

Open access megajournals: The publisher perspective (Part 1: Motivations)

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Abstract

This paper is the first of two *Learned Publishing* articles in which we report the results of a series of interviews with senior publishers and editors exploring open access megajournals (OAMJs). Megajournals (of which *PLoS One* is the best known example) represent a relatively new approach to scholarly communication and can be characterized as large, broad-scope, open access journals that take an innovative approach to peer review, basing acceptance decisions solely on the technical or scientific soundness of the article. This model is often said to support the broader goals of the open science movement. Based on in-depth interviews with 31 publishers and editors representing 16 different organizations (10 of which publish a megajournal), this paper reports how the term ‘megajournal’ is understood and publishers’ rationale and motivations for launching (or not launching) an OAMJ. We find that while there is general agreement on the common characteristics of megajournals, there is not yet a consensus on their relative importance. We also find seven motivating factors that were said to drive the launch of an OAMJ and link each of these factors to potential societal and business benefits. These results suggest that the often polarized debate surrounding OAMJs is a consequence of the extent to which observers perceive publishers to be motivated by these societal or business benefits.

INTRODUCTION

Since the launch of *PLoS One* in 2006, open access megajournals (OAMJs) have been the subject of wide-ranging and, at times, heated debate. Such journals are commonly defined as being broad in scope, with a high article output published using a gold open access (OA) model and an editorial policy that seeks to publish all work deemed scientifically or technically sound, regardless of its potential impact or perceived importance to the field (Björk, 2015). The subsequent success of *PLoS One*, which within 5 years became the largest journal in the world, appears to have alerted

other publishers to the potential value of the model, and there are now at least 20 journals that might reasonably be considered OAMJs. However, these titles remain controversial. Some commentators view OAMJs as ‘dumping grounds’ for low-quality research while serving as ‘cash cows’ for publishers who generate large revenues for minimal effort (Butler, 2008). Others argue that the OAMJ model democratizes knowledge, allowing for the publication of research that might not find a home in traditionally more selective journals (Binfield, 2013). These advocates suggest that the academic community at large is best placed to judge the significance and importance of an article, with post-publication

Key points

- There is general agreement about the defining characteristics of a megajournal but not regarding their relative importance.
- Creation of 'mini-megajournals', which follow open access megajournal (OAMJ) principles with a narrower subject scope, is seen as a lower-risk option.
- Motivating factors for launching a megajournal relate to both societal (e.g. open science) and business (e.g. system efficiency) benefits.
- OAMJ launch decisions were frequently based on a desire to retain articles rejected by more 'selective' titles in a publisher's portfolio.
- Perceptions of megajournals are likely shaped by the extent to which publishers are presumed to prioritize societal benefits.

measures such as altmetrics used to highlight important work. It is notable that such arguments chime closely with a wider movement, gaining increasing currency within academia, namely open science. The term has been usefully summarized as referring to 'a scientific culture that is characterized by its openness' (Bartling & Friesike, 2014, p. 10) and can be broadly seen to incorporate a range of objectives related to the removal of barriers to the undertaking, publication, sharing, and dissemination of scientific research (The Center for Open Science, 2017). Given the stated goals of many megajournal publishers, the development and evolution of OAMJs can be viewed in the context of the open science movement.

This paper reports part of a multi-phase study through which we seek to answer a wide range of questions relating to the megajournal phenomenon (see www.oamj.org). This phase consists of a series of interviews with senior publishers and editors. Given the broad scope of the interviews and the richness of the data collected, the results of this research phase are reported in a series of papers, this being the first. The focus of this article is on the following two research questions:

- How is the term 'megajournal' understood by publishers and editors, and what do they perceive as the defining characteristics of a megajournal?
- What was the strategic rationale of publishers for launching (or not launching) a megajournal?

These publisher perspectives are discussed in the context of potential societal (or open science) benefits and the business case to be made for the OAMJ model. A second paper (Wakeling *et al.*, 2017) focuses on publisher perspectives on developing and operating an OAMJ and views of the future

role of OAMJs in the wider scholarly communication landscape. Finally, a third paper addressing the specific issue of peer review in relation to OAMJs has also been prepared (Spezi *et al.*, 2017a).

