Frontiers' view on Open Access Costs

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Background on Frontiers

A leading community-driven open-access publisher, Frontiers publishes the most-cited open-access journals in several academic categories (2014 JCR) and won the ALPSP 2014 Gold Award for Innovation in Publishing for our innovations in review processes, evaluation metrics, and networking.

In the field of Psychology, both *Frontiers in Psychology* and *Frontiers in Human Neuroscience* have become the largest and most cited journals in all of Psychology (which has 597 well-established journals). This demonstrates that Open Access can be structured for both fairly managing the volume demands while maintaining the highest quality.
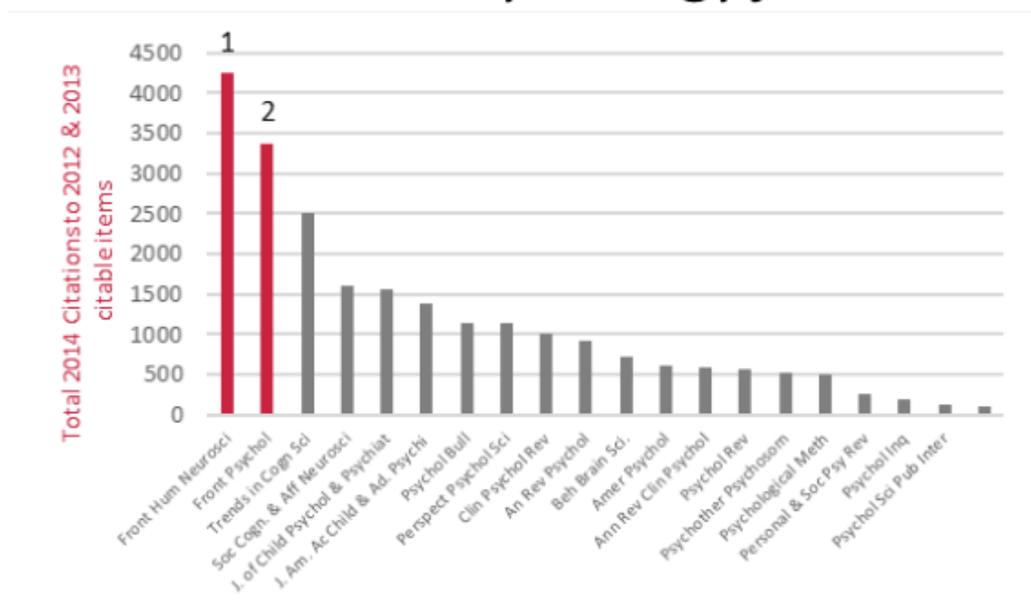

Figure 1. Top 20 most-cited journals in Psychology in 2014. Citations in 2014 were counted as done by the Journal Citation Reports for the impact factor: for articles published in 2012 and 2013. The journal analysis is based on the 2014 Journal Citations Reports published by Thomson Reuters, 2015 (all 11 JCR Psychology categories or ~ 600 psychology journals).

How can OA journals best meet the community's needs?

From our analysis of the responses to the survey by Pr. Alex Holcombe, arising from the CVNet discussion, it is clear that the top priorities for journals must be:
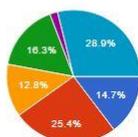
1. ***Open access with full academic or professional society control***
2. ***Low costs***

Which financial/organizational aspect of journals should be the community's top priority?
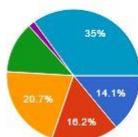
Transparent financial accounts	53	14%
Low cost	61	16.1%
Full academic or professional society control.	78	20.6%
Non-profit	47	12.4%
Don't think any of these are important.	6	1.6%
Open access	132	34.8%

Which should be the community's 2nd-highest priority?

Transparent financial accounts	55	14.6%
Low cost	95	25.3%
Full academic or professional society control.	48	12.8%
Non-profit	61	16.2%
Don't think any of the remaining are important.	7	1.9%
Open access	108	28.7%

Community control

Frontiers was launched to empower scientists to take back responsibility for scholarly publishing. Leading scientists lead journals in editorial roles to serve their communities and as Frontiers Editors they have complete editorial independence over content: they take editorial decisions to review, accept and reject manuscripts. They are provided with a Digital Editorial Office where they can operate and oversee their journal or specialty. Frontiers provides the entire infrastructure to launch, operate and promote the journals and qualified support staff to assist scientists in the peer-review, but our staff do not take editorial decisions. For more information on our publishing model, see here.

Which costs does a high-quality OA publisher have to meet?

Some, but not all, of the costs are listed below. We have provided an analysis on the operating costs for Frontiers previously on our blog.

