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Open Access in the Developing Regions: Situating the
Altercations About Predatory Publishing / L'accès libre
dans les régions en voie de développement : Situation de
la controverse concernant les pratiques d'édition
déloyales

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Canadian Journal of Information and Library Science, Volume 40,
Number 1, March / mars 2016, pp. 58-80 (Article)

Published by University of Toronto Press



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Errata

The article by Williams Nwagwu in the last issue of CJILS/RCSIB (Nwagwu, Williams. 2016. "Open access in the developing regions: situating the altercations about predatory publishing." *Canadian Journal of Information and Library Science/Revue canadienne des sciences de l'information et de bibliothéconomie*. 40(1): 58–80), contained the following errors and omissions:

Page 64, Paragraph 3:

Attribution error. The paper first submitted and accepted to the journal, *Science* in December, 2010 was misattributed to Michael Eisen (2013). The original paper (Wolfe-Simon, Felisa, et al. 2011. "A bacterium that can grow by using arsenic instead of phosphorus." *Science*. 332(6034): 1163-1166), can be found at: <http://science.sciencemag.org/content/332/6034/1163>.

Pages 64–65:

Citation error. This paragraph should have been attributed to Nwagwu and Onyancha (2015). Full Citation: Nwagwu, Williams and Bosire Onyancha. 2015. Back to the beginning – the journal is dead, long live science." *The Journal of Academic Librarianship*. 41(5): 669–679.

Tables 2, 3, and 4:

Citation error. These tables should have been attributed to O. Ojemini (2015). Both the author and CJILS/RCSIB regret the errors.

L'article par Williams Nwagwu dans le dernier numéro de la RCSIB/CJILS (Nwagwu, Williams. 2016. "Open access in the developing regions: situating the altercations about predatory publishing." *Revue canadienne des sciences de l'information et de bibliothéconomie/Canadian Journal of Information and Library Science*. 40(1): 58–80), contenait les erreurs et omissions suivantes :

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Open Access in the Developing Regions: Situating the Altercations About Predatory Publishing

L'accès libre dans les régions en voie de développement : Situa- tion de la controverse concernant les pratiques d'édition déloyales

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Abstract: A notable event in the current revolution of the World Wide Web is the open access model of publishing, which promotes freedom of inquiry and full and open availability of scientific information on a global scale. The promise of open access to replace existing scientific information dissemination practices and ethos has been contentious, with the interests of different stakeholders—countries, publishers, and open access activists, among others, clashing on an unprecedented scale. With special reference to the emergence of predatory journals, this article examines some of the challenges that have been triggered by the open access movement. Basically, open access is technology heavy, and its economic arrangements benefit mainly the developed world. There exists evidence of open access initiatives in the Africa region, but these initiatives are mainly individually based and are largely under-developed and sometimes predatory. The author argues that what is required now is a regional open access policy that spells out how the issues of right and cost, and others, will be viewed and addressed in the region to ensure that the benefits of open access do not bypass Africa.

Keywords: Africa, developing countries, open access, predatory publishing, scholarly publishing

Résumé : Un événement notable dans la révolution actuelle du web est le modèle du libre accès dans le domaine de l'édition, qui favorise la liberté de la recherche et la disponibilité pleine et entière de l'information scientifique à l'échelle mondiale. La promesse du libre accès de remplacer les pratiques existantes et la philosophie de diffusion de l'information scientifique a fait l'objet de controverses, les intérêts des différentes parties prenantes—pays, éditeurs, militants du libre accès, entre autres, s'affrontant sur une échelle sans précédent. Faisant référence particulièrement à l'émergence de revues aux pratiques déloyales, le présent article examine certains des défis qui ont été déclenchés par le mouvement du libre accès. Fondamentalement, le libre accès implique une forte composante technologique et ses arrangements économiques profitent essentiellement au monde développé. Il existe des preuves d'initiatives de libre accès en Afrique, mais ces initiatives sont essentiellement des initiatives individuelles, généralement sous-développées, et recourant

parfois à des pratiques déloyales. L'auteur fait valoir que ce qui est nécessaire maintenant est une politique de libre accès régionale précisant la façon dont les questions de droit et de coût, parmi d'autres, doivent être conçues et abordées dans cette région afin de s'assurer que l'Afrique ne soit pas exclue des avantages du libre accès.

Mots-clés : Afrique, pays en voie de développement, libre accès, pratiques déloyales d'édition, édition scientifique

Introduction

The expansion of electronic technologies in the 1990s is, without doubt, a great milestone in global scientific information production and dissemination practices and ethos. A notable development is the birth of the open access movement, which challenges and promises to replace the traditional scientific information dissemination methodologies with electronic alternatives (Harnad 2008; Laakso and Björk 2012; Lewis 2012; Suber 2012a, 2012b). Despite the avowed benefits of global free flow of scientific information, the movement has also generated some conflicts. These conflicts may be reflecting the variation in the social and technological statuses of human communities as well as the way in which these communities are deploying their resources to participate in the open access movement.

A typical case in point is the predatory publishing phenomenon that is credited to Jeffery Beall, a librarian at Auraria Library at the University of Colorado Denver in the United States in 2009. Beall has ever since maintained a regularly updated list of “potential, possible, or probable predatory scholarly open-access journals” on his website.¹ However, there is some evidence to suggest that the phenomenon is distorting the participation of developing countries in the open access movement. For instance, despite Beall's list being self-curated, not following any known scientific standard, and also being tentative in its description of the journals and their publishers (as potential, possible, or probable), the list has become widely accepted as a source for identifying fake and substandard journals in the world (Butler 2013; see also Beall's interview with Wilson 2013).

At the last count in August 2012, Beall had already identified 136 predatory publishing houses, with close to 1,400 journals. According to Beall, these journals are readily available, and they accept and are likely to publish all papers submitted to them, so long as the authors are willing to pay. The editorial quality of the papers is often very poor, while the content is not valid or not validated. In addition, the pedigrees of the journals, and the identity of their proprietors, are often unknown. There is no archiving practice leading to lack of access to their back numbers, and there is doubt about the veracity of their locations (Beall 2013a).

