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## **OPEN ACCESS: AN EVALUATION OF ITS IMPACT, OBSTACLES, AND ADVANCEMENTS**

### **Abstract**

Access to research results is imperative in today's robust digital age, yet access is often prevented by publisher paywalls. Open Access (OA) is the simple idea that all research should be free for all to access, use, and build upon. This paper will focus on three critical areas of the OA landscape: its impact on scholarship and the public, the obstacles to be overcome, and its advancements. The impact of OA actions and initiatives has been difficult to quantify, but the growing number of studies on OA have shown mostly overwhelmingly positive results. Cultural norms within academia, such as the reliance on the journal Impact Factor (IF) to assess the quality of individual research articles, have impeded the progress of OA. Conversely, federal mandates and institutional policies have supported the OA movement by requiring that scholarly publications be deposited into institutional or subject repositories immediately following publication. As information professionals, library and information science (LIS) professionals have a responsibility as practitioners, authors, and editors to support OA and encourage other academics to do the same.

**Keywords:** open access, scholarly publishing, self-archiving, copyright, scholarly communication, digital scholarship, open data

## Introduction

In 1989, Tim Berners-Lee invented the World Wide Web at CERN in order to facilitate automatic sharing and linking of information, raw data sets, and other research outputs among scientists and scholars at various institutions around the world (O’Luanaigh 2014).<sup>1</sup> While CERN was eager to adapt Internet protocols in order to share massive amounts of data with physicists around the world, the Internet became much more than CERN or Berners-Lee could have ever imagined. The Internet has evolved and altered the way the world communicates, interacts, conducts business, and socializes; as CERN Director-General Rolf Heuer asserts, “The web is a powerful example of the way that basic research benefits humankind.”<sup>2</sup>

This innovative digital tool – the Internet – is available for researchers, university faculty members, and scholars to use in order to conduct and share research in a variety of outputs, such as peer-reviewed online scholarly journal articles, online monographs, data sets, source code, conference presentations, and many other outputs. However, there are currently a number of barriers that prevent researchers from conducting and sharing their research online. One such barrier is the traditional scholarly publishing model, which still functions according to the pre-Internet, print era. Research outputs that are published or made available online without price barriers, such as subscriptions, licensing fees, and pay-per-view fees, are considered *gratis* Open Access (OA). An even more unrestricted type of OA is *libre* OA, which more closely follows the principles of the Budapest Open Access Initiative (BOAI) of 2002,<sup>3</sup> in which research published online eliminates price barriers and most permission barriers, or most copyright and licensing restrictions.<sup>4</sup> *Libre* and *gratis* OA should not be confused with green and gold OA, which are about venues, while *libre* and *gratis* OA are concerned with user rights. Green OA is provided by OA repositories, such as institutional or subject repositories and usually depends on authors practicing self-archiving.

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<sup>1</sup> Cian O’Luanaigh, “World Wide Web born at CERN 25 years ago,” *CERN*, 8 April 2014, <https://home.cern/about/updates/2014/03/world-wide-web-born-cern-25-years-ago>

<sup>2</sup> Marina Giampietro, “Twenty years of a free, open web,” *CERN*, 30 April 2013, <https://home.cern/about/updates/2013/04/twenty-years-free-open-web>

<sup>3</sup> Chan et al., “The Budapest Open Access Initiative Declaration,” *BOAI*, 2002, <http://www.budapestopenaccessinitiative.org/read>

<sup>4</sup> Peter Suber, “Open Access Overview,” *Earlham College*, 15 December 2015, <http://legacy.earlham.edu/~peters/fos/overview.htm>

Gold OA is provided by journals, whether they are fully OA journals or offer an OA option.<sup>5</sup>

In a sense, the OA movement is an effort to shift the ecosystem of scholarly communication and research into its natural state, with scholarly outputs being effortlessly and freely shared, reused, cited, text-mined, data-mined, and distributed online. The benefits of shifting digital scholarship into an OA environment are extensive, yet often misunderstood, components of the complex world of publishing and academia.

## **Open Access: Impact for Scholars and on the Public**

### Impact for Scholars

#### *The Journal Impact Factor*

Academics do not generally publish their research for royalties, though there are instances where this happens among those academics who participate as an author in a commercial textbook, for example. The primary motivation for authors to publish scholarly works is cemented in producing impact. Impact is not easily defined, especially in the world of scholarly communication. However, the motivation behind demonstrating impact for scholarly works is more easily identified; this motivation lies in an author's desire to either obtain tenure and promotion or develop a reputation as an influential researcher, or often it is a combination of both, in which both can simultaneously aid faculty in advancing their careers.<sup>6</sup>

The most common way that researchers determine impact is through the journal Impact Factor (IF) which is produced by the publisher Thomson Reuters in Journal Citation Reports (JCR) and represents the average number of citations an article receives in a given journal over a two-year period.<sup>7</sup> While many faculty, especially in the hard sciences, are often expected to publish in journals with high IFs in order to obtain tenure and promotion at their university or institution, the IF has numerous limitations, especially when it comes to

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<sup>5</sup> Peter Suber, "Gratis and Libre Open Access," SPARC Open Access Newsletter, August 2008, <http://sparcopen.org/our-work/gratis-and-libre-open-access/>

<sup>6</sup> Peter Suber, *Open Access*, (Cambridge, MA: The MIT Press, 2012): 12.

<sup>7</sup> Eugene Garfield, "The Thomson Reuters Impact Factor," *Web of Science*, 20 June 1994, <http://wokinfo.com/essays/impact-factor/>

assessing the research impact of a single article or author.<sup>8</sup> There is a general consensus among stakeholders of the research process that the IF is the authority on research assessment.<sup>9</sup> Such stakeholders include funding agencies, university administrators, and government bodies that are often responsible for funding research with tax dollars and writing public policy based on assessment of the current research literature using single measurements like the IF. While the IF serves a purpose, even Eugene Garfield, who originally developed the IF, admits to its limitations<sup>10</sup> and further points out that he never intended or imagined that the IF would be used as an evaluation tool to award research grants and funds.<sup>11</sup>

Though the IF has several limitations and criticisms, those will be addressed in the next section of this paper. What follows here are a number of cases that illustrate the impact of OA on the academic community and on the general public, including one notable case that emphasized how an OA journal can quickly climb the ranks of other journals indexed by JCR. In the aforementioned instance, *PLoS Biology*, after only two years since its inception, attained the highest IF in the field of biology.<sup>12</sup> Building a reputation within the academic community so quickly would not have been possible for a subscription-based journal; the high visibility of an OA journal, which is partly due to the ease in which OA articles are indexed on search engines, is a major factor contributing to *PLoS Biology*'s rapid achievement.

