Recalibrating the Scope of Scholarly Publishing: A Modest Step in a Vast Decolonization Process

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Abstract

By analyzing 25,671 journals largely absent from common journal counts, as well as Web of Science and Scopus, this study demonstrates that scholarly communication is more of a global endeavor than is commonly credited. These journals, employing the open source publishing platform Open Journal Systems (OJS), have published 5.8 million items; they are in 136 countries, with 79.9% in the Global South and 84.2% following the OA diamond model (charging neither reader nor author). A substantial proportion of journals operate in more than one language (48.3%), with research published in a total of 60 languages (led by English, Indonesian, Spanish, and Portuguese). The journals are distributed across the social sciences (45.9%), STEM

(40.3%), and the humanities (13.8%). For all their geographic, linguistic, and disciplinary diversity, 1.2% are indexed in the Web of Science and 5.7% in Scopus. On the other hand, 1.0% are found in Cabells Predatory Reports, while 1.4% show up in Beall's questionable list. This paper seeks to both contribute and historically situate expanded scale and diversity of scholarly publishing in the hope that this recognition may assist humankind in taking full advantage of what is increasingly a global research enterprise.

Keywords: Scholarly communication, journal publishing, open access, Global South, OA diamond journals, decolonial process

Recalibrating the Scope of Scholarly Publishing:

A Modest Step in a Vast Decolonization Process

In 2018, Philip G. Altbach and Hans de Wit, two leading scholars of higher education at Boston College, published "Too Much Academic Research Is Being Published" in *University World News*. In making their case, Altbach and de Wit point out that although "no one knows how many scientific journals there are... several estimates point to around 30,000" (2018).[1] Finding the number excessive, they declare "a crisis in academic publishing" involving "too much pressure on top journals" and "the rise of predatory journals and publishers that publish low or marginal quality research." They recommend steps be taken to reduce the amount of research published.[2] The analysis in this article not only challenges such journal estimates but calls for a recognition of the Global South's research commitment and engagement. The source of this analysis is 25,671 journals that are using the open source editorial management and publishing platform Open Journals Systems (OJS), first released by the Public Knowledge Project

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[1] Just how dated this number may be is suggested by the Library of Congress study of 1963 which found a global total of 35,000 journals, with 100 titles from Indonesia (Gottschalk & Desmond, 1963).

[2] Also in 2018, Gianfranco Pacchioni, Vice-Rector for Research at the University of Milano Bicocca, published *The Overproduction of Truth* (2018) on a similar theme ("accompanied by objective data and findings") claiming that as a result of the internet, "in a short time the world of research has changed from the passionate activity of a few selected people to a crowded universe of practitioners, often with few ideas and sharing little or no ethical values" (p. 4).

(PKP) in 2002.[3] Our association with PKP, as authors of this paper, is noted in the Competing Interests statement at the end of this paper.

Earlier studies of what we are calling JUOJS (journals using OJS) located 9,828 journals in 2015 (Alperin, Stranack, Garnett, 2016). A survey of 2,114 of JUOJS staff members found 97.8% of them to be open access (OA), with 13.6% utilizing Article Processing Charges (APC) to provide OA (Alperin, Stranack & Hanson, 2017; see also Edgar & Willinsky, 2010). These results suggest that 84.2% of the JUOJS are "OA diamond" (which neither charge authors nor readers for access). This result can be compared to a more recent study which placed JUOJS at 60% of OA diamond journals, among "at least 17,000, but likely up to 29,000, OA diamond journals" (Bosman et al., 2021, p. 93). Of relevance to this paper's section on indexing, Bosman and coauthors conclude that "even though they are well embedded in academic structures, OA diamond journals struggle to be properly integrated into the ecosystem of scholarly publications" (p. 84).

This "struggle to be properly integrated" has a postcolonial history that Altbach addressed in the "University as Center and Periphery" some four decades ago (1981). The "peripheral universities" of the "Third World," he noted, are "basically distributors of knowledge... dependent on the central institutions for innovation and for direction." Their "special problems with developing research capabilities" include "few outlets for scholarship, creative writing, and research reports by Third World intellectuals" as

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[3] Founded in 1998, PKP (https://pkp.sfu.ca/) is a research and development initiative at Simon Fraser University and Stanford University.

"publishers are largely uninterested in Third World authors."[4] Altbach saw this powerful

"colonial educational heritage" a form of "neocolonialism" not easily overcome: "The

odds against a fully autonomous and effective publishing enterprise being developed in

the [African] continent are high" (1976, p. 461). The universities there, he further warns,

"not only have to confront the reality of the historically and economically based power of

the industrialized nations but also… the widespread desire by the industrial nations to

maintain their dominant positions" (1981).[5]

The pervasiveness of this "intellectual imperialism" – as Syed Hussien Alatas at

the University of Malaya has framed this center-periphery pattern, beginning in the late

1960s (2000) – has also given rise to an "academic dependency" theory of relevance to

this paper.[6] Its leading scholar, Syed Farid Alatas, at the National University of

Singapore and the University of Malaya, writes of multiple dependencies afflicting Global

South researchers, including a "dependency on recognition" that leads to "many

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[4] In other contexts, Altbach addresses "the role and nurturing of journals in the Third World" by observing that "journals are especially crucial for African scholarly and scientific development" (1998, 2), just as he holds that universities in the Global South could "play a key national role in terms of training and sometimes in terms of applied research" (1981).

[5] In 2019, Collyer, Connell, Maia, & Morell observed that "the periphery continues to be a rich source of raw materials for the mainstream knowledge economy in our time. It produces data for the new biology, pharmaceuticals, astronomy, social science, linguistics, archaeology, and more. It is, for instance, a key source of data for modern climate science…. the metropole continues to be the main site of theoretical processing in the global economy of knowledge" (Collyer, Connell, Maia, & Morell, 2019, p. 10).

[6] Syed Farid Alatas on "academic dependency": "A condition in which the knowledge production of certain scholarly communities are conditioned by the development and growth of knowledge of other scholarly communities to which the former is subjected" (Alatas, 2022, p. 18).

scholars [being] torn between satisfying the requirements of publishing in high ranked 'international' journals, particularly those listed in the [Web of Science], and publishing locally in their own languages" (2022, p. 20). The JUOJS attest to a certain break with the recognition dependency, just as these journals address what the Kenyan novelist and essayist Ngũgĩ wa Thiong'o identified as a "need to move the center from its assumed location in the West to a multiplicity of spheres in all cultures of the world," which Thiong'o framed as part of a "vast decolonization process" (1991, p. xiv, 3).[7]

In the first decade of the twenty-first century, Ezra Ondari-Okemwa, an information science scholar at Machakos University, noted how the region's shortfalls in "the technological capability to support electronic knowledge transfer and scholarly publishing" were matched by the regional publications' "lack [of] visibility" (2007). What this means for researchers is summed by PLOS publisher Alison Muddit: "The need to achieve credibility and visibility within the global research system" means researchers in the Global South choosing "between a desire to strengthen local platforms and outlets that better serve local needs and feeling pulled to 'play the game' in which norms have been set by the Global North" (2020; see also Alperin and Rozemblum, 2017).