CONTEXT

Research into the OAMJ phenomenon has been relatively limited, with a recent review identifying only seven peer reviewed articles on the subject (Spezi *et al.*, 2017b). Of these, Björk (2015) published the first general overview of megajournals, charting the emergence of titles and their growth and defining the four primary criteria necessary for megajournal status (broad scope, large size, OA model, and soundness-only peer review). He also noted a series of secondary criteria that OAMJs commonly exhibit, including moderate article processing charges (APCs), fast publication times, the use of altmetrics, and the availability of commenting functionality. A similar review is provided by Domnina (2016). In Solomon's (2014) survey of OAMJ authors, around half of all articles published in megajournals had previously been rejected by another journal. Authors were found to rate the quality of the journal and speed of publication as the factors most likely to have influenced submission to an OAMJ. Björk and Catani (2016) investigated whether the distinctive editorial policies of OAMJs could be linked to subsequent citation rates, finding some evidence to suggest that reviewing only for scientific soundness does not necessarily reduce eventual citations to the journal. Earlier work by Wellen (2013) discussed megajournals in the context of academic 'unbundling', a word he uses to describe the potential for a digital academic commons to undertake functions once considered the preserve of structured organizations such as publishers and libraries. Wellen noted that while megajournals can reasonably be viewed as disruptive innovations due to the 'unbundling' of significance judgements from the peer review process, their eventual success will depend on 'the legitimacy of informal review in the community' (2013, p. 7) post-publication and the adaptation of academics to this new approach in a research evaluation environment wedded to traditional notions of journal quality. Most recently, a comprehensive bibliometric analysis of 11 OAMJs (Wakeling *et al.*, 2016) found that while total megajournal output grew by almost 15% between 2014 and 2015 (with 44,820 articles published in the latter year), this rise is largely attributable to two journals – *Scientific Reports* and *Medicine*. It also noted considerable variation in citation rates across megajournals and an apparent correlation between journal impact factor and submission rates, particularly for authors from China. A key finding of the paper was an understanding that a 'typical' megajournal does not exist, at least from a bibliometric point of view, as there was significant variation across the titles in almost every aspect (Wakeling *et al.*, 2016).

The broader subject of the open science movement has attracted substantially more attention in the published literature.

Fecher & Friesike (2014, p. 17), while noting that the term 'evokes quite different understandings and opens a multitude of battlefields', suggest that five 'schools' of motive and argumentation emerge from the literature. They classify these as the:

- Infrastructure school (which focuses on the creation of open platforms, tools, and services).
- Public school (with a focus on non-expert participation and comprehension).
- Measurement school (which seeks to develop alternative metrics for scientific impact).
- Democratic school (which seeks to make the products of research accessible to all).
- Pragmatic school (with a focus on improving the efficiency of knowledge generation).

These 'schools' are all intended to address perceived deficiencies in the current system: slow publication speeds; academic reward systems that use imperfect measures (such as journal impact factor) and disincentivize the publication of negative results or replication studies; journal subscription models that limit access to research; closed and ineffective peer review processes; and the absence of tools and incentives to share data, code, methods, and analysis techniques (Hey & Payne, 2015; Nosek & Bar-Anan, 2012; Ross & Krumholz, 2013). The megajournal approach, with its commitment to OA and a review process that seeks to evaluate only the soundness of the research, is seen by some as a means of addressing a number of these issues (Nosek *et al.*, 2015; Sitek & Bertelmann, 2014).

Despite the growing literature on megajournals – describing what they are, their growth and citation profiles, and who is publishing in them – it is notable that the papers cited above often raise as many questions as they answer. A large number of these questions relate to the strategic and operational perspectives of publishers, particularly their motives for launching OAMJ titles, issues associated with the practical challenges of launching, running and growing a megajournal, the relationship between revenue generation and notions of quality, and the future role of megajournals within scholarly publishing. The research presented here aims to extend prior work by addressing these issues.

TABLE 1 Overview of interviewees.

	Publishing an OAMJ	Not publishing an OAMJ	UK based	US based	Other	Total
Number of publishers	10	6	9	6	1	16
Commercial	6	2	4	3	1	8
Society	3	2	3	2	0	5
Not-for-profit	1	2	2	1	0	3
Interviewees	21	10	17	13	1	31
Publishers	12	7	9	9	1	19
Editors	9	3	8	4	0	12

OAMJ, open access megajournals.

METHOD

In order to thoroughly investigate the research questions and to gain a broad understanding of publisher perspectives on the megajournal phenomenon, interviews were conducted with 31 publishers and editors. To identify participants, a list of 10 megajournal publishers was compiled based on our prior work (Wakeling *et al.*, 2016) and was augmented with six major publishers who do not currently operate an OAMJ. For each organization, individuals were identified whom it was felt could best discuss the launch, growth, and management of their megajournal or, in cases where publishers did not operate an OAMJ, reflect on their organization's view of such journals. While these individuals were most commonly currently employed by the publisher, in some cases, it was felt to be appropriate to approach potential interviewees who had played a key role in a megajournal's development but who were no longer formally associated with the title. Some academic editors and editorial board members were identified in the same way, while others were suggested by publishers during the interview process. All participants were assured that their responses would be anonymized in any reporting of the results.

Invitations to participate in the research were sent by email. In several cases, target interviewees suggested colleagues who were better placed to participate, but ultimately, we were successful in interviewing at least one publisher representative from each of the 16 organizations on our target list. Publisher participants generally held relatively senior positions (e.g. 'publishing director', 'head of OA', and 'editor in chief'). Table 1 provides an overview of the interview population, with a breakdown of publisher and interviewee status. All the publishers represented in the sample publish at least one fully OA journal.

