

## Improvement of editorial quality of journals indexed in DOAJ: a data analysis

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### ABSTRACT

In 2013, Directory of Open Access Journals (DOAJ) expanded and updated its inclusion criteria and its journal evaluation process, ultimately removing a large number of journals that failed to submit an updated application. The present study examined the results of the new process and its capability to improve the quality of the directory and the reliability of the information contained in it. A dataset of 12.595 journals included in DOAJ, since its launch in 2003 until May 15 2016, was examined and compared to other data. The number of journals deleted from DOAJ during this period is 3776; the majority of them (2851 journals) were excluded because publishers failed to complete the reapplication on time; 490 had ceased publication or were otherwise inactive; 375 were excluded for ethical issues; 53 because they were no longer open access or the content was embargoed, the final 7 were removed for other reasons. The top five countries in terms of the percentage of journals removed are: Japan (74% of journals removed); Pakistan (60%); Canada (51%); United States (50%); and Mexico (49%). Our study has shown that 158 of the removed journals are included in Beall's lists; 1130 journals indexed in DOAJ are included in Scopus and/or JCR. Our analysis demonstrates that, thanks to the new acceptance criteria, to the improved screening process performed by national groups under the direction of the new management, there is a noticeable quality improvement of the journals indexed in DOAJ.

### KEYWORDS

DOAJ; E-publishing; Open access; Publishing Standards; Predatory publishers.

### CITATION

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## Introduction

The Directory of Open Access Journals (DOAJ)<sup>1</sup> was one of the projects funded, in 2002, by the Open Society Institute, with the purpose of creating a global index of open access journals (Olijhoek, Mitchell, and Bjornshauge 2016; Van Noorden 2014). It was initially hosted by Lund University, Sweden, but today, an independent Community Interest Company, Infrastructure Services for Open Access (IS4OA),<sup>2</sup> manages the Directory with a more formal structure.

DOAJ's mission has always been to increase the visibility and use of peer-reviewed, open access journals which it did initially by giving them their own presence on the web via the directory listing. In 2014, to match the maturity and development of the open access movement which had become more mainstream and an established mode of publishing academic research, DOAJ's mission broadened to start collecting more detailed information from editors and publishers that would act as "signposts" for the academic community as to the worthiness and merit of a journal. DOAJ started displaying more detailed information about publishers and journals, including APCs, type of peer review, copyright terms, type of licensing applied etc.

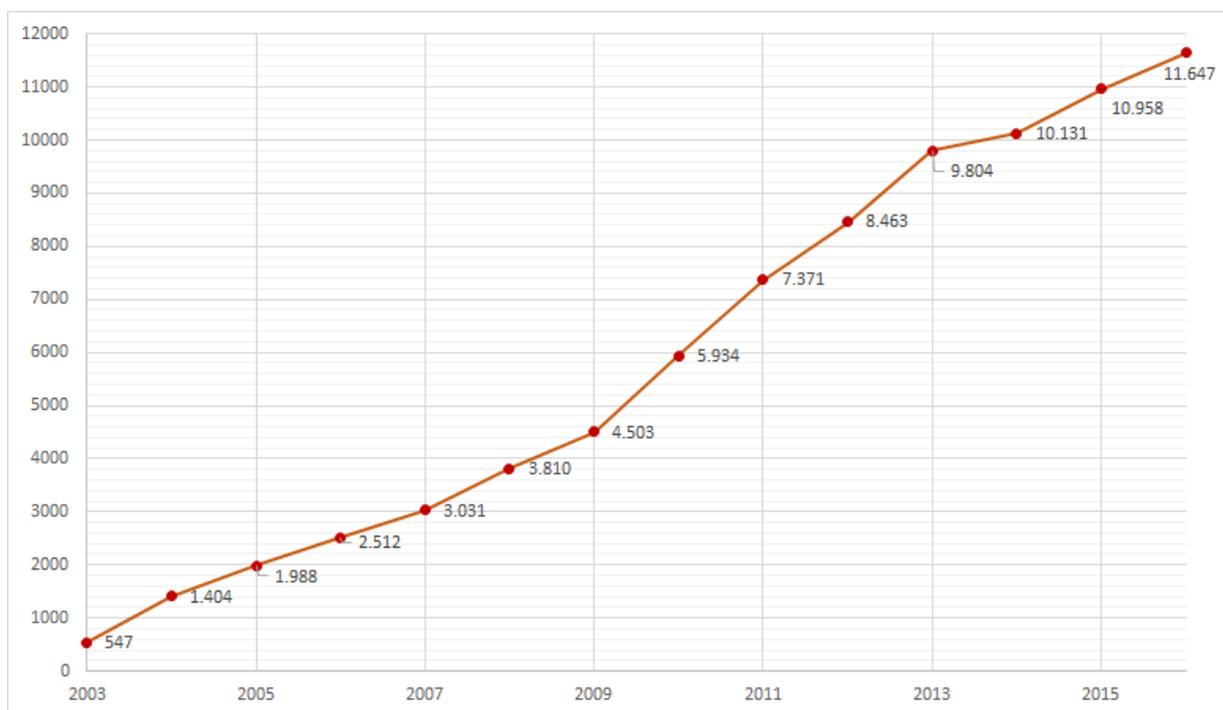


Figure 1: DOAJ growth rate (2003-8 May 2016)

<sup>1</sup> <https://doaj.org>.

<sup>2</sup> <https://is4oa.org>.

From launch to 2016, the number of the journals indexed in DOAJ increased very quickly: at launch in 2003 there were just 300 journals and on May 8<sup>th</sup>, 2016 the total number of journals was 11.647. The Directory's growth rate is presented in Figure 1.<sup>3</sup>

In 2012, ten years after the BOAI Declaration and the birth of the open access movement,<sup>4</sup> a new phenomenon appeared within open access that risked devaluing everything that the open access movement was working towards. The phenomenon of "predatory publishers, which publish counterfeit journals to exploit the open-access model in which the author pays." appeared on the academic publishing stage. "These predatory publishers are dishonest and lack transparency" (Beall 2012). On December 18<sup>th</sup> 2012, DOAJ's management company, IS4OA, announced that one of the first matters it would attend to was to devise and implement stronger selection criteria for journals to be included – and stay included – in the directory.<sup>5</sup>

In 2013, the publication of an article by John Bohannon (2013) raised criticisms of open access publishing worldwide, including DOAJ's quality control checks: he sent an obviously flawed paper to a list of journals, some of which were indexed in DOAJ, and some of them accepted it for publication.

After an extensive consultation period, the new DOAJ criteria went live on 19 March 2014 (Olijhoek, Mitchell, and Bjornshauge 2016; Van Noorden 2014).<sup>6</sup> Since then, journals asking to be listed in DOAJ have to fill in an application form containing more than 50 questions, covering general information about the journal, its digital archiving policy, its editorial board, the quality and transparency of the editorial process, how open the journal's policies are, which standards the journal adheres to, and its licensing and copyright terms.