Against this array of challenges, this paper seeks to bring to light how editors, publishers, and researchers around the world, and especially in the Global South, have

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[7] Thiongo's call for "decolonization" is to be tempered by Eve Tuck and K. Wayne Yang's cautionary point that in the North American context the "metaphorical" use of *decolonization* to, for example, describe Eurocentric bias reduction is not the "decolonization [that] brings about the repatriation of Indigenous land and life" and may "actually further settler colonialism" (2012, p. 1). While the scale and diversity of scholarly publishing reported here is presented as a break with the colonial past that has yet to be recognized, the extent to which it may also be furthering colonialism calls for additional studies.

taken advantage of an open source publishing platform to create, against Altbach's odds, "an effective scholarly publishing enterprise." The scale of this enterprise will be mapped across the principal dimensions of scholarly publishing: (a) country and region, (b) language, (c) discipline, and (d) indexing. By counting those whose research has too often been discounted, this paper demonstrates the extent to which scholarly publishing in the Global South is shifting the assumed center to "a multiplicity of spheres." This is enriching what is thought of as "the literature" across the disciplines, although its full generative potential for research is only beginning to be recognized and realized.

1.0 Data and Sample Selection

The JUOJS employ an optional PKP Beacon, released with the software in 2015, that enables PKP to notify OJS users of security patches and other software upgrades.[8] The beacon also transmits indexing information about the journal, including the journal's title, ISSN, number of items published, titles, and abstracts. This study employed a standard for "active" journals of five items a year, set by the Directory of Open Access Journals (DOAJ, 2020).[9] The resulting publicly available data set for 2020 was 25,671 journals or 36.5% of the 70,214 OJS beacons operating at the time (Khanna et al., 2021). The growth in journals using OJS over the previous decade has shown signs of increasing (Figure 1). The journals in the data set averaged 38.1 items in 2020, for a total of

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[8] One measure of the proportion of journals using OJS that have an active beacon is provided by the 4,326 journals in the Directory of Open Access Journals (DOAJ) using OJS, for which it could be determined that 75.7% transmit data to PKP through the beacon.

[9] The entire public dataset consists of 70,214 PKP software installations, with 487 instances of Open Monograph Press and 100 of Open Preprint Systems, in addition to 69,627 journals using OJS.

996,000 items, while these journals have published a total 5.4 million items since their inception. An OJS installation, from which multiple journals can be generated, is host to 2.62 active journals on average.

Figure 1

Journals Using OJS Over the Last Decade (2010-2020)
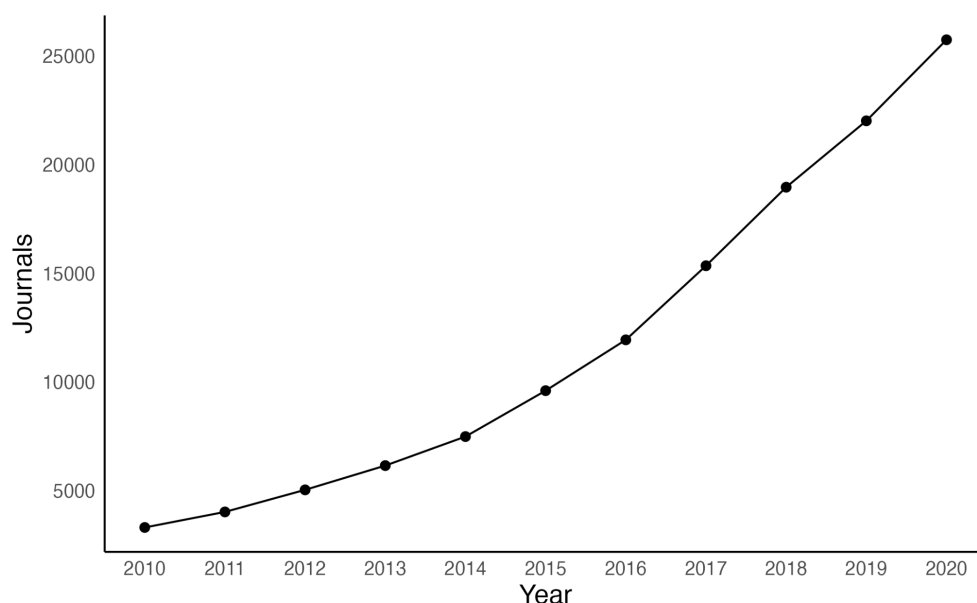
Note. Rmarkdown notebook analysis for this figure. Because OJS users are able to upload back issues, the line does not represent when journals started using OJS except in the most recent year.
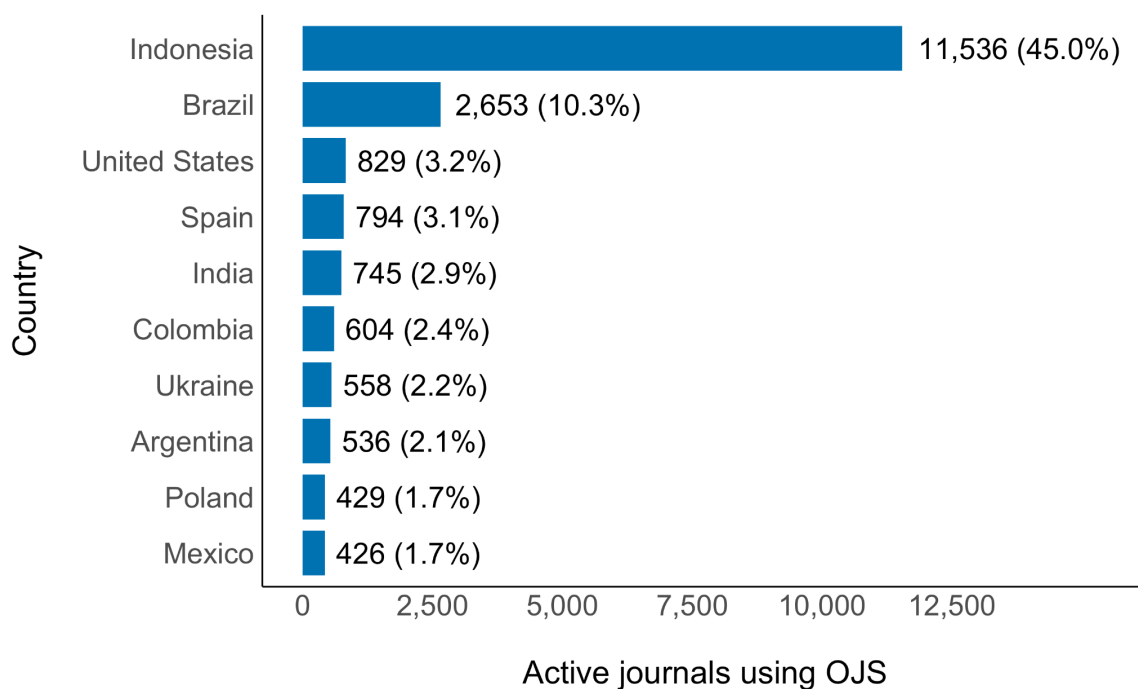
2.0 Country and Region

2.1 Country and Region Methodology

A journal's country of origin of a journal through a three step process. First, we used the ISSN (International Standard Serial Number) of a journal to query the LOC ISSN lookup API for location, which provides us with a MARC code. This MARC code can then be mapped to a country (Raoni, 2021). MARC codes that map to within-country regions or

states are handled manually to reflect corresponding countries. Second, we extract the

top level domains from the journal URLs and map them to their corresponding ISO

3166-1 alpha-2 country codes. Third, we geolocated the IP address of the journal host

using a weekly updated copy of the GeoLite2 Free Geolocation Data.[10]

Figure 2

The Distribution of Active Journals Using OJS in Top 10 Countries (N = 19,110)

*Note.* Jupyter notebook analysis and R visualization for this figure.

2.2 Country and Region Results

[10] Notwithstanding the robustness of our three level checks, this method can generate results skewed

towards the location of hosting servers and data centers, which in itself can reduce visibility of journals

originating in the Global South (Cloudscene, 2022).

