Prevalence of potentially predatory publishing in Scopus on the country level

Tatiana Marina1,2 · Ivan Sterligov1

Received: 23 September 2020 / Accepted: 2 February 2021 / Published online: 26 March 2021
© Akadémiai Kiadó, Budapest, Hungary 2021

Abstract
We present results of a large-scale study of potentially predatory journals (PPJ) represented in the Scopus database, which is widely used for research evaluation. Both journal metrics and country/disciplinary data have been evaluated for different groups of PPJ: those listed by Jeffrey Beall and those discontinued by Scopus because of “publication concerns”. Our results show that even after years of discontinuing, hundreds of active potentially predatory journals are still highly visible in the Scopus database. PPJ papers are continuously produced by all major countries, but with different prevalence. Most all science journal classification subject areas are affected. The largest number of PPJ papers are in engineering and medicine. On average, PPJ have much lower citation metrics than other Scopus-indexed journals. We conclude with a survey of the case of Russia and Kazakhstan where the share of PPJ papers in 2016 amounted to almost a half of all Kazakhstan papers in Scopus. Our data suggest a relation between PPJ prevalence and national research evaluation policies. As such policies become more widespread, the expansion of potentially predatory journal research will be increasingly important.

Keywords Potentially predatory journals · Government publishing policy · Publication concerns · Scopus database · Bibliometric analysis

Introduction
Recent years have witnessed many dramatic changes in scholarly communication across the world. The main drivers of these changes are the globalization of academia and proliferation of the Internet and digital technologies as well as the spread of the evaluation culture in research management (Dahler-Larsen 2011). The publish-or-perish motto (Roland 2007; Steele et al. 2006) and an ever-increasing supply of available metrics (Weingart 2005; Wilsdon et al. 2015) have facilitated the rapid growth of “citizen bibliometrics” including the usage of scientometric indicators by administrators of various degree of competence as well as by researchers themselves (Leydesdorff et al. 2016). In short, research evaluation
has become substantially more formalized relying on various indicators, which are mostly based on publication and citation counts. This metrics explosion is partially attributed to the priorities of many nations and organizations to reproduce the success of world leaders in science and technology.

In this paper, we provide a bird’s eye view of the growth of articles in potentially predatory journals (PPJ), a global phenomenon stemming from both the evaluation/metrics culture and globalization. “Potentially predatory journals” refers to publication venues providing publishing services of questionable quality while having the formal characteristics of respected academic journals, usually to receive article processing fees.

We introduce an algorithm that matches Jeffrey Beall’s lists (Beall 2016a, b) of publishers and standalone journals with the Source title list from Scopus and achieve a significantly better rate of detection than in previous studies (Bagues et al. 2017; Machacek and Srholec 2017, 2019). This allows us to show a comprehensive breakdown of such publications by countries and disciplines over time, and provide an overview of indicators for PPJ, as compared to non-PPJ sources. We argue that the PPJ phenomenon is mainly due to proliferation of indicator-based research evaluation systems (Gläser et al. 2010) and is an example of a goal displacement (Colwell et al. 2012; Rijke et al. 2016) and opportunistic behavior (Önder and Erdil 2017). In contrast to the previous work Shen and Björk (2015), our data suggest that almost all countries are affected, although with marked differences in the share of PPJ articles by country.

First, we provide an overview of Scopus usage across the world in order to justify choosing this particular data source. Next, we describe the PPJ phenomenon and review emerging studies of it. We pay special attention to the peculiarities and limitations of Jeffrey Beall’s lists. We also describe our data and methods. Then, the main section describes global PPJ statistics in Scopus and also reviews some recent efforts by Elsevier to clean its database. We conclude with an analysis of possible causes of the observed drastic variations in relative PPJ publications across various nations and sum up with policy advice.

**Scopus in research evaluation**

Before talking about potentially predatory journals, it is important to briefly describe the reasons of Scopus to be attractive for publishers and authors. Scopus is widely used in research evaluation. Along with the Web of Science (WoS) and Google Scholar, Scopus is a leading resource for searching relevant works and evaluation of researchers and journals (Wouters et al. 2015). These three databases, however, have different indexing policies and marketing strategies, leading to different coverage and indicator values (for recent comparisons see (Moed et al. 2016; Mongeon and Paul-Hus 2016; Harzing and Alakangas 2016)). Google Scholar is not widely used by research managers, because of its strategy of covering virtually all scientific literature with little quality control. So the options suitable for research evaluation are the Web of Science and Scopus.

The Web of Science is the most exclusive in terms of the number of indexed journals and poses itself as a “painstakingly selected, actively curated database of the journals that researchers themselves have judged to be the most important and useful in their fields”.¹ Scopus’ promotional text is similar, with a special reference of their customers’ high academic standards: “Scopus has a clearly stated selection policy and an internationally

¹ Promotional info at [http://clarivate.com/?product=web-of-science](http://clarivate.com/?product=web-of-science) accessed on 20 June 2017.
acclaimed board of selection experts so you can be sure that what you see on Scopus meets your high standards.” Judging from the sheer number of indexed journals, Scopus has more inclusive criteria, which is perceived as intentional and central to its main marketed advantage over WoS, i.e. the scope, reflected in its name itself. Mongeon and Paul-Hus (2016) find that Scopus has a “larger journal coverage in all fields”, especially in Business & Management and in Social Sciences. Country-level data presented by these authors also is favorable for Scopus for all 15 major countries studied both in the number of published journals and in the number of published papers. Thus, we conclude that in recent years Scopus has outperformed WoS in terms of coverage in all or at least in the vast majority of disciplines.

Also, Scopus has been chosen instead of WoS for several high-profile nation-wide evaluation projects, namely Research Excellence Framework in the United Kingdom, Excellence in Research for Australia (until 2019), and Evaluation of R&D Units in Portugal. As the Australian Research Council (ARC) put it in their press release, “When selecting Scopus, the ARC had regard to their coverage of relevant journals...”. Scopus has recently replaced WoS as a bibliometric data source for the influential Times Higher Education World University Rankings, and is already used by QS World University Rankings.

Overall, Scopus can now be considered as a more popular bibliometrics database, if we take into account Google Trends data that reflects global search intensity (see Fig. 1). This metric is plausible because there are almost no meanings of the terms “Scopus” and “Web of Science” other than those related to the two databases.

The country-level data may be more relevant to the topic of our paper (see Fig. 2), which show that in some regions people search for WoS and Scopus much more than in the

---

2 Promotional info at https://www.elsevier.com/solutions/scopus/content/content-policy-and-selection accessed on 21 June 2017.

3 See http://www.arc.gov.au/news-media/media-releases/scopus-provide-citation-information-era accessed on 21 June 2017 and currently available only via Internet Archive: https://web.archive.org/web/20151010083040/https://www.arc.gov.au/news-media/media-releases/scopus-provide-citation-information-era.

4 While “Web of Science” usually clearly means relevant database, “Scopus” may also refer to Mount Scopus, a historical mountain in northeast Jerusalem, or a latin name of the bird species Hamercop (Scopus Umbretta), or a specialist journal on east African ornithology.
others and that Scopus leads the way in many of the countries studied in the results section. Although vague, Google Trends data show that the general interest is substantial.

**Potentially predatory journals**

The PPJ phenomenon and its naming are both directly linked to the work of Jeffrey Beall, an academic librarian and associate professor of library science at the University of Colorado, Denver. In 2010, he published a review of Bentham Science Publishers in “The Charleston Advisor” (Beall 2009), which ended with a verdict that is typical of Beall’s latter critique of PPJ: “Bentham Open’s emergence into scholarly publishing in 2007 has served mainly as a venue to publish research of questionable quality. The site has exploited the Open Access (OA) model for its own financial motives and flooded scholarly communication with a flurry of low quality and questionable research...”.

It is important to note that Beall clearly links the problem to the Gold Open Access (“author pays”) model of journal publishing. He quotes Reed Elsevier’s CEO Crispin Davis, who mentioned in 2003 that “if you are receiving potential payments for every article submitted, there is an inherent conflict of interest that could threaten the quality of the peer review system”.

---

5 Open access scholarly literature is free of charge and often carries less restrictive copyright and licensing barriers than traditionally published works, for both the users and the authors.

6 Oral evidence to UK House of Commons Science & Technology Inquiry, March 1st 2004, Sir Crispin Davis (CEO, Reed Elsevier), see [https://publications.parliament.uk/pa/cm200304/cmrptselect/cmsctech/uc399-1/uc39902.htm](https://publications.parliament.uk/pa/cm200304/cmrptselect/cmsctech/uc399-1/uc39902.htm).
The somewhat controversial term “predatory” was coined by Jeffrey Beall in his 2010 review Beall (2010) of nine Gold OA scholarly publishers. As a result of his subsequent efforts on maintaining his famous lists, it became a standard term used by notable peer-reviewed articles published in mainstream journals in recent years (Shen and Björk 2015; Xia et al. 2015; Shamseer et al. 2017). Beall himself notes that “these publishers are predatory because their mission is not to promote, preserve, and make available scholarship; instead, their mission is to exploit the author-pays, Open-Access model for their own profit” (Beall 2010).

Jeffrey Beall faced a backlash and legal threats after making his lists public, and the term became “potential, possible or probable predatory”. Both Shen and Björk (2015) and Xia et al. (2015) use parentheses largely abstaining from the discussion of the criteria developed by Beall. They do not clarify whether the journals they have studied are really predatory. We follow this practice and use the term “potentially predatory” indicating that we use Beall’s lists with caution and that the quality of editorial processes in the journals differs widely. It should be noted that Beall’s approach, which pairs Gold OA as a whole with “broken”, anything-goes peer review, was frequently criticized mostly by members of the academic librarian community (Berger and Cirasella 2015; Crawford 2014; Esposito 2013). This discussion came to an end with the unexpected disappearance of Beall’s List itself. In January 2017, the author deleted it without explanation. However, in June 2017, Beall summarized his experience about predatory publishing and explained the List disappearance (Beall 2017).

The key issue with PPJ, i.e. perceived lack of adequate peer review, is the most difficult to study as the absolute majority of Beall’s-listed PPJ do not use an open peer review model. Usually it is studied experimentally, with a fake paper composed manually (Bohannon 2013) or using special software like SciGen (Davis 2009).