Interviews were conducted between April and November 2016. Where possible, the interviews were conducted in person, but Skype was used in the case of 12 interviewees based outside the UK and a further 3 for whom a meeting proved difficult to schedule. The interviews were semi-structured, and full versions of the schedules can be found in Appendices S1 and S2 (Supporting Information). For publishers, the interview began with questions exploring their understanding of the term 'megajournal' and then covered the following topics:

- Strategic aspects of producing a megajournal (the rationale for launching or not launching a title, opportunities and challenges associated with such journals, and the relationship of OAMJs with other titles in the publisher's portfolio).
- Operational aspects of producing a megajournal (economies of scale, quality control, peer review policies, APC rates).
- OAMJs and the broader scholarly communication context (the future role of OAMJs, other innovations, the role of OAMJs in knowledge transfer and inter-disciplinarity).

For editors, a similar schedule was used, but with a reduced focus on strategic aspects and additional questions exploring the practicalities of the peer review process.

The resulting data set consisted of over 30 hours of audio recording. Recordings were transcribed, and transcriptions were subjected to a thematic analysis using the principles laid out by Braun and Clarke (2006). Based on initial reviews of the transcriptions, the research team identified five broad themes and created a hierarchical codebook with 131 unique codes. Two team members then coded the transcripts using NVivo qualitative analysis software. To ensure a robust and reliable coding process, the two researchers each first coded the same four transcripts, and the results were compared. Inter-coder reliability was calculated using Krippendorff's alpha, with a value of 0.72. While values over 0.7 are often considered to indicate a sufficient level of agreement for exploratory research (Lombard, Snyder-Duch, & Bracken, 2002), additional steps were taken to ensure better agreement. Each researcher therefore coded half the remaining transcripts and then reviewed the other's coding. Any issues identified in this proof-coding stage were discussed and resolved, meaning that the final coding for each transcript was fully agreed on by both coders. The resulting coded transcripts then formed the basis for the results presented in the remainder of this paper, as well as the two additional papers that have been described previously.

FINDINGS

The characteristics of an OAMJ

All but three interviewees said they were familiar with the term megajournal – the three exceptions being academic editors – and several participants confidently attributed its invention to Peter Binfield, one of the Founders of *PLoS One*. In general, the term was viewed positively, not least because it allowed for easy reference to a particular publishing model and, by extension, had aided the promotion and awareness of the concept. Several interviewees, however, stated they did not like the term, although their reasons varied. One believed that OAMJs are best described as platforms rather than journals, while another suggested that the term was confusing as it is often first understood to refer only to size, which they considered a secondary characteristic. Another publisher felt that the term carried negative connotations: 'to my mind it sounds a little bit pejorative' [Society Megajournal

(MJ) publisher]. On the contrary, another participant felt the term to be 'falsely positive ... it makes it sound exemplary, in some way that I think is not accurate' (Society non-MJ publisher). No alternatives were suggested, although the term 'cascade journal' was used by one respondent to describe titles operating under similar peer review policies and intended as a venue for articles rejected by that publisher's more selective titles. Another recalled that prior to the emergence of 'megajournal', 'broad-acceptance journal' had been the common description.

When asked to describe the characteristics of a megajournal, it was notable that a significant number of interviewees cited *PLoS One* as an exemplar. In general, most participants mentioned the four criteria identified by Björk (2015), albeit with interesting variations in emphasis and precise definition.

Broad scope

The broad scope of the journal was most frequently mentioned first, with megajournals variously described as 'multidisciplinary', 'transdisciplinary', 'broad spectrum', 'covering a variety of topics', 'without a particular topic', and 'not having a specialism'. In most cases, a single large discipline – for example, physics or medicine – was considered sufficiently broad. An interesting variation on this topic was the mention of so-called 'mini-megajournals', these being titles fulfilling all but the scope criteria of OAMJs. The term was used by four participants, suggesting it already has some currency in the publishing community.

Peer review

As one interviewee put it, 'the criterion of soundness ... is what makes a megajournal in most people's eyes now' (Not-for-profit non-MJ publisher). A large number of interviewees, particularly those with historical involvement in the development of the model, highlighted the evaluation of articles based solely on their scientific or technical soundness as the single most novel aspect of megajournals and the characteristic that is most likely to influence scholarly publishing:

What's game changing about these journals is not their size, it's their peer review system, and that's the genuinely revolutionary thing. (Society MJ publisher)

Interestingly, a small subset of interviewees, while recognizing that *PLoS One* and other journals employed this form of peer review, did not feel it was integral to the definition of a megajournal:

I don't necessarily define a megajournal as having a low peer review barrier ... that's practically how things are set up but I don't think it has to be a megajournal. (Not-for-profit MJ publisher)

One participant in this group cited the example of *Nature Communications*, which they felt should be considered a megajournal despite the journal clearly being 'impact driven' (Commercial MJ publisher).