The beacon data revealed JUOJS in 136 countries (while a country was not identified for 20 journals). Indonesia leads with 11,535 (45.0%) journals, followed by Brazil with 2,653 (10.3%).[11] The top ten countries account for 74.6% of the total (Figure 2).[12] Yet the global distribution of the journals is widespread with pockets of more intense use (Figure 3).

Figure 3

Distribution of Journals Using OJS by Country in 2020 (N = 25,671)

Journals

0   100   200   300   400   500+
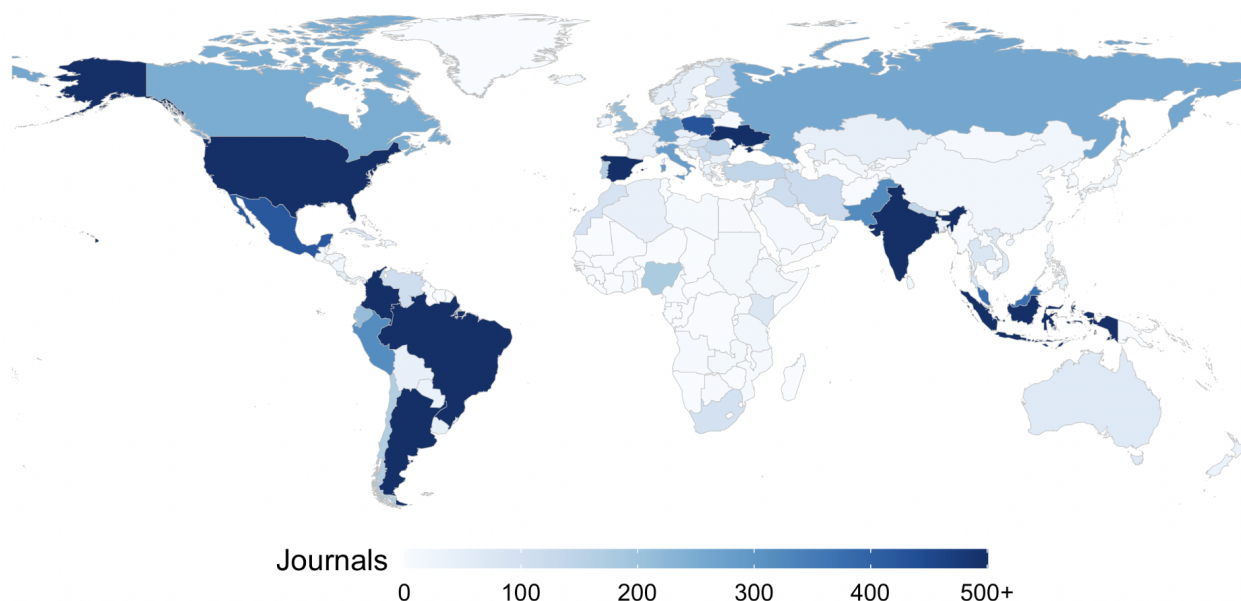
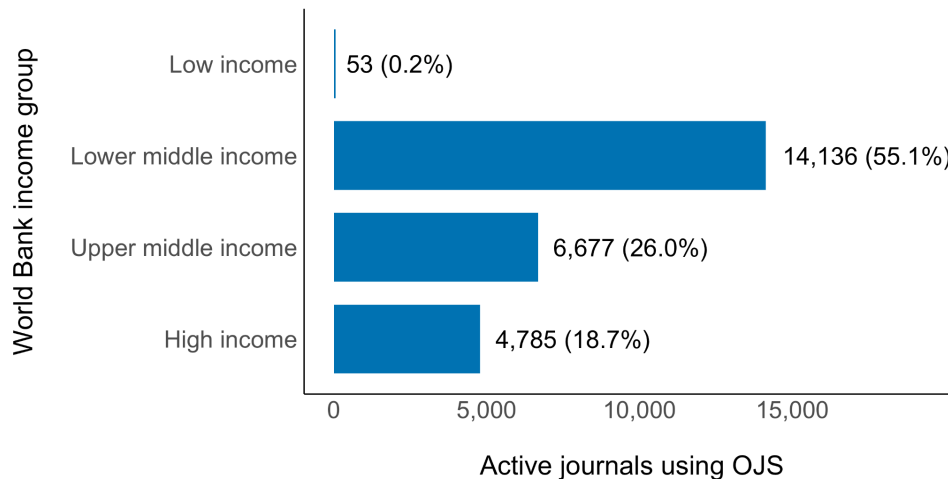*Note*. Rmarkdown notebook analysis for this figure.

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[11] Heather Piwowar posits Indonesian authors are open access leaders with 81% of their articles open, compared to a world average of 41% and the next closest country Colombia at 64% (Van Noorden, 2019).

[12] With regard to the 558 JUOJS in Ukraine (out of an estimated total of 2,500 titles in the country; Hawkins, 2022), and the multinational science academies statement "Action Steps for Rebuilding Ukraine's Science, Research, and Innovation (2022)," PKP has reached out to the journals' editors with strategies for journal preservation involving the Internet Archive, as well the PKP Preservation Network.

The economic distribution of JUOJS was analyzed using the four World Bank income groups (Figure 4). By gross national income (GNI) per capita, 81.1% of the JUOJS are found in the World Bank's middle income countries, with the 27 low income countries accounting for only 53 JUOJS (0.2%). This amounts to 81.6% of the journals coming from countries associated, by national income, with the Global South (Haug, 2021). From a geopolitical perspective, using the five United Nations Regional Groups, 78.1% of the JUOJS are located in three UN regional groups associated with Global South (Dados & Connell, 2012): Asia-Pacific States (54.7%), Latin American and Caribbean States (21%), and African States (2.4%) (Figure 5).
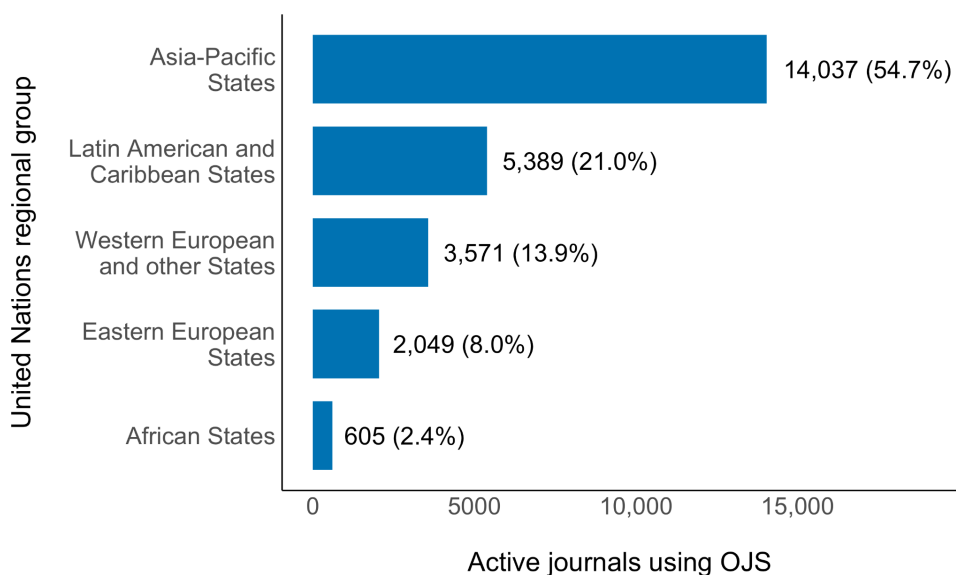
Figure 4

Journals Using OJS by World Bank Income Groups, Re: Gross National Income (GNI) per Capita (N = 25,651)

Note. Jupyter notebook analysis and R visualization for this figure. Source: *World Bank Country and Lending Groups* (2021).

Figure 5

Journals by United Nations Regional Group (N = 25,651)

Note. R visualization for this figure.

