Open Access 2015: Market Size, Share, Forecast, and Trends

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Market Performance

Advancing the Business of Information

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Why This Topic

The debate around whether open access will eviscerate scholarly publishers is no longer front and center. Public and private research funder mandates and policies are in place or in process, and once-controversial social collaboration networks (SCNs) facilitating article sharing and collaboration are an established part of the research landscape. But feathers continue to fly around pricing models, embargo periods, funder-mandate compliance, copyright, "double-dipping," and more.

These debates find startups, partnerships, and organizations developing infrastructure to support the inner workings of a highly controversial and disruptive industry shift. Rather than focus on institutional buyers and their budgets, publishers now must competitively address the wants and needs of a new customer: the researcher/author. This includes enhanced search and discovery, sharing and collaboration, conducting and reproducing experiments, publishing, and raising author profiles.

We estimate open access at about 1.1% of the total 2014 STM market and 4.3% of the STM journals market, but it packs a significant punch. Publishers' focus on profitable OA publications leading to redirected resources; open discussions around article sharing; mandate-management challenges for publishers and institutions; establishment of non-subject-specific publications known as megajournals: these are changing the face of the market as well as how publishers approach it, how researchers participate in it, and how librarians manage it.

This report updates Outsell's Open Access: Market Size, Share, Forecast, and Trends report, (January 31, 2013). We provide ongoing analysis of this market by outlining noteworthy developments in open access, as well as its challenges. We focus on the wide array of business models developed over the past two years and the trends and drivers influencing those models. And we offer insight into the future of open access in terms of growth and size as well as the players driving those dynamics, outlining essential actions the industry must take to manage change effectively.

Methodology

We developed market size estimates from many sources, including publishers' websites; databases such as CAS, PubMedCentral, ScienceDirect, Scopus, and Web of Science; peer-reviewed journal articles; and news stories.

Additional secondary research rounds out the approach to this analysis, including a strong sampling of the myriad studies and reports available on components of the open access market itself and on stakeholder attitudes and perspectives.

To produce estimated revenue numbers, Outsell analyzed article and journal counts and average article processing charges (APCs) or publishing fees, incorporating discounts as and where

appropriate. Often, we estimated article counts because there is no complete database allowing for a search on open access, publisher, and year. In many cases, this exercise entailed counting articles on publisher web pages.

We validated our estimates by reviewing publicly available information about open access revenue, and we conducted interviews with executives at traditional and open access publishers and other industry organizations. Conversations with industry executives, an ongoing part of Outsell's business, augmented these sources with discussions around revenue numbers, business models, and open access strategies.

Definition of the Market

For the purposes of this report, Outsell defines open access as the publication of peer-reviewed research articles as digital, online, free of charge, and free of most traditional copyright and licensing restrictions.

Outsell does not include other components of the open access market, such as books and datasets, and our analysis shows that they are not a large portion of the market. Data sharing is still nascent, with the majority of researchers taking the established route of publishing data as supplementary materials in journals, both online and in print, or posting on sites such as figshare and Dryad. We expect this to change as OA article publishing models, funder mandates, and technology infrastructure supporting datasets, especially versioning, become more developed and established.

When referring to types of journals, we use the term OA-only when referring to journals that contain no paywalled content. The term hybrid refers to subscription journals that include an offering to publish open access articles paid for by APCs. Paywalled or subscription-only journals are those with no accommodation for open access.

Market Size, Structure, and Performance

The fierce lobbying against open access gave way to a stubborn silence as publishers tried to ignore its progress, but with continued market pressures, the publisher towel went into the ring. Today, one of the main challenges for commercial publishers is maintaining margins while supporting open access, directly affecting open access growth with attempts to generate alternative revenue streams while providing free access to content. The result: OA journal "routes" of green and gold and their various permutations.

OA Revenue Models

Green Route comprises archiving accepted (peer-reviewed) articles in institutional or subject-based OA online repositories, as well as posting on personal or departmental homepages, made freely available after an embargo period, and making preprints (original manuscripts not yet reviewed or externally edited) available in the same places. Gold Route comprises publication of the final article (version of record or "VoR") in an online journal, immediately openly accessible. Business models in use today rely on one of these routes, with more sure to come. Gold Route models include OA-only and hybrid journals.

Hybrid currently prevails as the Gold model, and Outsell expects that to remain true for as long as impact factors and journal reputations hold sway in the researcher ecosystem – and as long as funders do not mandate publication in OA-only journals (currently mandated by the Research Council of Norway, for example). However, the number of variations on the OA-only Gold model, outlined in Table 1, makes it clear that stakeholders continue to seek the most comfortable fit in terms of maintaining or supplementing margins and in keeping transactions simple while ensuring research is openly accessible.

Table 1. Gold Route Open Access Models

Gold Models	Summary Information	Outlook
Platinum	• Pioneered by India-based MedKnow (acquired 2011 by Wolters Kluwer). • Revenue streams: advertising, journal sponsorship fees (governments and societies), low-priced subscriptions, PDF download fees. • "Fee-less-free" model with content available immediately online. • Publishing 353 journals for 320 associations and continuing to show growth; no legacy overhead expenses.	Sustainable, but relies on constrained revenue streams so not highly scalable.
Gold for Gold	• Created by the Royal Society of Chemistry in 2012. • UK institutions subscribe to RSC Gold (journals, databases, and magazines) and receive OA vouchers for their researchers/authors. • Subscription cost determines number of voucher codes, calculated by dividing by £1,600 APC. Example: £22,400 subscription = 14 voucher codes. • Codes pay for any type of accepted article in any journal; remain valid for year of issuance.	With no clear incentive for funders to pay APCs, an unsustainable model despite relatively significant uptake. Program pricing will increase with subscription prices if funders don't step in.
Sponsorship	• Institutions, funders, advertisers, and governments pay all journal publishing expenses and fees. • No supplemental subscription income.	Highly sustainable if sponsors are willing to pay all expenses, but the model would have more uptake by now if that were the case.