### *The Open Access Citation Advantage*

The success of *PLoS Biology* is only one example and cannot be applied across all journals, disciplines, and articles. However, the Scholarly Publishing and Research Coalition of Europe (SPARC Europe) currently maintains the Open Citation Project, or the OpCit Project, which has for many years kept track of studies that evaluate whether or not there is a citation advantage among OA

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<sup>8</sup> PLoS Medicine Editors, "The impact factor game," *PLoS Medicine* 3, no. 6 (2006): 291, <http://dx.doi.org/10.1371/journal.pmed.0030291>

<sup>9</sup> Colin Steele, Linda Butler, and Danny Kingsley, "The publishing imperative: the pervasive influence of publication metrics," *Learned Publishing* 19, no. 4 (2006): 277-290, accessed August 27, 2016, <http://dx.doi.org/10.1087/095315106778690751>

<sup>10</sup> John Willinsky, "Open access and academic reputation," *Annals of Library and Information Studies* 57, no. 3: 296-302, <http://14.139.47.15/handle/123456789/10242>

<sup>11</sup> Eugene Garfield, "The Agony and the Ecstasy—The History and Meaning of the Journal Impact Factor," *International Congress on Peer Review and Biomedical Publication*, (2005), [http://garfield.library.upenn.edu/papers/jifchicago2005.pdf?utm\\_source=false&utm\\_medium=false&utm\\_campaign=false](http://garfield.library.upenn.edu/papers/jifchicago2005.pdf?utm_source=false&utm_medium=false&utm_campaign=false)

<sup>12</sup> Willinsky, "Open Access and Academic Reputation," 299.

articles. Since OA articles are more searchable, findable, and accessible than toll-access (TA)<sup>13</sup>—or subscription-access—articles, the theory is that OA articles will thus be more cited than their TA counterparts. The OpCit Project produced a summary of all the studies to date in 2010, and in the same year, an annotated bibliography was published that listed many of the same studies. A central focus of the annotated bibliography questioned whether an OA citation advantage is merely a positive correlation or a matter of causation.<sup>14</sup> While the question is unresolved, yet still important, the summary from the OpCit Project emphasized that while OA literature might be more discoverable, it does not automatically make it more citable.<sup>15</sup>

The studies listed in OpCit must rely on two factors. First, research worthy of citations, regardless of providing OA to its content, still relies heavily on a number of factors, such as quality, relevance in the field, originality, reliability, objectivity, and replicability; depending on the discipline, one or many of these factors may be crucial to a researcher, and therefore, not all OA articles are necessarily citable. Research does not automatically receive citations simply because it provides *gratis* OA. In a 2010 study from *PLoS ONE*, researchers found that the higher the quality of an article, the more likely it was to have a citation advantage among green OA articles. Second, the nature of scholarly communication varies across disciplines and therefore cannot be compared across disciplines.<sup>16</sup> Though the OpCit summary was published in 2010, the list has been updated and has found 46 of the 70 studies, or 66 percent, have a citation advantage in OA literature, mostly in the following disciplines: natural sciences, such as physics and astronomy; life sciences, such as medicine and biology; formal sciences, such as mathematics; certain social sciences, such as political science and law; and library and information science.<sup>17</sup>

While the studies listed by SPARC Europe support the overall general hypothesis that open access contributes to greater citation counts, especially in the general sciences, the studies evaluated the impact and citation counts of a small number of articles. A recent note from *Iscience* analyzed data from the OAIndx and

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<sup>13</sup> Suber, *Open Access*, 6.

<sup>14</sup> Wagner, A. Ben, "Open Access Citation Advantage: An Annotated Bibliography." *Issues in Science and Technology Librarianship* 60, (2010), <http://www.istl.org/10-winter/article2.html>

<sup>15</sup> Alma Swan, "The Open Access Citation Advantage: Studies and Results to Date," *SPARC Europe*, 1-17, [http://eprints.soton.ac.uk/268516/2/Citation\\_advantage\\_paper.pdf](http://eprints.soton.ac.uk/268516/2/Citation_advantage_paper.pdf)

<sup>16</sup> *Ibid.*, 2.

<sup>17</sup> SPARC Europe, "The Open Access Citation Advantage: List of Studies and Results to Date," *SPARC Europe*, [http://sparceurope.org/oaca\\_table/](http://sparceurope.org/oaca_table/)

examined over three million papers indexed in the Web of Science (WoS) published between 2007 and 2009 with a citation window as early as 2007 to the latest date possible in 2016. More than 12,000 journals were indexed and evaluated in the study and had over 34 million citations collectively.<sup>18</sup> Overall, green OA was a more impactful form of research communication in most disciplines compared to gold OA. However, gold OA held the citation advantage over green OA in biology and biomedical research. Articles in TA, or paywalled, journals were the least impactful strategy for the majority of disciplines. In all disciplines, any form of OA—whether green or gold—had the maximum research impact with an average 50 percent higher research impact than those published strictly TA.<sup>19</sup>

### *Impact on the Public*

While the primary advantage of choosing OA—either green or gold—for a researcher or faculty member has the potential for greater impact through increased citation counts, the impact on the public can take longer to quantify and measure.

One of the most notable examples of OA's impact on the public—at least in the sciences—is the Human Genome Project. Starting in 1988, scientists were able to map and sequence all the genes of the human species by April 2003, and it was only made possible by requiring that researchers with the Human Genome Project make their data openly available online to the public within 24 hours of discovery. While the project is itself remarkable, it also had overwhelming impacts on the economy, public health, and the scientific understanding of genes with regards to certain diseases and disorders.<sup>20</sup>

In another more recent example, Joe Biden, current Vice President of the United States of America, developed a plan in 2015 to accelerate progress for cancer treatments and increase funding for cancer research.<sup>21</sup> While Biden hopes to break down barriers to cancer research through such initiatives as the Genomic Data Commons, which is a fully open database to be housed at the National

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<sup>18</sup> Archambault et al., "Research Impact of Paywalled versus Open Access Papers," *OAnumbr*, 1, [http://www.lscience.com/PDF/oaNumber\\_OACA\\_3million\\_paper.pdf](http://www.lscience.com/PDF/oaNumber_OACA_3million_paper.pdf)

<sup>19</sup> *Ibid.*, 3.

<sup>20</sup> "From Ideas to Industries: Human Genome Project," *SPARC*, 19 November 2015, <http://sparcopen.org/impact-story/human-genome-project/>

<sup>21</sup> Jocelyn Kaiser, "What Vice President Biden's moonshot may mean for cancer research," *Science*, January 2016, <http://www.sciencemag.org/news/2016/01/what-vice-president-biden-s-moonshot-may-mean-cancer-research>

Cancer Institute (NCI), SPARC also hopes to help by lending its expertise in accelerating progress towards cancer treatments and cures.<sup>22</sup>

While calculating the impact research has had on a community or population can take many years, usage data and altmetrics can provide more immediate information about the scholarly conversations occurring among the general public. Altmetrics are a relatively new type of metric that track the attention that research outputs receive online, such as through social media, news outlets, online reference managers like Mendeley and CiteULike, blogs, and public policy documents.<sup>23</sup> Altmetrics are not intended to replace traditional bibliometrics but to complement them. Researchers can now track what the public is saying about their research. If an author makes their paper or some other research output OA—green or gold—it’s likely that the output will receive more online attention,<sup>24</sup> such as download counts and social media mentions, than a research output published strictly TA.