A recent peer-reviewed article aiming to characterize PPJ (Shamseer et al. 2017) compared Beall’s-listed PPJ with presumably legitimate open-access and subscription journals. After surveying several hundreds of such venues, the authors came up with a set of 13 features that distinguish PPJ. These, for example, include having a name similar to a known legitimate journal, presenting pseudo-metrics like Global Impact Factor on their websites, and offering rapid peer review and publication. They found that nearly 75% of PPJ had editors or editorial board members whose affiliation with the journal was unverified while the same measure was 2% for open access journals and 1% for subscription-based journals. As for the geography of PPJ, (Shamseer et al. 2017) have found that India dominates as a country hosting 40% of the surveyed PPJ. By contrast, the UK dominates the open access group with 34% of journals and the USA dominates the subscription-based group with 66% of journals.

A well-known and widely cited study of PPJ (Shen and Björk 2015) takes a longitudinal approach to studying a subset of 613 Beall journals sampled from a much larger set constructed by the authors. One of the main results relevant for our study shows that India is a market leader hosting 27.1% of publishers that produce more than one journal. After studying a sample of 262 corresponding authors, Shen and Björk found that more than 60% of them are from Asia (specifically, 34.7% of the studied corresponding authors are from India) and 16.4% from Africa (8% from Nigeria). The paper concludes that the “problem of predatory open access seems highly contained to just a few countries”. Disciplinary structure is also considered, the top three subject areas are “General”, “Engineering” and “Medicine” respectively.

Young and inexperienced researchers from developing countries are the core authors of papers in “predatory” journals (Xia et al. 2015). Similarly to (Shamseer et al. 2017),
the authors of this paper considered three groups of journals in Biomedical science. The first group of journals consisted of seven journals from Beall’s list. The second group of journals included five journals that rejected Bohannon’s fake paper (Bohannon 2013). The third group contained high-status OA journals from the PLoS (Public Library of Science) series. Affiliations, publication counts, and citation data for authors in three groups of journals were analyzed. As a result, it was found that researchers with less than 5 publications from developing countries like Algeria, Bangladesh, Brazil, Egypt, India, Indonesia, Iran, Nigeria and others prevail among those publishing in the surveyed journals from Beall’s list.

Overall, we agree with (Xia et al. 2017) that current research on the scale and dynamics of PPJ publishing in mainstream peer-reviewed journals is limited. The vast majority of articles on this topic are opinion pieces about the dangers of predatory publishing for modern academia, and/or checklists or advices for prospective authors, usually in a specific subject area (Eriksson and Helgesson 2016, 2017; Balehegn 2017).

A contemporary study of the titles delisted by Scopus (Cortegiani et al. 2020) has shown that journals discontinued for “publication concerns” continue to be cited despite discontinuation and predatory behaviour seemed common. These citations may influence scholars’ metrics prompting artificial career advancements, bonus systems and promotion.

Another work Ibba et al. (2017) analyzed the ratio of the number of publications in PPJ and the number of publications in reputable journals in computer science from 2011 to 2015. They used 15 Google Scholar queries with selected key words. They concluded that the portion of publications in PPJ increased between 2011 and 2014, and significantly decreased in 2015 with respect to 2014. Only 6 of 89 identified publishers are indexed in Scopus: 35 journals from Academic Journals and 17 journals from WSEAS publishers.

There are also the results of our previous research project (Sterligov and Savina 2016). We matched Beall’s lists of journals and publishers to journal titles and publisher names from the Scopus’ Source title list. Inclusion of Frontiers Media S.A. publisher in the original Beall’s list has been controversial. The prevailing academic view is that the publisher has a sufficient quality (Bloudoff-Indelicato 2015). So we excluded 29 sources of Frontiers Media publisher from the list. Moreover, journals discontinued by Scopus were added. Hence, the final list included 531 PPJ. According to country-level data the most affected countries were Kazakhstan with about 30% publications in PPJ in 2015 and 47–49% in 2013–2014 and Indonesia with 23% in 2015. Few months later we (Savina and Sterligov 2016) modified our matching algorithm and identified 665 journals total (447 “active” and 218 “inactive” journals) that included 29 journals published by Frontiers Media S.A. As a result, we compared publication count during 2011–2015 period for the entire list and the list without Frontiers Media journals. The most affected countries by largest share of PPJ publications in 2015 were Kazakhstan, Indonesia, Iraq, India, Morocco, Malaysia, Nigeria.

Later, Machacek and Srholec (2017) also used Beall’s list to identify 405 PPJ in Scopus. They used Ulrichsweb to extract ISSN for journals in Beall’s lists of journals and publishers. This resulted in the omittance of PPJ not mentioned in Ulrichsweb. Machacek and Srholec do not provide the list of PPJ that they have identified in Scopus. They recently updated their results considering three groups of PPJ: standalone journals from Beall’s list, 29 journals of Frontiers Research Foundation and journals extracted from Beall’s list of publishers (Machacek and Srholec 2019). Total number of individual journals was 324.

7 See https://www.plos.org/.
8 See http://ulrichsweb.serialssolutions.com/.
According to their results the most affected countries were in Asia and Africa. In particular, Kazakhstan, Indonesia, Iraq and Albania are among them, which is consistent with our prior work (Sterligov and Savina 2016; Savina and Sterligov 2016).

This study continues our previous work (Sterligov and Savina 2016). In this paper, we consider a wider range of issues besides the country distribution, from the scientometric characteristics of the journals and subject areas to the governmental policies. We use three non-intersecting sets of PPJ based on both Beall’s lists of journals and publishers as well as sources discontinued by Elsevier. It allows us to draw conclusions and form hypotheses regarding both the scientific level of journals (through citation indicators) and the extent of the PPJ problem. We focus on the research areas that seem extremely relevant in connection with the noted growing role of Scopus in the management of science worldwide. In addition, we specifically consider the case of Kazakhstan and Russia to form a hypothesis about the causal link between the growth of PPJ publications and state policy in research evaluation. We provide the list of potentially predatory journals with their ISSNs in supplementary materials, see Table 8.

**Methods**

For the purpose of this study we considered a journal as *potentially predatory* if it is either in Beall’s list of standalone journals (Beall 2016b), or its publisher is from Beall’s list (Beall 2016a), or discontinued by Scopus for “Publication Concerns”.

**Data sources**

We downloaded Beall’s list of “potential, possible, or probable predatory scholarly open-access” publishers and standalone journals (Beall 2016a, b). It consisted of 1,064 publishers and 1,132 journals. We downloaded Scopus Discontinued Source list. This list included sources that were discontinued for three reasons: Metrics, Publication Concerns, and Radar. We used only 289 sources with tag “Publication Concerns”. We downloaded two versions of Scopus Source title list in August 2016 and in September 2018. There are different types of sources included in Source title list: Journal, Trade Journal, Book Series, and Conference Proceedings. We analysed only type “journal”.

**Data generating process**

We formed a list of Potentially Predatory Journals (PPJ) in the following way. We first formed a list of potentially predatory sources and then we selected journals from it.

We matched journal and publisher titles from Beall’s list to source title and publisher’s name in the official Scopus Source title list, see Fig. 3. Two titles are considered matched if either title is a substring of another.

---

9 Elsevier’s site [https://www.elsevier.com/solutions/scopus/how-scopus-works/content](https://www.elsevier.com/solutions/scopus/how-scopus-works/content).

10 Accessed in September 2018.

11 See [https://www.elsevier.com/solutions/scopus/how-scopus-works/content/content-policy-and-selection](https://www.elsevier.com/solutions/scopus/how-scopus-works/content/content-policy-and-selection).

12 Elsevier’s site [https://www.elsevier.com/solutions/scopus/how-scopus-works/content](https://www.elsevier.com/solutions/scopus/how-scopus-works/content).

13 August 2016 version.
We checked the matched items manually to remove false positives. For example, Beall’s list included Bentham Open publisher and did not include Bentham Science Publishers. The Source title list attributed Bentham Open journals to Bentham Science because Bentham Open was a division of Bentham Science (Beall 2009). So we manually selected only 117 journals published by Bentham Open for our list of potentially predatory sources. Also, we excluded 29 journals of Frontiers Media publisher from our list.

In September 2018, we identified 58 sources from Beall’s list that were included in the Source title list after August 2016. We also identified 78 new sources with the tag “Publication Concerns” in the Discontinued Source list (the rest 211 sources were already included in our list).

For the subsequent analysis, only sources of type “journal” were considered. The final list of PPJ included 637 titles. The list was divided into the following three non-intersecting groups:

**Fig. 3** Algorithm of formation of list with potentially predatory journals. The algorithm matches journal titles and publisher names from Beall’s lists to Source title list in Scopus.
Publication Concerns potentially predatory journals with tag “Publication Concerns” in the Discontinued Source list in September 2018 (252 titles, of which four journals were not in the Source title list).

Active PPJ potentially predatory journals marked Active (i.e. not discontinued) in the Source title list in September 2018 version (215 items).

Inactive PPJ all other potentially predatory journals that were marked Inactive in the Source title list in September 2018 version. We also added journals that were in the list in August 2016 but not in September 2018. The total number of journals were 170.

Data analysis

In this study we consider only journal articles and reviews as publications. We downloaded publication counts in the potentially predatory journals (PPJ) broken down by country, subject area, year and the group of PPJ (see Sect. "Data Generating Process") from Scopus for the period from 2001 to November 2018. The country of a publication is determined by the affiliation of the authors. So, one publication can be attributed to more than one country. Similarly, a publication can be attributed to multiple subject areas. We used Scopus active journals (excluding PPJ) as a reference group, and downloaded the same publication counts for them. The reference group had 23362 journals.

For the analysis of journal metrics, the values for 2016 were selected and taken from the Source title list (September 2018 version) because more journals had these indicators computed for this year compared to other years.

Results

Citation metrics

The most important bibliometric characteristic of scholarly journals is their citation impact indicators. There is a plethora of the indicators (Waltman 2016), but none are universal for all use cases. We study diverse journals that represent many different fields of research, thus the normalized metrics are more appropriate. Scopus offers two of them: Source-Normalized Impact per Paper (SNIP) (Waltman et al. 2013) and Scimago Journal Rank (SJR) (Guerrero-Bote and Moya-Anegón 2012).

To identify characteristics of PPJ, the descriptive statistics of journal measures (SNIP, SJR) were considered for the four groups of journals: our PPJ list, Publication Concerns, Active PPJ, active journals from the Source title list without potentially predatory journals (reference group), see Table 1 and Figs. 6, 7. In each group of journals, except Publication Concerns journals and all PPJ, we consider only “active” journals as of September 2018. For some journals these measures are not available and that means there were missing observations.

