Policy Considerations for Canada's Open Access Publishing Strategy

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https://doi.org/10.38126/JSPG250107
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Keywords: Canada; open access; Diamond journals; research funding

Executive Summary: Open access publishing is primarily driven by the motivation to make publicly funded research findings freely available to potential readers. This can entail increased costs for authors, research institutions, and funding bodies, although the relative costs for stakeholders of open access publishing depends on the publishing sub-type. This point is highly relevant to Canada's research funding agencies, which are reviewing their Open Access Policy on Publications, with a renewed policy to be released before 2026. Here, I review the open access publishing options, and I recommend Canadian funding agencies incentivize a shift to Diamond open access publishing.

I. Introduction

The traditional research publishing business model is based on subscriptions, meaning the public and institutions must pay to access research articles (Boudry et al. 2019). However, over the past three decades, a growing number of organizations have pushed for peer-reviewed articles to be made open access (OA; i.e., available for free, generally online, while allowing authors to retain copyright) (Gaind 2019; G7 Science and Technology Ministers 2023). This approach has gradually become common in scholarly publishing. For instance, 45% of published articles were OA in 2015 (Piwowar et al. 2018).

This shift in the research publishing landscape has been reflected in changes at Canada's three federal research funding agencies (the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council), referred to as the 'Tri-Agencies'. These organizations now mandate that researchers make their work publicly available (Government of Canada, Science and Innovation 2023a). Tri-Agency-funded researchers have two options for disseminating their findings: (1) publish their work in a journal under an OA license and/or (2) upload the final but non-copy-edited version of an otherwise non-OA paper to a public, online repository (with permission from the journal). Either way, published articles need to be openly available within one year.

Although these are sound requirements, the Tri-Agencies are re-evaluating their Open Access Policy on Publications (Government of Canada, Science and Innovation 2023b), and have requested feedback from stakeholders. This memo is intended to aid policymakers in updating this policy, by providing a brief overview of three divergent options related to possible OA publishing pathways.

II. The ongoing importance of journal prestige

A crucial consideration is that journal prestige (e.g., impact factor), and not the distinctions between publishing models (see below), is the key factor driving where researchers publish (Hoffman 2017). This is primarily because many researchers believe their career advancement is most dependent on their journal publication record (Niles et al. 2020).

Although this may be correct, it is also becoming appreciated that journal quality is an imperfect proxy for the quality of individual papers. For instance, the 2013 Declaration on Open Research Assessment (DORA 2013) calls for article-specific measures and evaluation instead, for which Canadian granting agencies have publicly expressed support (Government of Canada 2016). However,

such article-specific metrics are imperfect: the number of views or citations an article receives is not necessarily a reliable proxy for research quality. Additional work is required to aggregate reliable article statistics to evaluate researchers' outputs. Accordingly, although the current norms are non-optimal, journal prestige should still be considered when investigating changes to publishing policy.

Publishing type	Free for readers	Free for authors	Peer reviewed	Authors retain copyright
Subscription-based	No	Usually	Yes	No
Preprints	Yes	Yes	Not typically	Yes
Gold OA	Yes	No	Yes	Yes
Green OA	Yes	Yes	Yes	No
Diamond OA	Yes	Yes	Yes	Yes

Table 1: Key scholarly publishing models (as defined in Farquharson and Wadsworth 2018).

III. Publishing models

There are many scholarly OA publishing models, each with specific advantages and disadvantages (Hook, Calvert, and Hahnel 2019). The most common publishing sub-types are Gold, Green, and Diamond OA, as well as preprints (Table 1).

i. Gold OA

Gold OA refers to making published work immediately available to readers for free. To cover lost subscription fees, many publishers now require processing charges, which are fees paid by authors and were on average CAD 2,200 per article in 2021 (Morrison 2021). For especially prestigious journals, such as certain *Nature* Portfolio journals, these charges can be extremely high, such as CAD 16,600 per article (Nature Portfolio 2024), although authors can still opt to publish closed access (often free or at low-cost, for authors).

Charging processing fees, rather than relying on subscription revenues, can be highly profitable for publishers, and there has been rapid growth in for-profit open access journals (Rodrigues, Abadal, and Araújo 2020). In extreme cases, predatory journals have arisen, which maximize publications without consideration of content or quality (Manca et al. 2017). Even with certain non-predatory journals, the misaligned incentives between publisher and author mean that researchers' work can still be published with little rigorous peer-review, although with the appearance of traditional journal article evaluation (Bohannon 2013).

ii. Green OA

Green OA is an alternative for authors who want to publish in traditional journals and avoid high processing charges, while ensuring their work is openly available. This is done by uploading published manuscripts (typically prior to final journal formatting) to online university repositories (referred to as 'self-archiving'). This is not always possible as it depends on the publishing license, but it is often permitted after an embargo period of 6-24 months (Kramer and Bosman 2020; Wiley Publishing 2024).