3.0 Language

3.1 Language Methodology

To determine the languages of publication for the JUOJS, we ran Google's Compact Language Detector v3 (gcld3) on the 100 most recent articles in the ISSN-verified subset of JUOJS. Gcld3 is a freely available pre-trained neural classifier and has a built-in flag for language predictions that indicates when the predicted language classification exceeds an optimal probability threshold. Only reliable language classifications were retained for each journal. Then, the most frequent language

12

classification for each journal was designated as the journal's primary language of publishing. If gcld3 classified a given journal's article abstracts as being in multiple languages (i.e., with at least 5 articles per language), then the journal was designated as multilingual. Finally, a variety of heuristic checks were applied to verify the primary language of publishing for each journal, for example, by checking predicted languages against top-level domains, which resulted in the semi-manual correction of 478 journals. Two relatively under-resourced languages, Balochi and Faroese, are currently unsupported by gcld3 and were instead discovered by searching top-level domains.

3.2 Language Results

Language detection software indicated that research was being published in 60 languages by the JUOJS, for which an example journal was found by manually verifying each language (Table 1). The language classifications for all ISSN-verified JUOJS (n = 22,561), were shared with Google Scholar to extend the scope of its indexing of journals to additional languages.[13]

Table 1

Languages of Published Research in Journals Using OJS (N = 25,671)

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[13] This resulted, for example, in the Google Scholar indexing of the journals *Hanken* and *Balochistaniyat*, which publish in Balochi (an Iranic language spoken in Pakistan, Afghanistan, and Iran). On the other hand, *Fróðskaparrit*, which may be the only journal to publish research in Faroese, has yet to be indexed. As discussed below in the section on indexing, Google Scholar includes the vast majority of JUOJS, including those publishing in Kazakh, Kiswahili, and Kurdish.

Afrikaans	Danish	Igbo	Russian
Albanian	Dutch	Italian	Scottish Gaelic
Arabic	English	Japanese	Serbian
Armenian	Estonian	Kazakh	Sinhala
Indonesian	Faroese	Kiswahili	Slovak
Malay	Filipino	Korean	Slovenian
Balochi	Finnish	Kurdish	Spanish
Basque	French	Lithuanian	Swedish
Belarusian	Galician	Macedonian	Tamil
Bosnian	Georgian	Nepali	Thai
Bulgarian	German	Norwegian	Turkish
Catalan	Greek	Persian	Ukrainian
Chinese	Hindi	Polish	Urdu
Croatian	Hungarian	Portuguese	Uzbek
Czech	Icelandic	Romanian	Vietnamese

Note. A JUOJS publishing in each of these languages is listed and linked here.

Close to half of the JUOJS published articles primarily in English (49.7%), with the top ten languages accounting for 97.0% of the titles (Figure 6). By comparison, Scopus has publications in 40 languages, with the proportion of documents (rather than journals) in English at 92.6%, followed by 2.8% in Chinese and 1.3%% in Spanish (Vera-Baceta, Thelwall & Kousha, 2019).

Figure 6

Top Ten Primary Languages of Publication Among Journals Using OJS (N = 22,561)
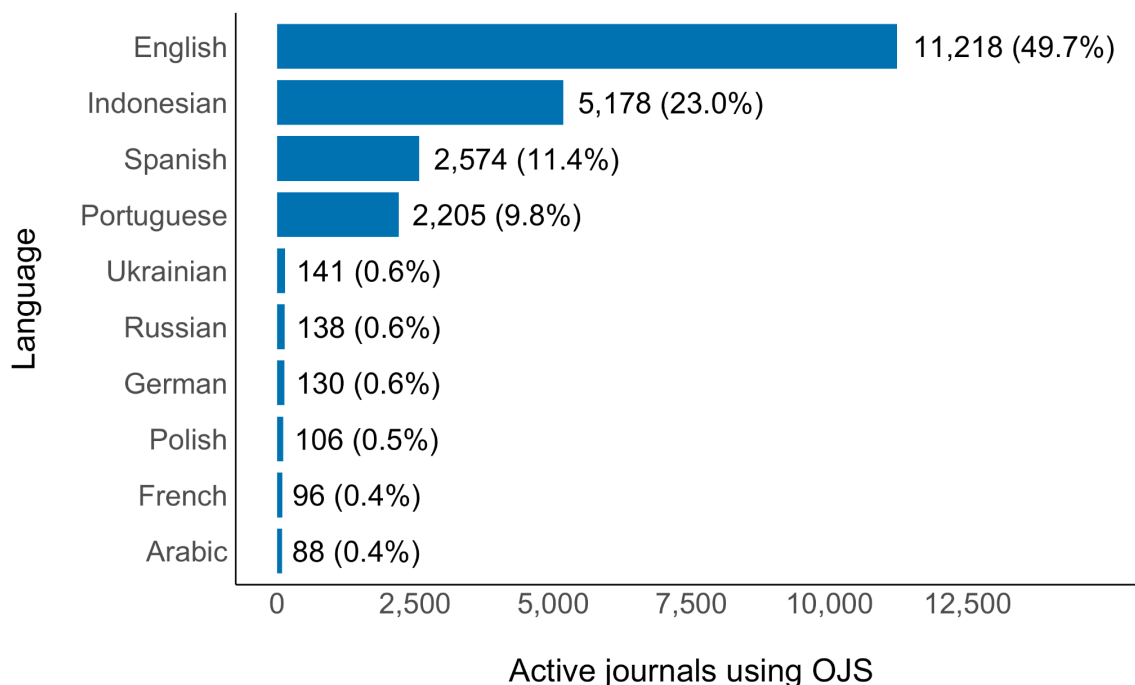
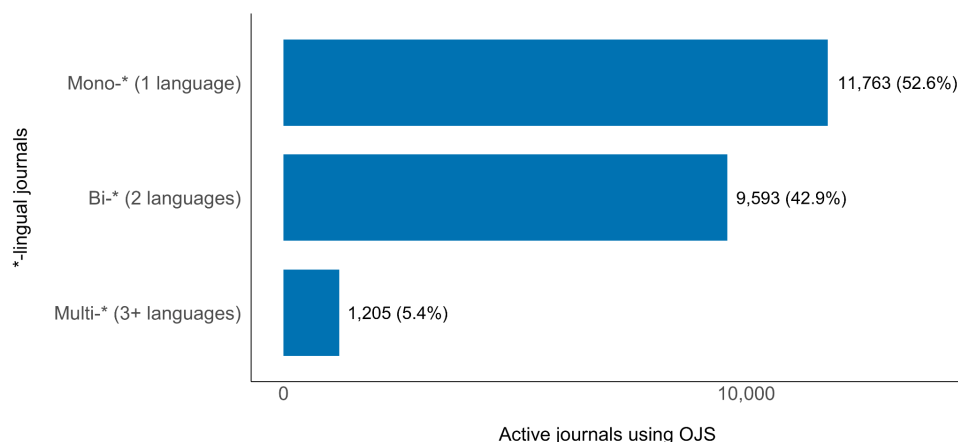*Note*. Jupyter notebook analysis and R visualization for this figure.

The high level of linguistic diversity among JUOJS calls into question the common linguistic assumption that "English is the language of science," as a recent headline in *Nature* read (Elnathan, 2021). The reign of English in research and scholarship only began to take hold in the latter half of the twentieth-century, after sharing the spotlight earlier with French and German; and while medieval Latin served as the language of learning in the West, the influx of learning from the Islamic world in Arabic, through the twelfth-century translation movement, made all the difference (Hunter-Konos, 2015, Willinsky, 2017, pp. 117-152).