Size

While peer review policy was viewed by some as the most significant characteristic of OAMJs, others felt journal size was the key defining factor. This view was most often justified by reference to the term's prefix:

Mega means large, it means large volumes, which sort of implies that there is some aspect of speed to it but in my view mega just means big, means large volumes. There is nothing else that is necessarily part of that definition. (Society non-MJ publisher)

Several participants were quick to point out that the term *mega* is technically inaccurate as no OAMJ is producing millions of articles. Others disputed whether most journals commonly called megajournals were actually publishing enough articles to be reasonably considered 'large'. Those who specified a figure tended to suggest between 5,000 and 10,000 articles per year as a minimum – a figure beyond all but three recognized OAMJs. For the rest, 'the only thing that makes the term megajournal quite silly is that they are not big' (Not-for-profit MJ editor). Yet another group of interviewees was happy in principle for smaller journals to be called megajournals while bemoaning the fact that the term then fails to capture the very large variation in size among OAMJs. Perhaps most interestingly, in comparing all interviews, a clear tension emerged between those who viewed very large article output as the ultimate goal of OAMJs, and therefore at the heart of how a megajournal should be defined, and those who saw it simply as a natural consequence of (in their view) the primary criteria of soundness-only peer review and broad scope. For the latter group, a high article output is best viewed as an indicator of a *successful* megajournal rather than a condition of megajournal status.

TABLE 2 Key and related characteristics of open access megajournals identified by interviewees.

Key characteristics	Related characteristics
Broad scope	Speed of publication
Soundness-only peer review	Distributed editorial structure
Large article output	Altmetrics
Open access	Acceptance of all article-types
	Streamlined publication process
	Innovative functionality

Open access

The requirement for a megajournal to be OA was the least discussed of Björk's four criteria. A majority of interviewees failed to mention OA in their initial definition of the term, although when prompted, most participants agreed it should be considered a defining characteristic, with several participants suggesting they had considered it 'a given'. Most participants agreed that OAMJs typically operated a gold OA model funded through APCs while acknowledging some exceptions, *PeerJ*'s institutional and lifetime membership plans being the most commonly cited. Only two interviewees felt that megajournals need not be OA, both having offered definitions focused solely on journal size.

One interviewee explained why OA should be considered a core characteristic of megajournals, suggesting that, at its heart, the OAMJ model is about reducing barriers. This characterization represents the scope and peer review policy criteria as a means of removing barriers to publication, while the OA component serves to remove barriers to access.

Other characteristics

While scope, size, peer review, and OA clearly emerged as the most commonly reported criteria, some interviewees felt that other characteristics were integral to the definition of an OAMJ. One participant identified megajournals' willingness to publish a range of article types 'beyond just original research' (Commercial MJ publisher), while several others considered fast publication speed a key factor. One publisher noted that megajournals typically operate a 'no-frills' or 'streamlined' publication process, while others suggested that OAMJs often incorporated innovative functionality on their websites (e.g. article commenting). The organization of OAMJs was also highlighted, particularly the distributed editorial structure common to many titles. This was characterized as a 'federated approach to editorial quality not a guided, accountable approach' (Society non-MJ publisher). Only one interviewee identified the incorporation of altmetrics as a defining characteristic of OAMJs – which, given the clear importance placed on peer review policy, is perhaps surprising.

Viewing these findings in aggregate, we can identify a distinction between four key characteristics and a number of related characteristics associated with OAMJs (see Table 2).

Rationale and motivations for launching (or not launching) an OAMJ

Participants were asked to explain their rationale for launching an OAMJ, or in cases where the publishers do not produce a megajournal, why they had chosen not to produce such a title. A wide range of motivations emerged.

A 'home for everything'

Several publishers were keen to emphasize that OAMJ review policies and broad scope facilitate the publication of articles that might otherwise not be published. Examples given included

papers on unfashionable topics and interdisciplinary work. The most commonly cited reasons, however, related to reproducibility and incremental progress:

By having sound science publication vehicles it is possible for example to see more negative results published, which is essential if you were trying to automate and make more reproducible science. You need to understand when experiments haven't worked, what research methods aren't going to be scalable or reproducible. So that's a publishing niche that we need to adequately fill and to cater for. (Commercial MJ publisher)

The argument was made that megajournal editorial policies deliberately remove the significance and impact barriers, which potentially limit the publication of studies with null results, that explicitly seek to reproduce prior work or that otherwise make only minor contributions. They thus serve science as 'lots and lots of tiny bits of information that on their own are not very significant, together can form something very significant' (Commercial MJ publisher).

Effecting change

Publishers spoke of launching megajournals as being a means of effecting change at two levels. Aside from the inherently innovative nature of OAMJs themselves, at a publisher level, megajournals were often viewed as an opportunity for experimentation. Examples of this experimentation included the introduction of open peer review; the rolling out of new submission and publication workflow systems; trials of new APC structures and payment methods (e.g. Bitcoins); and the introduction of pre-print services, commenting functionality, and infographics. For large commercial publishers in particular, using a megajournal for this type of experimentation was seen as relatively low risk. Innovations launched successfully could subsequently be utilized across the publisher portfolio, while unsuccessful experiments would have little impact on the reputation of the publisher's other titles.