Table 1. Gold Route Open Access Models (continued)

Gold Models	Summary Information	Outlook
Institutional Memberships	• Institutions subsidize APCs with membership fees. • Typically a discount applies. • Example: Wiley bases fees on institution size and annual article output.	Sustainable if it supports a journal's cost structure, unlikely for a traditional publisher with higher overheads than born-OA publishers.
Individual Memberships	• "Publish for life" membership model for individuals. • Employed by PeerJ. • Tiered plans at $99 and $199 for publication of one and two articles per year, respectively; $299 for publication of unlimited articles and no fees for accepted articles. • Members must review, question, or comment on at least one article every 12 months to maintain membership status. • Institutional plans available.	Highly sustainable if switched to an annual subscription model to increase revenues, and if content remains high quality to drive memberships.
Institutional Accounts	• Institution or funder pays some or all APCs through pre-funded account. • SpringerOpen's program currently has over 450 members worldwide. • The BMJ also fits in this model but only charges APCs when author can recover fee from a funder.	Sustainable if it supports a journal's cost structure.
Freemium	• Payment for premium content and/or services. • Premium aspect can be content, functionality, or additional services. • Example: Journal of Medical Internet Research (JMIR) offers content free online but charges a fee for extra functionality and services, including downloading, under both transaction-based and membership models.	Sustainable if the premium aspect appeals enough to attract subscription fees.
Price Per Page	• APCs based on page count. • Example: Copernicus charges for pages and quality of data format. Charges are higher if submitted in Word than if submitted in LaTeX, and higher still if not submitted in Copernicus Word or LaTeX template.	Sustainable because fees tie directly to production costs, but currently not a popular model.
"Community Fund"	• Support from specific scientific community participants. • Example: Collabra, University of California Press OA megajournal announced in early 2015, uses a variation based on $875 APC, of which $250 goes into a "research community fund" to pay reviewers and editors who earn points; checks are sent periodically based on fund balance divided by number of points earned. • SCOAP3, focusing on physics and funded by contributions from libraries, funders, and research centers.	Sustainable only if generating enough revenue from APCs, or donors continue to fund SCOAP3.
Others	• BMJ Open: 25% discount on APCs for "timely reviews" on articles and accepted submission within one year of review. • Open Library of Humanities: Library partnership subsidies. • Most publishers: Fee waivers and discounts to authors with limited resources.	Sustainable only if generating enough revenue from APCs/ subsidies.

Source: Outsell analysis

This list does not include OA journals existing within institutions as cost centers. While this is another model of open access, it does not produce revenues and therefore is not included in the sizing numbers, nor in the above list of Gold models. We acknowledge, however, that quite a few journals are published under this model.

The basic green model involves depositing a preprint in a repository – a sometimes discipline-specific institutional, organizational, or corporate archive – often guided by funder mandates, where it is freely available for viewing, typically after an embargo period. Until then, the VoR resides behind a publisher's paywall. Table 2 outlines two notable variations.

Table 2. Green Route Open Access Models

Green Models	Summary Information	Outlook
Diamond	• Also known as an overlay journal or an epijournal. • Provides links to articles within arXiv.org (repository for OA preprint articles). • Access is free, with editorial and peer review work provided by researchers. • Produced on Open Journals Systems (open source software).	A classic green model, but depth and breadth depends on authors depositing articles; not a lot of uptake to date.
bioRxiv	• Life sciences archive operated by Cold Spring Harbor Lab Press. • Also serves as distribution service for preprints (i.e., not peer-reviewed, edited or formatted). • Draft manuscript deposited for commentary. • Can be updated but not removed. • Provides links to the VoR.	Deposit in the archive depends on funder mandates, if a funder allows preprint deposits, and if researchers don't mind using preprints.

Source: Outsell analysis

A uniform pricing matrix does not yet exist; the market is battling to prevent margin erosion while providing a model that is not cost-prohibitive to authors, institutions, and funders. As a result, we expect the hybrid model will remain in play for most non-OA-only journals; born-OA journals will attempt to achieve impact factors allowing them to raise APCs in line with article submission numbers, providing leverage against increasing downward pressures on APC pricing; and megajournals will employ a variety of models to meet the philosophical goals of their directors. In Outsell's opinion, as long as impact factors remain relevant in the marketplace, they will be a major driver of business models, and competition to publish in the most prestigious journals will remain a driving force. We believe that if a model emerges providing sufficient margins to enable publishers to flip elite/high-impact journals from hybrid to OA-only, given a supporting infrastructure, the speed of moving toward open access will increase noticeably.

Whatever model or models save institutions and researchers time and money will have the advantage, which means they must have the technology to automate and simplify workflows. For now, the most easily managed are those with author- or institution-paid APCs, because it is a relatively straightforward transaction. The potentially complicating factor is mandate compliance – because most articles have multiple authors, often funded by various agencies – but so far, funders are not exerting significant compliance pressure because they don't have the systems to readily measure it. With the development of new systems to support compliance and APC transactions, we expect the market will shift to author-paid APCs alongside funder and institutional accounts, membership models, and sponsorships. The model makes life easier for institutions, funders, and authors, not to mention publishers, and therefore Outsell sees it as ultimately difficult to dislodge or disrupt.

Market Size and Forecast

With estimated growth of approximately 3.5% in both journals and STM revenues (excluding geophysical) in 2014, Outsell analysis indicates the STM market generated $26.2 billion and the journals market $6.8 billion last year. Using journal and article counts and average APCs in 2014, we estimate open access revenues were approximately $290.4 million, a growth rate of 15.1% over $252.3 million in 2013, comprising 1.1% of the STM market and growing to 4.3% of the journals market. This compares with $171.9 million in 2012, generating a growth rate of 33.9% from 2011 to 2012 and 46.8% from 2012 to 2013, as Figure 1 shows. Although we do not expect the decline to continue, we also do not expect growth to reach the levels achieved in the initial "gold rush." We base our forecast on the following assumptions:

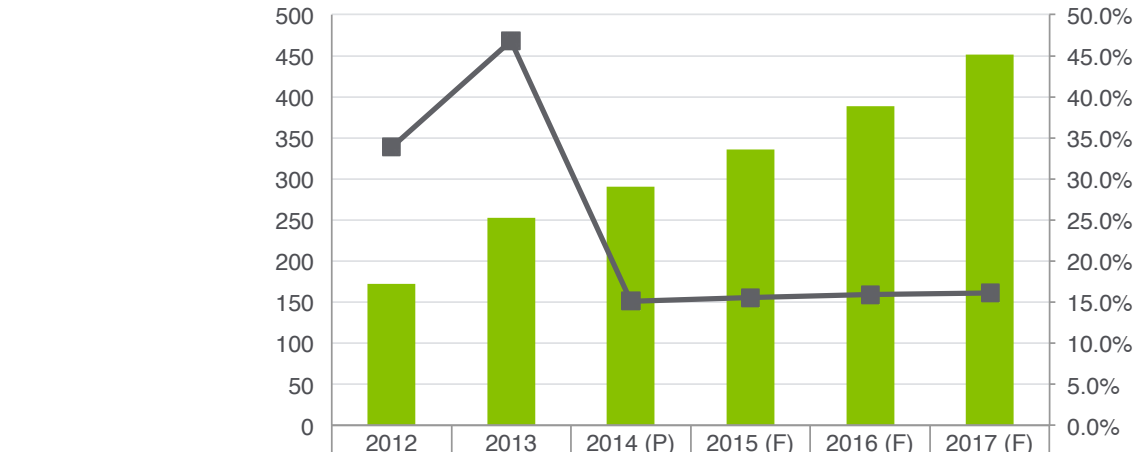
- **Market awareness of open access is at a saturation point.** Open access isn't news anymore, and those inclined to publish under OA models are already doing so. Further uptake by researchers and funders will not be enough to move the growth needle significantly.
- **Funders will not fully support APCs at their current levels.** Examples exist of funders sponsoring or supporting journals (eLife is one), and the Wellcome Trust pays APCs for authors from 36 UK institutions, but the practice is not ubiquitous. The lack of uptake of funding APCs will continue if APCs charged by traditional publishers, which make up the majority of the top players, remain at their current levels.
- **There will be minimal increases in APCs because of the inelasticity of payer (funder, author, etc.) budgets.** In fact, if funders begin to exert pressure, APC levels are likely to decrease – although, given the price levels necessary to support current margins, that could prove problematic for publishers. Increases are unlikely given the probability of backlash, except for the lower-priced APCs, and even in that case bad publicity would likely result.
- **Continued resistance by societies to adopt open access on a larger scale will remain the norm.** The main reason societies give for not participating in open access is the link

between membership benefits and journals. They feel that free journal content diminishes the value of membership. This thinking shows no signs of changing.

- **Robust infrastructure for OA transaction models will not be in place until at least 2017.** Once open access is quick, simple, and easy to measure, the market will settle into figuring out how to make it work best for all stakeholders. For example: Researchers need a clear understanding of who will pay APCs when submitting articles (authors, funders, etc.); authors, funders and publishers must settle on optimal copyright licenses; funders need to be able to track APC payments and measure the impact of the research they fund; and publishers need the ability to process and track transactions quickly and easily. It will take time for stakeholders to meet these conditions, but once they do, growth can pick up through new offerings based on established OA businesses.

Given current trends, Outsell projects growth of open access will slow significantly compared with the past several years, but that it will continue to outpace the overall market aggressively. Although we do not see the growth rate falling below 15% for 2015, we also do not see it rising much above that again, and we project that growth from 2014 through 2017 will be at a CAGR of 16% to reach a total market size of $451.5 million in 2017.

Figure 1. Open Access Market Revenue Forecast and Growth, 2012-17



	2012	2013	2014 (P)	2015 (F)	2016 (F)	2017 (F)
Open Access Revenue ($ Million)	172	252	290	335	389	452
Growth Estimate	33.9%	46.8%	15.1%	15.5%	15.9%	16.1%

Source: Outsell's Information Industry Database

Key Trends and Market Drivers

We see six basic factors influencing the open access landscape, motivating four primary stakeholder groups – funders, researchers, publishers, and institutional content buyers – to support it in varying degrees, as outlined in Table 3.

Table 3. Open Access Drivers Relative to Primary Stakeholders

	Funders	Researchers	Publishers	Institutional Buyers
Publication of research	●●●●	●●●●	●●●●	●●●●
Open access to research	●●●●	●●	●	●●●●
Margin preservation	○	○	●●●●	○
High researcher profiles	●●●●	●●●●	●●●	●●
High-quality, peer-reviewed journals	●●●●	●●●●	●●●	●●●
Speed to publication	●●●●	●●●●	●●	●●●

○ = No interest ● = Little interest ●● = Some interest ●●● = Significant interest ●●●● = Major motivating factor

Source: Outsell analysis

Key motivators for the four main stakeholder groups are as follows:

- **Funders:** Primary motivation is mission, reinforced through mandates attached to grants; the mission advances through publishing openly available, high-profile research findings funded by those grants, as quickly as possible.
- **Researchers:** Career and research are paramount, and being first to publish important findings in widely read, high-quality publications advances both, whether openly available or behind a paywall.
- **Publishers:** Publishing research in high-quality, peer-reviewed, paywalled journals, no matter how long it takes, drives profits, which support operations; the main motivation for supporting open access is adoption of its philosophy as well as public pressure (for these purposes, we group societies with publishers, acknowledging that society drivers include supporting mission and membership).
- **Institutional content buyers:** Serving researcher and author clients with high-quality, affordable (or free) content comes first, with speed to publication representing an important client service factor.

Drivers and Trends

Funder mandates represent the primary driver of the open access movement, dictating disposition of funded research by authors and institutions. Researcher attitudes and workflows influence the application of funder and copyright mandates – which aren't always in lockstep – as well as new market offerings.

Funder Mandates and Compliance

Institutions, funding agencies, and governments have their own general ideas about the optimal way to execute on open access, and mandates support those concepts. Some require depositing manuscripts into an institutional repository or other type of archive prior to publication and under an embargo period (for example, RCUK requires deposit to PubMedCentral), but at this point, compliance with funder mandates runs at less than 50%. Much of that compliance failure relates to author behavior. Many find the deposit process confusing, time-consuming, or just annoying, and because funders for the most part do not enforce mandates, authors frequently ignore them. Bottom line: In most cases, it isn't easy to comply or to track compliance.