Currently, research to find a correlation between altmetrics indicators and bibliometric success has been inconclusive and conflicting; however, in a meta-analysis of these studies, a strong correlation was found between articles’ citation counts and mentions on peer networks, with Mendeley readership having the strongest relationship.<sup>25</sup> Altmetrics are still new to the field of impact and research assessment, and more research, as well as time to allow for citation buildup, is needed. For now, usage data and altmetrics still offer insightful information into the influence of research on the public. Access to research encourages online conversations, whether they are among the general public through traditional and social media outlets or among scholars on peer networks. In addition to having a citation advantage, OA literature also has an altmetrics advantage, though this does not necessarily mean that altmetrics should be conflated with citation counts.<sup>26</sup>

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<sup>22</sup> Heather Joseph, “Supporting the Vice-President’s Cancer Moonshot Initiative,” *SPARC Open Access News*. June 6, 2016, <http://sparcopen.org/news/2016/supporting-the-vps-cancer-moonshot/>

<sup>23</sup> “About Altmetric and the Altmetric Attention Score,” *Altmetric*, 21 June 2016, <https://help.altmetric.com/support/solutions/articles/6000059309-about-altmetric-and-the-altmetric-attention-score>

<sup>24</sup> Xianwen Wang, Chen Liu, Wenli Mao, and Zhichao Fang, “The Open Access Advantage Considering Citation, Article Usage and Social Media Attention,” *Scientometrics* 103, no. 2 (2015): 555–564. doi: 10.1007/s11192-015-1547-0

<sup>25</sup> Robin Chin Roemer and Rachel Borchardt, *Meaningful Metrics: A 21<sup>st</sup>-Century Librarian’s Guide to Bibliometrics, Altmetrics, and Research Impact*, (Chicago, IL: Association of College and Research Libraries, 2015): 140.

<sup>26</sup> Jonathan P. Tennant et al., “The Academic, Economic and Societal Impacts of Open Access: An Evidence-Based Review,” *F1000Research* 5, (2016): 632, doi: 10.12688/f1000research.8460.2

While these stories and examples of impact represent a minute sample of the numerous ways that OA has benefited the public, they also illustrate a narrative that can better exemplify the core values that thrive at the heart of all OA advocates. Often, it is the story, not the numbers or the metrics, that truly compels a person—whether a scientist, an artist, or a common member of the public—to recognize the benefits, advantages, and practicalities of choosing OA.

## Obstacles to Open Access

As research on open access and its impact continues to grow, OA still struggles to advance in many respects. Misconceptions among the research community of OA, research impact metrics, the rapidly rising cost of research, and an academic culture that is slow to adapt to the digital age are major areas of concern for the OA movement.

### Lack of Awareness and Misunderstandings

One of the most prevalent obstacles to the progress of OA is the general lack of awareness and the misunderstandings among researchers of both green and gold OA and how they differentiate. Other significant obstacles include the misunderstandings of the quality of OA journals and OA mandates and policies, as well as the misunderstanding and misuse of research impact metrics.

### *Misconceptions of Self-Archiving and Institutional Repositories*

Many faculty members are often skeptical of making their research OA, and the reasons vary as much as disciplines in academia vary. However, one of the most prominent misconceptions concerns the institutional repository. In one example, researchers were found to have a low level of awareness with regards to their university's institutional repository (IR) but were still interested in adding their scholarly works to the IR.<sup>27</sup> In another example, faculty at Texas A&M University (TAMU) were found to have a low awareness of the IR deposit process, which was considered the greatest barrier to participation in self-archiving in the TAMU IR.<sup>28</sup>

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<sup>27</sup> Muluken Wubayehu Alemayehu, "Researchers' attitude to Using Institutional Repositories: A Case Study of the Oslo University Institutional Repository," Master's thesis at Oslo University College, 2010, <https://oda.hio.no/jspui/handle/10642/426>

<sup>28</sup> Zheng Yang and Yu Li, "University Faculty Awareness and Attitudes towards Open Access Publishing and the Institutional Repository: A Case Study," *Journal of Librarianship and Scholarly Communication* 3, no. 1 (May 6, 2015), doi:10.7710/2162-3309.1210.



Most publishers allow some form of author self-archiving, or green OA, whether the archived version is with the author's pre-print, post-print, or the final publisher version of the article.<sup>29</sup> Furthermore, there is a general feeling of anxiety—even fear—when it comes to self-archiving articles; authors tend to believe that they are infringing on the publishers' copyright with regard to self-archiving practices. Junior faculty members on the tenure-track at universities are busy, to put it lightly, and so they do not always pay attention to their copyright agreements and author rights with their publishers. Though most faculty members' principles are comparable to the principles of OA, they do not usually take advantage of self-archiving rights despite the citation advantage and the rights retention of their own research.<sup>30</sup>

Furthermore, faculty generally have more interest and enthusiasm for self-archiving on websites and often do not recognize or understand the benefits of self-archiving on an IR; for instance, those who actively self-archive on a website or disciplinary repository often believe that self-archiving on an IR is a redundant effort.<sup>31</sup> Faculty want to spend their time wisely, and since many faculty do not realize the benefits of depositing their work in the IR, they can be resistant to the effort. In addition, some faculty are concerned that OA will either lead to plagiarism of their work or publisher disapproval, which in turn could cause a publisher not to publish faculty work;<sup>32</sup> these fears, however, have largely been proven to be myths. When authors decide to publish OA, they are allowing anyone to read, copy, share, download, print, store, search, link, and crawl the full-text of the work; however, most authors also “retain the right to block the distribution of mangled or misattributed copies,” which basically blocks plagiarism.<sup>33</sup> In a study that examined the reuse of text in hundreds of thousands of articles deposited in arXiv,<sup>34</sup> the massive physics and mathematics disciplinary archive, researchers found that the reuse of text was widespread, but

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<sup>29</sup> Ibid., 79.

<sup>30</sup> David Hansen, “Understanding and Making Use of Academic Authors' Open Access Rights,” *Journal of Librarianship and Scholarly Communication* 1, no. 2: 1-10, <http://jlscc-pub.org/articles/10.7710/2162-3309.1050/galley/68/download/>

<sup>31</sup> Denise Troll Covey, “Recruiting Content for the Institutional Repository: The Barriers Exceed the Benefits,” *Journal of Digital Information* 12, no. 3 (2011). <https://journals.tdl.org/jodi/index.php/jodi/article/view/2068>

<sup>32</sup> Ibid., 4.

<sup>33</sup> Suber, “Open Access Overview.”