This article interrogates the emergence of predatory publishing from within local social, political, and technical realities in the developing regions as well as in the wider global science community. The article also examines how deep the journals have penetrated the global science community only as an index of their use and acceptance, and not quality.

Methodologically, this article is an opinion type, with strong empirical evidence to support the arguments. For the opinions, it adopts the approach of synthesizing, inferring, and interpreting published documents on science communication and open access, intermixed with personal observations and experiences. For the empirical support, we drew data from medical open access journals published by two publishers, namely Academic Journals and International Research Journals of Nigeria, which are both listed in Beall's list of predatory open access publishers in 2012. We retrieved the journals from their websites and extracted data about the countries of origin of the authors of the papers in the journals from the publishers' websites and used the Publish or Perish software to gauge their citations from Google Scholar. A further search was made in the Journal Citation Report of the Web of Science (WoS) to gauge the citation of those predatory journals that were listed in the WoS. Based on the classification of countries by the World Bank (2014), the countries of affiliation of the authors were categorized as developing and developed.

Engaging the dialectics of predatory open access publishing

There are issues about the predatory publishers/journals phenomenon that require further engagement. Importantly, many of the predatory journals are really located in the South (Harzing 2012; Truth 2012)—regions of the world where scholarly publishing did not flourish in the print era. Describing the journals as “predatory” means that the motive of the publishers is legitimately fraudulent—the word “predatory” therefore appears to be harsh given that Beall not only acted as a single evaluator but also developed the criteria for creating the list alone. The description of the journals as predatory risks a damning verdict on some honest, though perhaps amateurish, attempts by genuine people to enter the publishing market. It is possible that some of the open access journals listed as predatory are honest initiatives at their earliest stages of development, and describing them as predatory may be injurious to development open access. A typical example of an honest journal listed as predatory is *Malaria Chemotherapy, Control and Elimination*, an open access journal edited by David Warhurst, a malaria researcher at the London School of Hygiene and Tropical Medicine. In an interview with Declan Butler (2013), Warhurst defended his journals as not being toxic. It is therefore too early in the life of open access to describe some open access publishers and journals as completely predatory because they do not meet the standards or adopt the methodologies of existing distinguished and established publishers and their ethos.

In an interview with Kristen Wilson, Beall himself states that his criteria for categorizing these publishers as fake are subjective and that there is no objective way to measure new open access journals, especially when the publisher lacks transparency and hides its operations (Wilson 2013). When asked about peer review by the open access journals in his list, Beall explains:

We can't measure how well they're doing their peer review or if they're doing it at all. So the only way to judge them is by gathering all the information you can from their web sites, from talking to them, from reading emails from people who have worked with them or submitted articles to them and combine all of that information and complete the analysis. And it is subjective. (Wilson 2013)

Beall further stated that he often receives requests from publishers requesting that they be pulled from the list and that he reanalyzes the publishers' activities because publishers change over time (Wilson 2013). Hence, accepting Beall's categorization of journals as predatory is scientifically questionable. Contrary to Beall's opinion about publishers hiding their identities, some of these publishers may just be operating according to their skill and technology capacity or are intimidated by the big players.

Beall (2012, 789) further opinions may guide further engagement:

Predatory open-access publishers unprofessionally exploit the author-pays model of open-access publishing (Gold OA) for their own profit. . . . Operating essentially as vanity presses, these publishers typically have a low article acceptance threshold, with a false-front or non-existent peer review process. Unlike professional publishing operations, whether subscription-based or ethically-sound open access, these predatory publishers add little value to scholarship, pay little attention to digital preservation, and operate using fly-by-night, unsustainable business models.

Beall is not happy that the new predatory publishers are "unprofessional" in their exploitation practices—he seems to believe that exploitation by professional publishers would be preferable. With the advantages of scale, wealth, and time, Alison Flood (2012) and Frank Truth (2012) have shown that the author-pays model is exploited by Elsevier, Wiley, Sage, and others, who are really the big players in the open access arena. Beall appears to support the prestigious journals that package information that they do not buy and make it available online or offline at a very high cost to libraries and individual subscribers, thereby excluding the common man as the "legitimate" sources of academic publication.

How did Beall establish that these journals add little to scholarship? Beall based his strong opinions on the information obtained from the web pages of the journals without recognizing the constraints of the low levels of human and material infrastructure and skills in most developing countries. Many of the journals might have false contents, but a content analysis of the substance of the publications, as well as interaction with the authors and editors of these journals, could provide information about the veracity of the contents and why these journals do not meet the expected standards.

Some of the open access critics such as Jeffery Beall (2012, 2013b, 2013c, 2014) and John Bohannon (2013) appear to be biased against, or at least are indirectly tarring, scholars in developing countries. Despite the inclusion of journals from various parts of the world in his list of predatory journals, Beall remarks: "Look, when I discover a new publisher from Nigeria, I admit I am more suspicious than I would be were the publisher from, for example, the Vatican" (Butler 2013). In other words, every new publisher from Nigeria is a

potential fraud. According to Truth (2012), open access publishing practices in the developing regions are creating an opportunity for racist jargon in the open access landscape.

The open mindedness that is required in helping the evolution of open access journals in Africa and other low technology regions is demonstrated by Warhurst. In response to questions about the inclusion of his journal in Beall's list, Butler (2013) reports that Warhurst said he "certainly [does] not believe that this is a toxic journal," and, thus, may be a common problem among many journals that have been described as predatory. Warhurst observes that his journal was still in its launch phase and that, although the refereeing of papers has entailed extensive corrections, it has not been exceptional. He goes on to say that the papers in the journal have had new findings or findings useful in their geographical context but that they have needed help with presentation, mainly language and analysis. Warhurst's advice supports Williams Nwagwu's (2006) suggestion that science is ecological and contextual—the content, subject matter, and methodologies respond to social and environmental reality.