On a grander scale, some publishers spoke of the launch of their megajournal as being motivated by a desire for enacting change at a systemic level. As one publisher put it, 'we are very mission driven, where our mission is to transform scholarly communication' (Not-for-profit MJ publisher). In broad terms, this transformation was perceived to have several targets – reversing the primacy of journal impact factors, counteracting inherent inequalities in prevalent research evaluation and career advancement systems, and addressing the inefficiency of the traditional rejection and resubmission cycle. It should be noted that many observers, including a substantial number of our interviewees, question how realistic it is to effect change at this scale.

Open science

Some interviewees explicitly perceived OAMJ as aligning closely with the principles of open science and that the launch of such

journals was seen as one means of supporting its perceived goals. Three themes emerged from participants' discussion of open science. Several participants suggested that OAMJs are addressing the concerns of funders keen to ensure that all the work they fund is disseminated widely. As one interviewee put it, referring to sound research output being rejected on impact grounds by highly selective journals:

If it's funded research, it's a dreadful waste of the funding and if it's research that includes people who willingly took part assuming this was going to be useful to others, particularly patients, then it is actually scandalous, this waste of research. Megajournals are one really important contributor to reducing that waste. (Society MJ publisher)

Several publishers also described how they viewed megajournals as a means of encouraging and supporting open data practices, especially given the policies of some OAMJs requiring the publication of supporting data alongside published articles. Most significantly, however, megajournals were viewed by several commercial and society publishers as a low-risk way for them to develop OA titles. Interviewees from these publishers described a growing awareness of the need to enter the OA space – in some cases, in response to author surveys – and offered the example of *PLoS One*, suggesting that the megajournal business model could be sustainable. As one publisher put it, a megajournal was 'developed specifically for us to be in the open access market' (Commercial MJ publisher).

System efficiency

As discussed above, many interviewees stated that a motivation for launching an OAMJ was to effect change, and addressing perceived inefficiencies in the scholarly publishing system was widely spoken of as a key imperative. Interviewees suggested that the traditional model encourages authors to participate in rounds of submission and rejection as they attempt to find a journal willing to publish their work. By committing to publish anything deemed scientifically sound, megajournals potentially streamline this system, offering authors a means of bypassing the submission–rejection cycle. This not only allows faster publication for the author, but reduces waste for the system as a whole. As one interviewee stated, 'time saving, labour saving ... partly a way to address this multiple review iterative process which is totally inefficient' (Not-for-profit MJ publisher). Interviewees felt this was most obviously true in terms of reviewers; not only should the total number of reviews required be reduced, lessening the overall load on academia, but the reviews themselves should be less taxing as they should address only the soundness of the work. It should be noted that one interviewee took a dissenting position, seeing no real inefficiency in the current system and arguing that the process of submission and rejection helps researchers maximize the eventual impact of their work by ensuring that articles are eventually published in the most appropriate

journal. It was also notable that no publishers identified that while the OAMJ model potentially offers improved efficiency for publishers, authors, and reviewers, it can also be seen to increase the burden on readers. The lack of a filter based on the significance, novelty, and interest of the article means that readers are required to make such judgements.

Two interviewees identified further potential efficiency for publishers in the consolidation of resources into single large titles – essentially economies of scale. While the realities of this at a publisher level are dealt with in more detail in our subsequent paper (Wakeling *et al.*, 2017), of relevance here is the notion that this idea can be extended to the system as a whole:

If you look at the content of PubMed it's over a million articles a year, and we are subdividing that in literally thousands of journals through a tortuous editorial process. That model is just a really inefficient model which we don't need to use given the capabilities of the Internet and networked digital computing. (Not-for-profit MJ publisher)

One interviewee associated with a non-profit OAMJ took this argument to its logical conclusion, suggesting that a truly optimized system would consist of a single all-encompassing megajournal, thereby doing away with all disciplinary and publisher silos.

Revenue generation

Many interviewees stated that an important motivating factor for launching an OAMJ was its potential for revenue generation. For several commercial publishers, this motivation was placed in the context of declining subscription revenue and increased competition. The high output of megajournals combined with APCs is a potentially attractive proposition – as one interviewee observed, 'volume is certainly an economic strategy for journals' (Not-for-profit MJ publisher). While it is hardly surprising that commercial organizations might be motivated by potential profit, it should be noted that several interviewees recognized that non-profit publishers also saw the potential revenue benefits of the megajournal model, and that OAMJs could be used to subsidize other titles or operations. Nonetheless, it was clear that participants associated with some non-profit megajournals were dubious of the extent to which the motivations of some commercial publishers extended beyond the purely economic, despite their rhetoric. As one put it, 'there has been a cynical gold rush of publishers saying "PLoS One is making a lot of money, we would like a piece of that business"' (Not-for-profit MJ publisher). Several interviewees suggested that publishers motivated purely by profit were less likely to achieve long-term success as they were typically unwilling to invest sufficiently to support the growth and sustainability of the journal.

