










VIEWPOINT

Can I afford to publish? A dilemma for African scholars

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Abstract

With open-access publishing authors often pay an article processing charge and subsequently their article is freely available online. These charges are beyond the reach of most African academics. Thus, the trend towards open-access publishing will shift the business model from a pay-wall model, where access to literature is limited, to a pay-to-publish one, where African scholars cannot afford to publish. We explore the costs of publishing and the ability of African scholars to afford to publish via open access in top journals. Three-quarters of the 40 top ecology journals required payment for open-access publishing (average cost \$3150). Paying such fees is a hardship for African scholars as grant funding is not available and it is not feasible to pay the fees themselves as salaries are low. We encourage funders and publishers to facilitate an equitable publishing model that allows African scholars to make their research available through open-access publishing.

KEYWORDS

open-access publishing, pay-to-play, pay-wall, scientific journals, scientific publishing

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Humanity is facing unprecedented environmental challenges, and these challenges will be greatest in Africa. Over the next century, Africa's population is projected to quadruple (UN, 2015), the impact of climate change will be severe (Niang et al., 2014), and environmental conflict is projected to rise sharply (Laurance et al., 2014). Grappling with these challenges will require substantial investment in the continent's research capacity (Atickem et al., 2019). Yet, African scholars are disadvantaged by their inability to pay to access scientific information and pay to publish their research in the best journals. Most African universities cannot afford institutional journal fees; thus, their faculty have limited access to the latest published research. Such disadvantages have been recognised for some time (Björk, 2017; Solomon & Björk, 2012a) and strategies to mitigate them have been put in place. Governments, funders, and publishers have responded with strategies that facilitate better access to literature. For example, Research4Life, working with WHO, FAO, UNEP and 180 international publishers, provides institutions in low- and middle-income countries with online access to 111,255 books and 28,920 journals. But the publishing world is rapidly changing, and the academic community must adapt.

One way the academic landscape is changing deals with open access. The push to open access publishing began in 2000 (Solomon & Björk, 2016) and is widely accepted as a way of providing access to journal articles for everyone. This is a business model that typically involves authors or their institutions paying article processing charges (APC) to make their articles freely available online. Currently, these processing charges are beyond the reach of most African academics and their institutions. This is a concern as the number of open-access publications funded by article processing charges is growing rapidly (Solomon & Björk, 2016). Open access is set to increase as European science funders and international foundations launched Plan S 20, which encourages open-access publications (Else, 2018, 2021; Rabesandratana, 2018).

Open-access publishing in ecology will likely increase because it confers a citation advantage to individual articles (Tang et al., 2017). As researchers are increasingly evaluated for promotion and grants by citation metrics (Chapman et al., 2019; Chapman et al., in press), there is considerable pressure to pay article processing charges. However, article processing charges are expensive, even by the standards of wealthy countries. For most African scholars, moving to open-access publishing, with the associated APCs, is not within reach. Thus, for African scholars the move to open-access publishing may shift the business model from a pay-wall model, where access to literature is difficult, to a pay-to-publish model, where it is difficult to have research published (Green, 2019). As a result, it will be increasingly difficult for African scholars to fully engage in the scientific process because with a pay-wall model articles can be obtained from sites,

such as ResearchGate, or from the authors or friends, but with pay-to-publish models few alternatives to paying exist.

In this commentary, we first examine the premise that publishing in high-impact journals is costly. We then review what steps journals have taken to accommodate low-income country authors. Next, we explore the costs of publishing in the top-ranked ecology journals. Then, we use our joint African experience to provide information on the availability of research funds from our home countries to pay APCs, the salaries of professors at universities in Africa, illustrating the ability of individuals to pay, and the cost of student tuition and research, showing the tradeoff African scientists face between publishing and training.

OPEN-ACCESS PUBLISHING IN ECOLOGY

Do journals with higher impact metrics charge more to publish open-access articles? In 2021, we reviewed the article processing charges of all 169 ecology journals considered by Journal Citation Reports (Table S1). In this set of journals, 74.0% provided both open-access and pay-wall publishing options (hybrid journals), 22.4% were open-access only, and 4.1% publish behind a pay-wall only. The average APC was US \$2606 for all journals and US \$1317 for those that were open access only. A few open-access journals are free to publish in as the APC is covered by an institute or university. Journals with higher impact factors had higher APCs ($r = 0.612$, $p < 0.001$; Figure 1).

We evaluated open-access publishing for the top-ranked 40 ecology journals listed in Journal Citation Reports. For each journal, we reviewed online information on open access, their APCs, and waivers for low-income countries. In many instances, it was unclear when and how APCs are levied; thus, we wrote to all editors for clarification. It became apparent that publishers granted the journal and the editors flexibility in how APCs were levied, so different journals associated with the same large publishers have different policies. This allows journals to respond to the research community they serve in an adaptable manner, which we view as a positive approach.