Critics of open access journals in developing areas have no idea of the state of science in these communities. For example, what was the state of academic journals in Africa and the rest of the South before the open access regime? African science mainly addresses local problems—a focus that is also influenced by low resources to do a wider scale study, low technology, language, and others. The journals are also known to circulate mainly locally, sometimes only within the institutions in which they are published (Nwagwu 2006). Prior to modern-day article-processing charges that dominate the open access funding models, many scholars in Nigerian universities, for instance, periodically contributed money to produce journals that are circulated among lecturers and their students in their institutions and others near them. In addition, African journals are often generally believed to be poor in quality and low in circulation—research conducted in developing countries is known to lack visibility. Sometimes, nobody notices them. Nobody quotes them, and according to Subiah Arunachalam (2003), they get buried in an obscure corner of the world's literature. In his widely read book, Paul Zeleza (2003) opined that African scholarly sources are not designed to compete with those from the developed world—because they simply cannot—attributing this to the complexity as well as contradictory and conflicted terrain of the global publishing arena.

The spread of the predatory journals can be seen from the perspective that the World Wide Web (WWW) has facilitated the possibility of a more universal spread of the old journal production and circulation methodology that transpired in the closed access arena in developing areas. With respect to the role of ICT, Zeleza's observation that the design and the techno-culture ICT embodies and promises as well as the prevailing structural and institutional contexts and the broader material conditions and social relations in which it is articulated affects its impact is apt.

Many commentators, such as Anne-Wil Harzing (2012) who supports Beall's (2012) opinions have alluded to the quality of copy-editing by the predatory

journal editors. It is remarkable that Beall was only able to assess the open access journals emanating from Africa and other parts of the developing world because the journals are produced in English. There is no indication that he, Harzing and others, have been able to assess many journals circulating in the world whose content is written in other than English languages and are not translated into English.

Although English has become a dominant science language in the world, it should be noted that English is still a second language to many scholars in Africa and Asia. The question of the skewed advantages and role of English in the structure of global science has been described as both destructive to science and imperialistic. Dave Hill (2012) has discussed this limitation, identifying Britain, Australia, and North America as a privileged group in the economy of English-driven higher education. Undoubtedly, many native English speakers have no idea at all about the difficulty of learning English solely in school, outside of their parents' influence and outside of the English environment.

Writing English for scholars in Africa and other places for editors and reviewers in the Western world requires a lot of hard work and an enormous amount of confidence. Although it is difficult to question the dominance of the English language in science due to its widespread use, resources, and longevity, in comparison with many African languages that are poorly resourced and have limited numbers of users, the challenges posed by a second language in science must be recognized. The fact that the major players in the predatory open access field are from Asia and Africa attests to this fact. Mary Jane Curry and Theresa Lillis (2010) consider the dominance of English in science to be detestable for it makes knowledge production a material social practice that is shaped by the politics of language(s), resources, and global power relations. It is still pertinent to ask: is science synonymous with English? Is good science synonymous with good English? Is good science in bad English not better than no science at all?

Another ground upon which these journals are classed as predatory is poor peer review practices. Unfortunately, the peer review practices in formal science have become questionable in recent years (McNutt et al. 1990), and both closed access and open access journals are implicated in faulted peer reviewing.

The Bohannon's sting

A typical example is a recent study by Bohannon, a *Science* reporter who wrote a mundane scientific paper that had grave errors that a competent peer reviewer should easily have identified and judged to be flawed and unpublishable. Bohannon sent the spoof paper to 304 open access journals selected from the Directory of Open Access Journals (DOAJ) and Beall's list to establish how well the journals had observed the peer review practice. On 4 October 2013, *Science* published this paper. Bohannon (2013) found that 82 percent of the publishers in Beal's list that completed the review process had accepted the paper. He also found that 45 percent of the journals in the DOAJ accepted the paper. Furthermore, Bohannon also found that journals published by world-class publishers such as Elsevier, Wolters Kluwer, and Sage had all accepted the bogus paper.

Very interestingly, two journals from Hindawi Publishing Corporation, an open access publisher in Beal's list, rejected the spoof paper. *PLoS ONE*, which is also an open access journal, did not only reject the paper but also called attention to the paper's potential ethical problems. Bohannon also showed that 18 percent of the journals taken from Beal's list performed a peer review, and he was able to infer that 55 percent of the journals taken from DOAJ had not fallen prey to the sting. This outcome notwithstanding, Bohannon's conclusion appears to re-echo what looks to be a predetermined result, namely the flagrant and unsupported conclusion that open access publishing is flawed (Bohannon 2013).

As would be expected, Bohannon's experiment was received with terse reactions from open access proponents. They observed that Bohannon's paper was faulted for being restricted to open access journals only—there was no control in the experimental research and, these flaws escaped the peer reviewers and editors of a journal as reputable as *Science*. Hence, it would appear that the mission of Bohannon's research was to smear open access publishing. Basically, the issues raised by Bohannon's study are not strictly about open access journals but, rather, about the technical challenges of the peer review processes generally. This is because a fair number of journals that are known to carry out peer review accepted Bohannon's paper. The lesson to be learned from Bohannon's study is not that open access is bad but rather that peer review is failing science. On its own part, the DOAJ observed that Bohannon's paper was racist in tone and in design since he used only African names and cities in his sting. According to Sal Robinson (2013), Bohannon's paper "acted as both an imitation of and an opportunity to shame academic practice in the developing world, since Bohannon posed as a team of researchers from an obscure university in Eritrea."

Strikingly, Bohannon was silent on an earlier study by Michael Eisen that indicted the peer review mechanism in *Science*, the journal Bohannon represents and in which his paper was published. Bohannon's study, therefore, appears to have been designed to counteract Eisen (2013) who unveiled the underside of *Science* "after having read several really bad papers in the journal *Science*." Eisen created a manuscript that claimed something extraordinary, namely that he had discovered a species of bacteria that uses arsenic in its DNA instead of phosphorus. According to him, he made the science so egregiously bad that no competent peer reviewer would have accepted it (Eisen 2013). If flawed peer review is sufficient to malign open access journals, then there is a need to create a list of predatory subscription-based journals, similar to Beal's list of predatory open access journals, and put *Science* in this category.