Another factor is the cost of compliance. London Higher and SPARC Europe recently commissioned a study on the costs borne by UK institutions to comply with funder mandates, particularly the RCUK and the Higher Education Funding Council for England (HEFCE). The findings show a relatively high burden on institutions, particularly those receiving fewer or lower grants. The biggest issue is tracking costs supporting OA compliance with some funds remaining unspent because institutions do not effectively track costs – and, by default, the institutions bear the burden of those expenses earmarked to fall under grant provisions. The report clearly outlines the current issues created by mandating compliance with processes that do not yet have underlying systems to support them. This is ironic because mandates are the primary driver of open access, and therefore they attract the most attention as the market parses each mandate as it appears and, in most cases, finds murky areas requiring further clarification.

Researcher Behavior

Social collaboration networks (SCNs) such as Academia.edu, Mendeley, and ResearchGate bring together millions of researchers, providing tools for managing article libraries, constructing professional profiles, collaborating, and sharing – activities critical to advancing dialogue around scientific discovery.

Sharing drives dialogue and discovery as well as collaboration. Copyright restrictions and paywalls clearly deter sharing of content, but they do not prevent it. Open access tackles both of those hurdles head-on by using Creative Commons copyright licenses, primarily CC-BY, but the issue remains for subscription content. Two announcements in late 2014 and early 2015 indicate the

impact of this activity. First, Macmillan Science and Education announced an experimental initiative in late 2014, termed "SciShare" by industry pundits, permitting researchers to share Nature-owned content via e-mail, SCN, or social media, and providing the public with links to full-text articles from 100 Nature-chosen news sources. Early results of the experiment in 2015 indicate uptake, with most activity in Nature. Second, the STM association announced in early 2015 an industry consultation around principles supporting private article sharing (that is, sharing among research groups, not the general public) with the goal of providing a construct by which researchers could legally share articles within research or collaboration groups. While this may look like publishers trying to control an existing market activity that potentially undermines margins, it clearly represents a major shift in the attitude of traditional publishers to supporting research behavior.

Startups and New Services

The shift to digital and the incorporation of OA models into the scholarly publishing ecosystem caused a dramatic change in perspective for stakeholders. This shift led to new (article-level) metrics and funder mandates. The emergence of these types of new activities means there now exists a need for more infrastructure, new offerings, and more information. Startups and new services fill some of the gaps:

- **Altmetric** – Although the journal impact factor remains the key metric for most institutions and authors, there is increased attention to article-level metrics generated through activity on social media, news outlets, and other previously unmeasured data sources. Altmetric is a pioneer in gathering and disseminating that data.
- **Copyright Clearance Center's RightsLink** – Expanding on the CCC offering that helps publishers support copyright functions, RightsLink now also helps them process APC payments.
- **Kudos** – With a focus on authors, offerings help authors raise their profiles through improved discoverability and usage information.

This is a tiny sampling of the many new offerings appearing in the marketplace as open access opens new doors for workflow and other services.

Offsetting

An issue around hybrid journals is the concept of "double-dipping," meaning that subscription fees pay not only for paywalled content but also for OA content; a publisher is accepting payments from both an author and a subscriber for the same content. Several publishers announced subscription fees adjustments to compensate for this by tallying OA articles published in a hybrid journal at the end of the year and reducing subscription fees for the following year – referred to as "offsetting." Wiley and Elsevier, for example, announced partnerships with Jisc (a technology

services organization) to create models for UK institutions, typically providing credits based on APCs paid in the previous year or years, to offset APCs paid to the respective publishers' OA journals programs. Wiley even published a list of adjustments by journal, specifying that reduced prices apply only to those journals whose subscription article output for publication year 2013 declined as a result of OA article increases.

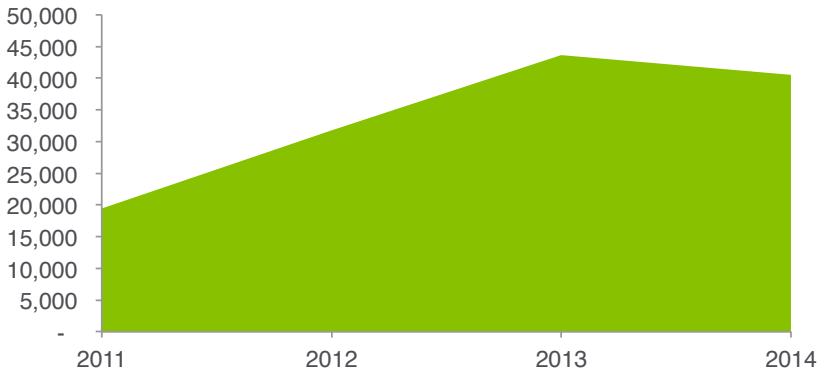
The Institute of Physics Publishing (IOP) introduced another model addressing this issue in the spring of 2014, a three-year pilot project under which the majority of APCs paid to IOP by 20 participating UK universities offset subscription and licensing fees. Basically, a sliding scale governs reductions in subscription fees, with lower levels of APC income offsetting subscription and licensing fees of universities in the pilot, and at higher levels offsetting prices for all customers. More models along these lines will come from other publishers in 2015. SAGE, for example, will globally discount the subscription rate of journals where more than 5% of articles published as gold OA, based on 2013 data. An issue facing these initiatives is the lack of trust on the part of institutions; many feel these are token actions that don't adequately address the problem. Continued pressure from institutions will drive a more uniform scheme that works for all parties, but that won't come for a year or two.

Megajournals

The rise of megajournals began about 10 years ago. Identifying characteristics include publishing articles from varying fields or from one overarching field rather than being discipline- or subject-specific; lower selectivity in terms of perceived scientific importance in favor of scientific soundness, with the same level of rigor applying to editorial boards; and typically a speedier peer review and publication process than with traditional publishers. Collection of APCs is the prevalent business model megajournals employ.

Considered a major factor in the future of open access, the growth in megajournal publishing seems to be slowing, with a decline in the number of articles published in 2014 in almost half of the approximately 20 megajournals, as Figure 2 shows.