- **Website and online software:** A publishing site such as Frontiers is by no means simply a website. The software code on which Frontiers operates has been written over 8 years and is continuously updated – a major development that has cost many millions. The computing infrastructure (application servers, connectivity, etc) and storage systems with double redundancy and geographically distributed backups are not inexpensive. Even more costly are the 100+ IT experts needed to develop and maintain such systems, and a help desk for user technical support.
- **Typesetting**: A surprisingly complex item, due to: supplier ethics, managing costs of PDF pages, HTMLs, XMLs, EPUBs, e-books, repeat edits and unexpected issues, volume handling (infrastructure, technology, bandwidth), proofing files for archiving. Managing relationships with suppliers, archiving and indexing organizations is a time-consuming operation and requires skilled staff.
- **Peer review**: Staffing, training and process creation overheads include: in-house quality checks (to ensure Editors don't receive inadequate papers for consideration, the peer-review is managed fairly and without conflicts-of-interest); problem-solving intervention over Editor delays or unexpected issues; capacity to handle complex papers, queries and – in extreme cases – the ramifications of retraction of papers; technology development to help automate processes and speed up workflows.

- **Staff management**. Permanent overheads include: office equipment; human resources management such as salary scales, bonuses, vacations; specialist managers to handle growing teams/expanding fields.
- **Accounting, waivers, awards, honoraria**. Costs of accounting and legal staff administrating: APCs, service provider payments, waivers for those who cannot pay fees (in 2014, Frontiers awarded nearly $2 million worth of waivers); honorarium transfers, travel and editor awards (in 2014, Frontiers paid $1 million in honoraria and awards); conference sponsorship; institutional agreements; legal costs.
- **Subsidies**: Frontiers helps communities launch journals at APCs that are well below cost (e.g. social sciences, humanities and some areas of mathematics).
- **Society Support**: Frontiers offers partnerships with societies which allow for a part of the APC to go to supporting the society.
- **Innovation**: Open Access comes with enormous challenges and opportunities for research evolution. Publishers will not only have to develop better ways to submit and have papers peer-reviewed, but also how to make this research stand out in a rapidly growing crowd of papers and authors. The challenge of linking data to papers still has to be addressed. At Frontiers, we began with Loop, and built dissemination and discovery algorithms that make articles and authors stand out. With 4 million monthly article views and 1.2 million downloads, as well as 1.2 million monthly Loop profile views, this strategy is starting to pay off.
- **The cost of the unexpected:** What really hikes costs is the unexpected; preparing for and managing the small fraction of cases when things don't go to plan is one of the largest costs in publishing – a factor often ignored.

How do APCs make OA publishers sustainable?

OA running costs may surprise you: for example, to process one article in **eLife**, which operates an impact-selective peer-review, costs approximately $14,000. The costs can come down with higher volumes. For example, the average cost of a **PLOS** article is around $1,250/article.

Given Frontiers' significant investments into developing new, 21st-century services for researchers, and dividing our total costs by the number of published papers, the average cost per paper at **Frontiers** is around $1,600. A minimal volume is needed to make Open Access viable. It took PLOS around 10 years to become financially sustainable, and in fact it was the launching of the impact neutral PLOSONE that made them sustainable. The average income per article in Frontiers has been around $1,100. It will therefore take Frontiers about the same amount of time to become financially self-sustainable: Frontiers has not made a profit since it started, so we are very grateful for those genuine and deeply committed people who support and dedicate themselves to OA publishing for such a long time without financial return.

Frontiers' strategic advantage: technology

Having been the first publisher to build our own custom publishing platform, with substantial investment (about 1/3 of our costs), we are able to lower costs for the type of advanced services we offer, including:

- We operate one of the smoothest submission systems in publishing and our online collaborative peer-review forum not only enjoys approval rates of over 90% (as

established in our [survey on 11K authors, editors and reviewers on their satisfaction levels](#)), but also reduces review time to about 3 months.

- Our Digital Editorial Office is accessible online 24/7 enabling over 65'000 editors to operate the journals and perform peer-review tasks.
- We pioneered online article impact metrics in 2008 and [author impact metrics](#) in 2010. Article level metrics have been adopted by other publishers subsequently and are becoming a new objective standard for evaluating research.
- We provide online researcher [Loop profiles](#), linked transparently for authors and editors to journals and papers and integrated them with [ORCID](#). Loop profiles currently receive 1.2M monthly views and attract further views on publications, maximizing impact and readership for authors.
- With Loop we invest in dissemination and discovery algorithms to make papers stand out in an ever-growing crowd. Here, Frontiers is also a member of the Horizon 2020 project OpenUp (to be launched in June 2016), which is emphasising the use of impact metrics and networking to drive the benefits of open access.
- We invest into efficient text mining of scientific literature, a project that not only benefits our internal peer-review process by matching the best suited reviewers with submitted manuscripts, but also guides the industry, for example as a member of the [OpenMinTed](#) consortium, through the Horizon 2020 programme.
- Our digital initiatives include [Frontiers for Young Minds](#), a free journal disseminating research results to the public, and reviewed by the next generation of researchers.
- Frontiers has pioneered a wide spectrum of innovation in OA publishing (see [Born Digital Blog](#)) and advanced services that are not being offered by any other publisher (see [Advanced Services Blog](#)).