Today, English hegemony is facing challenges in the name of "bibliodiversity," which Monica Berger, New York City College of Technology, places at the center of decolonizing the OA movement in research (2021; Shearer, 2019). A "position statement" on this question of research and language has been issued by the Chilean scholar Federico Navarro, La Universidad de O'Higgins, and eleven other faculty from around the globe, "challenge(s) assumptions made about the use of English as a 'lingua franca' in scientific-academic contexts," by identifying its deleterious effects on knowledge production, while arguing for "why we, as research communities in different fields and regions, should use multiple languages and varieties to promote transnational dialogue in scientific-academic contexts" (2022). Similarly, Suresh Canagarajah, at Penn State, expresses his hope this bibliodiversity amounts to a "gradual chipping away at power, to decolonize writing and scholarship as diverse communicative spaces, which will complement the parallel activism for large scale institutional and policy changes" (2022, p. 20). The commitment to such change within scholarly communication is reflected in the international array of signatories to the 2019 [Helsinki Initiative on Multilingualism](#).

Figure 7

*Languages Employed by Journals Using OJS (N = 22,561)*

Note. Jupyter notebook analysis and R visualization for this figure.

While the research hegemony of English is present among the JUOJS, another linguistic feature of this collection is that 48.3% publish in more than one language (Figure 7). The relationship among the four leading languages can be tracked among mono- and multi-lingual journals (Figure 8). While monolingual English language journals represent the largest segment at 6,651 titles (indicated in by single dot under the first column), the notable bibliodiversity among the JUOJS appears in the next column with Indonesian-English bilingual journals with 4,431 titles, and Portuguese-Spanish-English trilingual journals with 550 titles. It is also worth noting that the use of English may be overestimated, as it is common for titles and abstracts, on which the language analysis relies, to be translated from other languages into English. As well, articles do, on occasion, employ multiple languages in their text, for example, Spanish and Castilian, or Bahasa Indonesia and Javanese.

Figure 8

Top Four Languages Across Mono- and Multilingual Journals Using OJS (N = 22,561)

17
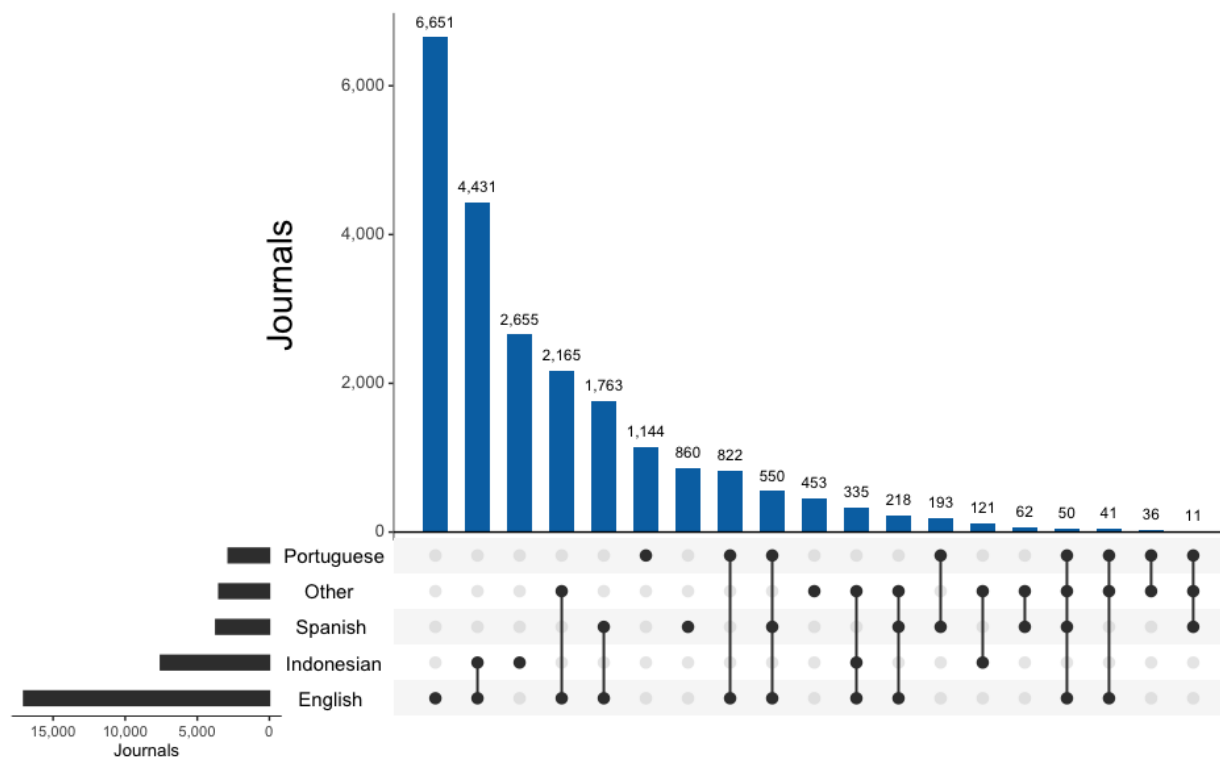
Note. Jupyter notebook analysis and R visualization for this figure.

4.0 Discipline

4.1 Discipline Methodology

To assess JUOJS' research coverage, the title and abstract of the five most recent articles published in the ISSN-verified journals were first concatenated, then passed as inputs to a neural field of study classifier trained on English-language data (Weber et al., 2020). The use of this classifier required the translation of all titles and abstracts into English, for which we used the Ubiquitous Knowledge Project's EasyNMT. The outputs of the classifier are distributions of likelihood over all classes, meaning that it supports multidisciplinary classification. But for ease of reporting, each journal was assigned the single most probable field of study label according to the Australian and New Zealand

Standard Research Classification (ANZSRC). This schema was preferred over others because of the availability of the data set used to train the neural classifier, examples in which were labeled according to ANZSRC (Weber et al., 2020). ANZSRC fields map to the OECD's Fields of Science and Technology (FOS), but differ from those embodied by the National Science Foundation's seven research area directorates. Differences are mainly found in STEM fields, especially in the pure sciences. The classifier mitigates this problem of comparison by assigning basic labels such as Chemical and Physical Sciences, which the NSF classification then groups into broader research fields.

4.2 Discipline Results

The disciplinary distribution of journals reveals that social science research is the leading area among journals, although the STEM fields – led by the medical and health sciences, followed by engineering and technology – also play a major role by journal count (Figure 8). The STEM presence is notable where the expectation is that research conducted beyond the center represents a degree of cultural diversity that will occupy the main body of research activity (Figure 9). Where the social sciences and humanities are assumed to have a local significance that can be well served by researchers on site, the "universality" of the sciences frees them up for gravitating toward the center, with these results suggesting a more distributed basis for research in the sciences, technologies, engineering, and mathematics (STEM).
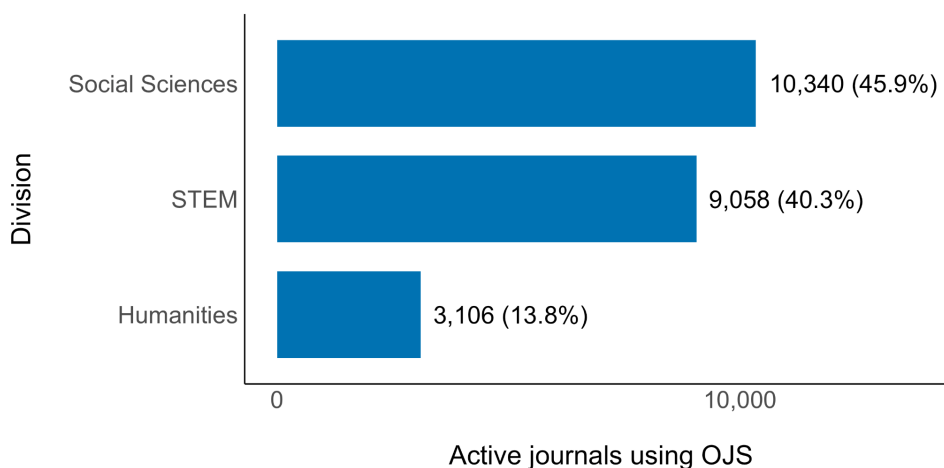
Figure 9