Figure 2. Total Articles Published in Megajournals, 2011-14



Sources: Scopus, Web of Science, Journal Websites, PubMed

This decline is despite the fact that the largest megajournal, PLOS ONE, has a comfortable impact factor of 3.5, and PeerJ will receive its first impact factor in June 2015. Most likely in a temporary lull attributable to reconfiguring business models and lack of participation from most large publishers, the growth rate will recover to some extent with the announced launches in 2015 of megajournals, including several by traditional publishers.

The lack of infrastructure and standards supporting convergence on these and other trends and drivers contributes to the lack of consensus on the future of open access. Myriad business models, along with inconsistencies in funder mandates and compliance, result in today's fragmented landscape.

Most researchers are too busy to be trailblazers, to figure out how open access works and make it work for them. Until there is consistency, confusion and falling back on the familiar or easiest route will continue to prevail. Such consistency is at least five years away, if not longer, and its inception relies on implementation of robust systems, agreement on standards, and sustainable business models.

Potential Disruptive Forces

Another major impediment to speedier uptake of open access is the lack of compromise between advocates who insist on immediately freely available scientific content no matter the cost, and traditional publishers looking to take a slower, more cautious approach, maintaining profit margins or at least sustainable and scalable business models. Other drivers requiring consensus for effective implementation include the following.

Infrastructure Challenges

Open access presents infrastructure challenges for institutions, funders, and publishers. Administering to repositories and monitoring compliance is an enormous staff challenge for institutions, typically falling under the purview of the academic library. This means staff have to ensure compliance by authors within their institution, including metadata and copyright requirements – regardless of whether authors notify staff of article submissions. In many cases, staff must periodically search databases such as Scopus and PubMed to look for articles, research mandates attached to each article, ensure compliance, and log it into an institutional system, if one exists (the "system" in many cases is an Excel spreadsheet).

The process is somewhat easier in the cases of institutions with Current Research Information Systems (CRIS) such as Symplectic, Elsevier's PURE or Thomson Reuters' Converis. These help manage the operational burden of tracking, reviewing, and cataloging researcher output. Not all institutions can afford a CRIS, however, and those that can't bear the heaviest burden of open access compliance.

Publishers also have to deal with new business models, unprepared for events such as greatly increased numbers of transactions. Wiley took several years to build a system to accommodate

open access. The company can now fully support APCs, institutional memberships, and sponsored journals, and it launched a tool in 2014 to support funders. Copyright Clearance Center's (CCC) RightsLink provides support for publishers and institutions for implementing and tracking APC and funding information, one of the first entrants into the field of infrastructure services and built on CCC's existing platform. The platform provides standardized metadata flowing through to the institutions paying the APCs, so they know what they're paying for.

Standards

Efforts continue to implement standards, particularly the digital object identifier (DOI) and the Open Researcher and Contributor ID (ORCID). The DOI attaches to articles and datasets as persistent digital identifiers, and ORCIDs attach to individual researchers. FundRef provides standardized funder names, but not all publishers use it, and those that do are not uniform in how they deploy it. Adoption of each of these (or similar) standards by all stakeholders is a must for effective compliance tracking and reporting.

Licensing standardization is another area muddying the open access waters. Publishers often present license metadata inconsistently and provide it at the journal level rather than at the article level, frequently only within a proprietary system. Licensing terms for an article can be prohibitively difficult to ascertain – to the point that PLoS, SPARC, and OASPA developed HowOpenIsIt?, an online tool that looks up an article by DOI and determines the licensing information associated with it. A standardized taxonomy and reporting system is imperative for relevant information to be discoverable and reportable, and to eliminate the need for tools to obtain important content metadata.

Embargo Periods

The debate over embargo periods is heated and ongoing. The perspective of OA advocates is on a spectrum ranging from immediate access to a length of time commensurate with the half-life of information pertaining to a specific discipline. Many publishers feel they can help advance the OA movement by working with institutions and authors to comply with deposits to repositories. The fact is, if publishers and institutions work together to advance use of repositories, it will lead to better usage tracking and compliance. As long as embargo policies exert pressure to reduce the time content is behind a paywall – Wellcome Trust, for example, requires deposit to PubMed Central (PMC) or Europe PMC after an embargo period of not more than six months following the date of official publication – not depositing into repositories allows publishers to maintain control over that content.

Repository managers find it frustrating to try to manage embargo mandates from funders, institutions, and publishers, a major impediment to green route OA.

Competitive Landscape

A sampling of publishers shown in Table 4 indicates the number of OA-only journals showed impressive growth from 2013 to 2014, although on a small base. The number of hybrid journals also increased both in terms of total numbers and as a percent of total published within this group. Subscription-only journals numbers decreased, not because of discontinued publication, but because approximately 13% were "flipped" to OA-only or hybrid.

Table 4. Sampling of Publisher Journal Numbers, 2013-14

	2013 Number of Journals Published				2014 Number of Journals Published			
	OA-Only	Hybrid	Subscription Only	Total Published	OA-Only	Hybrid	Subscription Only	Total Published
Elsevier*	75	1,599	416	2,090	392	1,609	524	2,525
Taylor & Francis	27	1,600	477	2,104	27	1,600	478	2,105
Springer (inc. BMC/CC)	463	1,570	951	2,984	491	2,089	404	2,984
Wiley Global Research	28	1,240	332	1,600	47	1,257	396	1,700
SAGE	15	730	0	745	24	768	13	805
Oxford University Press	20	235	63	318	24	240	97	361
Cambridge University Press	6	202	206	414	10	231	203	444
Nature Publishing Group	21	47	59	127	32	43	52	127
American Chemical Society	0	47	0	47	0	49	1	50
BMJ	10	43	0	53	10	53	0	63
RSC	0	37	0	37	0	37	0	37
IOP	7	34	34	75	7	45	23	75
Hindawi	438	0	0	438	438	0	0	438
American Institute of Physics	3	22	1	26	3	23	0	26
Totals	1,113	7,406	2,539	11,058	1,505	8,044	2,191	11,740
% of Total	10%	67%	23%		13%	69%	19%	
Growth					**35%**	**9%**	**-14%**	**6.2%**

* Note: OA-Only includes free journals

Source: Publicly available information and Outsell analysis

This data is directional and not definitive, but it does indicate that although article counts continue to grow, the number of journal launches seems primarily focused on OA-only and journals offering gold open access options, with significantly fewer journals launched or published without an open access option.