Where the information provided in a new application or reapplication is found to be untrue, either when reviewing the reapplication or even as part of the regular follow-up process, the journal is immediately removed and may be restricted from applying for up to 1 year. In cases where a single publisher has submitted more than 5 applications with information that DOAJ does not deem to be transparent or correct, DOAJ reserves the right to remove all of the publisher's journals and to not accept any more applications from that publisher for a maximum period of 3 years. The length of the ban depends on the number of journals for which incorrect information was provided and the eventual number of repeated incidents.<sup>7</sup>

The new criteria required that existing journals reapplied to remain indexed in DOAJ and, in May 2014, DOAJ announced their reapplication project. 99% of the journals in the Directory were invited to reapply to ensure that they met the new and aforementioned stricter criteria.<sup>8</sup> The process, started

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<sup>3</sup> The authors retraced the growth rate from the DOAJ home page copy stored in the "Internet Archives WayBack Machine", <https://archive.org/web>. Figures are drawn from the snapshots and files taken on 31st December of every year or, if not available, the last available snapshot of the month of December.

<sup>4</sup> The Budapest Open Access Initiative Declaration was published on February 14<sup>th</sup>, 2002; <http://www.budapestopenaccessinitiative.org/read>.

<sup>5</sup> <https://is4oa.org/2012/12/18/future-plans-for-the-development-of-the-doaj>

<sup>6</sup> <https://doajournals.wordpress.com/2014/08/08/proactive-not-reactive>.

<sup>7</sup> <https://doaj.org/publishers#disclaimer>.

<sup>8</sup> <https://doajournals.wordpress.com/2014/05/29/a-note-about-reapplications>.

in January 2015 and shut down at the end of March 2016, produced 6.359 reapplications. The project was a powerful statement by DOAJ, showing its commitment to best practice and transparency in open access publishing, forcing publishers to be upfront with this information and effectively overhauling the entire DOAJ database. Publishers were asked to show great diligence when submitting their reapplications and every answer is checked by at least 3 different people.

To cope with the extra workload that the reapplication project would generate, along with increased new submissions, DOAJ set up a new multi-layered system of review and approval for applications and reapplications: one stage of the review process is carried out by a group of voluntary associate editors – mainly librarians and PhD students from all over the world – that check the information submitted in the reapplications and a second layer of checks is performed by managing editors. If a journal fails the [re]application process (see below), it is removed from the Directory. The associate editor groups, whose voluntary members all responded to a call for experts, are organized into national groups based around country and language.<sup>9</sup>

A managing editor assigns a journal to a national group after a formal control is made of the journal's title, country of publisher, ISSN(s) and URL.<sup>10</sup> A national editor assigns the journal to an associate editor who checks the answers in the [re]application for quality and accuracy, eventually making corrections or contacting the editor of the journal to dig deeper around missing items, or incorrect answers. Although many applications are eventually rejected, one of the main objectives of the application review process, and in line with DOAJ's broadened mission, is to help journal editors and publishers understand and comply with international standards of quality and best practice, rather than punish or to discourage them. DOAJ wants to be, as far as possible, a "helping hand" to journal editors and publishers and have educational discourse that will, in the end, produce better quality applications to DOAJ and increase Best Practice and transparency in open access publishing. So it could be that, if the journal is willing to perform the changes requested, some weeks of iteration are necessary. When the review is completed, the associate editor makes a final recommendation to accept or reject the application.

The recommendations are verified by the national editors and then passed back to the managing editor who makes the final decision which is communicated to the publisher.

The efforts of IS4OA in rejuvenating the Directory were recognized by the EC which now considers that the Directory is the authoritative source for the post-grant FP7 project: this means that only articles published in journals indexed in DOAJ can be funded. Moreover, the EC devoted part of their budget to the economic support of Open Access journals and platforms which do not charge any Article Processing Charges (APC) to their authors.<sup>11</sup>

In consideration of the increasing importance of DOAJ, the Authors will verify if the modifications to the journals selection criteria and the resulting workflow are working well and are actually

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<sup>9</sup> <https://drive.google.com/file/d/0B0fPCpIPjZlmR1U4dkJ6LWV2Mjg/view>.

<sup>10</sup> The information is verified at [issn.org](http://issn.org).

<sup>11</sup> OpenAIRE call for proposals to fund APC-free Open Access journals and platforms, see <https://www.openaire.eu/edocman?id=831&task=document.viewdoc>.

improving the quality of DOAJ's contents, as well as its usability as a whitelist directory for peer-reviewed, open access journals.

## Methods

The aggregated dataset used for the analysis has been collected from different sources, and contains:

1. the list of journals included in DOAJ as of May 16<sup>th</sup>, 2016 (therefore this does not include the journals that did not submit a reapplication because, on May 9<sup>th</sup> 2016, DOAJ removed over 2800 journals that did not reapply on time<sup>12</sup>);
2. the list of journals that failed to reapply, as provided by DOAJ;<sup>13</sup>
3. the list of journals deleted from DOAJ since January 1<sup>st</sup>, 2014 until May 16<sup>th</sup>, 2016, with the exception of those that failed to reapply;<sup>14</sup>
4. the list of journals, as provided by DOAJ as a CSV export, and found in the Wayback Machine at the following times: December 25<sup>th</sup>, 2013; March 30<sup>th</sup>, 2014; July 2<sup>nd</sup>, 2014; March 26<sup>th</sup>, 2015; April 4<sup>th</sup>, 2015; September 6<sup>th</sup>, 2015; May 3<sup>rd</sup>, 2016; May 9<sup>th</sup> 2016. Used in order to enrich the data of the removed journals.<sup>15</sup>

Each list contains sets of journals that do not perfectly match each other therefore, using Pentaho Data Integration (aka Kettle)<sup>16</sup> and OpenRefine,<sup>17</sup> we cleaned and merged of all the data into a unique dataset. Then we de-duplicated the journal list, using the ISSN identifiers (ISSN and e-ISSN) as the match point to cross-reference each journal. When this was impossible, due to the absence of an identifier, we de-duplicated the journals based on their titles, after having normalised journal titles (trimming double spaces and cancelling case differences). Then we used the OpenRefine clustering functions, along with an accurate manual check of the data suggested by the software for matching.

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<sup>12</sup> <https://doajournals.wordpress.com/2016/05/09/doaj-to-remove-approximately-3300-journals>.

<sup>13</sup>

[https://docs.google.com/spreadsheets/d/183mRBRqs2iOyP0qZWXN8dUd02D4vL0Mov\\_kgYF8HORM/edit#gid=1678073646](https://docs.google.com/spreadsheets/d/183mRBRqs2iOyP0qZWXN8dUd02D4vL0Mov_kgYF8HORM/edit#gid=1678073646).