Retain rejected submissions

While clearly linked to revenue generation, some participants identified the retention of rejected submissions as an important

motivation for launching a megajournal. They suggested that by facilitating the cascade of articles rejected by selective journals to the same publisher's megajournal, costs (not least time and effort) can be recouped, with the added bonus of the articles not eventually being published by a competitor. This serves to maintain or grow market share whilst also potentially improving the service offered to authors, who generally benefit from relatively simple resubmission processes. Again, however, some participants were somewhat cynical about the commercial publisher's positioning of megajournals in this regard:

[Some large commercial publishers] have clearly launched their megajournals to be at the bottom of ... their portfolio of journals so that they can filter all their rejections down into it. (Not-for-profit MJ publisher)

Market considerations

Many interviewees described uncertainties surrounding the future of scholarly publishing, and some explained that the launch of an OAMJ was, to some extent, insurance against dramatic shifts in the market:

We don't know what the future looks like. What we wanted to do was have a diversity... a diverse approach, not focused on one particular theme or one particular strategy. (Society MJ publisher)

Typically, this was in particular reference to the potential dramatic growth of OA publishing, although one interviewee speculated that for some publishers, the diversification was centred on the development of a platform rather than journal approach. Interviewees also observed that the growth of megajournal output since 2008 suggested OAMJs were attractive to authors, and thus, publishers were 'driven by the economic competition vector' (Not-for-profit non-MJ publisher) to launch their own titles. This was exacerbated by recognition of the benefits of first-mover advantage, leading to the launch of a host of OAMJs in the period 2010–2012. Several participants felt that this growth in titles had, in turn, led authors to increasingly expect a publisher to operate an OAMJ title, a cycle that by extension has further encouraged the launch of OAMJs. It is also possible to infer a link between a publisher's recognition of the strength of its brand and the likelihood of a megajournal launch being successful. Thus, a strong position in the scholarly publishing market may encourage publishers to conclude that launching an OAMJ title is sustainable. A more detailed discussion of publishers' views on brand and reputation can be found in Wakeling *et al.* (2017).

A final important point regarding the market relates to the dramatic rise in all research output over the last decade. This led one interviewee to identify a 'supply-side problem' – that the current journal landscape is not equipped to cope with current and future publication levels. Megajournals are therefore launched in

recognition of, and as a solution to, this supply-side problem. While this has undoubtedly presented an opportunity to publishers, the participant was somewhat negative in his or her view of the consequences, believing that the OAMJ editorial policy supports the supply side at the expense of the demand side (as, they believe, much megajournal output is of questionable use to the research community). An extension of the supply-side argument comes in the form of recognition that new markets have emerged for publishers to draw on – particularly in the developing world. It was a notable coincidence that three interviewees, all of whom hold senior positions at large publishers, mentioned that they had independently travelled to China to undertake promotional and developmental work in the weeks preceding their interview. Several publishers admitted that a significant motivation for launching an OAMJ was as a streamlined and easy-to-access venue for authors from these new markets.

Motivations for launching mini-megajournals

As discussed above, the term ‘mini-megajournal’ emerged in discussions with publishers as a means of describing OA journals employing a megajournal-style peer review process and aiming for large volume, but with a narrower sub-disciplinary focus. The two publishers who described launching such journals described many of the same motivating factors as OAMJ publishers (particularly the retention of rejected papers, revenue generation, OA diversification, and as a low-risk opportunity for experimentation), with additional business-case justifications for maintaining a narrower focus. Typically, these related to particular disciplines where the publisher was already successfully operating traditionally selective journals, and thereby seeing a large and constant supply of rejected articles that were available to cascade to the mini-megajournal: ‘subject areas where we are strong and we have a good cascade and those journals are publishing several hundreds of papers a year each typically’ (Commercial non-MJ publisher). Mini-megajournals were also cited as a means of supporting scholarly society publishers’ first forays into the OA market – the narrower scope therefore being a consequence of societies’ desire to limit the journal’s scope in their field.

Reasons for not launching an OAMJ

Interviewees associated with a publisher not producing an OAMJ were asked to explain why that was the case. It was notable that all such participants admitted having at least considered doing so. Several publishers had launched broad-scope, high-volume titles but maintained a selective peer review policy. Their rationale for this approach was often related to maintaining a brand or reputation, which they felt a megajournal (with its more inclusive peer review policy) might dilute. This point was echoed by publishers who had gone on to launch an OAMJ, with one society publisher noting that its publishing board had initially considered the venture a ‘risk’ for these reasons. Other publishers cited variations in disciplinary culture as a reason not to launch an OAMJ. A variety of disciplines and sub-disciplines, from chemistry

through to most of the humanities, have historically been reluctant to engage with OA publishing, leading one interviewee to comment that any attempt to employ a form of OAMJ peer review would be too hard to ‘sell’ to the academic community in their discipline. One participant described consulting authors and concluded that researchers were unenthusiastic about broad-scope journals, preferring instead to maintain tighter communities centred around more narrowly focused journals. A final contributing factor for several publishers was the perceived scale of the challenges associated with launching an OAMJ from scratch, with these publishers deciding that alternative strategies, such as mini-megajournals, were more manageable and lower-risk options. We note here that the publishers represented in our sample were all relatively broad in subject scope (the most narrowly defined society publisher representing a large disciplinary community). It is possible, therefore, that a reason for not launching a megajournal not covered in our findings relates to subject scope; some publishers and societies may feel that their area of focus is too narrow to sustain an OAMJ.