Journal Discipline for Top 10 Primary Languages (N = 22,504)

Active journals using OJS
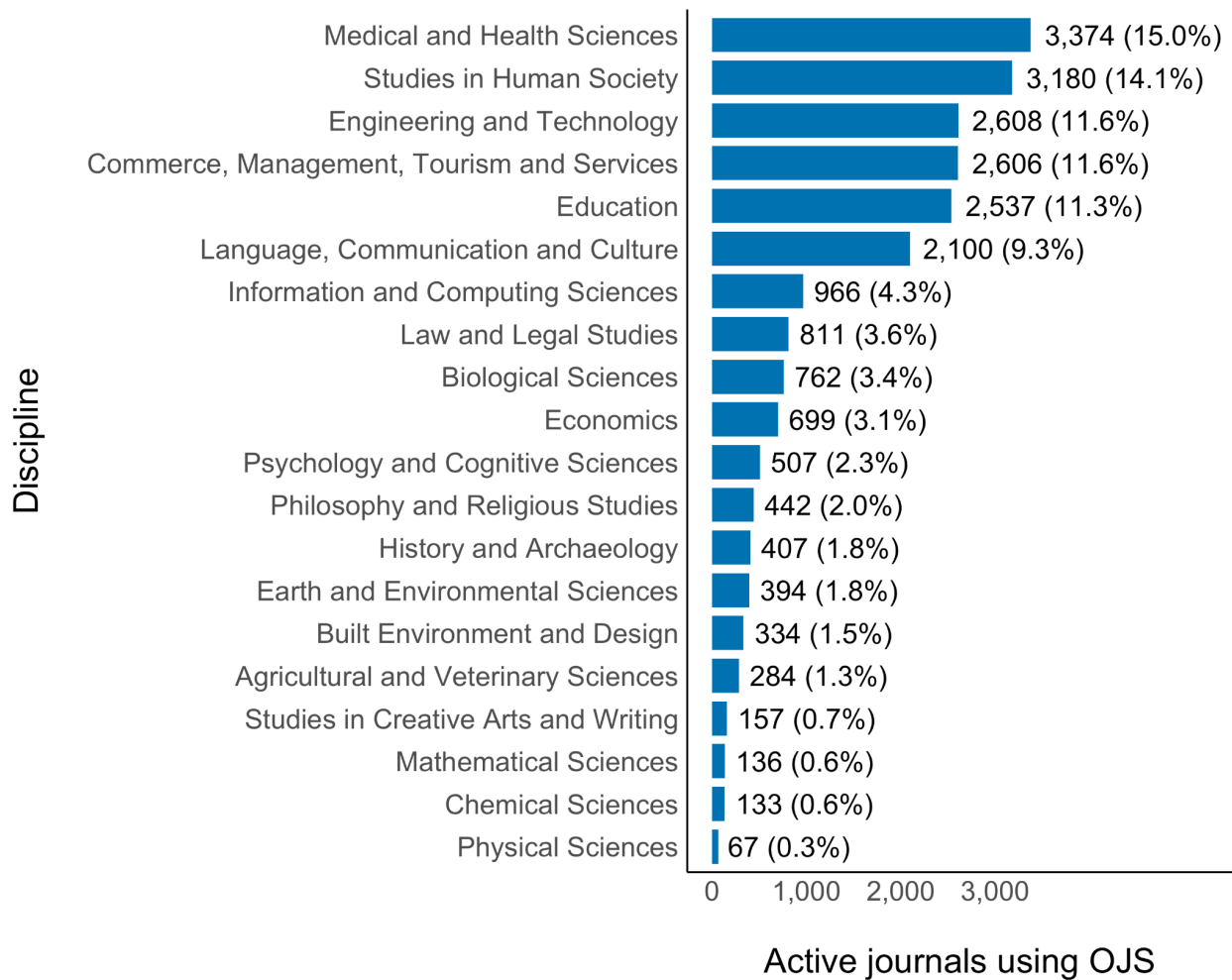
Note. Jupyter notebook analysis and R visualization for this figure.

Figure 10

Journal Disciplinary Area for Top 10 Primary Languages (N = 22,504)

Note. Jupyter notebook analysis and R visualization for this figure. See Table 2 for the top-ten languages in use by JUOJS.

To compare the JUOJS disciplinary breakdown to the profile found in Scopus (with an overlap of less than 4% between them; see below), one finds a mixed picture. On the one hand, Scopus has a higher proportion of titles in mathematics and medicine and health sciences, while the set of JUOJS have a higher proportion in education and language, communication and culture (Table 2). Yet in other disciplinary areas the journal coverage of disciplines is roughly comparable between the JUOJS and Scopus two sets, such as economics, engineering and computer science. One can imagine more advanced citational studies to determine the extent to which journals in these two sets draw on the other in their shared disciplinary interests.

Table 2

Disciplinary Coverage of Journals Using OJS and Journals in Scopus

Field	JUOJS	Journals in Scopus
Economics	699 (3.1%)	1,412 (3.4%)
Education	2,537 (11.3%)	1,097 (2.6%)
Engineering and computer science	3,574 (15.9%)	6,752 (16.1%)
Language, communication & culture	2,100 (9.3%)	2,493 (5.9%)
Mathematics	136 (0.6%)	1,929 (4.6%)
Medicine and health sciences	3,374 (15.0%)	14,744 (35.1%)
Other[a]	10,084 (44.8%)	13,530 (32.3%)
Total	22,504 (100%)	41,957 (100%)

Note. Jupyter notebook analysis of the Scopus data in this table.

[a]Includes JUOJS that were not classified in this analysis, and Scopus titles outside of fields identified for JUOJS.

5.0 Indexing

5.1 Indexing and citation methodology

The visibility and circulation of the JUOJS were assessed by determining the presence of these journals in 11 research indexes, directories, and lists. The analysis of the Web of Science Citation Reports and Cabells Predatory Reports involved drawing on Stanford University Library licensing agreements, with Cabells kindly determining the

JUOJS in its database, based on its use of our data set. EBSCOHost, Scopus, OpenAlex, DOAJ, and Beall's List make their respective journal lists publicly available. Bianca Kramer ascertained the number of JUOJS in ROAD (2022), while SerpApi generously assisted in assessing Google Scholar's indexing of JUOJS. With each of the indexes, we then assess how well JUOJS are represented in the index by assessing overlap based on matched ISSNs, and/or matched journal URLs and domain names. The specific matching criteria used for each resource are also reported with Table 3.

5.2 Indexing and Citation Results

As early as 1998, Ann María Cetto and Octavio Alonso-Gamboa, at the National Autonomous University of Mexico (UNAM), raised the marginalization of Global South research in the principal journal indexes (Cetto & Alonso-Gamboa, 1998). They found that the Web of Science's coverage of scholarly publishing in Latin America and the Caribbean amounted to 0.5% of the journals indexed (p. 114). Cetto and Alonso-Gamboa were inspired to join forces with others in the region to form Latindex in 1997, which currently indexes 24,486 journals, as a way of countering what had otherwise been constructed, in Cetto's words, as "the large periphery of the present world system" (1997, p. 40).[14]

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[14] Anna Maria Cetto: "We pertain to the large periphery of the present world system, in the economical sense,in the political sense,and of course in science as well" (1997, p. 40).