<sup>14</sup>

[https://docs.google.com/spreadsheets/d/183mRBRqs2iOyP0qZWXN8dUd02D4vL0Mov\\_kgYF8HORM/edit#gid=1650882189](https://docs.google.com/spreadsheets/d/183mRBRqs2iOyP0qZWXN8dUd02D4vL0Mov_kgYF8HORM/edit#gid=1650882189)

<sup>15</sup> [http://web.archive.org/web/\\*/https://doaj.org/csv](http://web.archive.org/web/*/https://doaj.org/csv)

<sup>16</sup> <http://community.pentaho.com/projects/data-integration>.

<sup>17</sup> OpenRefine (formerly Google Refine) is a powerful tool for working with messy data: cleaning it; transforming it from one format into another and extending it with web services and external data. More info at <http://openrefine.org>.

The final dataset lists 12.595 rows/journals,<sup>18</sup> corresponding to the unique titles of all the journals included in DOAJ since the launch of the Directory in 2003 until May 15<sup>th</sup>, 2016, accompanied by a note indicating whether they are still indexed or excluded and the reason for their exclusion.<sup>19</sup>

The dataset was first compared with the journals included in the *Potential, possible, or probable predatory scholarly open-access journals*<sup>20</sup> list by Jeffrey Beall, by matching journal titles and URLs; a further comparison was made between the publisher names of DOAJ-indexed journals and the names listed in the *Potential, possible, or probable predatory scholarly open-access publishers*<sup>21</sup> list, again by Beall; finally, we checked against the new *Hijacked Journals list*,<sup>22</sup> edited by Beall.

The data was then enriched to indicate if the journal was listed in Scopus<sup>23</sup> and/or JCR<sup>24</sup> and with information from Sherpa/RoMEO retrieved using the Sherpa/RoMEO API.<sup>25</sup>

## Data Analysis & Results

### Overview on DOAJ journals data

In 2014, with the new criteria live, DOAJ decided to start publishing the details of the journals it removed as part of its regular review process. DOAJ had been removing journals since its launch, journals that no longer met its criteria for a number of reasons and it had long been publishing a list of journals added into the Directory. Publishing a list of those removed helped the libraries and aggregators keep their own databases up-to-date. A further list of journals was published in 2016 of those journals that failed to submit a valid reapplication. The number of journals removed from DOAJ during the period March 2014-May 2016 equals 3.776, bringing the Directory's total of indexed journals to 8.819, as of May 16<sup>th</sup>, 2016.<sup>26</sup>

Table 1 shows the number of journals added and removed per year; the graph in Figure 2 shows the Directory size increase.<sup>27</sup>

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<sup>18</sup> Crawford (2016b; 2016a, 4, 179) counted 10.944 total journal; 7.996 of those was counted as included in DOAJ and 2.948 as removed, on May 16<sup>th</sup>, 2016. The differences between the two datasets are caused by the different dates of data collection (Crawford on December 31<sup>st</sup>, 2015, this study May 15<sup>th</sup>, 2016) and by some discrepancies and errors in the original data by DOAJ, csv exports and the added/removed list.

<sup>19</sup> All the data collected or created for this study were uploaded to Zenodo data repository, with DOI: [10.5281/zenodo.60516](https://doi.org/10.5281/zenodo.60516).

<sup>20</sup> <https://scholarlyoa.com/individual-journals>.

<sup>21</sup> <https://scholarlyoa.com/publishers>.

<sup>22</sup> <https://scholarlyoa.com/other-pages/hijacked-journals>.

<sup>23</sup> *Scopus Title list*, <https://www.elsevier.com/solutions/scopus/content>, data updated on May 20<sup>th</sup>, 2016.

<sup>24</sup> *JCR Global list*, updated on 2015, data referring to May 2014. Please note that some errors and confusion are possible because the different dataset refer to slightly different time periods.

<sup>25</sup> *Sherpa/RoMEO API*, <http://www.sherpa.ac.uk/romeo/apimanual.php?la=en>

<sup>26</sup> The Directory, even with the new policies and the screening continuation, is still growing, indexing 9.185 journals on August 18<sup>th</sup>, 2016.

<sup>27</sup> There is an evident discrepancy between the data obtained by using the “added on date” metadata as available in the DOAJ CSV export and the number that appears on the DOAJ homepage at the end of each year (as reported in Figure 1).

Year	# of added journals	# of removed journals
2002	32	–
2003	454	–
2004	448	–
2005	500	–
2006	413	–
2007	443	–
2008	691	–
2009	655	–
2010	1.276	–
2011	1.402	–
2012	1.184	–
2013	2.188	–
2014	507	144
2015	1.492	675
2016	813	2.957
(blank) <sup>28</sup>	97	–
<b>Total</b>	<b>12.595</b>	<b>3.776</b>

Table 1: Journals added to and removed from DOAJ per year

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These differences are caused by the loss of the original creation date in the merging process for each reapplication and/or data upgrade after the initial registration.

<sup>28</sup> This is the case of some journals removed from DOAJ that we found in old CSV export files and that did not show the date added.