The average and median values of SNIP and SJR for “active” journals in PPJ list are lower than for other groups. About 52% of Active PPJ and 58% of Publication Concerns & Active PPJ with SJR value (without missing values) have SJR value between 0.1 to 0.2 which is compared to about 27% of all active journals with SJR value in the Source title list with similar values (see Fig. 4). There are two active PPJ for which SJR value is more than 2. For instance, “Aging” (Impact Journals) has SJR 2016 of 2.458, and “Open
Table 1  Descriptive statistics for journal metrics

| 2016                | Publication Concerns Journals | Active PPJ | PPJ list (Pub Con + Active PPJ + Inactive PPJ) | Source title list minus PPJ list ("active" journals) |
|---------------------|-------------------------------|------------|-----------------------------------------------|-----------------------------------------------------|
|                     | SNIP  | SJR  | SNIP  | SJR  | SNIP  | SJR  | SNIP  | SJR  | SNIP  | SJR  |
| Mean                | 0.54  | 0.2  | 0.49  | 0.3  | 0.49  | 0.25 | 0.83  | 0.72 |
| Median              | 0.42  | 0.2  | 0.41  | 0.2  | 0.38  | 0.17 | 0.7   | 0.37 |
| Std. Deviation      | 0.53  | 0.2  | 0.4   | 0.4  | 0.49  | 0.26 | 0.93  | 1.32 |
| Maximum             | 4.56  | 1.3  | 2.44  | 2.5  | 4.56  | 2.46 | 68.18 | 43  |
| Percentiles         |       |      |       |      |       |      |       |      |
| 25                  | 0.26  | 0.1  | 0.19  | 0.1  | 0.18  | 0.12 | 0.37  | 0.17 |
| 75                  | 0.67  | 0.2  | 0.68  | 0.4  | 0.66  | 0.25 | 1.08  | 0.82 |
Fig. 4  The shares of journals (%) for each interval of SJR value in 2016. For example, the interval (0.2; 0.3] includes journals with the SJR value greater than or equal to 0.2 and less than or equal to 0.3. The figure shows the comparison of the SJR value for the Publication Concerns group, Active PPJ group and all Scopus active journals (including PPJ). Most of PPJ have the SJR value less than 1. In particular, 58% of Publication Concerns and Active PPJ have SJR value between 0.1 to 0.2. In contrast, only 27% of Scopus active journals have the same value.

Fig. 5  The shares of journals (%) for each interval of SNIP value in 2016.
Bioinformatics Journal” (Bentham Open) has SJR 2016 of 2.384. There are no PPJ titles with SJR value more than 5.

The distribution of SNIP is flatter than the distribution of SJR for Active PPJ group, see Fig. 5.

We tested the hypothesis if there were statistically significant differences between journal metrics for three groups of journals (Publication Concerns, Active PPJ, Inactive PPJ). There were statistically significant differences in the journal metrics depending on the journal group with a significance level of 5%, see Appendix 1.

The distribution of these indicators can be presented using the box plot, see Figs. 6 and 7. The average value of SNIP for the Publication Concerns and Active PPJ groups were greater than the average values of SNIP for the Inactive PPJ group. The average value of SJR for the Publication Concerns, Active PPJ and Inactive PPJ groups were similar.

Country-level data

The worldwide distribution of the publication count for three groups of PPJ in Scopus is presented in Fig. 8. The number of publications in PPJ has been increasing significantly since 2011. The peak of publications number in PPJ in Scopus was in 2016. The number of publications in the Publication Concerns journal group decreased in 2017 because Scopus delisted 140 journals.
To analyse publications in PPJ, we selected 76 countries for which the number of publications (articles and reviews) in all journals was more than 10,000 for the period 2011–2018. The United States and China had the largest total number of publications in Scopus during the same period, see Table 2.

Countries with the largest number of publications in PPJ during the period 2011–2018 were India with 97,454 publications and China with 94,058. The next top-8 countries with the largest numbers of publications in PPJ in the period 2011–2018 were Iran with 29,616 publications, Malaysia with 25,637, the United States with 24,064, South Korea with 23,017, Russia with 16,812, Egypt with 11,796, Indonesia with 11,781, and Turkey with 10,688 publications. Table 3 shows the change of publication shares (%) in PPJ over time.

The maximum number of publications in PPJ in Scopus was in 2016. Kazakhstan had the largest share (%) of such publications, i.e. 41.61%. Indonesia had the second largest share of publications in PPJ, i.e. 34.99%. The share of publications in PPJ increased in 2016 compared to 2011 for the following countries: Kazakhstan, Indonesia, Morocco, Philippines, Russian Federation, Ukraine, South Korea, Italy, Slovakia, Colombia, and Bulgaria. During the same period, the share of publications in PPJ decreased for the following countries: Iran, Nigeria, Jordan, Bangladesh, Serbia, Turkey.

In contrast, the share of publications in PPJ was less than 1% for many countries, for example, for the United States, the United Kingdom, Germany, France, Canada and Spain in the period 2010–2018, see Table 4.

The publication counts data were accessed in November 2018. So, the analysis for 2018 was based on preliminary data.
The share of publications in PPJ for China was 2.87% in 2017, about 2 times greater than in 2010 (1.44%). Since 2011, the share of publications in PPJ for China was more than 3% with the maximum value of 4.64% in 2012. The share of publications in PPJ

| Country       | Count     | PPJ share (%) | Country     | Count     | PPJ share (%) |
|---------------|-----------|---------------|-------------|-----------|---------------|
| United States | 3,551,810 | 0.68          | Pakistan    | 86,571    | 6.98          |
| China         | 2,834,181 | 3.32          | Argentina   | 85,883    | 0.51          |
| United Kingdom| 1,065,688 | 0.47          | Thailand    | 78,000    | 6.38          |
| Germany       | 945,778   | 0.43          | Romania     | 77,554    | 3.51          |
| India         | 749,684   | 13.00         | Ireland     | 76,208    | 0.47          |
| Japan         | 733,283   | 0.98          | Chile       | 73,013    | 0.62          |
| France        | 668,420   | 0.50          | Hungary     | 65,308    | 0.58          |
| Italy         | 596,605   | 1.22          | Ukraine     | 61,706    | 5.26          |
| Canada        | 589,023   | 0.52          | Colombia    | 52,823    | 1.87          |
| Spain         | 534,593   | 0.54          | Serbia      | 47,387    | 4.22          |
| Australia     | 533,209   | 0.63          | Indonesia   | 45,113    | 26.11         |
| South Korea   | 491,152   | 4.69          | Nigeria     | 42,289    | 17.18         |
| Brazil        | 432,373   | 1.14          | Croatia     | 41,798    | 2.45          |
| Russia        | 379,282   | 4.43          | Slovakia    | 39,631    | 2.83          |
| Netherlands   | 340,961   | 0.33          | Slovenia    | 38,368    | 0.94          |
| Iran          | 323,730   | 9.15          | Tunisia     | 37,437    | 2.96          |
| Turkey        | 259,591   | 4.12          | Algeria     | 30,863    | 8.05          |
| Switzerland   | 257,543   | 0.34          | Vietnam     | 27,420    | 2.77          |
| Poland        | 246,072   | 0.65          | Morocco     | 26,780    | 13.31         |
| Sweden        | 228,845   | 0.51          | Bulgaria    | 24,589    | 2.42          |
| Taiwan        | 228,489   | 2.68          | UAE         | 22,522    | 4.35          |
| Belgium       | 191,202   | 0.45          | Lithuania   | 20,917    | 1.21          |
| Denmark       | 151,456   | 0.38          | Bangladesh  | 20,830    | 8.90          |
| Malaysia      | 146,452   | 17.51         | Jordan      | 18,557    | 13.16         |
| Austria       | 133,763   | 0.52          | Iraq        | 16,847    | 22.27         |
| Mexico        | 128,330   | 1.49          | Estonia     | 16,782    | 0.53          |
| Portugal      | 126,155   | 0.72          | Kenya       | 16,544    | 3.02          |
| Czech Republic| 122,441   | 1.64          | Cuba        | 14,572    | 0.76          |
| South Africa  | 121,238   | 4.09          | Qatar       | 14,402    | 1.84          |
| Israel        | 119,169   | 0.54          | Philippines | 14,119    | 5.89          |
| Norway        | 115,907   | 0.49          | Ethiopia    | 13,858    | 6.53          |
| Saudi Arabia  | 112,286   | 7.89          | Lebanon     | 13,465    | 2.44          |
| Finland       | 110,643   | 0.41          | Kazakhstan  | 13,319    | 30.65         |
| Singapore     | 107,909   | 0.82          | Peru        | 12,072    | 0.86          |
| Egypt         | 106,544   | 11.07         | Belarus     | 11,722    | 0.90          |
| Greece        | 103,300   | 1.64          | Venezuela   | 11,622    | 1.47          |
| Hong Kong     | 100,248   | 0.89          | Cyprus      | 11,592    | 2.10          |
| New Zealand   | 88,861    | 0.48          | Ghana       | 11,520    | 5.48          |

*The table was based on data accessed in Nov 2018*
from China decreased after 2013, see Table 4. This is aligned with the implementation by the Government of China of harsh policies to regulate China’s publishing market, resulting in the suspension of many “trash” journals (Lin and Zhan 2014). In 2018, the Communist Party of China required the ministry of science and technology to establish a blacklist of academic journals (Cyranoski 2018).

The share of publication in PPJ for Iran dropped from 21.02% in 2011 to 3.82% in 2017 and then to 1.90% in 2018.