A quarter century after the Cetto and Alonso-Gamboa study, the Web of Science Citation Reports includes 1.2% of the JUOJS (Table 3).[15] The coverage of JUOJS in EBSCO and Scopus is only marginally better. Our concern here is with the extent to which these three databases are commonly assumed to constitute the *scientific literature*, with researchers turning to them to write literature reviews and analyze characteristics of scholarly communication, for example, in the Global South (e.g., Cortés, Guix & Carbonell, 2021).

On the other hand, a new generation of indexes, such as Dimensions and OpenAlex, do much better. They cover 54.3% and 63.8% of the JUOJS respectively, by relying on automated aggregation of open resources (such as Microsoft Academic Graph, Crossref, Unpaywall, DOAJ, ORCID, and PubMed). Finally, 88.3% of the JUOJS are indexed in Google Scholar. This is a result, in good part, of its lead engineer Anurag Acharya reaching out repeatedly to PKP, beginning in 2004, to improve its indexing of JUOJS through improvements on both sides. This suggests the deliberate effort needed to start to overcome the legacy of "the large periphery," as Cetto put it.

Table 3

Journals by Index, Directory, and List, with Proportion that Use OJS (N = 25,671)

	Journals	JUOJS	Index %	OJS %

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[15] The Web of Science Citation Reports expanded its Core Collection in 2015 to include an Emerging Sources Citation Index, currently consisting of 7,800 titles, for which it will release its influential Impact Factors, beginning in 2023 (Cochran, 2022).

a) General research indexes

Web of Science Citation Reports[a]	24,510	279	1.1%	1.2%
EBSCOHost[a]	17,874	771	4.3%	3.4%
Scopus[a]	41,957	1,646	3.9%	7.2%
Dimensions[a]	72,990	12,435	17.0%	54.5%
OpenAlex[a]	124,073	16,366	13.2%	63.8%
Google Scholar[b]	–	22,679	–	88.3%

b) Regional research index

Latindex[c]	24,486	4,208	17.2%	66.6%[d]

c) Open access research indexes

Directory of OA Journals (DOAJ)[a]	17,213	5,312	30.9%	20.7%
Directory of OA Resources (ROAD)[d]	37,333	10,976	29.4%	42.8%

d) "Predatory" journal lists

Cabells Predatory Reports[a]	7,490	237	3.2%	1.0%
Beall's List[e]	38,295[f]	366	1.0%	1.4%

Note. Rmarkdown notebook analysis for this table.

[a]JUOJS matched by ISSN (*N*=22,809) with Web of Science (mapped Apr 2022) including its

"Emerging Sources" segment, as well as sciences, social sciences, arts and humanities; Scopus (Jan

2021); EBSCOHost (Jan 2022), Dimensions (Jan 2022); OpenAlex (May 2022); Latindex (Jun 2022);

DOAJ (Jun 2021); and Cabells Predatory Reports (Nov 2021).

[b]Google Scholar, mapped Jun 2022 using domain name rather than journal URL, does not make its

total journal count available or calculable.

[c]Latindex analysis includes only JUOJS published in this index's participating countries (*N*=6,319).

[d]Analysis performed by Bianca Kramer (2022).

[e]Total projected from Chen's (2019) 10% sampling of list's 1,189 publishers, averaging 42.7

journals/publisher, with 28.5% of publishers no longer online in Jan 2019 with this proportion applied

to the list's 1,395 standalone journals.

Google Scholar data affords further insight into the JUOJS by offering article-level

citation data (although by OJS installation domain rather than by journal). The 22,679

JUOJS in Google Scholar (June 2022) were hosted on 8,548 OJS domains, with 2.7

journals on average. Each identified domain was accompanied by the first page of

search results, with citation counts for roughly the top ten articles by citation (Figure 10).

This revealed that 34 (0.4%) of the 8,548 journal domains had over 10,000 citations

among their first ten articles. 565 journal domains (6.6%) had over 1,000 citations, and

1,015 journal domains (11.9%) had over 500 citations. But then 547 domains (6.4%) had

no citations on the first page.[16] The overall mean for the JUOJS' first page of Google

Scholar search results is 358.8 citations (median: 50.0).

Figure 11

Citations for First Ten Articles by Domain Using OJS in Google Scholar (N = 8,548

Domains).

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[16] Google Scholar citation analysis was 18 months after JUOJS data was collected, suggesting that zero
citation counts were not the result of journals being too recent to have accumulated any citations.
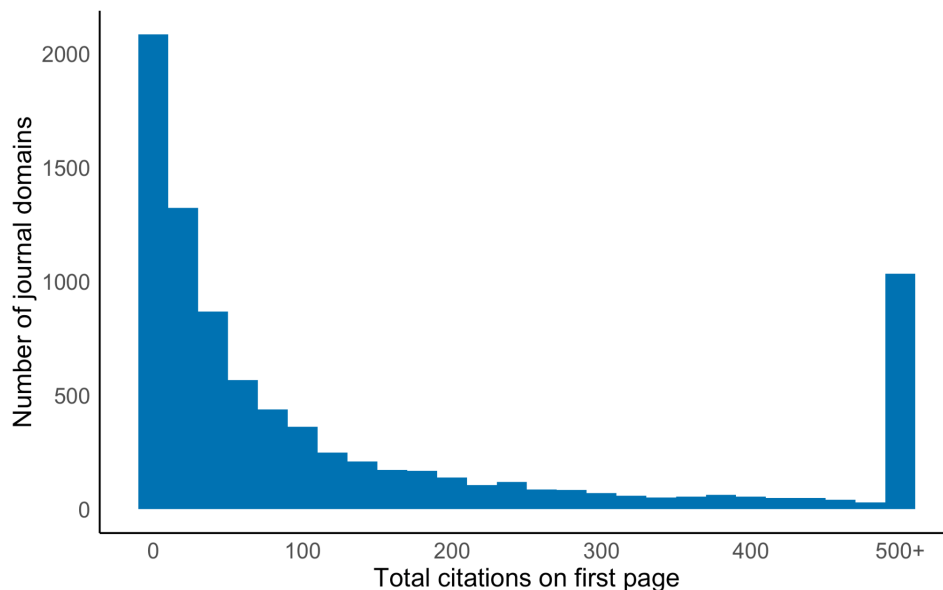
Note. Rmarkdown notebook analysis and R visualization for this figure.

As a further but still preliminary analysis of citation practices surrounding JUOJS, the most-cited articles in English, Indonesian, and Portuguese were examined for their citation by JUOJS or by other publications. For the leading English-language article, which has 16,432 citations and is published in the *Journal of Statistical Software*, 95% of the articles citing it come from outside of JUOJS (Table 4). Judging by this one very successful article, the journal is contributing to the broader research literature. This is less the case with the top-cited article in Indonesian, published in *Jurnal Ekonomi dan pendidikan*, and the top-cited article in Portuguese, published in *Outra travessia*. These two articles are cited less frequently than the English leader, with 1,321 citations and 1,408 respectively, with those citations coming to a far greater extent from JUOJS. The leading Indonesian article had 73.2% of its citing articles in JUOJS, while for the leading Portuguese article the proportion was 77.7%. This likely reflects the prevalent role played by JUOJS in these two languages, although still roughly one-fifth of the citing

articles come from sources other than JUOJS. Much more systematic work is needed on

this question of citational dynamics in recalibrating scholarly communication, and this

will be the subject of future studies.