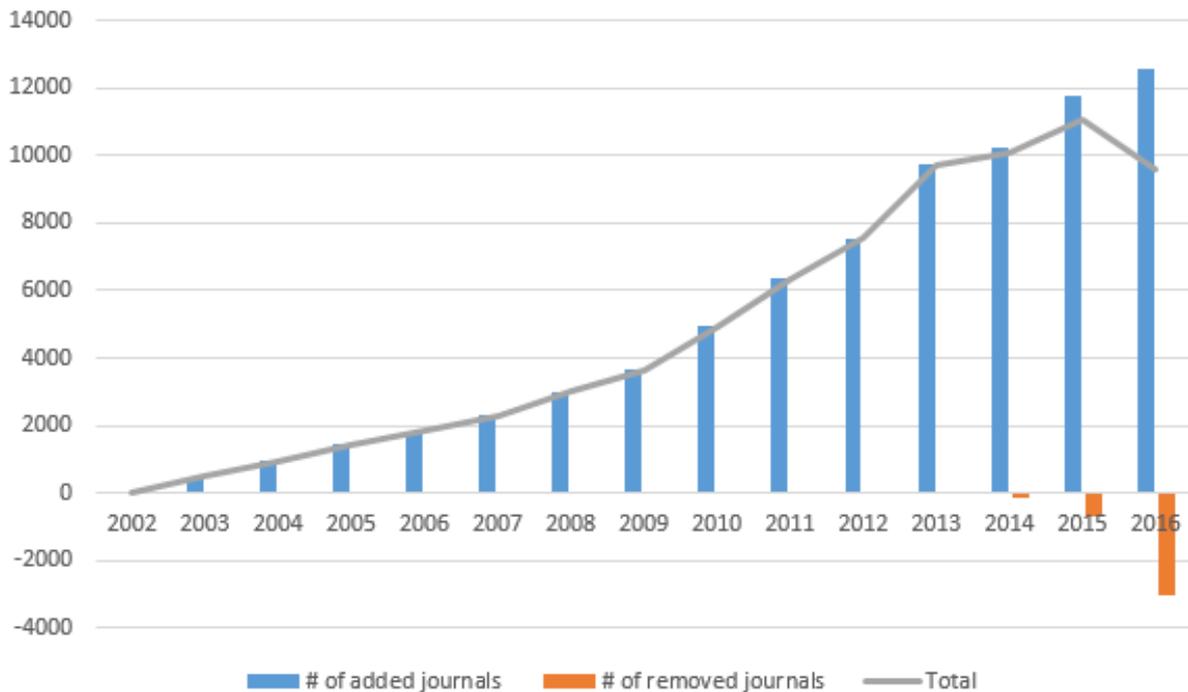


Figure 2: Journals added to and removed from DOAJ, with Directory size increase

The most common reason for exclusion from the Directory (2.851 journals) is because publishers failed to complete the reapplication on time according to Lars Bjørnshauge, who was “absolutely sure that the majority of the journals that did not reapply are not publications with poor ethics; rather, they are small outfits that are unfamiliar with providing the information required for reapplication” (Baker 2016). 243 journals were excluded because they did not publish in the previous year or they had published too few articles,<sup>29</sup> 125 were removed because they had ceased publication, or the journal website was continuously unavailable (122).

Exclusion for ethical issues relates to 375 journals: 112 were not adhering to editorial best practices, 263 were suspected for editorial misconduct. 53 journals were removed because they were not open access or were even embargoed; the remaining seven journals were removed for other reasons.

The metadata available for each removed journal is often incomplete so it is impossible to analyse extensively their composition.

The 3.692 journals excluded from DOAJ<sup>30</sup> were published in 98 different countries<sup>31</sup> from all continents (the top six countries for the number of excluded journals are: United States, 675; Brazil, 306; India, 268; Spain, 143; Canada, 142; United Kingdom, 139). These data are quite similar to some findings by Shen and Björk (Shen and Björk 2015) who observed

<sup>29</sup> DOAJ requires at least five published articles in the previous year.

<sup>30</sup> 84 from the 3.776 journals removed from DOAJ lack of country information.

<sup>31</sup> In the application form, DOAJ asks for the country of the publisher, where the publishing operations are carried out, and not the country where the publication is based, which can be completely different.

that questionable publishers are often based in India (27% of their sample), North America (17,5%) and Asia (11,6%).<sup>32</sup>

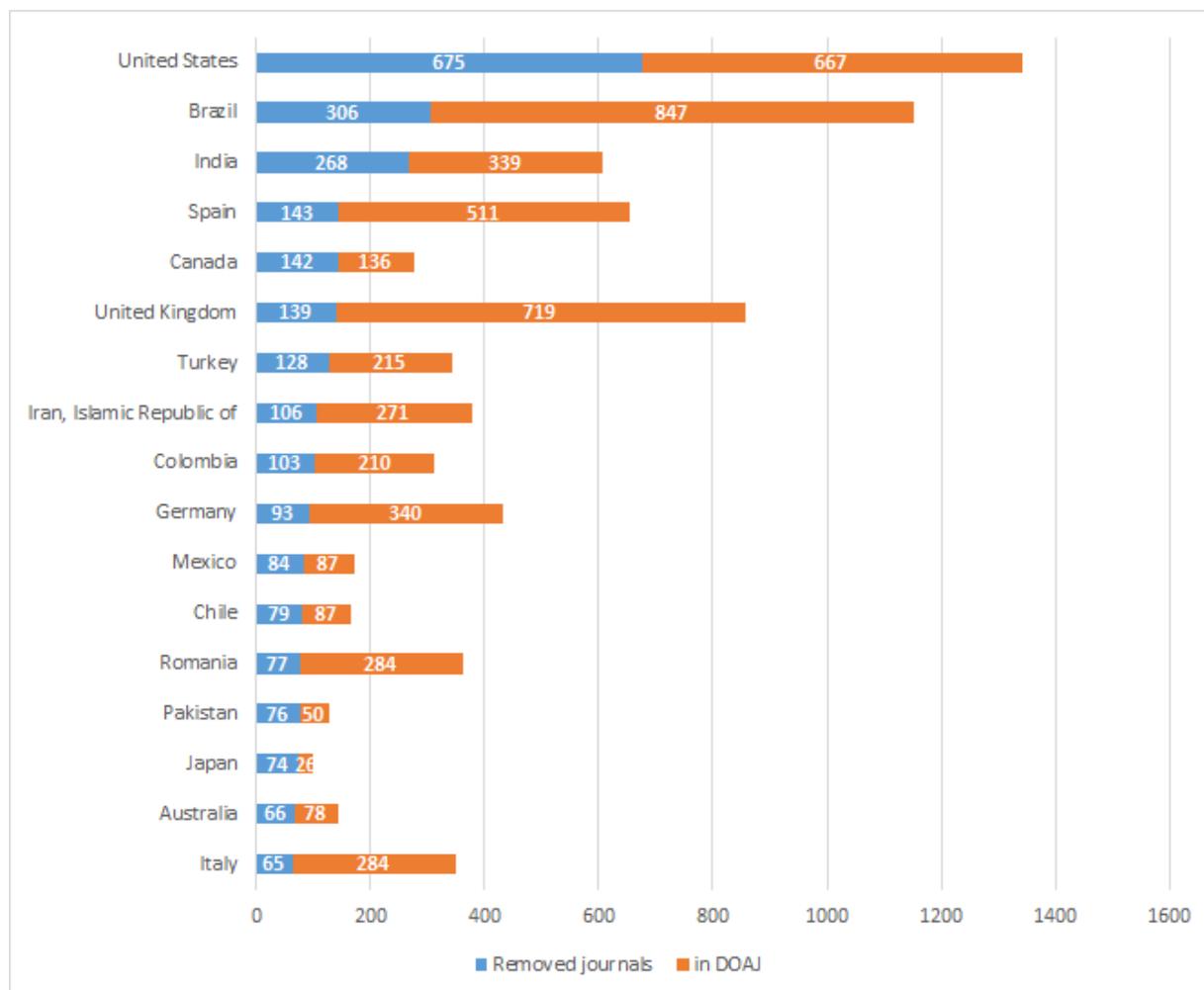


Figure 3: Countries with more than 50 removed journals

Ordering the countries by percentage of removed journals, a completely different distribution is shown. In this case top ten publishers are Japan (74% of journals removed),<sup>33</sup> Pakistan (60%), Canada (51%), United States (50%), Mexico (49%), Chile (48%), Australia (46%), India (44%), Turkey (37%) and Colombia (33%). See Figure 4 for more details.