Table 3  Dynamics of percentage shares of PPJ publications for top-15 countries from 2010 to 2018 sorted by values in 2016

| Share PPJ (%) | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018* |
|--------------|------|------|------|------|------|------|------|------|------|
| Kazakhstan   | 2.22 | 6.35 | 17.43| 49.02| 47.39| 35.97| 41.61| 18.66| 7.88  |
| Indonesia    | 11.12| 16.25| 12.82| 17.65| 28.32| 32.87| 34.99| 30.40| 18.16 |
| Iraq         | 23.38| 37.06| 24.51| 20.53| 19.85| 19.05| 28.52| 14.68| 23.49 |
| Malaysia     | 20.15| 26.59| 20.29| 20.12| 17.10| 17.30| 19.77| 13.59| 9.09  |
| Morocco      | 6.45 | 8.85 | 13.06| 14.23| 17.63| 17.08| 18.45| 12.16| 3.66  |
| India        | 10.68| 14.77| 13.92| 13.67| 16.10| 18.12| 15.18| 6.62 | 6.32  |
| Egypt        | 8.51 | 14.24| 17.51| 14.98| 11.81| 11.39| 12.80| 5.51 | 4.25  |
| Jordan       | 17.21| 19.74| 21.16| 16.10| 14.63| 11.15| 12.57| 8.39 | 5.86  |
| Nigeria      | 35.08| 34.00| 28.42| 25.85| 19.02| 15.18| 11.56| 5.32 | 4.09  |
| Algeria      | 10.70| 11.23| 9.57 | 10.19| 10.00| 11.26| 10.95| 3.29 | 1.89  |
| Iran         | 12.68| 21.02| 15.12| 12.49| 8.40 | 7.48 | 8.90 | 3.82 | 1.90  |
| Philippines  | 2.19 | 3.76 | 3.40 | 2.92 | 8.61 | 10.64| 8.67 | 5.04 | 2.06  |
| Russia       | 0.24 | 0.37 | 0.69 | 3.66 | 6.01 | 8.23 | 8.41 | 3.19 | 1.95  |
| Saudi Arabia | 10.21| 12.37| 11.41| 12.62| 9.68 | 7.39 | 7.42 | 4.74 | 3.07  |
| South Korea  | 1.20 | 1.73 | 2.95 | 4.64 | 5.93 | 6.77 | 7.24 | 5.19 | 1.64  |

*The table was based on data downloaded in November 2018

Table 4  The share of publications (articles and reviews) in PPJ for top-10 countries with largest amount of publications in Scopus in the period 2011–2018

| Share PPJ (%) | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018* |
|--------------|------|------|------|------|------|------|------|------|------|
| The United States | 0.57 | 0.61 | 0.62 | 0.57 | 0.61 | 0.79 | 0.93 | 0.80 | 0.45 |
| China        | 1.44 | 3.09 | 4.64 | 4.24 | 3.81 | 4.08 | 3.75 | 2.87 | 0.72 |
| The United Kingdom | 0.50 | 0.54 | 0.49 | 0.42 | 0.46 | 0.47 | 0.59 | 0.47 | 0.35 |
| Germany      | 0.34 | 0.35 | 0.30 | 0.32 | 0.33 | 0.48 | 0.60 | 0.58 | 0.44 |
| Japan        | 0.75 | 0.93 | 0.92 | 0.94 | 1.04 | 0.98 | 1.14 | 1.02 | 0.80 |
| France       | 0.46 | 0.52 | 0.43 | 0.39 | 0.47 | 0.56 | 0.66 | 0.55 | 0.42 |
| Italy        | 0.78 | 0.85 | 0.94 | 1.04 | 1.15 | 1.36 | 1.66 | 1.54 | 1.04 |
| Canada       | 0.46 | 0.56 | 0.54 | 0.46 | 0.48 | 0.52 | 0.71 | 0.54 | 0.35 |
| Spain        | 0.49 | 0.55 | 0.49 | 0.47 | 0.46 | 0.61 | 0.69 | 0.62 | 0.36 |

*The table was based on data downloaded in November 2018
Subject-level data

The largest subject area is “Engineering” which included 93,275 publications in PPJ in the period 2011–2018. The highest increase for “Engineering” was in 2015. The second-largest is “Medicine” with 85,188 publications during the same period. The third largest category is “Biochemistry, Genetics and Molecular Biology” at 65,498 publications. The fourth largest subject field is “Computer Science” at 61,699 publications from 2011 to 2018, but the number of publications decreased in 2017 compared with 2012, from 13,782 to 5865 publications. Category “Pharmacology, Toxicology and Pharmaceutics” had more than 50000 publications (55,887 publications) but it had the third largest amount of publications of 11,500 in 2016. For subject area “Agricultural and Biological Sciences”, the number of publications dramatically declined in 2018 compared with 2011, i.e. from 11,014 to 1332 publications. The number of publications in PPJ increased in 2016 compared to 2011 for four subject categories: “Mathematics”, “Chemistry”, “Social Sciences”, “Materials Science” with a total number of publications in the period 2011–2018 between 28,000 to 50,000.

Note that almost one third of publications in PPJ in 2011 was in the subject category “Multidisciplinary”, but in 2018 the share of publications in that field dramatically decreased to less than 1%, probably because of delisting of several prominent PPJ titles (for example, “Indian Journal Of Science And Technology”, “World Applied Sciences Journal”, “Journal of Applied Science”).

Table 5 represents the dynamics of publication share (%) by top-15 subject area sorted by the number of publications in the period from 2011 to 2018.

Government policy impact

The differences between countries in the shares of publications in PPJ suggest that the growth of publications in PPJ is associated with government policy. Machacek and Srholec (2019) formulated such hypothesis, but did not substantiated it. Obviously, the identification of the causal link requires special studies and a detailed analysis of incentives to publish and the configuration of research evaluation systems. To address the possible existence of such dependence, we consider the case of Kazakhstan as the most affected country according to our results in Sect. "Country-Level Data", and also briefly discuss the case of Russia, suggesting a possible influence of a national university excellence initiative. These examples problematize varied consequences of metric usage.

Case of Kazakhstan

In 2011–2012, the government of Kazakhstan implemented new Rules for awarding academic degrees that included a requirement to publish at least one paper in Scopus or WoS-indexed journals, see details in Appendix 2. The publications from Kazakhstan in all journals in Scopus increased sharply as well as publications in potentially predatory journals since 2013, see Fig. 9. We indicate that the rapid growth in PPJ publications for Kazakhstan from 2013 was associated with the new Rules.

In 2014 Elsevier stopped indexing 35 journals from the PPJ list, which were popular among authors from Kazakhstan. For example, more than a quarter of all articles and
| Subject Area                                             | Share of publications in PPJ by subject area (%) | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   | 2017   | 2018   | Publications in PPJ in 2011 - 2018 |
|----------------------------------------------------------|--------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|----------------------------------|
| Engineering                                              |                                                  | 3.81   | 3.70   | 3.43   | 4.12   | 6.27   | 4.84   | 3.05   | 2.90   | 93,275                           |
| Medicine                                                 |                                                  | 1.21   | 1.21   | 1.14   | 1.57   | 2.15   | 2.84   | 3.24   | 1.59   | 85,188                           |
| Biochemistry, Genetics and Molecular Biology             |                                                  | 3.26   | 2.27   | 2.98   | 3.53   | 3.48   | 3.72   | 1.81   | 2.27   | 65,498                           |
| Computer Science                                         |                                                  | 7.84   | 13.64  | 9.28   | 6.22   | 4.87   | 5.73   | 4.53   | 5.91   | 61,699                           |
| Pharmacology, Toxicology and Pharmaceutics               |                                                  | 9.63   | 7.90   | 8.90   | 11.38  | 10.50  | 13.28  | 4.82   | 3.99   | 55,887                           |
| Mathematics                                              |                                                  | 5.28   | 7.72   | 5.22   | 4.72   | 5.57   | 5.66   | 4.18   | 1.03   | 42,839                           |
| Chemistry                                                |                                                  | 1.91   | 2.17   | 3.00   | 2.81   | 2.97   | 2.94   | 1.61   | 0.86   | 38,111                           |
| Social Sciences                                          |                                                  | 2.09   | 3.54   | 2.68   | 3.53   | 3.89   | 3.24   | 2.32   | 0.36   | 37,745                           |
| Agricultural and Biological Sciences                     |                                                  | 6.67   | 3.22   | 2.44   | 2.71   | 1.49   | 0.95   | 0.66   | 0.75   | 34,358                           |
| Environmental Science                                    |                                                  | 3.41   | 4.54   | 3.62   | 3.32   | 2.57   | 3.01   | 2.81   | 3.54   | 32,032                           |
| Materials Science                                        |                                                  | 2.20   | 1.91   | 1.79   | 1.81   | 2.47   | 2.45   | 1.58   | 0.31   | 28,745                           |
| Multidisciplinary                                        |                                                  | 27.29  | 23.51  | 27.13  | 14.88  | 9.92   | 9.31   | 0.25   | 0.21   | 25,779                           |
| Economics, Econometrics and Finance                      |                                                  | 5.94   | 5.97   | 8.30   | 12.11  | 12.60  | 9.21   | 6.85   | 1.91   | 24,115                           |
| Chemical Engineering                                     |                                                  | 1.57   | 2.01   | 2.56   | 3.32   | 3.46   | 3.21   | 1.77   | 4.36   | 23,561                           |
| Physics and Astronomy                                    |                                                  | 1.21   | 0.65   | 0.93   | 0.92   | 1.19   | 1.60   | 0.94   | 0.23   | 17,516                           |
reviews from Kazakhstan were published in “Life Science Journal” and about 5.51% of all articles and reviews from Kazakhstan were published in “World Applied Sciences Journal” in 2014. Both journals were delisted by Elsevier in 2014 resulting in reduced number of publication in PPJ in 2015.

Elsevier stopped indexing 27 journals from the PPJ list in 2015. 3.9% of articles and reviews from Kazakhstan were published in the delisted “Mediterranean Journal of Social Sciences” and 3.68% of publications in the discontinued “Asian Social Science” in 2015.

In 2016, 140 journals from the PPJ list were discontinued. The largest share of Kazakhstan articles and reviews were published in “International Journal of Environmental and Science Education” (8.67%) in 2016.

The new policy encouraged publication activity mostly among young researchers, which is consistent with the results of Xia et al. (2015) showing that most publications in PPJ were attributed to young and inexperienced researchers from developing countries.

The burst of low-quality publications in Kazakhstan is a fact known to local authorities. Their reaction to the problem was further formalization of the list of journals through quantitative indicators and recommending additional “white lists”. The success of this
approach is questionable. For example, there are PPJ among those that satisfy the required threshold\textsuperscript{15} of the top 25\% according to the CiteScore.

**Case of Russia**

Russia has seen a huge increase in bibliometric Key Performance Indicators’ usage on all levels in recent years. Moed et al. (2018) offer a brief description and discussion of Russian policy, including university reporting requirements, pay-per-publication academic bonuses, PhD and tenure regulations.

One of the most important initiatives was set in accordance with the government’s main goals of development, stated in the president’s 2012 decrees. Launched in the same year, 5-top-100 project\textsuperscript{16} supports select 21 universities, so that at least 5 of them are in the top 100 of

---

\textsuperscript{15} See the order of the Minister of Education and Science of Kazakhstan from 03/31/2011 No. 127, appendix 1 http://web.archive.org/web/20190905234744/https://egov.kz/cms/ru/law/list/V1100006951.

\textsuperscript{16} https://5top100.ru/en/.
international university rankings by 2020. Exact rankings were not mentioned, so it is not clear if the project has been successful, but all participants were to demonstrate a yearly evaluated increase in WoS/Scopus publication counts. Within the course of a few years, there was a surge of PPJ articles from select participating universities, and soon the practice became widespread. Fig. 10 shows the resulting significant growth of PPJ paper counts for Russia as a whole.