The 2011 Nobel Prize winner of medicine, Randy Shekman (2013) has illustrated how the well-known journals *Nature*, *Cell*, and *Science* distort science through the incentive of having an impact factor. According to him, these journals aggressively curate their brands in ways that are more conducive to selling subscriptions than to stimulating important research. He likens them to fashion designers who create limited editions handbags or suits because they know that scarcity

stokes demand, and so they artificially restrict the number of papers they accept so as to appear to be publishing only high quality papers. The exclusive brands are then marketed with a gimmick called “impact factor”—a score for each journal, measuring the number of times its papers are cited by subsequent research. These journals therefore deliberately publish flashy and very attractive research papers, irrespective of whether they are factual or not, and so win citations from researchers. A paper can be cited heavily because it is eye-catching, provocative, or wrong; these journals are looking for citations, not whether the papers contain information that is useful to humanity. Is this why *Science* has had a high retraction of papers in the recent years, whereas these papers had already received high volumes of citations from scholars (Marcus and Oransky 2014). This action is also predation, or should predation be used to describe inordinate publishing behaviours manifested only by open access journals?

Drawing a list of predatory closed access journals will therefore be necessary, not only to inform readers about the quality of publications they contain but also about the state of science in the world generally. Most of the retracted papers in recent years have been papers published in very reputable closed access journals (Marcus and Oransky 2014). Why were these papers retracted? In simple terms, the papers were flawed, and the peer review mechanism of the journals had failed to spot the weaknesses in the papers. However, why were the journals and their publishers spared from either being delisted in reputable indexes or classed as substandard? The answer is heuristic: these journals are big and have built reputations over time. Retraction Watch regularly inundates us with information about retracted papers,² but the publishers and the journals retain their reputation despite the damage these papers cause to science.

A typical example is the paper by Diederick Stapel and Siegwir Lindenberg (2011) published in *Science* in 2011 that showed that a disordered environment promotes stereotypes and discrimination. Prior to its retraction, this paper was heavily tweeted, and the tweets suggested that people had learned a great deal from the research. However, how do we retract the wrong knowledge imparted to people and how do we “uncite” the papers from the literature or adjust the impact factor of the journal whose fake papers stimulated heavy citation from the public? These are practically unanswerable questions.

The penetration of the predatory open access papers: empirical evidence

Academic Journals and International Research Journals had thirty-four journals in their collection and all the journals were involved in the analysis. A total of 5,601 articles were written by 5,599 authors and published in the thirty-four journals. A large proportion of these papers (87.3 percent) were written by authors from seventy-five developing countries, while the developed countries contributed 12.3 percent. The articles had received a total of 12,596 citations from all sources.

Table 1: Publications in the Nigerian predatory medical open access journals by continent

Continent	Number of countries contributing	Number of papers contributed	% of papers
Europe	39	433	7.73
Africa	32	1,588	28.35
Asia	31	3,181	56.79
South America	6	163	2.91
North America	5	191	3.41
Oceania	3	19	0.34
Central America	1	3	0.05
Total	117	5,578	99.59
Others		23	0.41
Grand total	117	5,601	100

Distribution of sources of papers by continent

Table 1 shows the continental distribution of the papers from 117 countries spread across the seven continents of the world. In total, 5,601 papers were published in the thirty-four journals as of 2012. Authors from thirty-nine countries in Europe contributed 433 papers (7.73 percent), while those from thirty-two countries in Africa wrote 1,588 papers (28.35 percent).

The high number of papers in the Nigerian journals were written by authors from thirty-one countries in Asia, who accounted for 56.79 percent of the papers. Authors from the three countries in North America wrote 191 papers (3.41 percent), whereas those from six countries in South America wrote 163 papers. Three countries in Oceania wrote nineteen papers and only one country in Central America wrote three papers. The authorship origin of twenty-three papers could not be ascertained.

Distribution of papers by the top ten contributing countries

Table 2 shows that the top ten countries (whose authors wrote papers in the journals) accounted for 4,115 papers or 73.47 percent of the 5,601 papers.

Table 2: Top ten contributing countries

Continent	Countries	Number of publications	%	Rank
Africa	Nigeria	889	21.60	1
	South Africa	136	3.30	10
Asia	China	849	20.63	2
	India	634	15.41	3
	Iran	522	12.68	4
	Pakistan	382	9.28	5
	Malaysia	215	5.22	6
	Saudi Arabia	153	3.72	9
	Turkey	189	4.59	7
South America	Brazil	146	3.55	8
Total		4,115	100	

These countries are concentrated in Asia (six) and Africa (two), while Europe and South America had only one country each in the top ten.

Nigeria, which was the host country, produced the largest number of papers (21.60 percent). Five countries in Asia, namely China, India, Iran, Pakistan, and Malaysia ranked second to sixth respectively in terms of papers written in predatory open access journals. Although more countries in Europe contributed in the journals, only Turkey, which ranked seventh, was in the top ten. Brazil, the only American country in the top ten, ranked eighth, while Saudi Arabia and South Africa were the ninth and tenth countries respectively to contribute papers to predatory journals.

Citations of the Nigerian medical predatory open access journals by continents

Table 3 relates to citation statistics by continent and number of countries in each continent citing the journals. Thirteen countries in Asia that cited the journals account for 54.62 percent of the citations (81 percent of the top ten citations by the top ten countries), and Africa accounts for 18.25 percent of all of the citations but is responsible for only 14.3 percent of the top ten. Europe has the largest number of countries citing the journals—eighteen—but these countries account for only 16.92 percent of the total citations, and only Turkey was in the top ten. South and North America accounted for 3.10 percent and 6.71 percent of the total citations, while Australia in Oceania accounted for only one citation. No country in Central America was among the citers of the journals under study.