<sup>32</sup> In an interview on the blog “Retraction Watch”, Shen said: “Our results show that compared with other geographic regions, Asia countries have a relative higher percentage of ‘predatory’ publishers. This doesn’t imply that all of journals from that region and papers published in them are absolutely ‘predatory’. To judge a journal, from our perspective, the emphasis should be put more on the quality of papers of that journal rather than where it is operating”, <http://retractionwatch.com/2015/09/30/most-predatory-publishing-occurs-in-asia-africa-report>.

<sup>33</sup> Since DOAJ verified that most of those are on J-STAGE, Japan's largest platform for academic e-journals, DOAJ management started a targeted campaign to get as many of those journals to submit new applications as possible. <https://doajournals.wordpress.com/2016/08/25/walt-crawford-updates-his-analysis-of-doaj-data>.

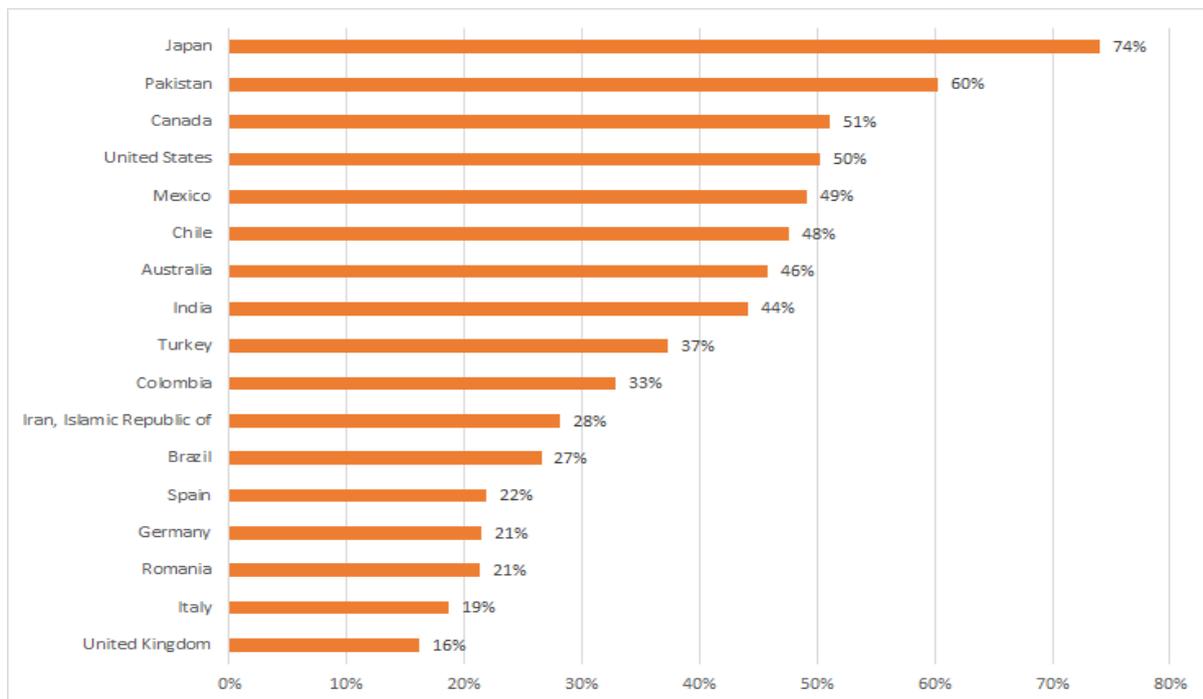


Figure 4: Countries with more than 50 removed journals (ordered by percentage)

It is interesting also to look at the geographical distribution of the 2.812 journals included in DOAJ since March 2014. The top countries are different to the top countries of the removed journals list, as represented in Figure 5.

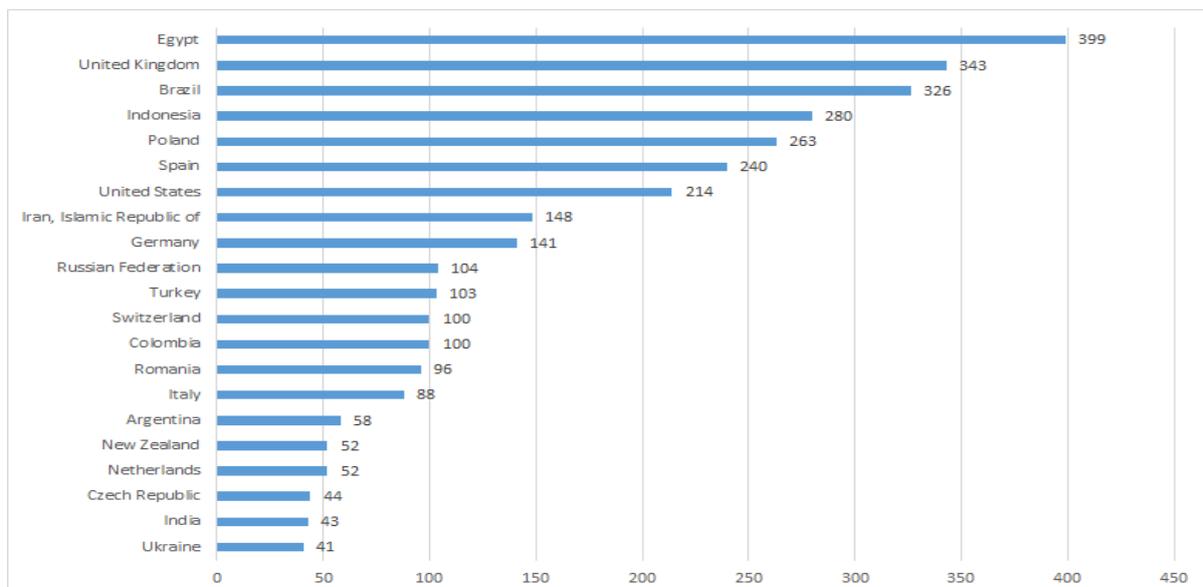


Figure 5: Distribution of countries of publishers for journals included in DOAJ after March 2014 (more than 40 journals per country)

Country	Total of journals	Removed journals	in DOAJ	% of removed
Japan	100	74	26	74%
Bolivarian Republic of Venezuela	69	46	23	67%
Pakistan	126	76	50	60%
Canada	278	142	136	51%
United States	1342	675	667	50%
Mexico	171	84	87	49%
Chile	166	79	87	48%
Australia	144	66	78	46%
India	607	268	339	44%
Turkey	343	128	215	37%
Colombia	313	103	210	33%
Argentina	180	54	126	30%
Iran, Islamic Republic of	377	106	271	28%
Brazil	1153	306	847	27%
France	191	46	145	24%
Spain	654	143	511	22%
Russian Federation	190	41	149	22%
Germany	433	93	340	21%
Romania	361	77	284	21%
Italy	349	65	284	19%
United Kingdom	858	139	719	16%
Poland	420	48	372	11%

Table 2: Journals removed vs. still in DOAJ journals, by country of publication (countries with more than 40 journals removed)

The removed journals were published by 2.522 different publishers; they are mostly small-medium sized publishers (this means less than 1,5 journals per publisher) but there are some exceptions represented by publishers, both commercial and institutional, important and well known. Table 3 lists the publishers with at least ten journals removed from DOAJ.