Other evidence

Besides Kazakhstan and Russia, several facts support our hypothesis that predatory publishing is linked to simplistic government policies based on Scopus publication counts. First of all it is the proliferation of various journal blacklists used to determine which publications will not be counted in evaluation formulas (Sterligov 2020). For example, such list, compiled by Malaysian Ministry of Education, is published on local universities’ websites. Harsh paper-counting policies are observed in Indonesia. Mouton and Valentine (2017) noted that “scholarly publishing in South African is strongly influenced by the [Government’s] system of paying subsidies to universities for research publications...[this] is the major driver behind the huge increase in publication output since 2005 and has become the major incentive for many academics to publish and publish as many articles as quickly as they can”. What is important, however, is that at least some countries heavily affected by predatory publishing seem to lack a centralised list-based policy, while paper-counting policies directly linked to career promotions exist on the university level, see Nwagwu and Ojemeni (2015) and Ajuwon and Ajuwon (2018).

Discussion and conclusion

Countries and subject areas

We examined the distribution of publications by subject area according to the All Science Journal Classification (ASJC) in Scopus database. The classification has 27 main fields comprising 334 subjects. Publications in PPJ cover all subjects, most of them are significantly affected. For 19 fields, the number of publications exceeded 10,000 for the 2011–2018 period. The largest number of publications in PPJ during the 2011–2018 period was in “Engineering”. However, the share of such publications is not large compared to the total number of publications in Scopus on this subject. The most affected area in terms of PPJ article share was “Multidisciplinary”, largely due to several predatory “megajournals”, which were subsequently delisted by Elsevier so that PPJ share dropped from 27% in 2013 to 0.21% in 2018.

Our analysis of the affected countries is consistent with the results of other studies (Xia et al. 2015; Shen and Björk 2015; Sterligov and Savina 2016; Machacek and Srholec 2019), but our dataset includes more journals (hence, 418,040 publications during 2011–2017 period) and uses a longer timeframe. In contrast, we consider a wider range of issues besides the country

17 http://rimc.uum.edu.my/index.php/blacklisted-journals-by-moe.
18 The Jakarta Post article https://www.thejakartapost.com/news/2018/06/10/wanted-6000-new-journals-to-publish-150000-papers.html: “The regulation requires academics to publish at least one scientific paper in three years in an international or accredited journal. Another regulation has also contributed to the surge in published papers. Three years ago, the government issued Ministerial Regulation No. 44/2015 on higher education quality, which required every graduate student to publish one piece in an accredited journal and a doctoral candidate to publish a piece in an international journal.”
distribution, i.e. the scientometric characteristics of the journals and subject areas, and the governmental policies.

Additionally, we examined the dynamics of publication counts starting from 2001. We showed that a significant increase in the number of publications started in 2007, when the total number of PPJ articles and reviews exceeded 10,000, but this growth pattern widely differs for the surveyed countries. For example, in Russia and Kazakhstan the surge started in 2013, which was primarily connected with the public policy of these countries, while in China and Iran this problem appeared much earlier. The most affected countries were the developing ones: Kazakhstan, Indonesia, India, Nigeria and Egypt, Iraq and Iran, see Machacek and Srholec (2019) for comparisons of PPJ shares and income of countries.

For Argentina, Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States the percentage of publications in PPJ is small, less than 1% for the 2011–2018 period. The only notable exception amongst developed countries is South Korea, where PPJ share increased from 1.73% in 2011 to 7.24% in 2016 and then fell to 5.19% in 2017. Our data suggests that the problems with journal quality are faced usually by the authors from less developed countries, but it is clear that they arise also in the countries with more elaborate and mature academic systems.

Based on the case of Kazakhstan and Russia, we suggest that the growth of PPJ is significantly impacted to government science policy. Although we cannot make claims about a causal connection, the (im)balance of government policy measures, the discontinuation of indexing PPJ popular in Kazakhstan by Elsevier, and the number and the share of publications in PPJ are highly illustrative. Thus, it is reasonable to conjecture that the growth of PPJ is affected by the research evaluation policies implementing similar Scopus-based performance indicators, such as publication requirements, university reporting requirements, academic bonuses and tenure policies.

State of PPJ in Scopus

Elsevier self-cleans its Scopus database by publishing a discontinued Source list and updating it. Since most of the delisting occurred in 2016, the number of publications by Publication Concerns group fell sharply in 2017 (from nearly 40,000 publications in 2016 to more than 10,000 in 2017). However, the other, active group of surveyed PPJ shows linear growth of the publication counts, which raises many questions. We observe that those who earlier published in PPJ, after their delisting, have quickly switched to publishing in a plethora of new Scopus journals that can be equally dubious, but counted as “good” in this and similar studies. We leave the detailed study of this phenomenon for the future.

It is important to point out Elsevier’s interest in addressing this problem. For example, our research team has been interacting with Elsevier’s experts on the issue since 2016. Previous studies have shown that journal inclusion in a particular data source used for evaluation leads to increased incentives to publish in PPJ (Bagues et al. 2017). Particularly worrying are the results of a recent citation study (Cortegiani et al. 2020), that has revealed that journals discontinued in Scopus for “publication concerns” continue to be cited despite discontinuation. However, Scopus is not the only database affected. Our preliminary studies show that at least several dozens of PPJ already delisted by Elsevier are listed as active in the Web of Science Core Collection (mostly in Emerging Sources Citation Index).

The incentives to publish for the sake of publication or indicators are only increasing (Biagioli and Lippman 2020), and new “fake” publications are no longer so easily detected (Biagioli et al. 2019). It is becoming increasingly difficult to deal with the issue using formal methods, which
emphasizes the importance of focusing on the motivation of authors and updating simplistic formal approach to assessment.

Appendix 1: Kruskal Wallis Test

The hypothesis: the median values of journal metrics for Publication Concerns, Active PPJ, Inactive PPJ groups were equal. We used the Kruskal–Wallis criterion (Kruskal and Wallis 1952). There were statistically significant differences in the journal metrics depending on the journal group, see Tables 6 and 7.

Appendix 2: Rules for awarding academic degrees

According to the Rules for awarding academic degrees of the Ministry of Education and Science of the Republic of Kazakhstan, the dissertation is written under the guidance of domestic and foreign supervisors who have academic degrees and are specialists in the field of scientific research of doctoral students. The main findings of the dissertation are to be published in at least 7 publications on the topic of the dissertation, including at least 3 in scientific publications recommended by the authorized body, 1 in an international scientific publication that has a non-zero impact factor in Web of Science or is indexed in Scopus, 3 in the materials of international conferences, including 1 in the materials of foreign conferences.

Table 6 Statistics: Kruskal Wallis test with grouping variable Journals

| 2016          | SNIP     | SJR     |
|---------------|----------|---------|
| Kruskal-Wallis H | 30.401   | 32.206  |
| Degrees of Freedom | 2        | 2       |
| Asymptotic Significance | 0.000   | 0.000   |

Table 7 Ranks: Kruskal Wallis test

| 2016          | Journals                | Count | Mean Rank |
|---------------|-------------------------|-------|-----------|
| SNIP          | Publication Concerns    | 239   | 288.98    |
|               | Active PPJ              | 193   | 279.30    |
|               | Inactive PPJ            | 101   | 191.50    |
|               | Total                   | 533   |           |
| SJR           | Publication Concerns    | 239   | 263.55    |
|               | Active PPJ              | 194   | 307.32    |
|               | Inactive PPJ            | 101   | 200.37    |
|               | Total                   | 534   |           |

Appendix 3: List of potentially predatory journals

see Table 8

---

19 First introduced in the order of the Minister of Education and Science of the Republic of Kazakhstan dated March 31, 2011, No. 127
20 See http://web.archive.org/save/http://adilet.zan.kz/rus/archive/docs/V1100006951/31.03.2011 and https://academy-gp.kz/?page_id=71&lang=en.
Table 8  List of potentially predatory journals