Growth in the number of OA-only plus hybrid journals is 12%, aligning roughly with revenue growth of 15%, shown in Table 5. Inclusion or discontinuation of promotional discounts or fee waivers for newly launched titles may drive the 3% variance, as well as an increase in the number of articles published in 2014 by journals launched in 2013.

Table 5. Estimated Open Access Revenues, 2013-14

	Total 2014 Estimated OA Journal Revenues ($000)	Total 2013 Estimated OA Journal Revenues ($000)	Estimated % Change 2013-2014	Estimated % Change 2012-2013
Springer Science+Business Media	70,972	62,219	14%	19%
Public Library of Science (PLoS)	39,850	46,337	-14%	28%
Elsevier	33,041	21,406	54%	254%
John Wiley & Sons, Inc.	17,673	6,221	184%	4%
Hindawi	15,840	14,400	10%	20%
Nature Publishing Group	6,998	4,729	48%	12%
Oxford University Press	6,494	4,995	30%	67%
Frontiers	6,435	5,754	12%	28%
Bentham	4,286	4,911	-13%	39%
BMJ	3,367	2,317	45%	16%
Total Leaderboard	204,957	173,289	18%	n/a
Total Estimated Market	290,376	252,287	15%	47%

10 to Watch

Outsell believes that there will not be a dramatic surge in open access growth soon, especially given today's market dynamics and drivers. We expect the actions of the following 10 companies and organizations, some already active participants and some emerging as a result of open access, to have an impact on the market going forward.

CHORUS

CHORUS (Clearinghouse for the Open Research of the United States), an initiative launched in 2013 and developed as a way to help US federal funding agencies implement OA policies, addresses compliance issues by automating the deposit of articles into a publisher's archive when submitting to a journal published by a CHORUS member. The US Department of Energy, for example, mandates use of CHORUS services, with article metadata and abstracts deposited to their PAGES (Public Access Gateway for Energy and Science) repository. The repository, now in beta, will enable linking to full-text articles after embargo periods of 12 months for each article. Agencies and publishers can track compliance through a dashboard.

This monitoring capability will lead to better management of the compliance process as weaknesses in the system become more visible and therefore addressable. The automatic addition of CrossRef's FundRef metadata optimizes search capabilities, and members can build additional search functions on top of CHORUS's open programming and interface. Finally, articles exist in perpetuity through partnerships with archiving services such as Portico (an agreement with CLOCKSS is also in the works). If the initiative continues to monitor and adapt to the market and its evolving dynamics, it should prove a highly effective tool supporting the basic purpose of making research open, if not completely fulfilling the OA vision advocates seek.

Combined Macmillan-Springer

The announcement of the marriage between Springer Science+Business Media and major assets of Macmillan Science and Education (MSE) in early 2015, with Holtzbrinck holding 53% ownership, creates an open access powerhouse. Springer already holds the leading position with BioMed Central, Chemistry Central, and SpringerOpen. With Springer now closely connected to the Digital Science offerings held by MSE, greater opportunity exists to deploy those platforms and services across Springer's assets, providing leverage to those operations and supporting profit margin goals. Although it is not clear what that will look like – the deal must be approved by competition authorities and systems integrations implemented – the possibility exists for an innovative and forward-looking open access business strongly supported by the Digital Science group and powered by Springer and MSE content. With Springer OA content combined with MSE's Nature Communications, Scientific Reports, and hybrid journals, OA revenues should easily exceed $100 million in 2016 (if not 2015), a milestone in OA publishing. Added to the strong Nature brand, this new entity has the potential to be a powerhouse in the scholarly publishing landscape, in terms of both open access and quality journals.

Copyright Clearance Center

CCC is firmly entrenched in scholarly publishing and corporate information ecosystems with its offerings, including RightsLink. The OA solutions built into the platform help publishers and information managers where they need it most with infrastructure to support OA business models,

something many publishers did not, and do not, have in place. Bigger players may have proprietary systems, but many do not, and partnering with CCC solves most of those problems. As an active player in developing solutions for publishers dealing with the fragmented OA market, including APCs and funder mandates, CCC is a company to watch as it continues to work closely with all stakeholders to identify and address challenges.

Creative Commons

Creative Commons started in 2001 with financial support from Duke Law School, and in 2002 CC released its first set of copyright licenses to the public. By 2003, there were about a million in use. That expanded to almost 5 million in 2004 and 20 million in 2005, along with the release of Version 2.0 of the licenses. Today, authors and publishers worldwide use the CC Version 4.0 licenses, with many funders mandating them. Staff and volunteers in more than 70 jurisdictions run the organization, supported by grants and donations, operating it as a not-for-profit. CC is a major driver in advancing the cause of open access in all types of publishing (music and education, for example), but it garners the most attention in scholarly publishing, in which OA advocates actively lobby for use of its license models by funders, publishers, and authors. Other models exist, but those from CC are the most prevalent, and supporters want to keep it that way. There are those who would prefer to give authors more choices, but it's a tough fight and for now, CC remains on top.

Directory of Open Access Journals (DOAJ)

The DOAJ is a database designed to increase visibility and ease of use of OA scholarly journals and articles, thereby supporting increased usage and impact. Inclusion in the database requires a journal to use a funding model that does not charge for access and allows users to "read, download, copy, distribute, print, search, or link to the full texts" of those articles. The DOAJ is the only database devoted to OA content, created to serve the global research and education community by collecting and organizing OA resources so that libraries worldwide can easily access them.