<sup>34</sup> Cornell University Library, *ArXiv*, <http://arxiv.org/>

there was also a complicated mix of reasoning behind the reuse. Most of the time, the reuse of text from these arXiv articles was either lengthy verbatim reuse of text with citations (i.e. not technically plagiarism but likely sloppy scholarship); or if it was plagiarism, it came from either low-quality research that received few if any citations or from countries in which academic cultures do not recognize the ethical concept of plagiarism.<sup>35</sup>

In response to the general resistance to repositories among the research community, the Confederation of Open Access Repositories (COAR) published a preliminary report in 2012 and a final report in 2013 on sustainable practices for populating repositories; both reports provided LIS professionals with valuable strategies to populate repositories, both institutional and disciplinary, as well as approaches to demonstrate the value of repositories to the larger research community.<sup>36 37</sup> The purpose of the reports was to give LIS professionals an amalgamated resource of case studies and practices for populating repositories, with practices sorted into three broad categories: incentives to faculty, such as metrics on individual articles and policies that require deposit; integration, which merges repository services; and mediation, such as workflows and tools that simplify the deposit process.<sup>38</sup>

### *Misconceptions of the Quality of OA Journals*

Awareness of OA has been steadily increasing over the past decade,<sup>39</sup> but faculty at universities are often unwilling to adapt to the rapidly changing environment of scholarly communication. Though awareness has assuredly increased, misunderstandings still prevail among faculty, especially concerning the perception that OA journals lack quality and prestige. A longitudinal study

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<sup>35</sup> Daniel T. Citron and Paul Ginsparg, "Patterns of Text Reuse in Scientific Corpus," *Proceedings of the National Academy of Sciences of the United States of America* 112, no. 1 (2014): 25-30, doi: 10.1073/pnas.1415135111

<sup>36</sup> "Sustainable Best Practices for Populating Repositories: Preliminary Report," *Confederation of Open Access Repositories (COAR)*, May 2012, [https://www.coar-repositories.org/files/Sustainable-practices-preliminary-results\\_final.pdf](https://www.coar-repositories.org/files/Sustainable-practices-preliminary-results_final.pdf)

<sup>37</sup> "Incentives, Integration, and Mediation: Sustainable Practices for Populating Repositories," *Confederation of Open Access Repositories (COAR)*, June 2013, <https://www.coar-repositories.org/fr/activities/repository-content/sustainable-practices-for-populating-repositories-report/>

<sup>38</sup> *Ibid.*, 3.

<sup>39</sup> Julia Rodriguez, "Awareness and Attitudes about Open Access Publishing: A Glance at Generational Differences," *The Journal of Academic Librarianship* 40, (2014): 604-610, <http://www.sciencedirect.com/science/article/pii/S0099133314001852>

was conducted over nearly thirty years to quantify the attitudes of scholars towards OA journal publishing and found that faculty consistently perceived such journals as being low quality, especially with respect to peer review.<sup>40</sup>

Unfortunately, many of the perceptions surrounding the belief that OA denotes poor quality and poor editorial practices has been reinforced by a 2013 experiment that has garnered a great deal of attention, discussion, and divergence among the research community and in the media. In the experiment, journalist John Bohannon submitted a bogus scientific research article to over 300 OA journals; 157 journals accepted the article while only 98 rejected it.<sup>41</sup> The experiment aroused a great deal of objection among key OA proponents, calling the experiment flawed and the methodology questionable, especially since the experiment was not also tested on subscription-based journals.<sup>42</sup> Moreover, a majority of the journals that accepted his bogus article were on Beall's List of Predatory Journals, a list of so-called "predatory" journals maintained by a library scientist at the University of Colorado, Denver.<sup>43</sup> Disturbingly, a third of the journals that accepted the paper were listed by the Directory of Open Access Journals (DOAJ), which is considered a credible source.

Many consider Bohannon's experiment to be a smear campaign about OA.<sup>44</sup> As a result of the criticism of the DOAJ and the growing skepticism towards OA, the DOAJ's criteria for inclusion became more stringent. While the number of OA journals included in the DOAJ has steadily been increasing over the past decade, the number decreased for the first time this year due to the tightened quality criteria.<sup>45</sup> In addition, other efforts are being made to vet the quality, transparency, and openness of journals, such as the Quality Open Access Market

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<sup>40</sup> Jingfeng Xia, "A longitudinal study of scholars attitudes and behaviors toward open-access journal publishing," *Journal of the American Society for Information Science and Technology* 61, no. 3 (2010): 615–624, <https://www.scopus.com/record/display.uri?eid=2-s2.0-76649109885&origin=inward&txGid=0>

<sup>41</sup> John Bohannon, "Who's Afraid of Peer Review?" *Science* 342, no. 6154 (October 4, 2013): 60–65, doi:10.1126/science.342.6154.60.

<sup>42</sup> Martin Eve, "Flawed Sting Operation Singles Out Open Access Journals," *The Conversation*, <https://theconversation.com/flawed-sting-operation-singles-out-open-access-journals-18846>

<sup>43</sup> Jeffrey Beall, "Beall's List," *Scholarly Open Access*, <https://scholarlyoa.com/publishers/>

<sup>44</sup> Lilian Nassi-Calò, "Open Access Reviewed: Stricter Criteria Preserve Credibility," *SciELO in Perspective*, [http://blog.scielo.org/en/2016/05/25/open-access-reviewed-stricter-criteria-preserve-credibility/#.WAD8X\\_krLmE](http://blog.scielo.org/en/2016/05/25/open-access-reviewed-stricter-criteria-preserve-credibility/#.WAD8X_krLmE)

<sup>45</sup> Monya Baker, "Open-access Index Delists Thousands of Journals," *Nature News*, <http://www.nature.com/news/open-access-index-delists-thousands-of-journals-1.19871>

(QOAM) which crowdsources academic authors' evaluations of journals and their experiences with those journals.<sup>46</sup>

Despite the rapidly growing number of publishers and journals with questionable marketing and peer review practices, one notable longitudinal study evaluated “predatory” OA journals and publishers and concluded that the advancement and rapid momentum of OA will soon outpace the problems associated with these journals and publishers.<sup>47</sup> For the time being, it is thus important to educate scholarly authors in the various publishing models and publishing practices while the journals and publishers that engage in questionable practices continue to rise.

Researchers' often believe that all OA journals are low quality and of low prestige despite the increasing number of high quality OA journals emerging and former subscription-access journals that have flipped to OA. Unfortunately, many OA journals are still relatively new, and though there are a great number of high quality OA journals, they have not yet had time to build reputation and demonstrate value in their fields. In addition, there is a false impression that all OA is gold OA, and therefore there is a belief that librarians and other OA advocates are attempting to force researchers to publish in strictly OA journals.<sup>48</sup> That is not the case. There is currently a healthy mix of both green and gold OA, and there are no strictly gold OA mandates at present.

### *Misconceptions of OA Mandates and Policies*

Another misconception about OA among researchers involves policies and mandates at both federal and institutional levels. Funding agencies, such as the National Institutes of Health (NIH) in the United States, and universities are acting in the best interest of the public and researchers by introducing mandates and policies, but misunderstandings still abound. In 2008, the NIH was the first federal agency in the United States that required its funded research to be made available freely online to the public; since the research at NIH is funded by taxpayer dollars, Congress recognized the importance of making the research available to the public.<sup>49</sup>

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<sup>46</sup> “About QOAM,” QOAM, <https://www.qoam.eu/>

<sup>47</sup> Cenyu Shen and Bo-Christer Bjork, “‘Predatory’ Open Access: A Longitudinal Study of Article Volumes and Market Characteristics,” *BMC Medicine* 15, no. 13 (2015), doi: 10.1186/s12916-015-0469-2

<sup>48</sup> Suber, *Open Access*, 55.