Citations by top ten countries

Table 4 relates to citations by the top ten countries. These countries made 65.75 percent of the overall citations (2,772). The top five (of the top ten) countries that cited the Nigerian open access medical journals, namely India (18.13 percent), China (16.21 percent), Pakistan (13.09 percent), Iran (10.63 percent), and Malaysia (9.69 percent) are all from Asia. Scholars from the United States, which was seventh, also cited the journals more than Nigeria, which was eighth. An intriguing result is that South Africa, which was sixth, cited the journals more than the host country of these journals, which ranked eighth.

Table 3: Citations of the Nigerian medical predatory open access journals by continent

Continents	Number of countries	Number of citations	%
Europe	18	469	16.92
Africa	14	506	18.25
Asia	13	1,514	54.62
North America	3	186	6.71
South America	2	86	3.10
Oceania	1	11	0.40
Total	51	2,772	100

Table 4: Citations by top ten countries

	Countries	Number of citations	%	Rank
Asia	India	331	18.13	1
	China	296	16.21	2
	Pakistan	239	13.09	3
	Iran	194	10.63	4
	Malaysia	177	9.69	5
	Saudi Arabia	98	5.37	9
Africa	South Africa	143	7.83	6
	Nigeria	119	6.52	8
North America	United States	141	7.72	7
Europe	Turkey	88	4.82	10
Total		1,826	100	

Journals indexed in WoS citing the predatory open access journals indexed in WoS

Table 5 shows that the WoS indexed only two of the Nigeria-based open access journals namely the *African Journal of Pharmacy and Pharmacology* and the *Journal of Medicinal Plants Research*. A total of fifty-four journals indexed in the WoS cited these two journals 1,195 times during 2007–12. Five of the citing journals originate from Nigeria, and they accounted for 313 of the citations. Forty-nine non-Nigeria-based journals accounted for the remaining 882 citations, an average of eighteen citations per journal.

We focused on the ten journals indexed in the WoS that cited the two Nigerian journals indexed most often in the WoS. The top ten citing journals are shown in Table 6 with the total number of citations they made to the Nigerian journals and the total number of citations ever made by the citing journals to other sources during the same period.

Altogether, the top ten journals made 453 citations to the Nigerian biomedical open access journals, and this finding represents 0.26 percent of the total cites made to the journals by the top ten mainstream journals, including the *Journal of Ethnopharmacology*, a Dutch journal, which cited the Nigerian journals the most (119), followed by *Molecule* (60), a US-based chemistry journal. Only one of the journals, the *African Journal of Traditional Complementary and Alternative Medicine*, is of African origin, and only two, *BMC Complementary*

Table 5: Journals in Web of Science (WoS) citing the two journals (2007–12)

Journals in WoS citing Nigerian open access journals in WoS	Citing journals		Citations	
	N	%	N	%
Nigerian journals	5	9.25	313	26.19
Other journals	49	80.75	882	73.81
All journals	54	100	1,195	100.00

Table 6: Top 10 Journals in WoS citing Nigerian biomedical OA journals indexed in WoS

Name of citing journals	Citations received by the Nigerian open access journals	Total cites made by the citing journals to all journals
<i>Journal of Ethnopharmacology</i>	119	21,278
<i>Molecules</i>	63	7,552
<i>BMC Complementary and Alternative Medicine</i>	50	1,388
<i>Plos One</i>	40	133,246
<i>Evidence-Based Complementary and Alternative Medicine</i>	38	2,609
<i>Pakistan Journal of Botany</i>	34	2,347
<i>Industrial Crops and Products</i>	32	4,151
<i>International Journal of Pharmacology</i>	28	572
<i>Scientific World Journal</i>	25	2,297
<i>African Journal of Traditional Complementary and Alternative Medicine</i>	24	337
Total	453	175,777

and Alternative Medicine and *PLoS ONE*, are open access journals. It should be stated that the cited journals, the *African Journal of Pharmacy and Pharmacology* and the *Journal of Medicinal Plants Research*, cited themselves most heavily, 194 and 123 (they are not included in the top ten list).

Figure 1 shows the country-wise distribution of the citers of articles in the Nigerian predatory medical science journals. India cited the journals the most with 331 citations, followed by China with 296 citers, Pakistan with 239, Iran with 194, Malaysia with 177, and South Africa with 143. Hence, the predatory journals have really penetrated the world of science. Researchers from the United States, Italy, Spain, and Switzerland have cited papers in the predatory journals. What is very interesting is that although the journals studied emanated from Nigeria, Asian scholars used the sources more than scholars from African countries.

What do the results from these tables and figure tell us about predatory open access journals? These journals have penetrated the entire globe and are being used by scholars both as channels of distribution and as sources of influence for their research. Evidently, one would point to the challenge of the insufficiency of publishing channels to cater to the needs of the ever-growing number of scholars and researchers in various institutions in the world. In addition, this result might also be reflecting the state and status of information exchange between scholars from the South and publication channels from the South. The high rejection rate of research papers from the South has been topical in the research literature (Arunachalam 2003; Lor and Britz 2004), and it demonstrates the likelihood of scholars being pushed to publish in sources with less stringent quality control measures. Generally, the academic print business