Table 4

Source of Articles Citing the Top-cited Article in English, Indonesian, and Portuguese

JUOJS in Google Scholar

Top-cited article in top-cited domain	Lang	Citations	Source of citing articles[a]	
			JUOJS	Others
Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*, 1-36.	EN	16,432	5 (5.0%)	95 (95.0%)
Nurseto, T. (2011). Membuat media pembelajaran yang menarik. *Jurnal Ekonomi dan pendidikan*, *8*(1).	ID	1,321	71 (73.2%)	26 (26.8%)
Agamben, G. (2005). O que é um dispositivo? *Outra travessia*, (5), 9-16.	PT	1,408	73 (77.7%)	21 (22.3%)

Notes. Rmarkdown notebook analysis for this table.

[a] Drawn from the first ten pages of Google Scholar's list of articles citing the three highly cited articles.

5.2.1 Regional Index

As noted above, Latindex is a regional index, which draws on bibliographic data from 17

national resource centers across Latin America, the Caribbean, and the Iberian

Peninsula. Of the 24,486 journals indexed in Latindex, 4,208 (17.2%) are JUOJS. On

the other hand, fully two-thirds of the JUOJS that are published within this

Iberoamerican region are indexed in Latindex.

5.2.2 OA Indexes

The Directory of Open Access Journals (DOAJ) is an independent organization supported by libraries, publishers, and others, which accepts journals based on a thorough review of their adherence to scholarly standards. The Directory of Open Access Scholarly Resources is operated by the International Center for the registration of serial publications that manages ISSN (International Standard Serial Number) registration and accepts data from related sources, such as DOAJ, Latindex, and Scopus, which accounts for the greater number of journals it indexes and the corresponding increase in JUOJS that it indexes.

5.2.3 "Predatory" Journal Indexes

The University of Colorado Denver librarian Jeffrey Beall's designation of "potential, possible, or probable predatory scholarly OA publisher[s]," for which he began to keep a list in 2008, has played an outsize role in the discounting of Global South journals. While we have addressed this issue in some detail elsewhere (Khanna & Willinsky, in press), suffice it to state here that that there are two prominent lists of so-called "predatory" journals: Beall managed his publicly available list until 2017, at which time Cabells began to offer its subscription service Predatory Reports.[17] Beall's 2017 list contains 366 JUOJS (1.4% of the JUOJS), while Cabells' Predatory Report has 237 (1.0), with the two lists sharing 82 JUOJS in common.

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[17] In 2021, Stanford University Library paid $3,500 for a year of Cabells Predatory Reports at our request.

The relevance of this analysis for this study has to do with recent and repeated assertions that "predatory journals are a global threat" (Oviedo-García, 2021; Bagat, 2021; Shrestha, Timsina, & Subedi, 2021; Grudniewicz et al., 2019; Strong 2019), with other articles conflating predatory with OA publishing (Krawczyk & Kulczycki, 2021). We are no less opposed, to be clear, to deceptive and dishonest journals, wherever they are published.[18] Yet the way this is being framed as a *global* research threat plays into the peripheralizing world system, bemoaned by Cetto (1997) in the last century, while doing little to address the problem. What might be more effective, and less damaging to global science, is to set a publishing standard for the transparency of journal integrity, for which we've begun running initial tests (Willinsky, 2022).

6.0 Conclusion

This paper does not answer the question of how many journals there are in the world. It establishes, however, that the several estimates of 30,000, noted above, fall woefully short. Scholarly publishing is taking place on far more of a global scale than is commonly recognized in such estimates, as well as in studies that rely on the Web of Science Citation Index and Scopus. Dismissing this global scale out of hand, as too much research or predatory publishing, seems a less than scientific approach. Rather, there are grounds for beginning to recalibrate scholarly communication on a decidedly expanded, but no less rigorous, scale. This can only help the world take advantage of a

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[18] John Bohannon's notable experiment in determining deceptive journals, involving the submission of a hoax study, found 18% of the titles selected from Beall's list redeemed themselves by rejecting the submission, among those who accepted it were journals published by Elsevier, Wolters Kluwer, and SAGE (Bohannon, 2013).

yet to be fully grasped growth of the research enterprise. This growth is about more than journal counts. It concerns significant bibliodiversity in scholarly communication reflected, in this case, by the 60 languages in which research is published from 136 countries. It involves changes in scholarly communication economics. There are open source alternatives to corporate domination of publishing services relied upon by profit and non-profit publishers.[19] The open source platform investigated in this study can be said, for example, to be driving an OA diamond model of equitable access for authors, users, and readers across the full range of academic disciplines.[20]

Still, this study represents preliminary rescaling work in scholarly communication. It leaves many questions unanswered on how JUOJS operate within the larger world of research. How are the researchers they publish engaging and contributing to the work of others? The citation patterns need to be mapped to learn about how this work interacts within and beyond this set of journals. Is this work contributing, for example, to the improved efficiency that has been observed in research's circulation and use.[21] Case

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[19] That the scale of this alternative has yet to register with scholarly communication is reflected in the otherwise acute observer Roger Schonfeld noting in his remarks on "keeping [scholarly publishing] infrastructure independent" that "open source alternatives, including Janeway and OJS… do not yet seem to have substantially impacted the market share of the commercial infrastructure providers" (Schonfeld, 2022).

[20] The OA diamond model challenges "the more salient mechanisms through which the inequalities of knowledge production between the North and South are maintained," namely, the corporate sector's "market concentration, commodification, and monopolization" of journal publishing (Collyer, 2018, p. 60).

[21] "Citations are not becoming more concentrated but increasingly dispersed, and one can therefore argue that the scientific system is increasingly efficient at using published knowledge. Moreover, what our data

studies are called on JUOJS' influence on policy-making and professional practice. Such investigations will serve the 2030 goal set by Research4Life, in an encouraging accord among its 160 "publisher partners," which is to raise the "profile… and support for the Global South research publishing industry" (*Our vision*, 2022, p. 26).

Yet there is something more at issue with the global scale of this publishing activity that aligns with the point made Achille Mbembe at the University of the Witwatersrand, in paying tribute to Ngũgĩ wa Thiong'o's re-centering project of the last century, that "the decolonizing project is back on the agenda worldwide" (2019, p. 18, original emphasis). Mbembe envisions this agenda transforming universities into *"platforms for the redistribution of different kinds of knowledges"* (p. 7, original emphasis). This, too, is a part of what we have found here, linguistically and geopolitically. It suggests that another world of scholarly communication – more broadly global, diverse, and inclusive – is not just possible or on the agenda.[22] It is already underway for the benefit of all.

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shows is not a tendency towards an increasingly exclusive and elitist scientific system, but rather one that is increasingly democratic" (Larivière, Gingras, & Archambault, 2009, p. 861).

[22] This is inspired by Handel Kashope Wright and Yao Xiao' observation that "in terms of ontology and epistemology and indeed the world order, decolonization helps us see that another world is possible" (2021).

Competing interests

As acknowledged, the authors are associated with the Public Knowledge Project, developer of Open Journal Systems (JB and SK serve as research associates, while JPA and JW are Co-Scientific Directors).

Data and Code Availability

The study's dataset is available (Khanna et al., 2021), while Jupyter Notebooks (Ball, 2022; Khanna, 2022) containing the analysis code have been linked to the corresponding figures presenting the data.

Author Contributions

- Saurabh Khanna: Conceptualization, Data curation, Methodology, Formal analysis, Investigation, Visualization, Software, Resources, Writing – original draft, Writing – review & editing

- Jon Ball: Conceptualization, Data curation, Methodology, Formal analysis, Investigation, Visualization, Software, Resources, Writing – original draft, Writing – review & editing

- Juan Pablo Alperin: Conceptualization, Methodology, Investigation, Writing – review & editing, Resources

- John Willinsky, Conceptualization, Supervision, Methodology, Funding acquisition, Writing – original draft, Writing – review & editing

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