<sup>49</sup> Ray English and Heather Joseph, “The NIH Mandate: An Open Access Landmark,” *College and Research Libraries News* 69, no. 2 (2008): 82-85, <http://ohio5.openrepository.com/ohio5/handle/11282/309836>

Currently there are no strictly gold OA mandates and policies, only green OA mandates and policies with the option of choosing gold OA. However, researchers often mistake these mandates and policies to be gold OA mandates and object to their implementation.<sup>50</sup> Simply put, when these misunderstandings arise, faculty members wrongly believe that the university is attempting to force them to publish strictly in OA journals. In reality, these OA policies are implemented to increase self-archiving of published research produced by faculty members at the university. In no way do these policies force faculty members to select strictly OA journals or to infringe on the publishers' copyright. On the contrary, institutional OA policies require that faculty members and/or librarians—whoever is archiving the institution's scholarly publications—adhere to publisher contracts and policies.

There is OA action taking place in many of the hard sciences, such as in physics with its massive subject repository arXiv, which calls for the green archiving of scholarly publications, but unless federal mandates or institutional policies require self-archiving, there tends to be hesitation on the part of researchers to take self-initiated OA actions. Disciplines in the hard sciences are currently taking huge strides in opening the results of research to everyone, and library and information science (LIS) professionals usually call on other disciplines to move in a more OA direction or to take action, such as the Cambridge mathematician who “called for a boycott of Elsevier, a large STEM publisher, for its unsatisfactory business practices,”<sup>51</sup> which now has over 16 thousand signatures.<sup>52</sup> Around the same time that the boycott started, editors of the journal *Lingua* quit in protest to Elsevier's business practices, namely high subscription costs and author fees.<sup>53</sup> Academic librarians often feel the same way about publishing as other academics. In a survey conducted on the attitudes of library faculty's publishing and self-archiving behaviors, researchers found that librarians encouraged other academics to take risks but did not take the same risks as authors and researchers.<sup>54</sup> Librarians might not have many options, as it

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<sup>50</sup> Suber, *Open Access*, 79.

<sup>51</sup> Chealsey Bowley and Micah Vandegrift, “Librarian, Heal Thyself: A Scholarly Communication Analysis of LIS Journals,” *In the Library with the Lead Pipe*, (2014): 2-18, <http://www.inthelibrarywiththeleadpipe.org/2014/healthysself/>

<sup>52</sup> “The Cost of Knowledge,” <http://thecostofknowledge.com/>

<sup>53</sup> Julia Greenberg, “Editors of the Journal *Lingua* Protest-Quit in Battle for Open Access,” *Wired*, <https://www.wired.com/2015/11/editors-of-the-journal-lingua-protest-quit-in-battle-for-open-access/>

<sup>54</sup> Howard Carter, Carolyn A. Snyder, and Andrea Imre, “Library Faculty Publishing and Intellectual Property Issues: A Survey of Attitudes and Awareness,” *Libraries and the Academy* 7, no. 1 (2007): 65-79.

turns out, because a significant portion of the LIS professional literature is still under the control of commercial publishers who utilize the same subscription-access publishing models.<sup>55</sup>

### *Misunderstandings of Impact Metrics*

While the number of academics in the world continues to rise, competition to secure faculty, tenure-track positions also increases, and as a result, the growing pressures to publish, establish a reputation, and demonstrate original and impactful research for career advancement have created a culture of fierce competition and rivalry. Without delving deeply into the culture of academia and the struggles of career advancement, such as the burdens of attaining tenure and promotion, it can readily be stated that impact metrics and research assessment usually play a significant role in an academic's professional life.

The same reliance on metrics can not necessarily be said for all disciplines, such as those in the arts and humanities, as their standards for building reputation and status usually revolve around non-periodical publications, such as single-authored monographs, conference proceedings, and non-English journal articles;<sup>56</sup> these forms of research output and their impact can be difficult to quantify by traditional metrics, or bibliometrics, and therefore, the humanities and arts don't necessarily rely on the same type of research assessment as the "hard" sciences. However, there is a considerable degree of faith in bibliometrics for scholars in the humanities and social sciences.

The Social Sciences and Humanities Research Council (SSHRC) advises caution when using bibliometrics in a number of SSH disciplines, mostly because of the greater presence of books as a method of research output of SSH compared to the research output of the natural sciences and engineering disciplines.<sup>57</sup> Present indicators of humanities research also do not measure the relevant criteria and thus should not rely solely on these indicators.<sup>58</sup> Furthermore, the Humanities

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<sup>55</sup> Bowley and Vandegrift, "Library, Heal Thyself," 13.

<sup>56</sup> Audrey Baneyx, "'Publish or Perish' as Citation Metrics Used to Analyze Scientific Output in the Humanities: International Case Studies in Economics, Geography, Social Sciences, Philosophy, and History," *Archivum Immunologiae et Therapiae Experimentalis* 56, no. 6 (2008): 363-371, <http://link.springer.com/article/10.1007/s00005-008-0043-0>

<sup>57</sup> Éric Archambault, and Étienne Vignola-Gagné, "The Use of Bibliometrics in the Social Sciences and Humanities," *Science Metrix*, 2004. [http://www.science-metrix.com/pdf/SM\\_2004\\_008\\_SSHRC\\_Bibliometrics\\_Social\\_Science.pdf](http://www.science-metrix.com/pdf/SM_2004_008_SSHRC_Bibliometrics_Social_Science.pdf)

<sup>58</sup> Michael Ochsner, Sven E. Hug, and Hans-Dieter Daniel, "Indicators for Research Quality in the Humanities: Opportunities and Limitations," *Bibliometrie-Praxis Und Forschung* 1, (2012). <http://www.bibliometrie-pf.de/index.php/bibliometrie/article/view/157/192>

in the European Research Area (HERA), a partnership of European funding organizations, identified a number of humanities-specific issues related to citation indices; two significant issues identified were poor coverage of the humanities by the heavily-relied upon Science Citation Index (SCI) and the different publication practices and patterns of the humanities that do not fit the fast-paced publication model of the natural sciences, and thus, the two- to three-year citation window is typically too short for humanities publications.<sup>59</sup>

The emergence of Google Scholar (GS) as a research assessment tool has offered a broader coverage of other types of scholarly publications besides the traditional scholarly journal article.<sup>60</sup> However, GS has a number of weaknesses that should be addressed. First, information about the coverage of scholarly content on GS is thus far completely unknown.<sup>61</sup> Second, though this crucial information remains unknown, some evidence suggests that GS does not fully index all the available scholarly content on the web, which leads to poor coverage, discovery, and retrieval of scholarly information.<sup>62</sup> As tools and resources, such as GS, continue to develop to capture a fuller representation of the varieties of scholarly publications, the need to understand these research assessment strategies will also continue to become increasingly important for more disciplines and for more scholars in the early stages of their careers. Though this section discusses research impact with respect to scholarly journal articles, the implications of publishing and providing evidence of research impact weigh heavily on every scholar in every discipline.