iii. Preprints

Preprints are closely related to Green OA, as they are non-final versions of manuscripts uploaded to online repositories. This approach is commonly used to share findings before a lengthy review process. Although there are exciting examples of ways preprints are changing scholarly publishing (van den Heuvel 2015; Eisen et al. 2022), in most fields they are generally not an option for final publication. For this reason, preprints will not be discussed as a standalone solution.

iv. Diamond OA

Diamond OA refers to published articles which are free for both authors and readers, usually supported by research institutions and organizations (Bosman et al. 2021). Research funding agencies also fund Diamond OA initiatives, but this is to a much lower degree. Although this publishing model has arisen quite recently, it represents a significant proportion of publications. For instance, only slightly less scholarly work was published as Diamond OA compared to Gold OA in 2021 (Bosman et al. 2021).

IV. Policy options

There are many possible approaches the Tri-Agencies could take regarding the different OA publishing models (Table 1). These options represent different ways to mandate or incentive shifts to specific publishing models. In brief, the three representative options described below are to remove the embargo period on OA publications (but with no preference for OA sub-type), to better enable Green OA, or to incentivize Diamond OA.

i. Option 1: Eliminate embargo period, but have no preference for a specific open access publishing model

Having no preference where researchers publish, with the added stipulation that published work be immediately openly available, would be a simple policy change that could have major consequences. This potential change has previously been highlighted as many Canadian researchers believe that an embargo period before articles are openly available is incompatible with the principle of equal access to the results of publicly funded scientific research, and with the rapid pace of scientific progress (Owens 2023).

Advantages

This option would provide authors the opportunity to continue publishing in traditional high-impact journals through Gold OA. This would likely be preferred by researchers with sufficient grant funding to cover high publishing fees, who could opt to continue publishing in high-impact journals rather than shift to less well-known venues.

It would also bring Canadian funders into line with the international community. Many research funding organizations worldwide have pledged to follow the Plan S initiative (Schiltz 2018; Else 2021), which calls for funders to stipulate the avoidance of subscription journals, and to require articles to be immediately OA. Recent signees of Plan S include Québec's research funding body (FRQ 2021) and the European Commission, which funds Europe's largest science funding program, Horizon Europe. Similarly, the United States White House Office of Science and Technology Policy recently announced that scholarly papers resulting from federally funded research must be freely available without delay as of December 31, 2025 (OSTP 2022).

Disadvantages

The primary disadvantage with this option is that, without changes to authors' publishing preferences, an increased amount of grant funds will be spent on costly processing charges. This is because high-impact journals require high fees to publish articles under Gold OA, and Green OA would usually not be possible as it requires an embargo period. Such fees can represent a substantial proportion of scholarly grants, which otherwise could be used elsewhere for research production (e.g., reagents and salaries). Accordingly, this mandate would likely be negatively received by many researchers, who have previously expressed concerns about such restrictions (Lajtha 2019). One key concern is that publishing in impactful journals through Gold OA is prohibitively expensive for many research groups and institutions, meaning that this policy change could exacerbate existing differences in academic prestige between research groups with more and less funding.

Market forces driven by authors' journal choices (e.g., to drive competition between journals to decrease processing charges) could ostensibly help eliminate this problem. However, there is no evidence that fee considerations impact where authors submit their manuscripts, on average (Khoo 2019): prestige considerations are likely more important. In addition, this approach would likely be highly profitable to OA publishers (Butler et al. 2022). Thus, it would indirectly incentivize the continued growth of predatory journals.

ii. Option 2: Traditional closed-access publishing combined with self-archiving

A divergent policy approach, compared to the international community, would be to encourage Canadian researchers to publish through Green OA. In other words, to encourage researchers to upload

manuscripts published in non-OA journals to online university repositories. Educational resources on the self-archiving process, both practically and in terms of legality, need to be created to aid researchers. For instance, online resources such as Sherpa Romeo (https://www.sherpa.ac.uk/romeo/), have already been developed to clarify specific publishers' self-archiving policies, about which Tri-Agency grantees could receive training.

Advantages

Encouraging Green OA would help researchers avoid paying processing charges. Researchers could self-archive near-final versions of their manuscripts, while continuing to submit to prestigious, subscription-based journals. This would either leave additional grant funds directly for research, or alternatively would allow the Tri-Agencies to support additional researchers.

Disadvantages

The clear disadvantage is that Green OA generally (but not always) requires an embargo period after publishing. Accordingly, this option would be incompatible with making published research immediately available. Although some publishers are allowing zero-embargo Green OA in certain cases (American Chemical Society 2023), this is not the norm.

Finally, without a user-friendly, centralized repository across disciplines and institutions, or at least consistently indexed repositories, readers would have difficulty finding self-archived articles of interest.

iii. Option 3: Preference for Diamond open access publishers

A third option available to the Tri-Agencies is to encourage researchers to publish in Diamond OA journals specifically, which are free for both authors and readers. These journals are typically quite recent and have not become widely known, meaning they lack prestige. Due to this issue, researchers are unlikely to primarily publish in such journals without incentives.