Concluding remarks on the costs of publishing

The confusion over OA fees is unfortunately only slowing down the [inevitable adoption of the open-access model](#). Researchers have not directly felt the costs before, but it's important to understand that, actually, the subscription model has been costing authors at least [$7,000 per subscription paper](#), more than 3 times what Open Access can cost – in 2014, $14 billion in actual revenue was collected by subscription publishers for 2 million total papers published [1]. If Open Access were widely adopted overnight, even at a pricey average article cost of $3,000, research institutions would save at least $8 billion per year, which could be spent on actual research.

Additional costs mount up in wasted time, energy and opportunities while shuffling papers between impact-selective journals. According to one estimate, about [15 million hours](#) of researchers' time are wasted in rejection cascades [2]. At a researcher's average hourly rate of $200, this amounts to another $3 billion wasted per year in the selective subscription system. In this context, it is important to note that [rejection rates are not correlated with journals' impact factors](#). A constructive and collaborative peer-review, focused on the soundness of research and improving manuscript quality – as practiced at Frontiers – should be the standard in publishing, not just an open access phenomenon.

We are aware that you can put a paper out for seemingly little or no cost on the internet or a repository. ArXiv has already demonstrated that this can be done at high volumes for around $10 per paper [3]. But this is only possible in a highly subsidized environment through

volunteer staff performing very basic quality checks, author self-management of all editing and typesetting, and universities covering the hidden costs of servers and technical support. ArXiv provides an immensely important service to the community to get papers out quickly. But the reality is that most of them must still be published in a peer-reviewed journal before they count towards CVs and grant applications.

So when it comes to scholarly publishing, it *can* also be done cheaply. Some open-access journals operate with very low APCs to cover basic services – off-the-shelf submission and article management software, peer-review where staff manage only unexpected cases or unresponsive external editors or reviewers, and typesetting.

The catch is that in these cheap models, where only very basic needs are covered, there is also no budget for outreach or IT innovation, which could improve submission, review and article display processes, and functions to make your paper stand out amidst the crowd. You do not receive impact analytics or data-mining enhancements for your work, no article page optimization to reach maximum readership (Frontiers articles receive 4M views and 1.2M downloads per month, this is expectionally high), no promotion to communities or dissemination to the public, and there's no money to make your papers discoverable in the future, when all research data will become freely available and potentially linked to every paper. You do not even get papers indexed on archives, such as PubMed Central or Web of Science, nor the Impact Factors that come with it.

Finally, let's put open-access fees and the type of advanced services it can offer in perspective: it is only about half of one month's salary of a student conducting a study. A paper is cast in stone for eternity, so why try to do that very last step of a major study as cheaply as possible, when conveying valuable research and obtaining the impact it deserves is one of the most important steps of your career?

Frontiers was designed by scientists to allow scientists to help shape publishing. So get involved, launch a journal or a specialty, launch a research topic in your own area of expertise, become an editor or reviewer, provide your input to how you think peer-review should evolve and what features you would like to see developed – we invite you whole-heartedly to join, to help us drive the open access transition and shape the future of scholarly publishing.

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[1] This figure is obtained by combining The STM Report (T*he STM Report: An overview of scientific and scholarly journal publishing,* 2015) and SIMBA Report (*Global Social Science and Humanities Publishing 2013 – 2014,* 2013).

[2] https://blog.rubriq.com/2013/06/03/how-we-found-15-million-hours-of-lost-time/

[3] ArXiv Business Model White Paper, 2010

Links:
Frontiers website: http://www.frontiersin.org/
Frontiers Publishing Model: http://home.frontiersin.org/about/publishing-model
Frontiers Collaborative Peer-Review: http://home.frontiersin.org/about/review-system
Frontiers Financial Commitment to Open Access Publishing: http://blog.frontiersin.org/2015/10/13/frontiers-financial-commitment-to-open-access-publishing/
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Frontiers Advanced Services: http://blog.frontiersin.org/2016/01/27/frontiers-offers-premier-open-access-services/
Frontiers journals are most cited in their fields: http://blog.frontiersin.org/2015/09/11/frontiers-leads-in-size-and-quality-in-gold-open-access-comparison/