While the pressures on faculty in the hard sciences to produce high quality research in order to fulfill tenure and promotion requirements—which often demand a certain number of publications in specific journals or journals with high IFs—increase, it is surprising how few people understand how the journal IF is calculated, how it is often gamed and manipulated, and the level to which the IF is marketed by corporations who do not share the same interests as the stakeholders involved in scholarly communication. In addition, many disciplines,

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<sup>59</sup> Carl Dolan, “Feasibility Study: The Evaluation and Benchmarking of Humanities Research in Europe,” *HERA*, 2007. [http://heranet.info/system/files/hera\\_report\\_-\\_evaluation\\_and\\_benchmarking\\_of\\_humanities\\_research\\_in\\_europe.pdf](http://heranet.info/system/files/hera_report_-_evaluation_and_benchmarking_of_humanities_research_in_europe.pdf)

<sup>60</sup> *Ibid.*, 369.

<sup>61</sup> M. E. Falagas et al., “Comparison of PubMed, Scopus, Web of Science, and Google Scholar: Strengths and Weaknesses,” *The FASEB Journal* 22, no. 2 (September 20, 2007): 338–42, doi:10.1096/fj.07-9492LSF

<sup>62</sup> Péter Jacsó, “Google Scholar: The Pros and the Cons,” *Online Information Review* 29, no. 2 (April 2005): 208–14, doi:10.1108/14684520510598066.

mainly in the humanities, are underrepresented in terms of journal coverage by JCR.<sup>63</sup> In 2006, the editors of *PLoS Medicine* criticized Thomson Reuters for its non-transparent calculation of the IF, which only uses a nontransparent process to select a number of articles deemed “citable” from a journal to calculate its IF.<sup>64</sup> A recent proposal from 2016 made recommendations to journals about providing their own IFs, rather than relying on the IF calculated by Thomson Reuters and published in JCR. The researchers that published the proposal relied on data from Web of Science in order to generate citation distributions for 11 journals in multiple disciplines and in a variety of subject-specific scopes; the journals also varied in the range of their IF. Their results showed that 65 to 75 percent of the articles selected based on Thomson Reuter’s classification of “citable” articles had fewer citations than indicated by the IF.<sup>65</sup>

The IF has major limitations and flaws, yet it is still the most used scientific metric tool for assessing the quality of scientific research despite the experts in scholarly communication that advise scholars against using the IF to assess the quality of individual journal articles and authors. The IF has a very close and troubling connection to the OA movement, because it acts as a tremendous cultural barrier. Reputation in scientific journals is very often assessed by this singular method of assessment, and though some OA journals, such as *PLoS Biology*, have quickly climbed to the top of the journal hierarchy, many still face the disadvantage of being new journals. New journals, OA or not, take time to establish reputations in their respective fields, and those journals considered prestigious have been around the longest, have established credibility, and have the highest IFs. On average, OA journals with IFs published in JCR are slightly below average, but most of the scientific disciplines usually have “at least one prominent, high-quality open access journal available”.<sup>66</sup> Unfortunately, a common belief among many tenure-track faculty is that only subscription-access journals can establish a high IF and thus prestige. Currently, while high-quality, prestigious OA journals exist, they are still outnumbered by their TA counterparts, at least when being strictly assessed by their IF. The pressures for

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<sup>63</sup> Willinsky, “Open Access and Academic Reputation,” 299.

<sup>64</sup> PLoS Medicine Editors, “The Impact Factor Game.”

<sup>65</sup> Vincent Larivière et al., “A Simple Proposal for the Publication of Journal Citation Distributions,” *Publication of Journal Citations*, (2016): 2-24, <http://biorxiv.org/content/biorxiv/early/2016/07/05/062109.full.pdf>

<sup>66</sup> Anarita Barbaro, Monica Zedda, Donatella Gentili, and Rafael Leon Greenblatt, “The Presence of High-impact factor Open Access Journals in Science, Technology, Engineering and Medicine (STEM) Disciplines,” *Journal of Library and Information Science* 6, no. 3 (2015): doi: 10.4403/jlis.it-11257



faculty to publish in prestigious journals for career advancement while new OA journals struggle to establish their reputations has created a vicious cycle within scholarly communication.

Ignoring the IF, or any other type of research assessment, is not a viable option for scholars. It is a well-established and mature measurement of journals, and currently, there is no alternative option for replacing it.<sup>67</sup> Cultural norms are slow to change in the academic community, and though there is an over-reliance on the IF in some fields, this does not mean that all researchers rely on it or publish only in journals with the highest impact factors. In 2012, the San Francisco Declaration on Research Assessment (DORA), initiated by the American Society for Cell Biology (ASCB), was drafted and currently has over 12 thousand signers from individuals and over 800 signers from organizations.<sup>68</sup> DORA is a call to major universities, institutions, organizations, and individual researchers within academia to use journal impact factors as a “surrogate measure of quality of individual research articles, to assess an individual scientist’s contributions, or in hiring, promotion, or funding decisions.”<sup>69</sup> Outdated belief systems within academia have delayed the adoption of OA, but OA is now ascending some of its greatest obstacles.

### The Serials Pricing Crisis and the Origin of OA

Unfortunately, a major obstacle to OA cannot be overcome by cultural adaptation, at least not within academia itself. A phenomenon known as the serials pricing crisis is affecting all communities within academia, whether they are represented by librarians, students, or faculty. Although the serials crisis is discussed here as a major obstacle, it is the reason the OA movement began in the early 1990s. Over the past few decades, the size of academic library budgets has decreased while the subscription rates to scholarly journals have risen significantly faster than the rate of inflation.<sup>70</sup> Even Harvard, one of the wealthiest academic libraries in the world as well as the largest academic library with the largest annual budget, cannot afford its journal subscriptions and has had to accept the decision to cancel journal subscriptions.<sup>71</sup> As a result, Harvard Faculty of Arts and Sciences

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<sup>67</sup> Larivière et al., “Simple Proposal for Publication,” 61.

<sup>68</sup> “San Francisco Declaration on Research Assessment,” *DORA*, <http://www.ascb.org/dora/>

<sup>69</sup> “San Francisco Declaration on Research Assessment: Putting Science into the Assessment of Research,” *DORA*, December 2012, <http://www.ascb.org/files/SFDeclarationFINAL.pdf?910290>

<sup>70</sup> Brenda Dingley, “U.S. Periodical Prices – 2005,” (2005): 1-16, <http://www.ala.org/alcts/sites/ala.org.alcts/files/content/resources/collect/serials/ppi/05usppi.pdf>

<sup>71</sup> Suber, *Open Access*, 30.

