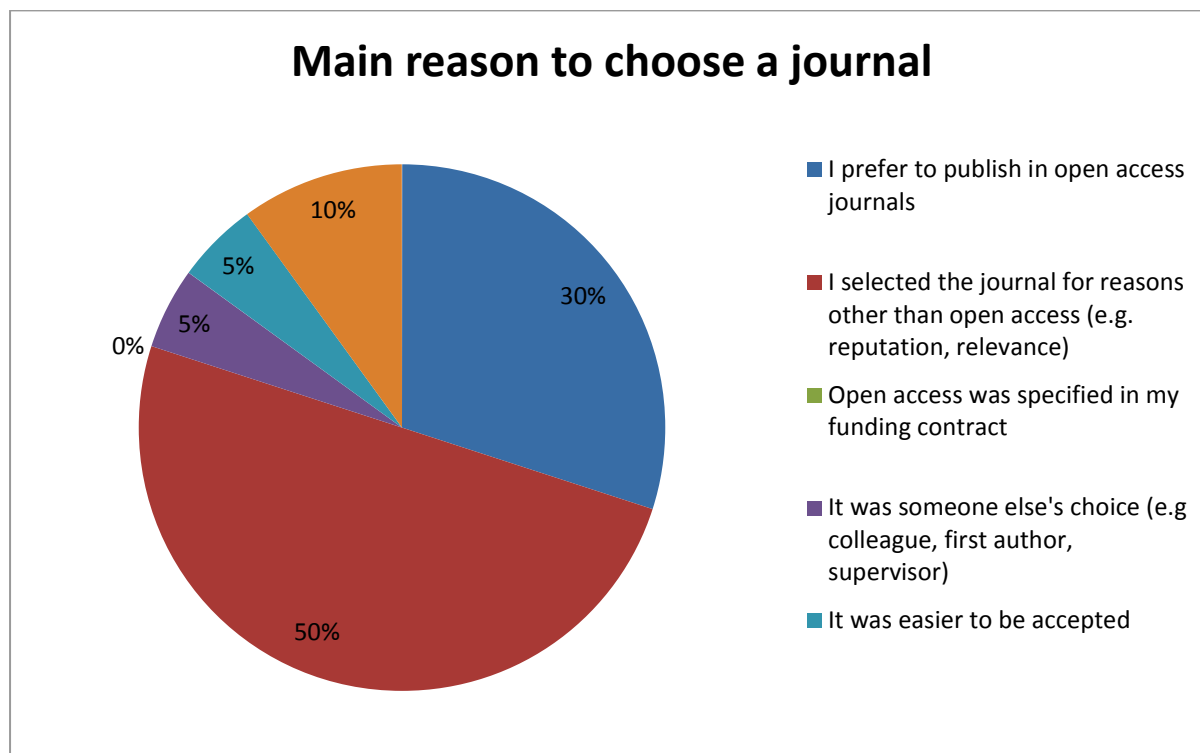
How likely is it that you will pay APCs or other open access charges in the future?



Unsurprisingly, out of our sample of APC paying authors 70% thought it likely or very likely they would pay APCs again. That 30% were undecided, or found it unlikely that they would pay APCs is interesting, as there are a group that have been 'turned off' the process for some reason.

Question 7

Why did you choose to publish in a journal with APCs?



As Open Access becomes more common as a model for scholarly publishing, it is more likely that an author will select an OA journal based on criteria other than its licencing. Though 30% of our respondents chose OA journals on its publishing model, 50% selected them for other reasons, such as academic reputation, and their relevance in the field.

Discussion

Understanding APC payments is complex. Payments occur from multiple budgets, from decentralised funds to a multitude of publishers. As complex as the overall publishing situation is, what becomes clear from the data is that 286 papers over the 28 months which incurred APCs represents a significant number of research outputs, incurring a large cost, one that warrants much further investigation.