| No. | Title                                                | Print-ISSN   | E-ISSN       |
|-----|------------------------------------------------------|--------------|--------------|
| PC-1| Academic Journal of Cancer Research                  | 1995-8943    |              |
| PC-2| Academy of Marketing Studies Journal                 | 1095-6298    | 1528-2678    |
| PC-3| Actual Problems of Economics                         | 1993-6788    |              |
| PC-4| Advance Journal of Food Science and Technology       | 2042-4868    | 2042-4876    |
| PC-5| Advanced Materials Letters                           | 0976-3961    | 0976-397X    |
| PC-6| Advanced Science Letters                             | 1936-6612    | 1936-7317    |
| PC-7| Advanced Studies In Theoretical Physics              | 1313-1311    | 1314-7609    |
| PC-8| African Journal of Psychiatry (South Africa)         | 1994-8220    | 2378-5756    |
| PC-9| African Journal of Traditional, Complementary and Alternative Medicines | 0189-6016 | 2505-0044 |
| PC-10| American Journal of Agricultural and Biological Science | 1557-4989 | 1557-4997 |
| PC-11| American Journal of Applied Sciences                | 1546-9239    | 1554-3641    |
| PC-12| American Journal of Biochemistry and Molecular Biology | 2150-4210 | 2150-4253 |
| PC-13| American Journal of Cancer Research                  |              | 2156-6976    |
| PC-14| American Journal of Drug Discovery and Development  | 2150-427X    | 2150-4296    |
| PC-15| American Journal of Engineering and Applied Sciences | 1941-7020    | 1941-7039    |
| PC-16| American Journal of Environmental Sciences           | 1553-345X    | 1558-3910    |
| PC-17| American Journal of Food Technology                  | 1557-4571    | 1557-458X    |
| PC-18| American Journal of Immunology                       | 1553-619X    | 1558-3775    |
| PC-19| American Journal of Infectious Diseases              | 1553-6203    | 1558-6340    |
| No.  | Title                                                   | Print-ISSN       | E-ISSN      |
|------|---------------------------------------------------------|------------------|-------------|
| PC-20| American Journal of Pharmacology and Toxicology         | 1557-4962        | 1557-4970   |
| PC-21| American Journal of Plant Physiology                    | 1557-4539        | 1557-4547   |
| PC-22| American Journal of Stem Cells                          |                  | 2160-4150   |
| PC-23| Anales Venezolanos de Nutricion                         | 0798-0752        |             |
| PC-24| Annals of Translational Medicine                        | 2305-5839        | 2305-5847   |
| PC-25| Anthropologist                                          | 0972-0073        |             |
| PC-26| Applied Mathematical Sciences                           | 1312-885X        | 1314-7552   |
| PC-27| Archives of Clinical Microbiology                       | 1989-8436        |             |
| PC-28| Archivos de Medicina                                    | 1698-9465        |             |
| PC-29| Asian Journal of Agricultural Research                  | 1819-1894        |             |
| PC-30| Asian Journal of Animal and Veterinary Advances          | 1683-9919        |             |
| PC-31| Asian Journal of Animal Sciences                        | 1819-1878        |             |
| PC-32| Asian Journal of Applied Sciences                       | 1996-3343        |             |
| PC-33| Asian Journal of Biochemistry                           | 1815-9923        |             |
| PC-34| Asian Journal of Cell Biology                           | 1814-0068        |             |
| PC-35| Asian Journal of Earth Sciences                         | 1819-1886        | 2152-3509   |
| PC-36| Asian Journal of Information Technology                 | 1682-3915        | 1993-5994   |
| PC-37| Asian Journal of Pharmaceutical Research and Health Care| 2250-1444        | 2250-1460   |
| PC-38| Asian Journal of Plant Pathology                        | 1819-1541        |             |
| PC-39| Asian Journal of Poultry Science                        | 1819-3609        |             |
| PC-40| Asian Social Science                                    | 1911-2017        | 1911-2025   |
| PC-41| Australasian Medical Journal                            | 1836-1935        |             |
| PC-42| Biology and Medicine                                    | 0974-8369        |             |
| No.  | Title                                                        | Print-ISSN   | E-ISSN  |
|------|--------------------------------------------------------------|--------------|---------|
| PC-43| Biosciences, Biotechnology Research Asia                     | 0973-1245    |         |
| PC-44| BioTechnology: An Indian Journal                             | 0974-7435    |         |
| PC-45| C e c a                                                      | 0045-6152    |         |
| PC-46| Canadian Journal of Geriatrics                               | 1718-1879    |         |
| PC-47| Carbon - Science and Technology                              | 0974-0546    |         |
| PC-48| Cardiology (Pakistan)                                        | 1811-8194    | 1993-6117|
| PC-49| Communications in Applied Analysis                          | 1083-2564    |         |
| PC-50| Contemporary Engineering Sciences                            | 1313-6569    | 1314-7641|
| PC-51| Chinese Journal of Cancer Research                           | 1000-9604    | 1993-0631|
| PC-52| Corporate Board: Role, Duties and Composition               | 1810-8601    | 2312-2722|
| PC-53| Corporate Ownership and Control                              | 1727-9232    | 1810-3057|
| PC-54| Current Neurobiology                                         | 0975-9042    | 0976-1705|
| PC-55| Der Pharma Chemica                                           | 0975-413X    |         |
| PC-56| Der Pharmacia Lettre                                         | 0975-5071    |         |
| PC-57| Diversity and Equality in Health and Care                    | 2049-5471    | 2049548X|
| PC-58| Dynamic Systems and Applications                             | 1056-2176    |         |
| PC-59| Eastern Anthropologist                                       | 0012-8686    |         |
| PC-60| Electronic Journal of Geotechnical Engineering              | 1089-3032    |         |
| PC-61| Current Research In Tuberculosis                             | 1819-3366    | 2152-3363|
| PC-62| Energy Education Science and Technology Part A: Energy Science and Research | 1308-772X |         |
Table 8 (continued)

| No. | Title                                                                 | Print-ISSN  | E-ISSN       |
|-----|-----------------------------------------------------------------------|-------------|--------------|
| PC-63| Energy Education Science and Technology Part B: Social and Educational Studies | 1308-7711   |              |
| PC-64| English Language Teaching                                             | 1916-4742   | 1916-4750    |
| PC-65| Entrepreneurial Executive                                            | 1087-8955   | 1939-4667    |
| PC-66| European Journal of Economics, Finance and Administrative Sciences  | 1450-2275   |              |
| PC-67| European Journal of Scientific Research                             | 1450-202X   |              |
| PC-68| European Journal of Social Sciences                                   | 1450-2267   |              |
| PC-69| Far East Journal of Electronics and Communications                   | 0973-7006   |              |
| PC-70| Frontiers                                                            | 0160-9009   | 1536-0334    |
| PC-71| Global Journal of Pharmacology                                       | 1992-0075   |              |
| PC-72| Global Journal of Pure and Applied Mathematics                       | 0973-1768   | 0973-9750    |
| PC-73| Global Veterinaria                                                   | 1992-6197   | 1999-8163    |
| PC-74| Health Science Journal                                               | 1108-7366   | 1791-809X    |
| PC-75| Global Media Journal                                                 | 1550-7521   |              |
| PC-76| Head and Neck Oncology                                               |              | 1758-3284    |
| PC-77| IIOAB Journal                                                        | 0976-3104   |              |
| PC-78| Indian Journal of Science and Technology                             | 0974-6846   | 0974-5645    |
| PC-79| Information                                                          | 1343-4500   | 1344-8994    |
| PC-80| IEJME - Mathematics Education                                        | 1306-3030   | 2468-4945    |
| PC-81| International Archives of Medicine                                   | 1755-7682   |              |
| PC-82| International Business Management                                     | 1993-5250   |              |
| PC-83| International Education Studies                                      | 1913-9020   |              |
| No. | Title                                                                 | Print-ISSN   | E-ISSN     |
|-----|----------------------------------------------------------------------|--------------|------------|
| PC-84 | International Journal of Advances in Pharmaceutical Sciences | 0976-1055     |            |
| PC-85 | International Journal of Agricultural Research                    | 1816-4897    | 2152-2553  |
| PC-86 | International Journal of Applied Business and Economic Research   | 0972-7302    |            |
| PC-87 | International Journal of Applied Chemistry                         | 0973-1792    | 0973-9734  |
| PC-88 | International Journal of Applied Engineering Research              | 0973-4562    | 0973-9769  |
| PC-89 | International Journal of Applied Linguistics and English Literature | 2200-3592    | 2200-3452  |
| PC-90 | International Journal of Applied Research in Natural Products     | 1940-6223    |            |
| PC-91 | International Journal of Bio Science and Bio Technology             | 2233-7849    |            |
| PC-92 | International Journal of Biochemistry and Molecular Biology         | 2152-4114    |            |
| PC-93 | International Journal of Biological Chemistry                      | 1819-155X    | 2152-2561  |
| PC-94 | International Journal of Biomedical Science                        | 1550-9702    | 1555-2810  |
| PC-95 | International Journal of Business Research                         | 1555-1296    | 2378-8577  |
| PC-96 | International Journal of Celiac Disease                           | 2334-3427    | 2334-3486  |
| PC-97 | International Journal of Chemical Sciences                         | 0972-768X    |            |
| PC-98 | International Journal of Chemtech Research                          | 0974-4290    | 2455-9555  |
| No. | Title | Print-ISSN | E-ISSN |
|-----|-------|------------|--------|
| PC-99 | International Journal of Control Theory and Applications | 0974-5572 |  |
| PC-100 | International Journal of Current Pharmaceutical Review and Research | 0976-822X |  |
| PC-101 | International Journal of Drug Delivery and Research | 0975-9344 |  |
| PC-102 | International Journal of Earth Sciences and Engineering | 0974-5904 |  |
| PC-103 | International Journal of Ecological Economics and Statistics | 0973-1385 |  |
| PC-104 | International Journal of Economics and Research | 0972-9380 |  |
| PC-105 | International Journal of Engineering and Technology | 2319-8613 | 0975-4024 |
| PC-106 | International Journal of Environmental and Science Education | 1306-3065 |  |
| PC-107 | International Journal of Human Genetics | 0972-3757 |  |
| PC-108 | International Journal of Integrative Biology | 0974-2816 | 0973-8363 |
| PC-109 | International Journal of Mathematical Analysis | 1312-8876 |  |
| PC-110 | International Journal of Engineering and Technology | 1314-7579 |  |
| No.  | Title                                                        | Print-ISSN | E-ISSN   |
|------|--------------------------------------------------------------|------------|----------|
| PC-114 | International Journal of Mathematical Models and Methods in Applied Sciences | 1998-0140 |          |
| PC-115 | International Journal of Mathematics and Computers in Simulation | 1998-0159 |          |
| PC-116 | International Journal of Oceans and Oceanography            | 0973-2667  | 0974-4827|
| PC-117 | International Journal of Multimedia and Ubiquitous Engineering | 1975-0080 |          |
| PC-118 | International Journal of Pediatrics-Mashhad                 | 2345-5055  |          |
| PC-119 | International Journal of Pharma and Bio Sciences            | 0975-6299  |          |
| PC-120 | International Journal of Pharmaceutical and Clinical Research | 0975-1556 |          |
| PC-121 | International Journal of Pharmaceutical Sciences Review and Research | 0976-044X |          |
| PC-122 | International Journal of Pharmacognosy and Phytochemical Research | 0975-4873 |          |
| PC-123 | International Journal of Pharmacy and Pharmaceutical Sciences | 0975-1491 |          |
| PC-124 | International Journal of Pharmacy and Technology            | 0975766X   |          |
| PC-125 | International Journal of Pharmtech Research                 | 0974-4304  | 2455-9563|
| PC-126 | International Journal of Phytomedicine                       | 0975-0185  |          |
| PC-127 | International Journal of Pure and Applied Mathematics       | 1311-8080  | 1314-3395|
| No.  | Title                                                      | Print-ISSN     | E-ISSN        |
|------|-----------------------------------------------------------|----------------|---------------|
| PC-128 | International Journal of Research in Ayurveda and Pharmacy | 2277-4343      | 2229-3566     |
| PC-129 | International Journal of Security and Its Applications    | 1738-9976      |               |
| PC-130 | International Journal of Smart Home                       | 1975-4094      | 2383-725X     |
| PC-131 | International Journal of Soft Computing                   | 1816-9503      |               |
| PC-132 | International Journal of Software Engineering and its Applications | 1738-9984      |               |
| PC-133 | International Journal of Soil Science                     | 1816-4978      |               |
| PC-134 | International Journal of Systems Signal Control and Engineering Application | 1997-5422      | 2309-9607     |
| PC-135 | International Journal of Toxicological and Pharmacological Research | 0975-5160      |               |
| PC-136 | International Journal of Tropical Medicine                | 1816-3319      | 1818-779X     |
| PC-137 | International Journal on Advances in Life Sciences        | 1942-2660      |               |
| PC-138 | International Research Journal of Finance and Economics   | 1450-2887      |               |
| PC-139 | International Review of Management and Marketing          | 2146-4405      |               |
| PC-140 | International Review on Computers and Software            | 1828-6003      | 1828-6011     |
| PC-141 | Journal of the Pancreas                                  | 1590-8577      |               |
| PC-142 | Journal of Agricultural Food and Environmental Sciences   | 1934-7235      |               |
| PC-143 | Journal of AIDS and Clinical Research                     | 2155-6113      |               |
| PC-144 | Journal of Analytical Oncology                            | 1927-7210      | 1927-7229     |
| No.   | Title                                                                 | Print-ISSN      | E-ISSN       |
|-------|-----------------------------------------------------------------------|-----------------|--------------|
| PC-145| Journal of Anesthesia and Clinical Research                           |                 | 2155-6148    |
| PC-146| Journal of Animal and Veterinary Advances                            | 1680-5593       | 1993-601X    |
| PC-147| Journal of Antivirals and Antiretrovirals                            | 1948-5964       |              |
| PC-148| Journal of Applied Sciences                                          | 1812-5654       | 1812-5662    |
| PC-149| Journal of Aquaculture Research and Development                      | 2155-9546       |              |
| PC-150| Journal of Bioanalysis and Biomedicine                               | 1948-593X       |              |
| PC-151| Journal of Bioequivalence and Bioavailability                        | 0975-0851       |              |
| PC-152| Journal of Cancer Science and Therapy                                | 1948-5956       |              |
| PC-153| Journal of Chemical and Pharmaceutical Research                      | 0975-7384       |              |
| PC-154| Journal of Chemical and Pharmaceutical Sciences                      | 0974-2115       | 2349-8552    |
| PC-155| Journal of Clinical and Experimental Cardiology                      |                 | 2155-9880    |
| PC-156| Journal of Computers                                                 | 1796-203X       |              |
| PC-157| Journal of Biology and Today’s World                                 | 2476-5376       | 2322-3308    |
| PC-158| Journal of Economics and Economic Education Research                 | 1533-3604       | 1533-3590    |
| PC-159| Journal of Electrical Engineering                                    | 1582-4594       |              |
| PC-160| Journal of Emerging Technologies in Web Intelligence                 | 1798-0461       |              |
| PC-161| Journal of Environmental Hydrology                                   | 1058-3912       | 1996-7918    |
| PC-162| Journal of Fisheries and Aquatic Science                             | 1816-4927       | 1996-0751    |
Table 8 (continued)