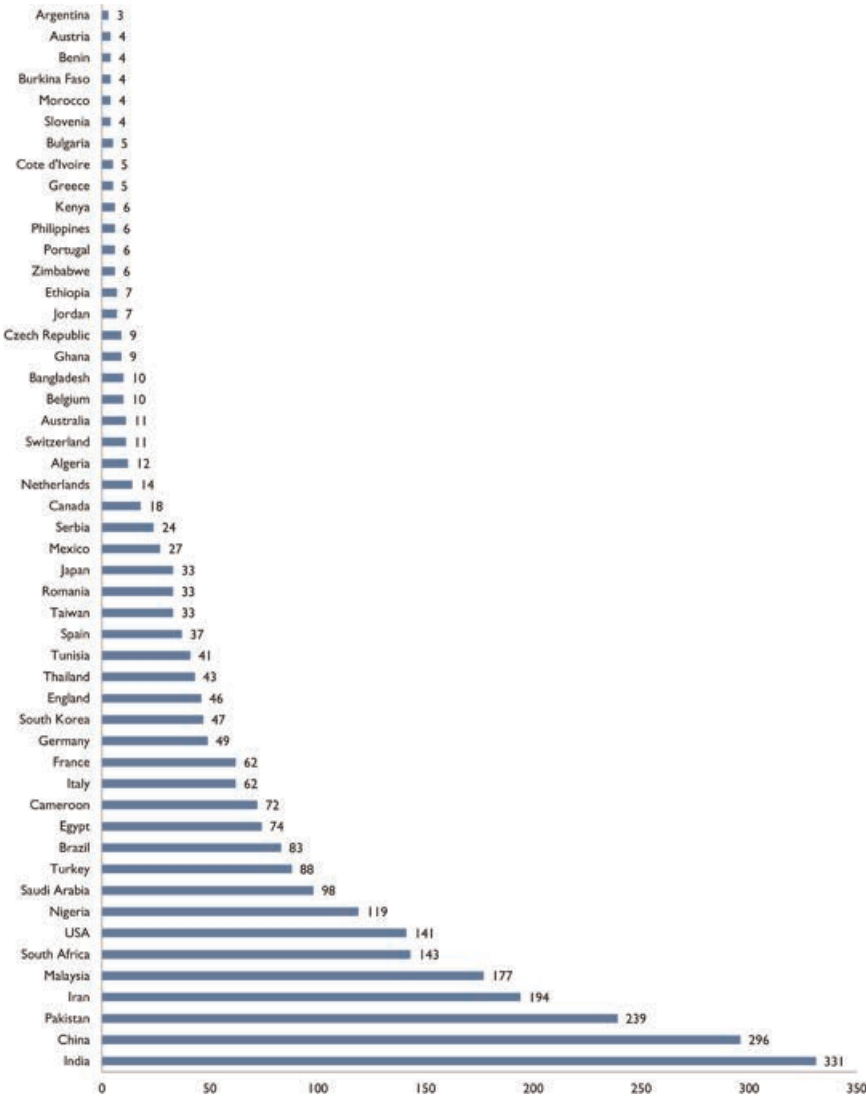


Figure 1: Distribution of citers of the Nigerian predatory medical open access journals

has not flourished in Africa in comparison to Europe and the Americas, but the low cost and ease of use of the Internet has liberalized the publishing space more than ever before (Truth 2012).

Explaining the altercation in the open access arena

Why are many of the open access journals emanating from the developing areas said to be predatory? Remarkably, open access publishing is aiding in the wider

circulation of non-scientific and local literature through the use of the WWW. Much of this kind of literature is usually not controlled by commercial publishers, but it serves to guide a substantial part of the education in Africa. In the traditional publishing era, this literature was seldom visible beyond where it was published and used (Christian 2008). In the open access era, producers of this literature are able to disseminate and market their products through the Internet and, thus, risk exposing the poor English quality of their products to the developed world.

In addition, scholars from developing regions have realized the ease of using the Internet to circulate the information they produce, whether the information is of low or poor quality or not. What would one expect of scholars and publishers from parts of the world where print publishing has never flourished as a result of economic and other limitations? If a technology develops that enables them to bypass the obstacles posed by the print technology, should they not use it? What would be expected of scholars whose research efforts are often rejected by scholars from developed countries due to the limitations of language and other quality criteria? The expectation will be an aggressive embracing of the WWW. In line with the empirical results, Truth (2012) has observed that the predatory open access journals of Nigeria, for instance, have attracted authors from a wide range of countries. In contrast, authors from these countries seldom published papers in any Nigerian hardcopy journals in the offline regime.

Open access is an opportunity for African scholars to take the future of scholarship in the region in their own hands—they can share their thoughts and exchange information with one another. With open access journals promoting freedom of expression, scholars in English-poor Africa and Asia are finding routes to express themselves according to their level of human and technological development, but unconsciously revealing to the global science public the limitations of their publications that might not have been visible before. Open access publishing in Africa and Asia includes experimentation on self-initiatives in scientific information production and dissemination in the new publishing era.

Open access is creating spaces for experimentation that will foster the indigenization of scientific knowledge production. There is increasing socializing and democratizing of human rights in the collective production, circulation, and use of knowledge (Quijano 2000). People are freely sharing the knowledge they produce. Instead of bullying start-up publishers alongside fake ones, by classing them as predatory, international open access policy makers and associations should take the responsibility of policing open access publishers. Many factors make this action a necessity:

- Scientific information is value laden: Scientific information, whether expressed in the form of research findings in the pages of research journals or as innovations in the marketplace has economic, political, and other values, with governments, non-governmental organizations, companies, and individuals having vested interests (Cowan 2004; Caffentzis 2010). It should therefore be expected that countries and organizations that make a profit or that wield

political power in the academic print and publishing industry will seek to protect their interest in the academic publishing.