<b>Publisher's name</b>	<b># of journals removed</b>
Scientific Research Publishing	125
Internet Scientific Publications, Llc	47
Canadian Center Of Science And Education	37
Bentham Open	30
Hans Publishers	26
Asian Network For Scientific Information	24
Iacsit Press	22
Niscair	16
Hikari Ltd	15
Baishideng Publishing Group Co. Limited	14
E-century Publishing Corporation	14
Ivy Publisher	14
Universidad De Antioquia	13
Aves Yayincilik	12
Biomed Central	12
Sciedu Press	12
Scientific And Technical Research Council Of Turkey	12
Academic And Business Research Institute	11
Editorial Ciencias Médicas	11
Moscow State Regional University	11
Pontificia Universidad Javeriana	11
Termedia Publishing House	11
Universidad De Los Andes	10
Universidad Nacional Autonoma De México	10

Table 3: publishers with at least 10 journals removed from DOAJ

In terms of subject area, the journals removed from DOAJ cover all areas with a fairly regular distribution, of a range between 20% and 30%. The subject area with the highest percentage of removal is Law; those with the lowest percentage of removal are History (and auxiliary sciences) and Military science.

The subject areas of the removed journals are listed in Table 4; data is taken from the element “Subject” in DOAJ, generalized at the first subdivision. The number of journals without a subject is very high, unfortunately almost all the removed ones.<sup>34</sup>

Subject	# total journals	# journals excluded	% of excluded journals
Medicine	2.671	614	23%
Science	1.905	491	26%
Social Sciences	1.193	321	27%
Technology	1.025	203	20%
Language	724	189	26%
Education	789	184	23%
General Works	531	149	28%
Philosophy	521	137	26%
Geography	542	133	25%
Agriculture	490	129	26%
Law	262	79	30%
History (and auxiliary sciences)	326	66	20%
Political sciences	233	49	21%
Fine Arts	205	48	23%
Bibliography	147	41	28%
Music	46	12	26%
Military Science	15	3	20%
uncategorized	970	928	96%
<b>Total</b>	<b>12.595</b>	<b>3.776</b>	

Table 4: Removed journals, by subject area

<sup>34</sup> At launch, DOAJ used a complicated subject categorisation system that relied on Library of Congress Classification codes (that are still in use now) and some custom DOAJ codes (now defunct). When DOAJ migrated to the new platform, they dropped the DOAJ codes which were not migrated over and some journals lost their categories. This, however, would not matter since every journal is being reclassified during the reapplication process anyway. Moreover, in the old system, providing a subject category for a journal was not compulsory like it is now so some journals had never been categorised.

## An analysis of the quality

Generally speaking, there is no unequivocal or accepted definition of what “publishing quality” is so the qualitative analysis of the journals included in and excluded from DOAJ was based on benchmarking with other sources.

In this context, the authors identified some elements that can be recommended as indicators of irregular editorial or publishing practices and therefore be used as a benchmark for the DOAJ-indexed journals: in particular the criteria that form the basis of the lists in which Jeffrey Beall includes publishers who show signs of editorial misconduct, and that he calls “predatory”;<sup>35</sup> these lists were considered “blacklists” in the benchmarking. Various authors have criticized Beall for not contextualizing predatory or low-quality publishing as a phenomenon that predates Open Access and which is not exclusive to Open Access journals. They have determined that this issue is a bias (Berger and Cirasella 2015; Bloudoff-Indelicato 2015; Coyle 2013; Crawford 2014; Emery 2013). Although we are aware of this premise, we decided to use Beall’s lists because, even if biased, they represent a significant reference point.

As positive reference points for the benchmarking, the authors selected the two most important international bibliographic databases—Scopus,<sup>36</sup> by Elsevier, and Journal Citation Reports, by Thomson Reuters.<sup>37</sup> — and membership of the organisation for open access publishers, OASPA. OASPA membership criteria are transparent and their membership list acts as a sort of whitelist.

## How Beall’s list and the DOAJ list match

Using the entire list of 12.595 journals as a starting point, we discovered that 367 journals were included in one of the Beall lists mentioned previously. 158 of these had already been removed from DOAJ (43%), while 209 journals are still included (57%). The percentage of questionable publishers out of 8.819 titles included in DOAJ on 16<sup>th</sup> May 2016 is smaller than 2,4%, less than the 7,8% estimated by Shen and Björk in their recent study (2015).

The most common reason for exclusion was that the journal failed to reapply (134 journals); 16, approximately 10%, were removed for reasons concerning ethical issues.

Considering exclusively the 3.922 journals accepted into DOAJ after March 2014, under the new inclusion criteria and policies, only 30 journals (out of 209 titles mentioned before) are listed as predatory by Beall, driving the percentage of questionable publishers on this set to 0,8%.

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<sup>35</sup> *Criteria for Determining Predatory Open-Access Publishers (3rd edition)*, <https://scholarlyoa.files.wordpress.com/2015/01/criteria-2015.pdf>. DOAJ prefers to use the term “questionable” instead of predatory, see <https://doaj.org/faq>.

<sup>36</sup> Even though Scopus indexes many more open access journals than JCR, it was observed that it covers less than half of the quantity of journals listed in the DOAJ (Archambault et al. 2014, iii)

<sup>37</sup> Thomson Reuters announced a definitive agreement to sell its Intellectual Property & Science Business divisions to Onex and Baring Asia on July 11th, 2016: see <http://thomsonreuters.com/en/press-releases/2016/july/thomson-reuters-announces-definitive-agreement-to-sell-its-intellectual-property-science-business.html>.

## Scopus, JCR and DOAJ

Out of 8.819 journals listed in DOAJ, 874 are in Journal Citation Reports (10%), too, and 2.056 in Scopus (23%).

It is interesting to note that among the 3.776 journals removed from DOAJ 116 of them are defined as “Inactive” by Scopus (mostly predecessors of the active titles, or ceased journals), 874 are still listed in Scopus and 344 are still included in JCR.<sup>38</sup>

Table 5 shows the journals that were removed from DOAJ, broken down by reason, but which are still registered (either as active or as inactive) in Scopus and in JCR.