| No.  | Title                                           | Print-ISSN   | E-ISSN        |
|------|-------------------------------------------------|--------------|---------------|
| PC-163 | Journal of Food, Agriculture and Environment |              | 1459-0263     |
| PC-164 | Journal of Generalized Lie Theory and Applications | 1736-5279 | 1736-4337     |
| PC-165 | Journal of Humanities and Social Sciences       |              | 1934-7227     |
| PC-166 | Journal of Industrial Pollution Control         | 0970-2083    | 2146-8397     |
| PC-167 | Journal of Intercultural Ethnopharmacology      |              |               |
| PC-168 | Journal of Interdisciplinary and Multidisciplinary Research | 1945-3019 | 1936-6264     |
| PC-169 | Journal of International Business and Economics | 1544-8037 | 2378-9174     |
| PC-170 | Journal of Internet Banking and Commerce        |              | 1204-5357     |
| PC-171 | Journal of Language and Literature              | 2078-0303    |               |
| PC-172 | Journal of Language Teaching and Research       | 1798-4769    | 2053-0684     |
| PC-173 | Journal of Materials and Environmental Science  | 2028-2508    |               |
| PC-174 | Journal of Mathematics and Statistics           | 1549-3644    | 1558-6359     |
| PC-175 | Journal of Microbial and Biochemical Technology | 1948-5948 |               |
| PC-176 | Journal of Multimedia                           | 1796-2048    |               |
| PC-177 | Journal of Nanoelectronics and Optoelectronics  | 1555-130X    | 1555-1318     |
| PC-178 | Journal of Nanomedicine and Nanotechnology      |              | 2157-7439     |
| No.  | Title                                                                 | Print-ISSN     | E-ISSN       |
|------|----------------------------------------------------------------------|----------------|--------------|
| PC-179 | Journal of Networks                                                   | 1796-2056      |              |
| PC-180 | Journal of Nonlinear Science and Applications                        | 2008-1898      | 2008-1901    |
| PC-181 | Journal of Organizational Culture, Communications and Conflict       | 1544-0508      | 1939-4691    |
| PC-182 | Journal of Pharmacognosy and Phytotherapy                            | 2141-2502      |              |
| PC-183 | Journal of Pharmacology and Toxicology                               | 1816-496X      | 2152-100X    |
| PC-184 | Journal of Physical Therapy Science                                  | 0915-5287      | 2187-5626    |
| PC-185 | Journal of Plant Sciences                                            | 1816-4951      |              |
| PC-186 | Journal of Proteomics and Bioinformatics                             | 0974-276X      |              |
| PC-187 | Journal of Residuals Science and Technology                          | 1544-8053      | 2376-578X    |
| PC-188 | Journal of Software                                                  | 1796-217X      |              |
| PC-189 | Journal of Software Engineering                                      | 1819-4311      | 2152-0941    |
| PC-190 | Journal of Sustainable Development                                   | 1913-9063      |              |
| PC-191 | Journal of the International Academy for Case Studies                | 1078-4950      | 1532-5822    |
| PC-192 | Journal of Vaccines and Vaccination                                  | 2157-7560      |              |
| PC-193 | Journal of Veterinary Science and Technology                         | 2157-7579      |              |
| PC-194 | Leonardo Journal of Practices and Technologies                       | 1583-1078      |              |
| PC-195 | Life Science Journal                                                 | 1097-8135      |              |
| PC-196 | Man in India                                                         | 0025-1569      |              |
| PC-197 | Mathematical and Computational Applications                           | 1300-686X      | 2297-8747    |
Table 8 (continued)