- Open access is a socio-technical phenomenon: New technologies often introduce new ways of solving new and old problems. Every new technology therefore has its own cycle of advantages and disadvantages, creating new weak and strong communities (Lunenfield 2011). Mierge Bernard (1989) has shown that most technology issues initially sound very simple but that they soon become social issues, especially in networks. These observations relate to the open access movement. Nwagwu (2006) has used the analogy of cybernetics to illustrate how advanced application of information technology is being used to exert undue control and discipline in global scientific endeavours.
- Open access is infrastructure heavy: Infrastructure remains an obstacle in information technology implementation and application in the developing world (Castell 2006; Jakobsson and Stiernstedt 2010; Jakobsson and Fredrick 2012). Open access is about networked technology, encompassing a large number of actors, including sovereign governments, national and international advisory panels, and affected industries. The structure of activities in this complex interrelationship will always reflect the differences in the capacity of individuals, organizations, and countries to exploit the technologies (Benckler 2006).
- Open access and scientific information market: The scientific information market is a special market, with business interests that intermediate between the researchers and scientific information consumers. This interest will continue to influence the efforts to give scientific information free to the reading public.
- Open access may spur unfair competition among scholars: In the access publication charge regime, will funds be available to all universities and researchers in a country at the same scale? What criteria will guide the allocation of these funds? An access publication charge will introduce stiff competition in scientific publishing. Researchers have unequal capabilities and characteristics—some are young and new (Chen, Chong, and Tong 1993), some are mature and command pages of high quality journals at will, while others will be chance authors whose contributions can still make positive contributions to society. Early career scholars, scholars on contract, retired members of faculty, and researchers from low ranked institutions will be the early losers, while scholars that have always attracted large citations or have affiliation with privileged institutions will be those who gain (Rogers 2012). These observations relate to the state of embracing open access in Africa and probably other low-income regions of the world (McCabe and Snyder 2013).

Open access and scientific publishing in Africa

Nwagwu and Ahmed (2009) and Nwagwu (2012, 2013) have examined uptake, initiatives, and structure of open access movement in Africa in previous publications. A personal practitioner's observation and the UN Educational, Scientific and Cultural Organization's (UNESCO 2010) country-by-country situation

analysis of open access in Africa suggests that there is a persisting low level of awareness and consciousness in many countries in the region, although there are many open access activities going on. In Nigeria, only six of the over 120 universities have established repositories, and there are actually no institutional open access policies in the universities (Nwagwu 2013)—a situation that will be strengthening the foothold of predatory journals. My personal experience in institutions in Nigeria show that there exist informal expressions of concern about the quality of sources through which scholars are publishing, but similar expressions of concern about what students and their teachers are reading is not pronounced. Many scholars even equate open access journals with predatory open access journals. There is also no observable policy action to address the challenges. Open access statements are limited to the recognition of the ubiquitous scientific publications on the Internet, which students and their teachers can access to meet their needs, and not a clear document of direction spelling out how the institutions should participate in the movement.

Generally, it can be observed that the level of research about open access in Africa is also very low. Experts on the subject matter are therefore very few. In addition, meta-disciplines such as science studies and informetrics that promote science literacy are scarcely mounted in the universities (Onyancha 2009), leaving scholars to conduct their research without adequate knowledge about the structure of their disciplines. Open access will be most effective when combined with science and academic literacy training and effective signposting to create a research culture and environment that supports and promotes critical thinking.

In comparison with other countries in the region, Egypt stands out in terms of the scale and number of open access initiatives (UNESCO 2010; Nwagwu 2013). As of May 2014, Egypt's Hindawi Publishing hosted 434 gold open access journals.³ This large number of journals, however, emanates from a single publishing house. Many of these journals, however, are listed as predatory by Beall (2013a). Academic Journals and International Research Journals, two of the foremost predatory publishers in Nigeria, had a total of 136 journals as of December 2012 (Ojemeni 2014). Generally, many homegrown open access initiatives are haphazard, uncoordinated, and sometimes actually predatory. Individuals simply initiate journal services and sometimes in the most unprofessional manner. However, information of all sorts from these journals and various institutions and organizations in Africa can be seen on the Internet, a situation that sometimes creates a false impression that open access is being achieved.

Open access journals are rapidly being developed in Africa (Truth 2012), suggesting that open access will provide a way of strengthening and showcasing African scholarship, if the movement is consciously nurtured. The new and upcoming open access initiatives and publishing houses may be providing an immediate answer for younger and weaker scholars who do not care about the quality of journals in which they debut.

With respect to the efforts aimed at institutionalizing open access, South Africa has made significant progress in gold open access in the past five years, although the first open access journals in Africa actually started in Egypt (Nwagwu 2013). According to UNESCO (2010), South Africa is a leading African country in terms of open access policies that exist at the governmental level, and there exist grassroots open access initiatives in universities and research organizations.

The question of cost must be given due consideration in regard to open access in Africa. Only a very small number of publications in the region emanate from funded research; the rest are based on the individual efforts of scholars who struggle to satisfy the “publish or perish” situation in their institutions (Adomi and Mordi 2003). Although the open access policies of many funding agencies (such as the Wellcome Trust 2013) and countries (Mikkelsen 2010; Finch 2012) have provided for inclusion of publication costs in the budgets of projects they fund, researchers in the region will have to fund the publication of papers that are developed from unfunded projects. When the access publication charge is implemented in the United Kingdom (Finch 2012), scholars from Africa region may find it difficult to put a paper in journals there—the United Kingdom being the major channel of scientific papers from African countries (Nwagwu 2012). Much of research in Africa is not funded by agencies. A new development that requires further investigation is that agencies in Nigeria and many other countries in the region prefer funding non-governmental organizations whose research outputs are hardly channelled through journals—whether local or otherwise (Fafchamps and Owens 2009).

Generally, scientific practices in Africa embrace new development and scientific innovations very slowly. For instance, science in Africa is hardly indexed at home despite the great benefits derivable from indexation, and research evaluation is based mainly on numbers of papers produced. Institutions encourage research produced locally to be published externally, irrespective of whether or not the content of the research benefits local researchers (Adomi and Mordi 2003). In addition, remuneration of academic staff is based on rank and productivity and not on the quality of the research work done (Nwagwu 2006). Scholars, therefore, adopt any strategies that can help them increase their number of publications, and the purpose of disseminating science may not necessarily be for the purpose of sharing knowledge. This will fuel and sustain the predatory publishing activities.