DISCUSSION AND CONCLUSIONS

Awareness and interpretation of the term ‘megajournal’

Analysis of the interview data reveals that awareness of the term megajournal is widespread, and there is a consensus that, despite some perceived flaws, it is now the established label within publishing circles for a particular type of journal. It is, however, striking that the three interviewees unaware of the term are all working researchers who act as academic editors for a megajournal. While this is not absolute evidence, it does suggest that the term has yet to reach anything like widespread currency in the wider academy. An interesting question here is the extent to which this lack of awareness might simply relate to terminology or whether, in fact, it indicates that the concept itself is alien. While interviewees were broadly in agreement about the defining characteristics of OAMJs, which were found to align closely with the criteria proposed by Björk (2015), it is revealing that even among publishers intimately acquainted with the phenomenon, there is apparent disagreement about the relative importance of the criteria and what notions such as ‘large’ actually mean. While ‘*PLoS One*-like journal’ serves as a useful short-hand, these interviews support our earlier findings that there is no such thing as a ‘typical’ megajournal (Wakeling *et al.*, 2016). Each publisher views both the term and the concept through the lens of their own organizational needs and values or their perceptions of the needs of a particular research community.

Motivations for launching an OAMJ

Perhaps the most striking theme to emerge from these results is the apparent tension between the motivations for launching a megajournal. The imperatives driving publishers in their

production of megajournals are clearly varied, and even interpretation of the term megajournal is to some extent driven by this: in general, commercial publishers were quicker to highlight high output as the key characteristic of OAMJs, while non-profits were more likely to focus on innovative peer review. One approach to deepening our understanding of this issue is to consider the various motivations outlined above in terms of their potential business benefits (i.e. benefits to the publisher, such as revenue growth or cost savings) and their societal benefits (i.e. benefits to the wider community, such as improving the dissemination of research results or broadening the kind of research outputs that can find a home). Launching an OAMJ in order to generate revenue and profits appears to represent a purely business-orientated motivation. Similarly, creating a megajournal in order to support the aims of the open-science movement can be identified to a societal benefit. What is striking, however, is the fact that in all cases, motivating factors have potentially both societal and business benefits. To take one example, the

suitability of the megajournal model to serve authors from developing markets can be presented as being of great societal benefit in the sense that the megajournal reduces barriers to publication (and access) for developing nations and, by extension, provides exposure to research, and researchers, that might not otherwise be visible to the global research community. At the same time, of course, these markets represent a potentially huge business opportunity for publishers who are able to tap into their ever-increasing research outputs – undoubtedly a business benefit. In fact, as Fig. 1 shows, all the motivations outlined by participants can be viewed as potentially having both societal and business benefits.

Figure 1 also indicates which of the four primary megajournal characteristics (peer review for soundness only, broad subject scope, large publishing volume, and OA) are fundamental to each motivating factor. It is notable that peer review for soundness only supports every stated motivation for launching an OAMJ, something that is not the case for the other three characteristics.

