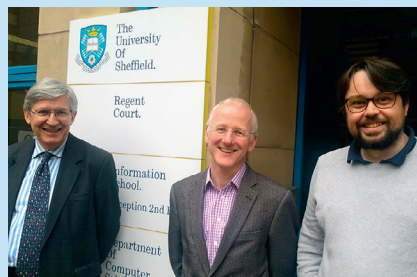


# Open-access mega-journals



The authors: at Sheffield University, Peter Willett is Co-Investigator; Stephen Pinfield is the OAMJ project's Principal Investigator; and Simon Wakeling is Research Associate (s.wakeling@sheffield.ac.uk).



At Loughborough University, Valerie Spezi (v.c.i.spezi@lboro.ac.uk) is Research Associate and Claire Creaser and Jenny Fry are Co-Investigators.

As most major publishers have now launched a mega-journal with new approaches to scale, scope, and quality, a project team headed by **Stephen Pinfield** at Sheffield University is investigating the phenomenon which is causing some debate and controversy.

ONE of the most important trends in scientific publishing over the past decade has been the advent of the so-called open-access (OA) 'mega-journal'. In 2015, a team from the Universities of Sheffield and Loughborough, led by Stephen Pinfield, was awarded a grant by the Arts and Humanities Research Council (AHRC) to analyse the characteristics of the phenomenon and evaluate its significance for the research community and beyond. This article provides a brief introduction to mega-journals, based on the literature review undertaken in the first phase of that project.<sup>1</sup>

Open-access mega-journals (OAMJs) now appear to be an established part of the scholarly communication landscape. Almost all major publishers have now launched their own mega-journal. Their combination of new approaches to scale, scope, and quality – in conjunction with an OA business model – mean that they have given rise to debate and controversy, some of it heated.

### What is a 'mega-journal'?

The term 'mega-journal' was first used specifically in relation to journal size, but is now used more widely, and there are



several titles which can be grouped under this broad heading. The first such journal, *PLOS ONE* launched in 2006, has been followed by titles such as *PeerJ*, *BMJ Open*, and *Scientific Reports* (Nature Publishing), to name only a few. Size is relative, however, with both *PLOS ONE* and *Scientific Reports* each publishing more than 10,000 citable articles in 2015, while others are, by comparison, somewhat smaller, albeit still much larger than many academic journals, e.g. *PeerJ* published some 800 articles in 2015.

One key reason for such large numbers is having a broad subject scope: *PLOS ONE*

Table 1: Criteria for a mega-journal

Primary criteria	Secondary criteria
<ul style="list-style-type: none"> <li>● Large publishing volume or aiming for it</li> <li>● Broad subject area</li> <li>● Peer review of scientific soundness only</li> <li>● Full open access with APC</li> </ul>	<ul style="list-style-type: none"> <li>● Moderate APC</li> <li>● High-prestige publisher</li> <li>● Academic editors</li> <li>● Reusable graphics &amp; data</li> <li>● Altmetrics</li> <li>● Commenting</li> <li>● Portable reviews</li> <li>● Rapid publication</li> </ul>



Open-access mega-journals (OAMJs) now appear to be an established part of the scholarly communication landscape.

accepts articles from all science, technology and medicine (STM) disciplines and some social sciences. Articles are not assessed on their potential 'interest' to a narrow subject community, nor on criteria of 'novelty' or 'importance', judgements which are traditionally central to the acceptance criteria of the majority of established peer-reviewed titles. Rather, *PLOS ONE* assesses articles based on the primary criterion of 'scientific soundness', and all articles which meet this quality threshold (within the very broad subject coverage) are accepted for publication.

As a result, the term 'mega-journal' has become associated not merely with large-scale publishing output, but also breadth of scope and peer-review criteria based specifically on soundness, as well as the basic criterion of open access, normally with a business model of pre-publication article-processing charges (APCs). The key elements are summarised in table 1 together with several secondary criteria, some or all of which are characteristic of many mega-journals.

These criteria (derived from Björk)<sup>2</sup> are somewhat subjective, so that providing an exact classification is challenging – when can a journal be described as 'mega'? We discuss the primary criteria further in the remainder of this section.

### 1 How large is 'large'?

Bibliometric work conducted by the research team reveals variations in mega-journal size.<sup>3</sup> In 2015, the combined outputs of the 11 mega-journals that meet a strict interpretation of Björk's primary criteria and that are also indexed in Scopus totalled 44,820 articles (Figure 1). *PLOS ONE* clearly dominates this figure. However, 2013 was a high point in *PLOS ONE* output, with a decline to 27,488 in 2015, while *Nature's Scientific Reports* grew from 2,494 in 2013 to 10,600 in 2015. In September 2016, *Scientific Reports* overtook *PLOS ONE* as the most