Academic communities in many African countries can be considered semi-closed communities in terms of interaction with, and outflow of, scientific information to public policy makers and other stakeholders. Scholarly publishing is largely viewed as being exclusively for the benefit and consumption of scholars in educational institutions, research institutes, and other organizations. Non-academic communities—for instance, government ministries, departments, or agencies, as well as industries—may be seen to be supporting education. They may make policies that relate to education and provide funding as much as

possible. They give some scholarships to students to study at home and abroad and may provide study materials for educational institutions, but their relationship with the academia appears to be that of patron and client. They are not necessarily using the research outcomes of researchers in their policy and innovation activities (Nwagwu and Iheanetu 2011). Furthermore, investment in academic publishing is very low in the region—academic publishing in African countries makes no significant contribution to the economy (Olukoju 2002). African economies may therefore be nonchalant about investing in academic information production and dissemination, which contrasts sharply with many other countries (Harvie et al. 2012).

The benefits of open access to Africa are still tied to the benevolence of the developed countries. Most recent initiatives include Research4Life, which is the collective name for AGORA (agriculture), HINARI (medicine and health), OARE (environmental science) and ARDI (technology and innovation), four public–private partnerships that aim to provide the developing world with access to critical scientific research. Subiah Arunachalam (2003) and Nwagwu (2013) have at different times discussed the deficiencies of this approach for promoting scientific development in developing regions. African home-grown initiatives are few and economically not strong (Nwagwu 2006). The International Network for the Availability of Scientific Publications and African Journals Online came into existence to address this question of making local research results in Africa available to the world (Rosenberg 2002; Murray 2008); their activities remain significant but low in scale, influence, acceptance, and distribution.

Much of the understanding about open access in Africa is that there exists a huge wealth of information resources at no cost on the Internet, and researchers, students, and others can draw from this resource to do their own research. Peter Lunenfeld's (2011) observation that the emerging global science community is split into two groups, namely uploaders and downloaders, is apt. Scholars from low technology regions are mainly consumers of information uploaded by people from high technology regions. The quality of the downloaded information is generally questionable in many cases (Arunachalam 2004; Arunachalam and Muthu 2012). Arunachalam also observes that there is evidence in the literature that access to high quality sources has become even more restrictive in the era of open access. The open access arena is populated mainly by new journals and sources, and they may not compare in the near future in quality with older and well-established journals, which remain subscription based. Moreover, with the advent of predatory journals, the quantity of scientific information on the Internet has spiralled tremendously.

Africa is currently standing at the edge of many open access advantages. Presently, there is no African presence in the definition and the structure of the open access movement, although there exists some evidence of consciousness about the benefits of movement as well as initiatives in some countries (Nwagwu and Makhubela, forthcoming). There is therefore an urgent need for national

policies to spell out what open access means in and to Africa, providing guidelines for the adoption and institutionalization of the movement. An African open access policy will confront the common challenges of cost and copyright, but specific issues of infrastructure, technology, business models, institutional and individual repositories, indexing, preservation, a rewards system, and collaboration, among others, must also be considered. The available routes for dealing with cost and rights issues relate mainly to whether gold or green routes should be adopted. However, these models of open access relate directly or indirectly to how to achieve the global distribution of information produced locally. What Africa requires is not an open access model that focuses on formulas for accessing information produced elsewhere but, rather, a model that promotes the exploitation of the web to disseminate information created locally, first among local consumers and next to the rest of the global community. Peter Lor and Johann Britz (2004) have elaborated on this subject matter.

Emphasis on infrastructural requirements for open access in Africa must focus on open access technologies, manpower and skill, repositories, and indexes. The internal mechanism for the evaluation and promotion of academic staff and researchers in higher educational institutions and research institutes should be examined to weed out and discourage publication in unreliable sources. Institutions could achieve this goal by creating continuously verified and validated lists of journals and other sources in which scholars in various disciplines should publish. This observation explains why many institutions still insist that their researchers publish in journals recognized by the Institute for Scientific Information (ISI). Given that the ISI database is skewed in disfavour of African and other sources, the implementation of the recommendation of this author for an African citation index could provide a regionally relevant authority list that could serve as a basis for accessing journals in which scholars publish (Nwagwu 2006). This index should build on a census of already existing journals and other primary sources to provide initial information about sources and source characteristics of African scientific information. Further roles of regulating publication channels must be created for the association of universities, non-governmental organizations, and international agencies in the region who provide funding for research. Finally, the same roles must be created for scientific societies, professional associations, and higher educational institutions and research institutes in ensuring that publishing houses and sources are not predatory.

Concluding remarks

Information production and dissemination, as well as access to information, have increased globally. Open access has contributed in this development. The response of Africa and other poor regions has been dictated by their low level of social and technological development. The technology heaviness of open access and high technology advancement in the developed world are exerting some pressure on the implementation of open access in low income countries, thus weakening the apprenticeship experiments of newcomers in the scientific publishing business in developing countries. What predominates today as the definition

and meaning of open access may therefore leave developing countries struggling to fit into the complex and cosmopolitan arrangements that are developing to manage and control scientific information resources—resources whose social and economic role in national development is yet to be realized in much of Africa.

Whether following the green or gold route, the benefit of open access that will accrue to Africa may for a long time remain that of access to scientific information from the North rather than increased circulation of African information. In addition, Africa's slow pace in adopting scientific information management strategies, which could enhance the exploitation of open access advantages, will continue to devalue the significance of open access in the national development in Africa. What could be considered homegrown evidence of African contribution in the open access movement—namely the numerous open access journals emanating from the region, are either predatory, or so termed, and some of the excesses will require the intervention from professional societies, associations of universities, non-governmental organizations, and others to address. National open access policies are yet to emerge in Africa, and the observed adoption of templates of open access policies from developed countries by African countries may result in further challenges to science development in the region. Given the critical role of scientific information for development in the world today, open access will remain an important issue in the global knowledge development arena for a very long time to come.

Notes

1. Beall's List of Predatory Publishers 2015, <http://scholarlyoa.com/2015/01/02/bealls-list-of-predatory-publishers> (accessed 15 December 2015).
2. See Retraction Watch, <http://retractionwatch.com/> (accessed 15 December 2015).
3. See <http://www.hindawi.com/journals/> (accessed 15 December 2015).

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