Publishing in Diamond OA journals could be normalized if funding organizations incentivized grant recipients to publish in these venues (Racimo et al. 2022). Specifically, the Tri-Agencies could include an OA declaration section in Tri-Agency grant applications. This would clarify the Tri-Agency OA policies to applicants, to which they would need to agree to follow to be eligible and provide space for applicants to demonstrate how they have followed OA regulations. Evidence of past (and anticipated) publishing in Diamond OA journals could be considered a higher scoring contribution here compared to alternatives, although evidence of other OA publishing could be scored as well. This information could be explicitly incorporated as one component of the overall review process.

Advantages

Favoring Diamond OA publishers would provide the clear benefit of decreasing grant spending on processing charges while avoiding the accessibility issues of self-archiving. This option would be compatible with eliminating OA embargo periods, as in option #1. The additional section on grant applications would provide the Tri-Agencies a mechanism to incentivize researchers to follow their OA publishing policies, which are not currently enforced (Butler 2023).

Disadvantages

There would also be negative consequences to indirectly discouraging researchers in Canada from submitting to more prestigious journals. In particular, the perception of decreased excellence of researchers in Canada could make them less competitive for international grants and global recognition. More generally, if researchers in Canada primarily published in less well-known Diamond OA journals, it would be difficult to assess their research outputs. Adding an additional section to grant reviews would also create more overhead for applicants and reviewers.

V. Recommendations

The Tri-Agencies should consider eliminating the one-year OA embargo period, which would be compatible with options #1 or #3 above. Green OA would largely no longer be possible, but this would bring Canada's research funders in agreement with the Plan S initiative. However, this policy change should only be implemented if researchers in Canada have reliable access to grant funds, or there are institutional agreements, to cover costly OA publishing fees. Mandating this change without an existing framework for researchers with limited

grant funding to publish in impactful journals would be detrimental to Canadian research.

In addition to this point for consideration, I recommend the Tri-Agencies adopt option #3: that a section be added to Tri-Agency applications for researchers to provide evidence on which OA publishing sub-types they have published under. Publication in Diamond OA journals should be scored highest in this section, as they best fit with the spirit of the Declaration on Open Research Assessment's focus on individual article quality over journal quality (DORA 2013), while avoiding costly processing charges. The scoring rubric will need to be flexible, as Diamond OA options are not currently available in every field.

This OA publishing section should be a secondary consideration during grant reviews. Researchers will prefer submitting to prestigious journals in the near-term, which should not be overly penalized as this could negatively impact the international standing of researchers in Canada (van Vlokhoven 2019). Incorporating preference for Diamond OA journals in grant applications, but not mandating this shift, will better enable a sustainable transition to improved publishing practices.

There are two key barriers to implementing this new section. First, each agency would need to develop specific instructions and evaluation criteria that appropriately apply to researchers across diverse fields. Second, this new section would add to the application burden for both grant applicants and evaluators. Accordingly, this section should be as streamlined as possible.

VI. Conclusions

The Tri-Agencies have an opportunity to drive cultural shifts in OA scholarly publishing in Canada. The three general policy options described above focus on whether the Tri-Agencies should have no preference for the OA sub-type, or whether to specifically favor either self-archiving or Diamond OA journals. Each of these represent different directions the Tri-Agencies could prioritize.

The context for the Tri-Agencies' policy review is the shift in Europe and the USA to requiring publications be immediately OA upon publication. This is a laudable goal but requires sufficient funding to allow researchers to continue productively publishing in their preferred journals. The Tri-Agencies should only implement this change in Canada if additional funding and/or infrastructure is provided to enable researchers in Canada to consistently cover OA publishing fees.

My key recommendation focuses on incentivizing a shift to improved OA publishing practices by including a section on this topic in Tri-Agency grant applications. This approach would allow the Tri-Agencies to favor certain OA publishing routes without overly penalizing researchers using other approaches.

Diamond OA journals are a particularly appealing publishing route that the Tri-Agencies could favor in this way. Incentivizing the shift to Diamond OA journals, whether through the specific recommendation here or not, would indirectly benefit all Canadian researchers and citizens. Such journals, which are generally non-profit, have low overheads compared to traditional for-profit journals. Therefore, were all research findings published in Diamond OA journals a higher proportion of government research funding would go directly to research compared to publication costs.

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Acknowledgements

I would like to thank A. S. MacCara, Jekoniya Chitereka, William Ota, and Dominique Roche for their valuable comments. I would also like to thank volunteers from Science & Policy Exchange and the National Science Policy Network Writer's Room (led by Anastasia Bernat) for their feedback. An early version of this article, which has since been heavily revised, was posted as a Canadian Science Policy Centre online editorial (under no copyright). I would like to thank the Canadian Science Policy Centre for granting me permission to submit this updated manuscript to the Journal of Science Policy and Governance.