DOAJ hit a speed bump in late 2012, when IS4OA (Infrastructure Services for Open Access) took over and determined that journal inclusion required stricter criteria, a decision reinforced by the discovery of unscrupulous publishers listed in the database. After a platform migration and extensive development, the new DOAJ launched in March 2014 with an application form that publishers must complete for inclusion in the database. As of August 2014, only 231 journals (there are more than 10,000 journals in the database) qualified under the new stringent criteria and now appear with a green tick (check mark) next to the title. A positive recent step is including in the application an indication of whether APC or submission charges apply, the amount and currency of each, and the URL where that information resides. If the DOAJ continues along these lines, it will go a long way toward providing valuable metrics around the open access movement itself while serving as a valuable resource for researchers and institutions.

eLife

This journal is trying to be all things to all people – and it's having some success. Covering life science and biomedical fields, it accepts articles within days, and then subjects them to post-publication peer review, typically accomplished within a month. The journal touts its process of putting most articles through only one revision – primarily because anonymous reviewers present a summary list of suggestions that will make the article publishable. Because the site discourages the concept of the journal as a container, it discounts the impact factor and instead provides qualitative and quantitative metrics indicating the depth and breadth of an author's work. Provisions exist for cascading peer review, with reviews for rejected papers going with the paper (with permission from the reviewer) to partner journals such as those in the BMC journals series. Metadata is simple and straightforward, and source data file submissions are welcome.

Major funders Wellcome Trust, Max-Planck-Gesellschaft, and the Howard Hughes Medical Institute started eLife at the end of 2012 and continue to support the website/journal, in essence paying twice for research – once to researchers and again to publish their findings, thereby indirectly becoming publishers themselves. Based on 2013 financials, the organization is currently spending close to what legacy publishers spend on a per-article basis. The industry will watch to see if eLife realizes economies of scale to reduce cost-per-article and if its funders continue to support operations indefinitely. In the meantime, funders and authors accomplish the goal of speedily publishing quality open research.

Faculty of 1000

Faculty of 1000 started about 14 years ago as a literature recommendation service comprising 1,000 biologists and doctors. About two years ago, the founder, Vitek Tracz, also the founder of BioMedCentral, started the OA journal F1000Research. Tracz felt the launch of BioMed Central advanced the cause of open access, but with F1000Research he wanted to address other issues in publishing: speed, transparency, fairness, and reproducibility. F1000Research employs post-publication peer review, thereby addressing the speed issue. A paper undergoes a quick review to ensure that it is actually science; publication follows, and then open peer review begins and, as it unfolds, the transparency, fairness, and reproducibility factors enter.

The interesting aspect of the F1000Research evolution is the mindset that it is not a journal but rather a publishing platform for peer review: A select group should not delay publication or deem which science is or is not important; the decision should be about whether it is science and therefore worth discussion. An issue arising from this philosophy is the amount of metadata now residing on the site and how to enable discoverability. F1000Research currently addresses the issues of speed, transparency, and reproducibility. It will be interesting to see if they can effectively tackle the issue of discoverability and if the combination of all of these factors, plus the lack of focus on a single or group of disciplines, will be a first step toward eliminating the notion of the journal as the de facto container for scholarly information.

PeerJ

Although PeerJ's membership model is innovative, it will not drive significant revenue until the number of new authors reaches critical mass. In fact, it is doubtful that the company is at present generating much over $1 million at the end of 2014. That does not mean PeerJ is not profitable – the company itself says overheads are relatively low – but it is likely that it is currently at breakeven or generating a slight loss. In 2012, when the journal launched under the aegis of Peter Binfield and Jason Hoyt, coming from PLoS and Mendeley respectively, Outsell felt the model was sustainable. Those sentiments have cooled given heavy competition, in terms of both publications and models, not to mention continued focus on impact factor. However, first- and second-stage investments by SAGE and Tim O'Reilly give hope that this model, or a variation of it, will survive. Quality, speed to publication, and margins supporting the model the organization ultimately employs will determine success.

ResearchGate

The next step for this Germany-based collaboration portal is to mash up the millions of datasets on the site (hundreds are uploaded daily), categorize them, and help others with an API to analyze them. Clinical trials, for example, conducted in various countries and looking at the same problem, come up with different results and conclusions. The site intends to make data available to scientists for analysis through a taxonomy overlaid on the datasets to enable effective analysis through external algorithms or other tools. If it can effectively accomplish that goal, the next step in furthering the open access cause can proceed. Whether ResearchGate can do that before any of the big players remains to be seen and will depend on funding and strategic goals. The company needs to focus now on a business model – of which datasets may be a part – to drive revenue. Based on usage and membership numbers, that is not a completely unrealistic goal.

ScienceOpen

ScienceOpen is another Germany-based collaboration site, but unlike ResearchGate, SO is basically a megajournal publisher. ScienceOpen Research is a multidiscipline online publication with APCs of $800 that published 36 articles in 2014 (those funded by the Max Planck Society can publish free of charge). The site also publishes ScienceOpen Posters, with APCs of $80, and published 33 in 2014. Articles publish after a basic review for scientific soundness – ScienceOpen stated in December 2014 that it accepts 60%-70% of submissions – and peer review takes place post-publication. Because of this process, the site considers itself both a journal and a preprint archive.

The third prong of the site's activities comprises research networking, allowing for collaboration and communication between researchers and academics. Members must, however, have an ORCID before registering. Membership is free, but the site ranks its members in an interesting stratification: Guests (browsing, reading, and sharing articles allowed without registering); Junior Members (those

planning to publish their first scientific paper); Members (must have at least one published scientific paper assigned to their ORCID account to comment on and rate SO publications); Scientific Members (must be affiliated with an accredited university and have at least five publications associated with their ORCID accounts to have Members privileges and establish discussion groups); and Experts (same as Scientific Members but with more than 20 peer reviewed publications). It is a creative and simple structure with impressive editorial and advisory boards, but marketing has been minimal, unlike with other OA-related publications or publishers. With increased press exposure and marketing by means other than social media, SO can be a top-tier publication.

Continuing to examine, discuss, and analyze open access is an important exercise because the OA market directly affects researchers, funders, publishers, and institutional buyers. Accelerated and open access to critical, peer-reviewed research findings changes the way each of those stakeholders functions. Researchers now must comply with funder mandates and pay to publish; funders must formulate and enforce mandates; publishers must find new ways to preserve profits and serve customers through new products and partnerships; and institutional buyers must determine an optimal mix of subscription and open content to serve clients. And all of that must happen while technology catches up with new workflows and business models: The market awaits more funder mandates, and accepted standards do not yet enable an efficient open access market.

Companies emerge, evolve, and consolidate in an effort to support and execute on OA initiatives, with the message resonating loud and clear: Open access is now an integral part of the scholarly publishing landscape. To move the open access market forward, key actions are necessary.