Publishing in journals which charge APCs is commonplace among authors at University of Canterbury and most authors are likely or very likely to publish in open access journals in future. *Actual* payment of APCs by UC researchers is less frequent as many papers are paid for by co-authors at other institutions. Nevertheless it seems likely that expenditure on APCs will increase at the University of Canterbury. In anticipation of an open access policy, support for UC researchers to publish in gold open access journals could be increased by creating a fund to centralise the payment of some or all APCs or paying membership fees to attract discounts. Limiting these payments to a small number of defined, leading publishers would minimise the likelihood that researchers fall foul of predatory publishers. PLoS and Biomed Central are the publishers of most UC authored articles and many of these journals have significant impact factors. Though Hindawi was not caught by

our sample, there is a significant number of Canterbury affiliated authors publishing in their journals (see Table 1, above). It may be that they are publishing in Hindawi's totally free journals with no APC component.

No UC researcher published in open access journals as a requirement of their funding contract. Although some UC researchers preferred to publish in open access journals, the most common reason for publishing was for other reasons such as the reputation or relevance of the journal.

Benefits to the *institution* of taking membership of schemes offered by these publishers could include:

- Increasing the support for open access at University of Canterbury and thereby increasing citations of UC papers.
- Increasing the potential for collaboration with authors in other institutions
- Receiving discounts available.
- Reducing per article administration costs by consolidating author invoices.
- Reducing author queries about payment arrangements.
- Supporting postgraduate students and early career researchers who may not have research grants to support payment of APCs.

A move to supporting gold open access through the creation of a centralised fund for APCs is likely to involve a significant workload as much metadata will need to be collected and documented in a consistent way. Required metadata is listed in the Information Power report for Jisc (Woodward and Henderson, 2014). Guidelines, issued as part of an open access policy, will need to make clear what papers and authors can be funded.

The source of funds for a centralised fund is noted elsewhere (Fruin and Rascoe, 2014). At the University of Canterbury the tight financial situation post-earthquakes means that limited monies are likely to be available to support a centralised fund. University of Canterbury may take a similar approach to Emory University which has an open access publishing fund *of last resort*. An author must have exhausted all other grant and other funding sources to be eligible for the Emory fund and preference is given to authors who have not been previously funded. "*Due to limited funds, any given author is limited to one fund reimbursement per fiscal year.*" (Emory University, 2014). The adoption of a similar approach to Emory's will make the best use of limited funds at the University of Canterbury.

Conclusion

It may seem counterintuitive that when 'information wants to be free' (Polk in Wagner 2003) the focus should be on cost. In this model of Open Access Publishing, the intent is for information to be free to the end reader (Laakso et al., 2011) and the cost of making the information available is borne elsewhere. In this case the cost is removed from journal subscriptions paid centrally by libraries, and put onto the author. The question of a lost opportunity of economies of scale that had been

partially achieved in traditional journal subscriptions is highlighted, and this study demonstrates that the cost is of an order of magnitude that must be actively investigated. Charging authors through APCs effectively hides the cost of Gold OA publishing, and any solution has to be sensitive to scholar's wishes on where they think the best place to publish is – the main driver on journal choice as demonstrated in our study – along with prudent management of mostly state funds.

Article processing charges are a growing presence in the landscape of scholarly communication and create a challenge for academic institutions. In the UK where gold open access has been recommended as a route forward in the Finch report and by RCUK, many research intensive institutions have centralised funds based in the libraries and guidance on the administration of these has been provided by the Research Information Network (The Working Group on Expanding Access to Published Research Findings, 2012). New Zealand institutions do not as yet face demands from research funders such as Marsden, MBIE and HRC to make their research available as open access nor does the PBRF demand that nominated outputs be publically available as open access as HEFCE has recently announced for the UK REF2020. (HEFCE, 2014). Nevertheless such a fund would be of significant benefit for New Zealand universities in supporting open access and would be particularly advantageous for early career researchers who may not have good access to research grants or be as confident about stipulating publication costs for inclusion in their funding bids.

The authors are recommending to the University of Canterbury's Senior Management Team that researchers be encouraged to publish in leading open access journals through the payment of APCs to reputable OA publishers. Researchers applying for research grants will also be encouraged to specify a contingency for payment of APCs if required. A further recommendation made is that a fund of last resort be established to encourage early career researchers that do not have access to grants to publish in journals charging APCs. It is proposed that this could be managed by the Library as is now commonly occurring in UK and North American research-led universities. In this way UC Library will increase support for open access publishing and for early career research at the University of Canterbury.

Creation of a centralised payment system to monitor the cost of all APCs and take advantage of discounts and centralised accounting could also be beneficial though at this stage would require further consultation.

Acknowledgments

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Data

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