Reason of exclusion	Scopus (active and inactive)	JCR
Ceased publishing	33	–
Failed to reapply	844	320
Has not published enough articles this calendar year	3	–
Inactive (has not published in the last calendar year)	25	–
Journal is no longer Open Access	31	19
Journal not adhering to Best practice	31	3
Suspected editorial misconduct by publisher	4	–
Web site URL no longer works	18	1
Other	1	1

Table 5: Reasons for exclusion from DOAJ for those journals included in Scopus and JCR

As shown before, out of 3.776 journals removed from DOAJ there are 158 that Beall considered “predatory”; of these, 20 are still listed as active in Scopus and two are inactive; six are listed in JCR.

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<sup>38</sup> The presence of predatory journals in preeminent bibliographic databases is central to a study by Djuric, who wrote “The relevance of this case for the topic at hand is in showing the vulnerability of such metrics, among them Thomson-Reuters JCR. However, although vulnerable, impact factor is still one of the best objective metrics available for judging the journal quality. The point is that it has to be narrowed, by removing publications that use dishonest techniques to manipulate the impact factor, and that it should be used while paying attention to details” (Djuric 2014).

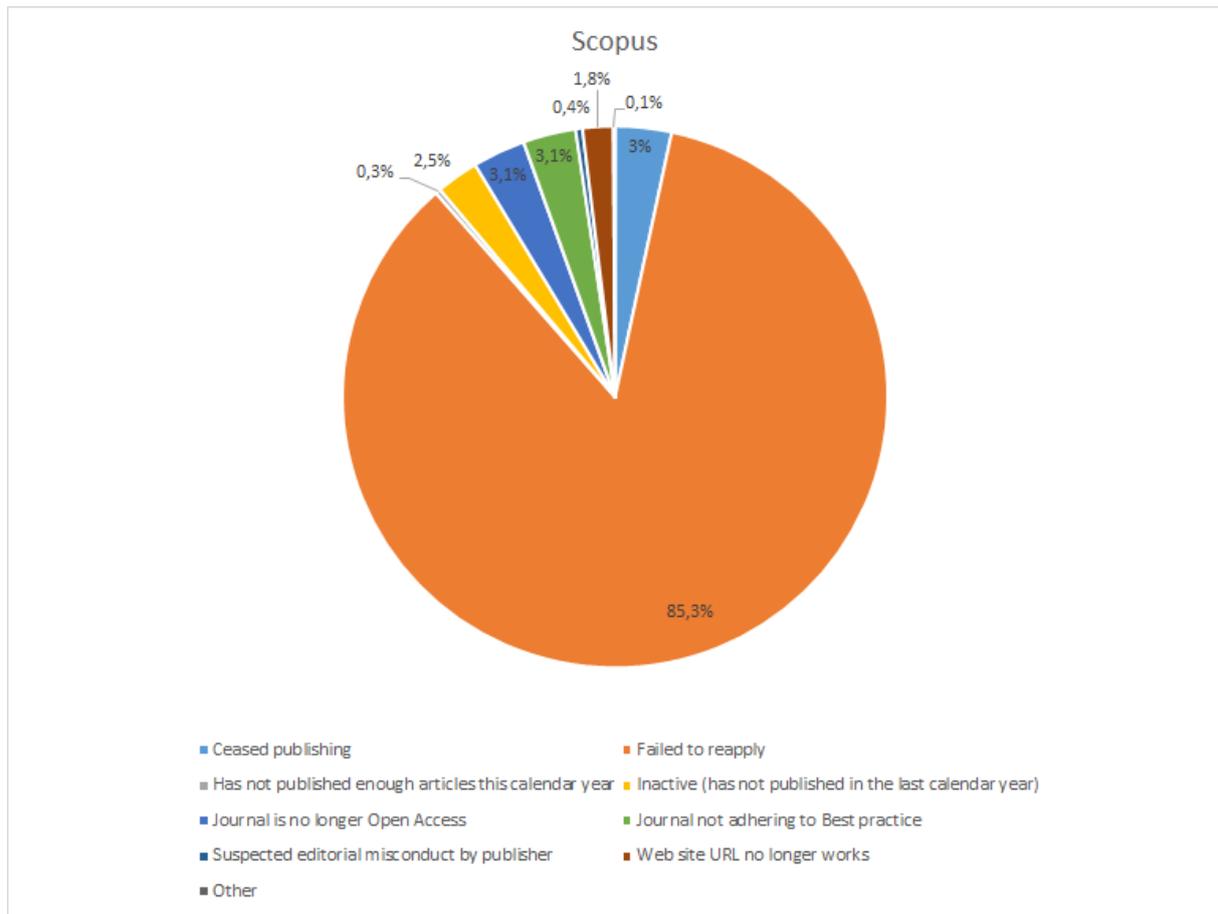


Figure 6: Reasons of exclusion from DOAJ for journals included in Scopus

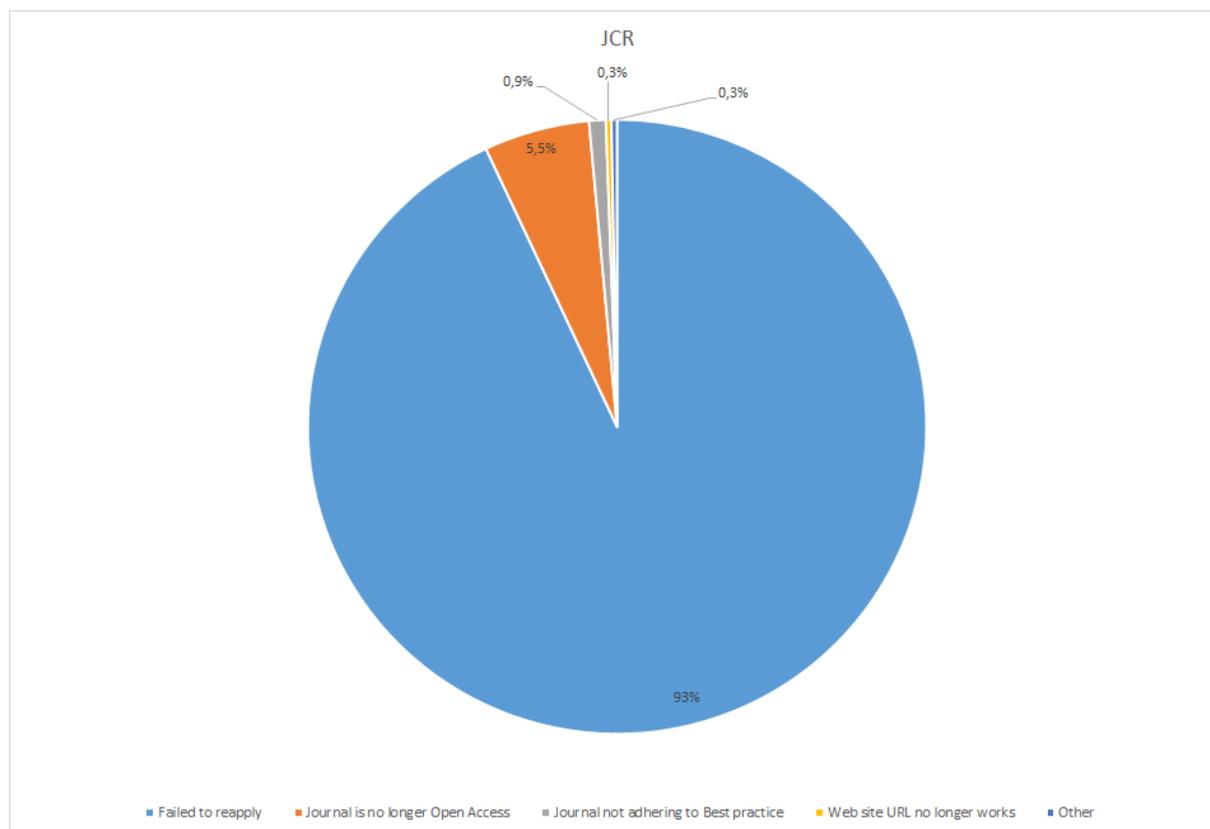


Figure 7: Reasons of exclusion from DOAJ for journals included in JCR

## The DOAJ Seal of Approval for Open Access Journals

The DOAJ Seal is a mark of recognition awarded to journals adhering to editorial and publishing best practices. It is granted by DOAJ to journals that comply with the following seven conditions:<sup>39</sup>

1. use permanent identifiers for articles;
2. provide DOAJ with article metadata;
3. deposit content with a long term digital preservation or archiving program;
4. embed machine-readable CC licensing information in articles;
5. allow generous reuse and mixing of content, in accordance with a CC BY, CC BY-SA or CC BY-NC license;
6. have a deposit policy registered with a deposit policy registry;
7. allow the author to hold the copyright without restrictions.

Of the journals accepted in DOAJ after March 2014, 198 of them were awarded with the Seal, equalling 7%. Those journals should represent the highest level of editorial and publishing best

<sup>39</sup> <https://doaj.org/application/new#seal>.

practice. None of these journals appear in any of Beall's lists but many of them are included in the other bibliographic databases: 14 (7%) are in JCR, 22 (11%) in Scopus.

Journals with the DOAJ Seal are published by 42 publishers, publishers who are generally bigger in size (mean 4,7 journals per publisher; 15 publishers, out of 42, published more than 1 title).

Table 6 shows the top 10 publishers of journals that have been awarded the Seal.

Publishers	# of journals
BioMed Central	45
Springer	40
MDPI AG	24
Cogent OA	11
Ubiquity Press	10
Copernicus Publications	9
AOSIS	8
University of Pittsburgh	5
PAGEPress Publications	4
Smart Science & Technology LLC	4

Table 6: Top ten publishers awarded with DOAJ Seal

The distribution analysis by country of the 198 journals awarded the DOAJ Seal is not surprising, as shown in Table 7. If we compare these data with the number of the journals that potentially could have received the Seal, i.e. all 2.812 journals accepted in DOAJ after March 2014, the comparison reveals some interesting perspectives (see Table 7).