Essential Actions

The past 10 to 15 years were volatile, disruptive, and confusing relative to the formerly leisurely pace of scholarly publishing, with changes driven by the rise of open access and the sometimes converging, sometimes colliding interests of stakeholders. The mission of driving, supporting, and disseminating important research is unquestioned; now it's a matter of agreeing on to how to execute most efficiently with maximum benefit to all market stakeholders as well as the general public.

Publishers have made a lot of concessions – because they had to – to support open access, but they are still trying to exercise control over how it takes shape. That's only natural, because they're trying to protect their bread and butter from further erosion – consortia have pressured margins, online availability of content has pressured margins, and now publishers are supporting open access in a way that attempts to prevent further erosion through APCs. There are so many approaches to open access, with various stakeholders trying to control which one publishers follow. If participants worked together, it would go a long way toward creating standards around open access and making it easier to manage, but right now, despite the valiant efforts of some, that just isn't happening.

To keep the dialogue moving forward in a constructive and positive fashion, we recommend the following essential actions.

✓Innovate and identify alternative revenue opportunities.

Innovation in business models is clearly not lacking, but only Gold Route APCs provide enough revenue to make a material contribution to the marketplace. This means that publishers must continue to develop sustainable and scalable new offerings, new services, and creative strategies around products and services. They must monitor researcher behaviors, funder needs, and institutional processes to drive revenue from innovative OA-related offerings. Open journal content is well on its way to realizing its full revenue potential, but business models supporting open datasets and experimental methods, for example, remain relatively undeveloped and represent an unmet opportunity.

✓Support the use of standards.

Institutions bear a heavy operational burden in the move to open access, and publishers can help by utilizing robust metadata vocabularies that are field- or discipline-specific, reducing manual classification of article deposits. Publishers, funders, and institutions must require researcher ORCID registration and use to move the needle significantly in organizing data and providing valuable article metadata. Automating deposits of final accepted manuscripts into institutional or publisher repositories, or both, in formats other than or in addition to PDF, with the appropriate metadata and copyright, is necessary to relieve the institutional burden as well as to advance discoverability and support reuse of content. All stakeholders must proactively support the use of standards to create efficiencies, making OA models easier to support and use.

✓Improve the flow of information.

Content database functionality focuses primarily on one group: researchers. Database administrations must add search facets across article metadata to enable additional data collection and scientific analysis of the OA landscape by academics and economists, helping to better guide its future. Few, if any, institutions can quote the total number of APCs paid in a specific time frame, for example. Some do not even know the number of OA articles published by their institution in a given academic year. The same is true for publishers, many of which cannot quote the number of OA articles published in a given year, and it is impossible to glean that information from a single database. The DOAJ's announcement of including APC charges in its database is a step forward, but it's only a beginning. The course of open access will advance through discoverable publication information, not just content.

✓Remember the mission.

The deep divide between OA advocates and legacy publishers blocks a reasonable solution to what works best for all stakeholders while fulfilling the goal of scholarly publishing – providing cutting-edge research. Publishers feel they have moved more toward the middle of the spectrum

than OA advocates have, and radical advocates feel there can be no compromise with profit-seeking behemoths. A continued measured approach with all stakeholders working together to come up with solutions will best serve all involved as the industry moves toward freely available research created and disseminated at reasonable cost, with that cost borne by those stakeholders either most willing or most able to bear the expenses. It is imperative that mandates, guiding principles, and approaches to the market take into equal consideration the perspectives of all stakeholders to support the effective distribution of important research.

Imperatives for Information Managers

Outsell recommends the following imperatives for information managers.

✓Be part of the conversation.

Libraries need to be part of the dialogue around open access because it has a resounding impact on how libraries manage content and budgets, and how they deal with demands on staff time (which means money) to ensure researcher compliance with funder mandates. Open access offers an alternative to steadily increasing prices of serials, and it supports a core value of the library community – access to knowledge through research.

✓Educate the community.

Internal education is critical to ensuring researchers comply with mandates. Having some sort of communication with researchers and authors will help move the needle in getting all stakeholders behind a system that works, and reducing workloads on library staff. Cover topics such as: What is open access, what are funder mandates, why do I have to comply, how OA benefits the library, and so forth. IM managers can also support administration and executives by constructing a systematic approach to open access through mining institutional repositories to monitor departmental and institutional research output.

✓Work with vendors.

Vendors are starting to develop platforms to support institutions when it comes to tracking publications, APCs paid, and how grant monies are used or not used for publication fees. Providing feedback to vendors helps them come up with the best products possible. Although APCs probably won't eventually become a larger part of a library's materials budget – right now they're estimated at 1%-5% of materials spend for many libraries – be prepared for an increase over time. Offsetting should help, but libraries need to keep the pressure on publishers to ensure that they aren't paying twice for content. Some have offsetting schemes in place, but libraries need to closely monitor and track how those impact budgets to ensure that they are effective and properly implemented.

Related Research

Outsell clients can click here for more information on the companies analyzed in this report.

Reports

Open Access: Market Size, Share, Forecast, and Trends	January 31, 2013
An Open Access Primer – Market Size and Trends	September 21, 2009

Insights

The Times They are A-Changin': Macmillan + Springer = Another Publishing Powerhouse	January 16, 2015
Researching the Researcher: Macmillan Science & Education Takes a Big Step into a Brave New World	December 2, 2014
International Open Access Week: Celebrating a New Era in Scholarly Publishing	October 22, 2014
In Technology We Trust: Efforts to Preserve the Integrity of Scholarly Publishing Continue	September 30, 2014
Sound and Fury: The Debate over Open Access Licenses has its "Hour Upon the Stage"	August 29, 2014
F1000Research Changes the Game with the First Live, Collaborative Article Figure	August 18, 2014
SAGE Leads Series A Investment Round in PeerJ	July 28, 2014
NPG's New 'Nature Partner Journals' Offer a New Vision for Open Access Partner Publishing	April 21, 2014
ScienceOpen.com: Another Startup Looking to Change the Landscape of Scholarly Publishing	January 30, 2014
Text and Data Mining Are Set to Become a Reality in 2014	January 29, 2014
New Open Access Publisher PeerJ Launches	June 18, 2012

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