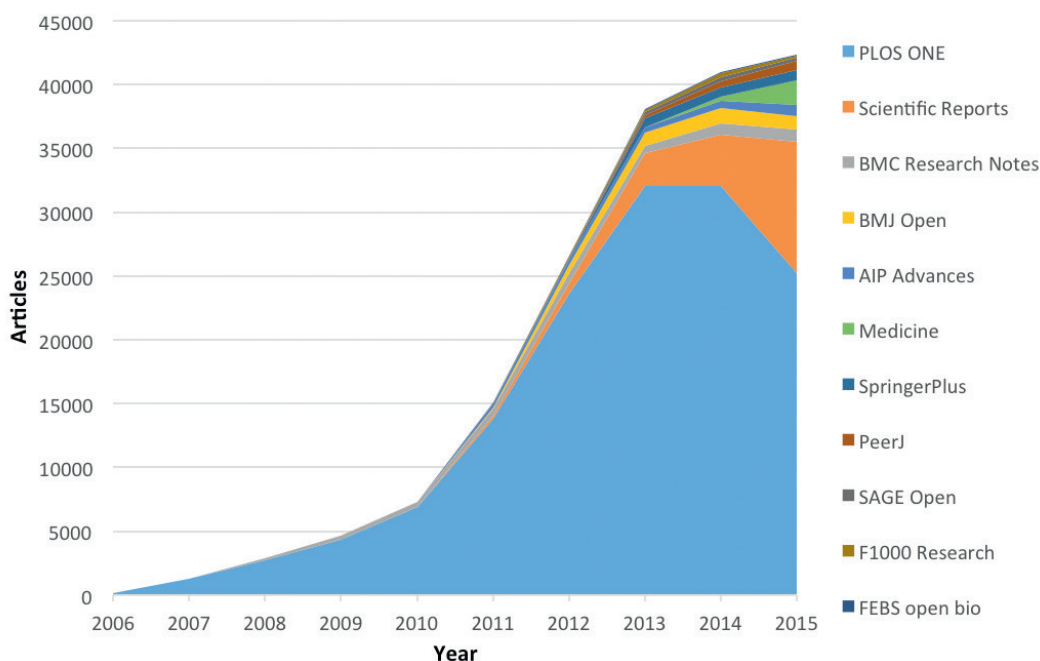


Figure 1: Article numbers in the 11 largest mega-journals, 2006-2015.

Source: Scopus.

prolific title, publishing 1,940 research articles compared to *PLOS ONE's* 1,756. *RSC Advances*, the third most productive title in 2015, published over 12,800 articles in 2015, and is now, as of the beginning of 2017, Gold OA, but still has a traditional peer review process.<sup>4</sup>

Other mega-journal titles also grew during the period, but with much smaller numbers of articles, between 500-1,000 articles a year. Bearing in mind that publication volumes are strongly discipline-dependent, this places them at the same level as some large, well-established STM journals based on conventional interest and significance-based peer review; indeed, 15 other titles indexed in Web of Science published more than 3,000 articles in 2015, and more than 400 published over 500 articles in that year. While such titles are in the largest one per cent of all journals, the lack of a clearly agreed definition means it remains open

to debate whether some of the smaller mega-journal titles are large enough to justify the 'mega' prefix.

### 2 How broad is 'broad'?

Large publication volumes are generally associated with broad disciplinary scope, the second of the Björk criteria. Broad scope is a major departure from scholarly publishing trends of the last 50 years, which have been characterised by ever-increasing levels of subject specialisation. Many mega-journals cover an entire discipline (e.g. all life sciences; all of physics) or a range of disciplines (e.g. all science, technology and medicine). *Heliyon*, launched in 2015, covers all academic disciplines. Again, this is not unique to mega-journals – *Nature* and *Science* have long covered all scientific disciplines, while *RSC Advances* covers 'all of the chemical sciences, including multi-disciplinary and emerging areas' detailing over 100 topics which are included.

Notwithstanding their theoretically broad scope, mega-journals have been dominated by biomedical disciplines in terms of the number of articles published. One factor may be the wider acceptance of Gold OA publishing by these disciplines, and the willingness of the cognate funding agencies to support the associated costs. There is evidence, however, that other disciplines, particularly the physical sciences, are now adopting mega-journals, for example *AIP Advances* in physics, with a small number of OAMJ initiatives in the humanities and social sciences, notably *SAGE Open*, launched in 2011, and the *Open Library of the Humanities*, launched in 2014.

## The OAMJ Project

We are conducting a two-year project funded by AHRC to explore the recent phenomenon of open-access mega-journals and the future of scholarly communication.



This is a collaboration between Loughborough University and Sheffield University. The project is led by Stephen Pinfield from Sheffield University. Further details can be found on our project website at <http://oamj.org/> Follow us on twitter at @OAMJ\_Project



The University Of Sheffield.