Two of the 40 journals were fully open access and for each of these journals, there was no waiver option available for African scholars (Table S2). Two of the journals were invitation only and were not considered further. Two journals did not have the open-access option. Excluding the two journals that were invitation only ($n = 38$), most (24, 63.2%) were hybrid journals that did not offer APC waivers, but it was possible to publish for free under the subscription model with the article being available behind a paywall which only paying subscribers (e.g. Universities) can bypass. Nine

Sheet 1

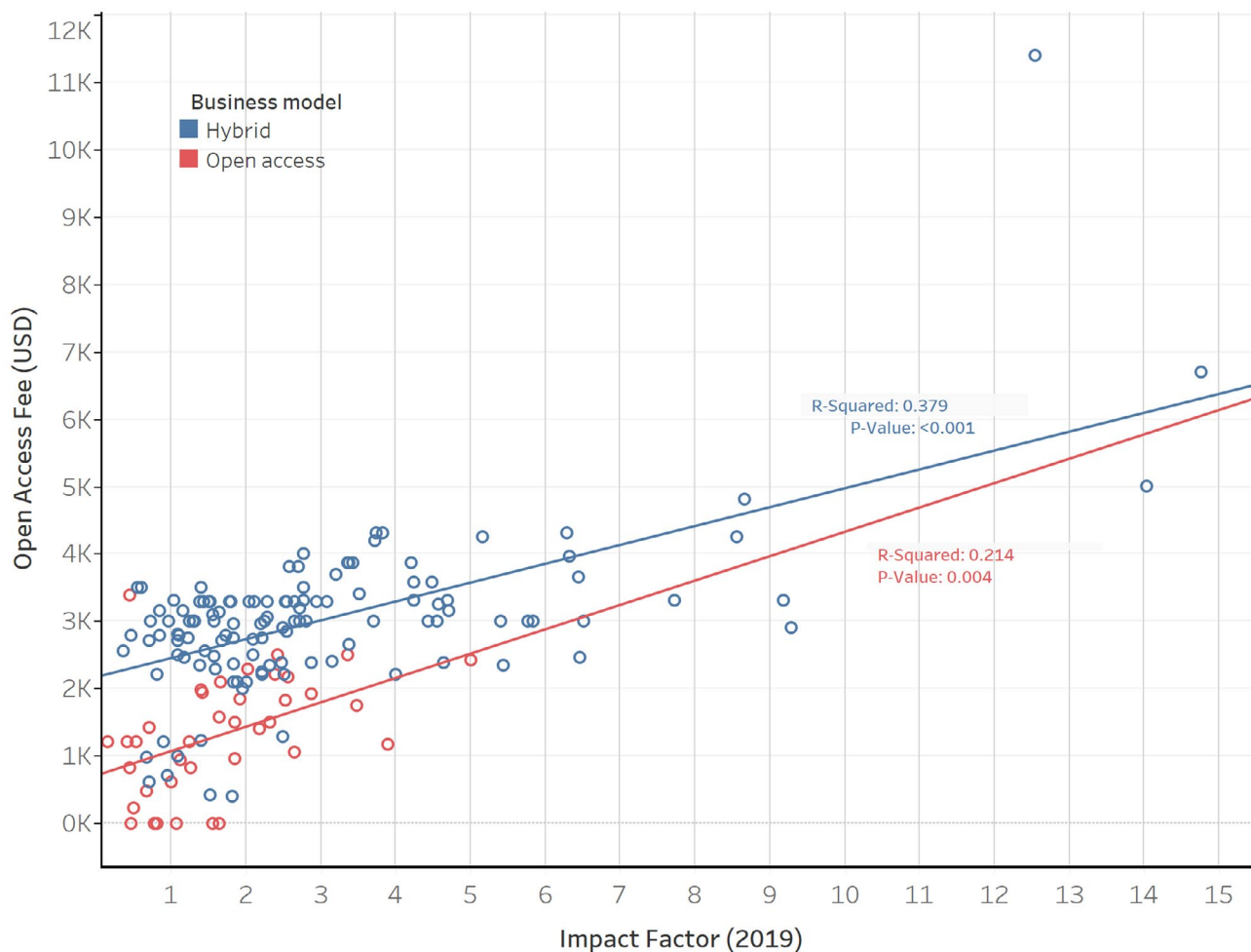


FIGURE 1 The relationship between the Open-Access Fees (article processing charges) of all 169 ecology journals considered by the Journal Citation Reports from ISI Web of Knowledge in the ecology category and the impact factor of the journal (all journals $r = 0.612$, $p < 0.001$)

journals (23.7%) provided waivers for African scholars. Four journals (10.5%) did not offer a waiver for either open access or the subscription model, requiring a fee to be paid in both cases. One journal did not have a waiver for open access but provided a waiver for paying under the subscription model. Only 7.9% of the top 40 journals asked low-income scholars to pay to publish no matter what (i.e. publishing was not free under a subscription model and there was no waiver). However, of those that were not invitation only and offered open access, three-quarters of journals ask for payment for publishing open-access research.