(FAS) unanimously voted to in 2008 to adopt the first institutional OA mandate at a major university.<sup>72</sup>

To emphasize the severity of the serials crisis, many researchers, especially in poor countries, now turn to the controversial Sci-Hub in order to obtain access to the research needed to complete their own research projects. Sci-Hub is an online search engine for academic papers, which are available for download illegally, since they infringe on publishers' copyright and bypass the publisher paywalls. Price tags on articles may not be individually expensive for a scholar, but conducting thorough research involves collecting, reading, and analyzing dozens, if not hundreds, of research articles for a single project or paper.<sup>73</sup>

Although programs exist with publishers to help researchers access academic papers in poor or developing countries, either researchers are not finding these programs sufficient for their research needs, or they simply find Sci-Hub easier to use. Most surprisingly, users of Sci-Hub are not limited to poor countries; they are everywhere and most especially congregated near universities with access to academic journals; for students and faculty at universities, searching Sci-Hub is simply faster and easier than finding the correct link that provides access. As OA publishing expert Peter Suber points out, "this is here to stay," whether people agree with it or not.<sup>74</sup> Though these examples do not support the positions of Sci-Hub, they do demonstrate the gravity of the serials pricing situation. In addition, it appears that most academics do not feel any moral guilt over downloading pirated papers from Sci-Hub, likely because they don't receive royalties from publishers for their published articles, and they are the contributors of the very research articles provided by Sci-Hub, at least on a vast scale.<sup>75</sup>

### Advancements of the OA Movement

OA is mostly made possible by the World Wide Web, and the awareness and understanding of OA has dramatically improved since 1996; in addition, the number of articles published OA has increased significantly, especially among

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<sup>72</sup> Robin Peek, "Harvard Faculty Mandates OA," *Information Today*, (2008), <https://www.questia.com/magazine/1G1-177673457/harvard-faculty-mandates-oa>

<sup>73</sup> Suber, *Open Access*, 6.

<sup>74</sup> John Bohannon, "Who's Downloading Pirated Papers? Everyone," *Science Magazine*, (2016), <http://www.sciencemag.org/news/2016/04/whos-downloading-pirated-papers-everyone>

<sup>75</sup> John Travis, "In Survey, Most Give Thumbs-up to Pirated Papers," *Science Magazine*, (2016), <http://www.sciencemag.org/news/2016/05/survey-most-give-thumbs-pirated-papers>

authors publishing research articles in the hard sciences and technology.<sup>76</sup> Furthermore, a 2011 study from *PLoS ONE* found that there is a steady rise of gold OA journals growing at 20 percent per year.<sup>77</sup>

### *The OA Business Model*

While OA information provides anyone, anywhere with access to research and scholarship, OA itself is not free. OA journals often charge Article Processing Fees (APCs) to authors in order to fund the publication and editorial process, which has inopportunately opened the door to so-called “predatory” publishers and journals. When viewed from the author’s perspective, the APC option can seem unappealing, even though funding agencies and institutions pay the APCs for the majority of cases.<sup>78</sup> OA presents an alternative publishing model, and though some publishers fear OA as a threat to their profits, there are some key examples to suggest otherwise. In the 2009 Hindawi publishing press release, the publisher announced the substantial growth of OA journal collections, especially among its biological and medical collections.<sup>79</sup> In addition, the press release from Springer in 2008 stated that the acquisition of BioMed Central Group, the world’s largest OA publisher, complemented its publishing practices and that the OA publishing model could and did work.<sup>80</sup>

### *OA Policies and Mandates*

As previously discussed, faculty members at universities are not generally proactive about self-archiving their own research articles in repositories as a green OA action. However, one of the major advancements of OA involves publishers adding language to their contract agreement with authors or in their author rights retention policies which allow authors to archive a version of record—most often the post-print version,<sup>81</sup> though publishers sometimes allow the final publisher’s PDF version. Despite the advantage of retaining these rights, scholars often need motivation and assistance in taking action in order to

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<sup>76</sup> Archambault et al., “Proportion of Open Access Papers Published in Peer-Reviewed Journals at the European and World Levels—1996–2013,” *Science-Metrix*, (2014), [http://science-metrix.com/files/science-metrix/publications/d\\_1.8\\_sm\\_ec\\_dg-rtd\\_proportion\\_oa\\_1996-2013\\_v11p.pdf](http://science-metrix.com/files/science-metrix/publications/d_1.8_sm_ec_dg-rtd_proportion_oa_1996-2013_v11p.pdf)

<sup>77</sup> John Whitfield, “Open Access Comes of Age,” *Nature News* 474, no. 428 (2011), doi:10.1038/474428a

<sup>78</sup> Barbaro et al., “Presence of High-impact OA Journals,” 60.

<sup>79</sup> Paul Peters, “2009: A Year of Strong Growth for Hindawi,” *SPARC-OAForum*, (2010), <http://mx2.arl.org/lists/sparc-oaforum/message/5326.html>

<sup>80</sup> Peter Suber, “Springer to Acquire BioMed Central Group,” *SPARC-OAForum*, (2008), <http://mx2.arl.org/lists/sparc-oaforum/message/4605.html>

<sup>81</sup> Suber, *Open Access*, 199.

exercise these rights. As a result, institutions and funding agencies have begun to develop OA policies and mandates.<sup>82</sup>

When the NIH implemented the first national OA mandate for taxpayer-funded research in 2008, a new precedent was set for putting OA into practice. Since then, the Registry of Open Access Repository Mandates and Policies (ROARMAP) was established and currently tracks over 770 institutional and funder OA policies from around the world.<sup>83</sup> Moreover, in 2013 the White House issued an Executive Directive on Increasing Access to Results of Federally Funded Scientific Research which requires federal funding agencies in the U.S. with “expenditures over 100 million dollars to make the results of taxpayer-funded research” freely available to the general public.<sup>84</sup> The Directive specifically requires that results from scholarly publications and data sets be made OA. As of February 2016, “16 federal departments and agencies have issued public access plans covering publications and digital data,” and these completed public access plans account for 98 percent of the annual Federal research and development expenditures in the United States.<sup>85</sup>

The NIH has now started an initiative to change the format of its papers in PubMed Central so that they can be text-mined and further analyzed by researchers.<sup>86</sup> Overall, all of these mandates, the Directive, and the initiative have one common goal: to make research freely available to all in order to advance science in areas such as agriculture, environmental protection, health, and energy. The Directive from the White House expands upon these advances by adding that the progression of science ultimately aids in solving issues associated with economic and societal challenges.<sup>87</sup>

In Europe, leaders recently announced an ambitious goal to make all scientific papers OA by 2020. Though some critics are calling the proposed objective

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<sup>82</sup> Hansen, “Authors’ Open Access Rights,” 8.

<sup>83</sup> David Crotty, “A Quack Tour around the World of Scholarly Journal Publishing,” *The Scholarly Kitchen*, 18 August 2016, <https://scholarlykitchen.sspnet.org/2016/08/18/a-quick-tour-around-the-world-of-scholarly-journal-publishing/>

<sup>84</sup> “Executive Directive on Public Access,” *SPARC*, 2013, <http://sparcopen.org/our-work/2013-executive-directive/>

<sup>85</sup> Jerry Sheehan, “Increasing Access to Results of Federally Funded Science,” *The White House*. 22 February 2016, <https://www.whitehouse.gov/blog/2016/02/22/increasing-access-results-federally-funded-science>

<sup>86</sup> “NIH Manuscript Collection Optimized for Text-Mining and More,” *Extramural Nexus*. 16 November 2015.