Loughborough University



Arts & Humanities Research Council

### 3 Approach to Peer Review

This is perhaps the criterion which most closely defines the mega-journal and is certainly the most controversial. Mega-journals' approach to quality control – peer review based only on scientific soundness – has been criticised as representing a decline in quality standards, labelled, for example, as 'light peer review'. By dispensing with traditional peer review processes, mega-journals are seen as casting off the valuable filtering function of journals that researchers rely on, even if only to save them time. Mega-journals, it is argued, simply have a lower quality bar.

On the other hand, it is also argued that peer review focused on soundness – described more positively as 'objective peer review' – avoids the subjectivity associated with peer reviewers judging the novelty of a piece of work, its potential importance to a field, or its interest to a given subject community. All of these, it is suggested, involve subjective judgements compared with the more 'objective' assessment of scientific soundness. It could be argued that the process is no less rigorous, and the frequent requirement to deposit data alongside the article can be seen to enhance quality, since the results can be properly assessed, and replicated.

Accompanying this argument is the view that novelty, importance and interest can, in fact, be better assessed following publication by measuring the reception and use of a paper. This has been part of the motivation for mega-journals giving article-level metrics (including downloads, citations, bookmarks, and social-media comment) greater prominence than has often been the case in conventional journals.

### 4 OA Economic Model

The fourth primary criterion for defining mega-journals is open access based on an APC-business model. The model is not, of course, unique to mega-journals, and is not the only way to achieve Gold OA. In fact, the majority of journals listed in the Directory of Open Access Journals (DOAJ, at <https://doaj.org/>) are not funded by APCs; alternatives, including sponsorship and membership models, are also widely used.

Mega-journals typically charge a moderate APC, with an average around US \$1,300. This is more than the average APC for fully-OA journals, in the region of US \$900<sup>5</sup> but substantially less than that of top ranking, fully-OA journals (ranging from US \$2,500-\$5,000), or hybrid journals (US \$3,000).

### Mega-journals in the information landscape

It is clear that there is great variety in the mega-journal landscape. Björk's mega-journal criteria are interrelated – large

publishing volume is clearly facilitated by broad subject scope and objective peer review, but which of these criteria is the driving aim? Alternatively, do publishers of mega-journals simply wish to implement a novel and more 'democratic' approach to scholarly publishing? In practice, the answer is likely to differ for the various OAMJ publishers, and one of the aims of our project is to obtain the views of a range of stakeholders on this and other aspects of the OAMJ phenomenon.

Mega-journals themselves are heterogeneous in terms of their characteristics. Key components of OAMJs are being implemented and combined in different ways. It remains to be seen whether this will simply add to the range of choices for authors so that mega-journals find an accommodation with conventional selective journals, or whether mega-journals signal a reshaping of scholarly communication that will ultimately change its fundamental character.

The relative lack of detailed research into the mega-journal phenomenon means understanding their current place in the publishing landscape is challenging. Determining the role OAMJs may play in the future is an even more difficult task. Clearly a range of factors will influence this future, including the extent to which funder mandates can drive OA publishing in general, the role and perceived importance of the journal impact factor, how well technology can support researchers' information seeking and filtering, and the emergence (or not) of competing models.

Determining how mega-journals will interact with and shape the development of these and other innovations remains a key challenge, and one that merits further systematic study. Our project is making a start, analysing the bibliometric data of

mega-journals, interviewing publishers, conducting subject-based case studies, and a broad survey of academics to analyse the characteristics of the emergent open-access 'mega-journal' phenomenon and evaluate its significance for the research community and beyond.

### Conclusion

Mega-journals have the potential to fundamentally alter the scholarly communication landscape and this may have direct implications for research support librarians, serials librarians, and research libraries as a whole. Librarians have a key role to play in the evolving scholarly communication landscape, particularly as their role as curators of scholarly output is changing, moving from serials purchasing decisions to signposting resources in the increasingly open access journal landscape. Whether this will be made easier or harder by the rise of the mega-journal remains to be seen. [J]

### Acknowledgements

This article was produced as part of the **Open-Access Mega-Journals and the Future of Scholarly Communication** project funded AHRC, AH/M010643/1.

### References & further reading

- 1 Spezi, V. et al. 'Open-access mega-journals: the future of scholarly communication or academic dumping ground? a review.' *Journal of Documentation*, 2017, doi: 10.1108/JD-06-2016-0082
- 2 Björk, B.-C. 'Have the 'mega-journals' reached the limits to growth?', *PeerJ*, 2015, Vol. 3, p. e981.
- 3 Wakeling, S. et al. 'Open access mega-journals: a bibliometric profile.' *PLOS ONE*, 2016, doi: 10.1371/journal.pone.0165359
- 4 [www.rsc.org/journals-books-databases/about-journals/rsc-advances/](http://www.rsc.org/journals-books-databases/about-journals/rsc-advances/)
- 5 Solomon, D.J. and Björk, B.-C. 'A study of open access journals using article processing charges.' *Journal of the American Society for Information Science and Technology*, 2012, Vol. 63 No. 8, pp. 1485–1495.