For those 40 journals with APCs, the average cost was US \$3150. Journal websites referred readers to Research4Life to determine if the author's country was eligible for a waiver. However, Research4Life indicated that if an author from a low-income country had co-authors from high-income countries, they are ineligible for a waiver. Upon inquiry with editors, this requirement does not seem to be typically enforced. Only one journal levied charges if there were co-authors from high-income

countries. If publishing fees are discounted only when all authors are African, it puts the African scholar in the inappropriate position of relying on international collaborators to pay to publish the research they lead.

OPEN-ACCESS PUBLISHING FOR AFRICAN RESEARCHERS

Paying APCs of approximately \$3000 is a hardship for many researchers, but it is particularly difficult for African scholars. From our experiences, it is clear that there are no national grant funds available in Ethiopia, Madagascar, or Uganda to specifically pay publication-related expenses. In Nigeria, the Tertiary Education Trust Fund provides support; however, these grants are competitive and allow only \$300 towards publishing. South Africa is not considered a low-income country and is not eligible for waivers. South Africa's National Research Foundation does support publication costs and some universities offer internal support to cover APCs.

Only 10% of researchers in ecology, botany, and zoology in North America and Europe always or often have access to funds for APCs (Cookson, 2012). Thus, researchers often personally pay the fees to publish. It is not feasible for African scholars to personally pay the fees as salaries for ecologists are low (the monthly salary for a lecturer – Uganda US\$2300, Tanzania US\$2027, South Africa US\$2176, Madagascar US\$531, Ethiopia US\$365 – salary levels determined by the authors).

As specific money is not available for APCs, it means that scholars have used research grant funds to pay, which would mean foregoing research or student support. This would be a shame as grant money can go a long way to helping graduate training. Considering the six African countries represented by the co-authors, the average annual tuition costs for a Masters student in ecology is only \$1086 US (\$936 excluding South Africa; Table S3). Similarly, based on the recent graduate students at our universities, we determined that to support annual tuition, student living stipend, and the research costs for a Master student is \$5327 (\$3638 excluding South Africa). In contrast, the average cost of annual graduate tuition in the USA is \$12,171 for public institutions and US\$25,929 for private institutions. The average costs of room and board, books and supplies, and other expenses are also high, around \$14,999 (Ginder et al., 2018). So, the funds that could be allocated to pay APCs could go a long way to supporting training in Africa, but not in high-income countries, like the USA.

Open-access models, where authors pay to publish, increase the advantages of those with resources over those without, promoting inequality (Burgman et al., 2019). This not only pertains to the African context but also to equality within high-income countries; thus, many researchers in high-income countries struggle to afford to publish. This has led to creative solutions, such as institutional agreements with publishers to cover or discount APCs to their members, publishers promoting funders that will cover charges, publishers allowing authors to archive publications for public access on personal websites – ‘green’ model, and granting agencies allowing researchers to include funds to publishing in grants (Alston, 2019; Roche et al., 2021; Tennant et al., 2016). However, these solutions primarily apply to researchers at participating institutions in high-income countries, or individuals who can obtain large grants, and in general, they do not apply to African researchers.

It is clear that finding solutions to bringing more equitability to open-access publishing for African scholars will be challenging. Solutions will need to involve publishers, funders and most importantly the academic community as a whole. Whatever the solution to improving equitability, it is clear that we must take immediate action to make the research of conservation scientists more accessible and make it easier for African scholars

to publish in the best open-access journals. It is only by having the best and most up to date information available to scientists, practitioners and policy makers that it will be possible to effectively address the environmental challenges that Africa will face in the coming decades.

CONCLUDING REMARKS

There has been a rapid shift to open-access publishing and there is every indication that this trend will grow. On the one hand, this is a very positive development for African scholars because, with reliable internet, it is possible to keep up-to-date on international research. Conversely, African scholars currently cannot afford to publish in the best journals. We are encouraged to see deliberations on how to make the open-access business model more globally equitable (Björk, 2021; Green, 2019; Solomon & Björk, 2012a, 2012b). Academics should keep in mind that top-ranked journals are, for the most part, for-profit businesses. In 2017, the global revenues from scientific publishing were estimated to be US\$24 billion, and in 2010 the profit margins were higher than Apple, Google or Amazon (Buranyi, 2017). However, publication charges account for a tiny fraction of the global research and development budget (Else, 2018), thus, exploring creative ways to maintain equity and diversity in research publishing should be encouraged.

Having research available through open-access publishing will advance African science and we applaud efforts that promote the accessibility of research to all and created a more equitable publishing realm. Strategies to make research truly open access should be explored (e.g. African Academy of Sciences Open Publishing). Such advances will be needed if we are to grapple with the environmental challenges that Africa will face in the coming years.

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AUTHOR CONTRIBUTIONS

Addisu Mekonnen and Colin A. Chapman conceived of the project and wrote the first draft. All authors contributed data, helped with the writing and approved the final draft.

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DATA AVAILABILITY STATEMENT

The datasets used in this study are available from the Figshare repository (<https://doi.org/10.6084/m9.figshare.17147966>).

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