<sup>87</sup> Sheehan, “Increasing Access to Results.”

overly-ambitious and unrealistic, the League of European Research Universities (LERU) said the goals were “a major boost for the transition towards an Open Science system.”<sup>88</sup> Advocates say that the goal is possible if strict green OA mandates are put in place for the immediate access to research without any embargos attached.

Out of the 136 funders worldwide, 105 employ OA policies or mandates for the research they fund; as a result, OA journals have grown substantially over the past decade.<sup>89</sup> The overall increase of OA journals has led to a growing number of OA journals with high IFs in Science, Technology, Engineering, and Medicine (STEM); these high-quality OA journals have matured quickly in their fields.<sup>90</sup> Compared to a 2010 study, the percentage of OA journals present in JCR was considerably smaller.<sup>91</sup>

Many traditional publishers do not flip their journals to OA models but instead rely on a hybrid model in which they receive both subscription payments and APCs for the same articles, a practice that is commonly known as “double dipping” in academic libraries. Fully OA scientific journals that require APCs have the highest IFs in their fields, and therefore, it can be inferred that OA journals that follow the APC business models present the most sustainable funding option currently available.<sup>92</sup>

### Opportune Metrics

Currently, the IF reigns supreme as the chief assessment tool of research. However, other metrics are making their way into the scene, such as the Eigenfactor, a new score that communicates the importance and value of a journal,<sup>93</sup> usage data, such as download counts and page views; altmetrics, which represent the level of online attention an article receives; and Source Normalized Impact per Paper (SNIP), which measure “the ratio of a journal’s citation count per paper

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<sup>88</sup> Martin Enserink, “In dramatic statement, European leaders call for ‘immediate’ open access to all scientific papers by 2020,” *Science Magazine*, <http://www.sciencemag.org/news/2016/05/dramatic-statement-european-leaders-call-immediate-open-access-all-scientific-papers>

<sup>89</sup> Barbaro et al., “Presence of High-impact OA Journals,” 58.

<sup>90</sup> *Ibid.*, 67.

<sup>91</sup> Elena Giglia, “The Impact Factor of Open Access Journals: Data and Trends,” *Rédaction Médicale et Scientifique*, (2011): 16-39, [http://www.h2mw.eu/redactionmedicale/2011/02/Giglia\\_IF%20of%20OA%20journals\\_2010.pdf](http://www.h2mw.eu/redactionmedicale/2011/02/Giglia_IF%20of%20OA%20journals_2010.pdf)

<sup>92</sup> Barbaro et al., “Presence of High-impact OA Journals,” 70.

<sup>93</sup> “About the Eigenfactor Project,” *Eigenfactor.org*, <http://www.eigenfactor.org/about.php>

and the citation potential in its subject field,”<sup>94</sup> which is useful for comparing scholarship across disciplines. Alternative and robust metrics allow for research to be assessed in different ways, which then offers authors of scholarship more options and opportunities for publishing and disseminating their work. At the very least, alternative metrics offer new ways to perceive impact and research assessment and to not blindly trust in one measure of assessment alone.

Another useful tool which can be implemented by LIS journals and publishers is the Journal Openness Index (JOI). The JOI is an alternative and nonconventional approach to measure the openness of journals and is a scale produced by SPARC/PLoS that uses the following criteria: reader rights, reuse rights, copyrights, author posting rights, automatic posting, and machine readability.<sup>95</sup> While the JOI should be used independently of other metrics and research assessment tools, it provides librarians and other academics with a means of measuring the openness of specific journals. Since there is an OA citation and altmetrics advantage with most disciplines, the JOI could serve as a useful tool to potentially help increase other metric scores for a journal.

With the JOI, librarians and academics can choose which journals to publish in based on their preferred level of openness as an author as well as negotiate rights with publishers for self-archiving purposes. Furthermore, editorial boards can make decisions for their journals based on the principles outlined in the JOI.<sup>96</sup> As a profession, LIS professionals have made generous contributions to the OA movement, but it is time to make OA publishing practices a reality in LIS. Otherwise, the same academics from other disciplines who are encouraged by librarians to practice OA publishing and archiving strategies may not feel compelled to take their own initiatives to progress OA.

## Conclusion

Major advancements in disciplines of science and technology have been made in the direction of open access with other disciplines following in their footsteps. LIS professionals have taken significant OA actions in their professional practices but have yet to make significant progress in the realm of LIS publishing

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<sup>94</sup> “About Source Normalized Impact per Paper (SNIP),” *Journal Metrics*, <https://www.journalmetrics.com/snip.php>

<sup>95</sup> SPARC/PLOS/OASPA, “How Open Is It?” *PLoS*. 2014, [https://www.plos.org/files/HowOpenIsIt\\_English.pdf](https://www.plos.org/files/HowOpenIsIt_English.pdf)

<sup>96</sup> Bowley and Vandegrift, “Librarian, Heal Thyself,” 13.

practices. There are significant obstacles to OA, but the evolution of OA has taken extraordinary steps in the past ten years towards the original principles outlined in the original 2002 BOAI. Federal mandates and institutional policies have helped collectively with the OA movement, as well as organizations and publishers such as SPARC and PLOS. Organizations and individual researchers have many opportunities to take actions in order to facilitate greater access to research results to both researchers and the general public around the world. The business model of print journals has outgrown its mold, and the organism of research is struggling to use its digital medium to thrive in its new ecosystem.

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## ОТВОРЕНИ ПРИСТУП: ПРОЦЕНА ЊЕГОВОГ УТИЦАЈА, ПРЕПРЕКА И УНАПРЕЂЕЊА

**Сажетак**

Доступност резултата истраживања императив је данашњег жилавог дигиталног доба, међутим често је отежана због плаћања надокнаде издавачу. Идеја отвореног приступа врло је једноставна: свима треба да буде омогућено да приступају, користе или надограђују сва истраживања. Овај рад фокусираће се на три кључна подручја отвореног приступа: његов утицај на научну комуникацију и јавност, препреке које треба да се превазиђу, као и његова унапређења. Утицај деловања отвореног приступа тешко је квантификовати, али све већи број студија о отвореном приступу приказују углавном изразито позитивне резултате. Културне норме унутар академске заједнице, као што је ослањање на импакт фактор часописа за процену квалитета појединих истраживачких радова ометају напредак отвореног приступа. С друге стране, држава и саме институције подржавају покрет за отворени приступ захтевајући да се научни радови депонују у институционалним или тематским репозиторијумима одмах након објављивања. Као информациони стручњаци, библиотекари имају одговорност као практичари, аутори и уредници да подрже отворени приступ и охрабре друге у академској заједници да учине исто.

**Кључне речи:** отворени приступ, објављивање научних радова, самоархивирање, ауторско право, научна комуникација, дигитална научна комуникација, отворени подаци

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