Some countries did not receive the Seal at all; for example, Poland (260 journals), Indonesia (258), Spain (137), Egypt (110), Turkey (84), Colombia (66) and Romania (63), India (38), Argentina (37), Chile (24), Cuba (18), Mexico (18), Ecuador and Portugal (17), Costa Rica (16), Canada (14) and so on. Others have minimal percentages, equal to or lower than 3%: Brazil (0,3%), Russian Federation and Netherlands (1,9%), Ukraine (2,4%), Czech Republic (2,3%), Iran (2,7%).

Country	Journals with Seal	Journal included after march 2014	% of journal with Seal
Singapore	2	3	66,7%
South Africa	8	20	40,0%
Korea, Republic of	4	15	26,7%
Switzerland	26	100	26,0%

Germany	34	141	24,1%
United Kingdom	79	343	23,0%
Croatia	2	14	14,3%
Bulgaria	2	17	11,8%
Sweden	2	17	11,8%
Australia	4	35	11,4%
China	3	28	10,7%
United States	15	214	7,0%
Austria	1	17	5,9%
Italy	5	88	5,7%
Norway	1	26	3,9%
Iran, Islamic Republic of	4	148	2,7%
Ukraine	1	41	2,4%
Czech Republic	1	44	2,3%
Russian Federation	2	104	1,9%
Netherlands	1	52	1,9%
Brazil	1	326	0,3%

Table 7: Percentage of journals awarded with DOAJ Seal, by country (journals added to DOAJ after March 2014)

## OASPA members

A further analysis was manually conducted by matching DOAJ journal publishers with the OASPA members list.<sup>40</sup> This analysis was made in 2014 by Walt Crawford (Crawford 2014) and the authors re-performed it with updated numbers because they agreed that OASPA membership counted as one of the quality signals. 1.553 journals are published by society and institutional members of OASPA and comply with OASPA membership criteria (12% of 12.595 journals of the whole dataset).<sup>41</sup>

These journals are published by 62 different publishers; the biggest one is Hindawi (544 titles); the 21 smallest publish only one title each (the mean is about 25 journals per publisher).

Limiting the dataset to journals accepted into DOAJ after March 2014, the percentage raises to 16% (439 journals out of 2.812).

<sup>40</sup> <http://oaspa.org/membership/members>.

<sup>41</sup> <http://oaspa.org/membership/membership-criteria>.

## Conclusions

The authors wanted to verify if the new DOAJ inclusion criteria and policies are fit-for-purpose for helping publishers and editors to improve the quality of the journals listed in the Directory. To do that, a comparison with the journals included in Beall's (black)list and in some lists chosen as whitelists (JCR, Scopus, OASPA members) was made; a stricter analysis was conducted on journals added to and removed from DOAJ since March 2014, at which point new criteria had been implemented.

The analysis demonstrates that the reapplication project and the consequent removal of journals that did not reapply, combined with the work performed by the national groups and the new management, has had a positive, invaluable influence on the improvement of editorial and publishing standards of many open access journals.

Since the processing the submitted reapplications is still ongoing (a few less than 5.000), the authors recommend that the analysis of the results should be checked again once every reapplication has been reviewed. This should verify the emerging trend.<sup>42</sup>

Furthermore, the DOAJ management should continue to perform, on a periodical basis, their monitoring activities to ensure that the new criteria are still being adhered to by journals indexed in DOAJ, thereby ensuring that journals listed in DOAJ continue to comply to the high quality standards year on year.<sup>43</sup>

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<sup>42</sup> Since January 2015, 1.572 reapplications have been accepted; on 18th August 2015 there are 3.865 reapplications pending and 416 in progress (data from DOAJ).

<sup>43</sup> This issue is felt as a need also by other important bibliographic databases, like Scopus, <https://blog.scopus.com/posts/evaluation-maintaining-high-quality-content-in-scopus>.

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