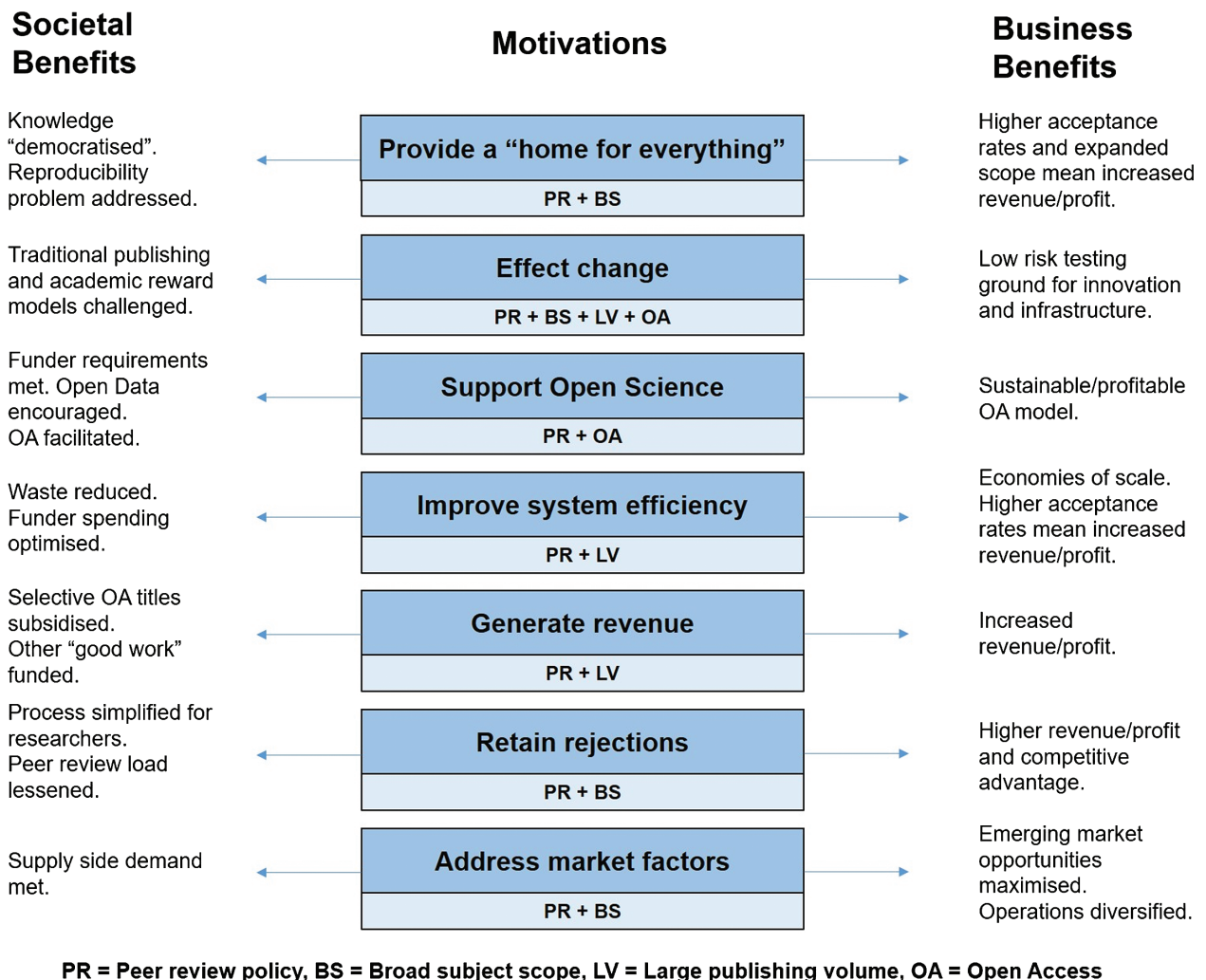


FIGURE 1 Contrasting emphases in the benefits of megajournals and the megajournal characteristics integral to each motivating factor.

This supports the assertion made by several of our interviewees that soundness-only peer review can reasonably be viewed as the principal defining characteristic of an OAMJ.

OAMJs and the open science movement

It is also instructive to review the perceived potential societal benefits in the context of the open science movement. Our interviewees tended to express a somewhat narrow view of open science, with the term typically employed to describe a focus on OA, open data, and increased publication rates. Clearly, however, many of the other motivating factors, and their associated societal benefits, can be seen to match the broader goals of open science. Providing a 'home for everything' supports the goal of increasing the publication of null results and replication studies, something that is often considered to be an important aspect of open science (Nosek, Spies, & Motyl, 2012). Likewise 'effecting change' can be seen to address issues relating to research assessment and the academic reward system (Nosek et al., 2015). It is important to note here that there was significant variation among interviewees regarding the extent to which different aspects of the open science agenda were prioritized, or even supported at all. OA, for example, was universally recognized as a positive phenomenon, but views about the likelihood and benefit of OA one day entirely replacing subscription models were extremely varied. Similar differences were observed in discussions of the journal impact factor and the extent to which the traditional peer review system served or failed to serve authors and readers. Thus, while it is reasonable to identify common broad motivations for launching a megajournal, the rationale for each publisher remains somewhat ambiguous.

Implications for the megajournal debate

The ambiguity over publisher motivations is perhaps the reason that much of the debate surrounding megajournals is so polarized. Does an editorial policy that facilitates the publication of replication studies mean a publisher is genuinely concerned with the reproducibility issue in science, or does it instead reflect a calculation of what such studies might be worth in APCs? While interviewees were generally reluctant to openly criticize other publishers, there was a sense of mistrust on both sides of the debate. The suggestion from some interviewees was that commercial publishers' public support for the societal benefits of OAMJs represent somewhat cynical attempts to obscure their true, profit-driven motivations. Others perhaps suspect the large not-for-profit and society OAMJ publishers of deliberately downplaying the importance of revenue generation as a motivating factor. This is consistent with the tone and content of much public debate of the megajournal concept (e.g. see the comments left on Anderson, 2010).

Two further factors complicate any attempt to fully understand the relative importance of motivating factors for any given publisher. The first is that even with the promise of anonymity, it would be naive to assume that interviewees were entirely

transparent about their motivations. What has been termed 'social desirability bias' (Nederhof, 1985) suggests that we should perhaps expect participants to be keener to expand on the societal benefits of their publishing operations than delve into the financial imperatives underpinning them. The second is that for most motivating factors, it is possible and even likely that publishers understand and value both the societal and business benefits. Understanding the extent to which different motivating factors drive operations is therefore doubly complicated and requires a deeper understanding of how publishers run their journals. In order to address this, our second paper reporting this research explores publisher responses to questions about the development and day-to-day operations of their megajournals.

ACKNOWLEDGEMENTS

The research was funded by a grant from the UK Arts and Humanities Research Council (AH/M010643/1). The authors also thank all interviewees for their contribution to the research.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Interview schedule (publishers).

Appendix S2. Interview schedule (editors).

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