| No.  | Title                                                      | Print-ISSN   | E-ISSN      |
|------|------------------------------------------------------------|--------------|-------------|
| PC-198 | Mediterranean Journal of Social Sciences                    | 2039-9340    | 2039-2117   |
| PC-199 | Mental Health in Family Medicine                            | 1756-834X    |             |
| PC-200 | Metallurgical and Mining Industry                           | 2076-0507    | 2078-8312   |
| PC-201 | Middle East Journal of Scientific Research                 | 1990-9233    | 1999-8147   |
| PC-202 | Modern Applied Science                                     | 1913-1844    | 1913-1852   |
| PC-203 | National Journal of Physiology, Pharmacy and Pharmacology |             | 2231-3206   |
| PC-204 | Network Biology                                            |              | 2220-8879   |
| PC-205 | Neural, Parallel and Scientific Computation                | 1061-5369    |             |
| PC-206 | Oncoscience                                                |              | 2331-4737   |
| PC-207 | Open Infectious Diseases Journal                            | 1874-2793    |             |
| PC-208 | Pharma Research                                            |              | 0975-8216   |
| PC-209 | Ponte                                                      | 0032-423X    |             |
| PC-210 | Quality in Primary Care                                    | 1479-1072    | 1479-1064   |
| PC-211 | Research Journal of Applied Sciences, Engineering and Technology | 2040-7459 | 2040-7467   |
| PC-212 | Research Journal of Applied Sciences                       | 1815-932X    | 1993-6079   |
| PC-213 | Research Journal of Botany                                 | 1816-4919    | 2152-0461   |
| PC-214 | Research Journal of Business Management                    | 1819-1932    | 2152-0437   |
| PC-215 | Research Journal of Cardiology                             | 1819-3404    | 2151-8297   |
| PC-216 | Research Journal of Environmental Toxicology               | 1819-3420    |             |
| PC-217 | Research Journal of Information Technology                 | 1815-7432    | 2151-7959   |
| No.  | Title                                                        | Print-ISSN  | E-ISSN    |
|------|--------------------------------------------------------------|-------------|-----------|
| PC-218 | Research Journal of Medical Sciences                         | 1815-9346   | 1993-6095 |
| PC-219 | Research Journal of Medicinal Plant                         | 1819-3455   | 2151-7924 |
| PC-220 | Research Journal of Microbiology                            | 1816-4935   |           |
| PC-221 | Research Journal of Parasitology                            | 1816-4943   |           |
| PC-222 | Research Journal of Pharmaceutical, Biological and Chemical Sciences |         | 0975-8585 |
| PC-223 | Research Journal of Pharmacology                            | 1815-9362   | 1993-6109 |
| PC-224 | Research Journal of Phytochemistry                          | 1819-3471   | 2151-6081 |
| PC-225 | Research Journal of Seed Science                            | 1819-3552   | 2151-6146 |
| PC-226 | Research Journal of Toxins                                  | 1819-3560   | 2151-7258 |
| PC-227 | Review of European Studies                                  | 1918-7173   | 1918-7181 |
| PC-228 | Risk Governance and Control: Financial Markets and Institutions | 2077-429X   | 2077-4303 |
| PC-229 | International Arabian Journal of Antimicrobial Agents        | 2174-9094   |           |
| PC-230 | Romanian Biotechnological Letters                           | 1224-5984   | 2248-3942 |
| PC-231 | Sensor Letters                                               | 1546-198X   | 1546-1971 |
| PC-232 | Social Sciences                                              | 1818-5800   | 1993-6125 |
| PC-233 | Space Research Journal                                      | 1819-3382   |           |
| PC-234 | Theory and Practice in Language Studies                     | 1799-2591   | 2053-0692 |
| PC-235 | Translational Biomedicine                                  | 2172-0479   |           |
| PC-236 | Trends In Medical Research                                 | 1819-3587   | 2151-6065 |
| PC-237 | Veterinary Research                                         | 1993-5412   | 1994-4659 |
| PC-238 | World Applied Sciences Journal                              | 1818-4952   | 1991-6426 |
| PC-239 | World Journal of Medical Sciences                           | 1817-3055   | 1990-4061 |
| No. | Title                                                                 | Print-ISSN       | E-ISSN     |
|-----|-----------------------------------------------------------------------|------------------|------------|
| PC-240 | WSEAS Transactions on Biology and Biomedicine                            |                  | 1109-9518 |
| PC-241 | WSEAS Transactions on Circuits and Systems                              | 2224-266X        | 1109-2734 |
| PC-242 | WSEAS Transactions on Communications                                    | 2224-2864        | 1109-2742 |
| PC-243 | WSEAS Transactions on Computers                                          | 2224-2872        | 1109-2750 |
| PC-244 | WSEAS Transactions on Heat and Mass Transfer                            |                  | 1790-5044 |
| PC-245 | WSEAS Transactions on Information Science and Applications              |                  | 1790-0832 |
| PC-246 | WSEAS Transactions on Power Systems                                     | 1790-5060        | 2224350X  |
| PC-247 | WSEAS Transactions on Signal Processing                                 | 2224-3488        | 1790-5052 |
| PC-248 | WSEAS Transactions on Systems                                            | 2224-2678        | 1109-2777 |
| PC-249 | Turkish Online Journal of Educational Technology                        | 1303-6521        |            |
| PC-250 | World Journal of Modelling and Simulation                               | 1746-7233        |            |
| PC-251 | American Journal of Neurodegenerative Disease                           |                  | 2165-591X |
| PC-252 | Research Journal of Allergy                                             | 1819-3390        | 2152-095X |
| A-1 | Active Potentially Predatory Journals                                   |                  |            |
| A-2 | Academy of Accounting and Financial Studies Journal                     | 1096-3685        |            |
| A-3 | Academy of Entrepreneurship Journal                                      | 1087-9595        | 1528-2686 |
| A-4 | Academy of Strategic Management Journal                                 | 1544-1458        |            |
| No. | Title                                                                 | Print-ISSN   | E-ISSN     |
|-----|-----------------------------------------------------------------------|--------------|------------|
| A-4 | Advanced Science, Engineering and Medicine                            | 2164-6627    | 2164-6635  |
| A-5 | Advances in Animal and Veterinary Sciences                           | 2309-3331    | 2307-8316  |
| A-6 | Aging                                                                 | 0002-0966    | 1945-4589  |
| A-7 | American Journal of Animal and Veterinary Sciences                   | 1557-4555    | 1557-4563  |
| A-8 | American Journal of Biochemistry and Biotechnology                   | 1553-3468    | 1558-6332  |
| A-9 | American Journal of Blood Research                                   | 2160-1992    |            |
| A-10| American Journal of Cardiovascular Disease                           | 2160-200X    |            |
| A-11| American Journal of Nuclear Medicine and Molecular Imaging           | 2160-8407    |            |
| A-12| American Journal of Translational Research                           | 1943-8141    |            |
| A-13| Anesthesiology and Pain Medicine                                     | 2228-7523    | 2228-7531  |
| A-14| Annals of Cardiothoracic Surgery                                     | 2225-319X    | 2304-1021  |
| A-15| Annals of Palliative Medicine                                        | 2224-5820    | 2224-5839  |
| A-16| Applied Mathematics and Information Sciences                         | 1935-0090    |            |
| A-17| Archives of Pediatric Infectious Diseases                            | 2322-1828    | 2322-1836  |
| A-18| ARPN Journal of Engineering and Applied Sciences                     | 1819-6608    |            |
| A-19| Asian Journal of Chemistry                                           | 0970-7077    |            |
| A-20| Asian Journal of Clinical Nutrition                                  | 1992-1470    |            |
| A-21| Asian Journal of Crop Science                                        | 1994-7879    |            |
| A-22| Asian Journal of Epidemiology                                        | 1992-1462    |            |
| No. | Title                                                        | Print-ISSN   | E-ISSN       |
|-----|--------------------------------------------------------------|--------------|--------------|
| A-23| Asian Journal of Pharmaceutical and Clinical Research        | 0974-2441    | 2455-3891    |
| A-24| Asian Journal of Plant Sciences                              | 1682-3974    | 1812-5697    |
| A-25| Asian Journal of Scientific Research                        | 1992-1454    |              |
| A-26| Asian Journal of Sports Medicine                            | 2008-000X    | 2008-7209    |
| A-27| Asian Pacific Journal of Tropical Disease                   | 2222-1808    |              |
| A-28| Banks and Bank Systems                                      | 1816-7403    | 1991-7074    |
| A-29| Biomedical and Pharmacology Journal                         | 0974-6242    | 2456-2610    |
| A-30| Bioscience Research                                         | 1811-9506    | 2218-3973    |
| A-31| Biotechnology                                               | 1682-296X    | 1682-2978    |
| A-32| Cardiology Research                                         | 1923-2829    | 1923-2837    |
| A-33| Cardiovascular Diagnosis and Therapy                        | 2223-3652    | 2223-3660    |
| A-34| Cellular and Molecular Biology                              | 0145-5680    | 1165-158X    |
| A-35| Chinese Clinical Oncology                                   | 2304-3865    | 2304-3873    |
| A-36| Clinical Practice and Epidemiology in Mental Health         | 1745-0179    |              |
| A-37| Clinical Rhinology                                          | 0974-4630    | 0975-6965    |
| A-38| Current Research in Nutrition and Food Science               | 2347-467X    | 2322-0007    |
| A-39| Disaster Advances                                            | 0974-262X    |              |
| A-40| Donald School Journal of Ultrasound in Obstetrics and Gynecology | 0973-614X |              |
| A-41| European Journal of Science and Theology                     | 1841-0464    | 1842-8517    |
| A-42| Frontiers in Bioscience                                     | 1093-9946    |              |
| A-43| Frontiers in Bioscience - Elite                             | 1945-0494    | 1945-0508    |
| A-44| Frontiers in Bioscience - Scholar                           | 1945-0516    | 1945-0524    |
| No. | Title                                      | Print-ISSN    | E-ISSN      |
|-----|--------------------------------------------|---------------|-------------|
| A-45| Genes and Cancer                           | 1947-6019     | 1947-6027   |
| A-46| Genetics and Molecular Research            | 1676-5680     |             |
| A-47| Gland Surgery                              | 2227-684X     | 2227-8575   |
| A-48| Global and Stochastic Analysis             | 2248-9444     |             |
| A-49| Global journal of health science           | 1916-9736     | 1916-9744   |
| A-50| Hepatitis Monthly                          | 1735-143X     | 1735-3408   |
| A-51| Interdisciplinary Toxicology               | 1337-6853     | 1337-9569   |
| A-52| International Journal of Agriculture and Biology | 1560-8530  | 1814-9596   |
| A-53| International Journal of Applied Mathematics | 1311-1728     | 1314-8060   |
| A-54| International Journal of Applied Pharmaceutics | 0975-7058     |             |
| A-55| International Journal of Artificial Intelli- | 0974-0635     |             |
| A-56| International Journal of Biology and Biomedical Engineering | 1998-4510 |             |
| A-57| International Journal of Botany            | 1811-9700     | 1811-9719   |
| A-58| International Journal of Cancer Research   | 1811-9727     | 1811-9735   |
| A-59| International Journal of Circuits, Systems and Signal Processing | 1998-4464 |             |
| A-60| International Journal of Communication Networks and Information Security | 2076-0930     | 2073607X   |
| A-61| International Journal of Dairy Science     | 1811-9743     | 1811-9751   |
| A-62| International Journal of Design and Nature and Ecodynamics | 1755-7437 |             |
| A-63| International Journal of Electrochemical Science | 1452-3981 |             |
| No. | Title                                                                 | Print-ISSN   | E-ISSN     |
|-----|----------------------------------------------------------------------|--------------|------------|
| A-64| International Journal of Endocrinology and Metabolism               | 1726-913X    | 1726-9148  |
| A-65| International Journal of Energy Economics and Policy                 | 2146-4553    |            |
| A-66| International Journal of Engineering and Technology (UAE)           |              | 2227-524X  |
| A-67| International Journal of Engineering Research and Technology        | 0974-3154    |            |
| A-68| International Journal of Entrepreneurship                           | 1099-9264    |            |
| A-69| International Journal of High Risk Behaviors and Addiction          | 2251-8711    | 2251-872X  |
| A-70| International Journal of Infertility and Fetal Medicine             | 2229-3817    | 2229-3833  |
| A-71| International Journal of Life Sciences Biotechnology and Pharma Research |          | 2250-3137  |
| A-72| International Journal of Mechanical and Mechatronics Engineering    | 2227-2771    | 2077124X   |
| A-73| International Journal of Mechanics                                | 1998-4448    |            |
| A-74| International Journal of Osteoporosis and Metabolic Disorders       | 1994-5442    | 2077-2157  |
| A-75| International Journal of Pharmaceutical Sciences and Research      | 2320-5148    | 0975-8232  |
| A-76| International Journal of Pharmacology                             | 1811-7775    | 1812-5700  |
| A-77| International Journal of Poultry Science                           | 1682-8356    |            |
| A-78| International Journal of Renewable Energy Research                 | 1309-0127    |            |
| A-79| International Journal of Research in Pharmaceutical Sciences       | 0975-7538    |            |
| No.  | Title                                                      | Print-ISSN   | E-ISSN            |
|------|------------------------------------------------------------|--------------|-------------------|
| A-80 | International Journal of Safety and Security Engineering   | 2041-9031    | 2041-904X         |
| A-81 | International Journal of Smart Grid and Clean Energy       | 2315-4462    | 2373-3594         |
| A-82 | International Journal of Sustainable Development and Planning | 1743-7601    | 1743-761X         |
| A-83 | International Journal of Virology                          | 1816-4900    |                   |
| A-84 | International Journal of Zoological Research               | 1811-9778    | 1811-9786         |
| A-85 | International Research Journal of Pharmacy                 | 2230-8407    |                   |
| A-86 | Internet Journal of Gynecology and Obstetrics              | 1528-8439    |                   |
| A-87 | Internet Journal of Infectious Diseases                    | 1528-8366    |                   |
| A-88 | Internet Journal of Microbiology                           | 1937-8289    |                   |
| A-89 | Internet Journal of Neurology                              | 1531-295X    |                   |
| A-90 | Investment Management and Financial Innovations            | 1810-4967    | 1812-9358         |
| A-91 | Iranian Journal of Biotechnology                           | 1728-3043    |                   |
| A-92 | Iranian Journal of Radiology                              | 1735-1065    | 2008-2711         |
| A-93 | Iranian Red Crescent Medical Journal                       | 2074-1804    | 2074-1812         |
| A-94 | Journal of Advanced Microscopy Research                    | 2156-7573    | 2156-7581         |
| A-95 | Journal of Advanced Research in Dynamical and Control Systems | 1943-023X    |                   |
| A-96 | Journal of Advanced Research in Law and Economics          | 2068-696X    |                   |
| No. | Title                                   | Print-ISSN  | E-ISSN     |
|-----|-----------------------------------------|-------------|------------|
| A-97| Journal of Advanced Veterinary and Animal Research | 2311-7710   |            |
| A-98| Journal of Agronomy                     | 1812-5379   | 1812-5417  |
| A-99| Journal of Applied Pharmaceutical Science | 2231-3354   |            |
| A-100| Journal of Artificial Intelligence      | 1994-5450   |            |
| A-101| Journal of Biological Sciences          | 1727-3048   | 1812-5719  |
| A-102| Journal of Biomedical Nanotechnology    | 1550-7033   |            |
| A-103| Journal of Bionanoscience               | 1557-7910   | 1557-7929  |
| A-104| Journal of Business and Retail Management Research | 1751-8202   |            |
| A-105| Journal of Communications               | 1796-2021   |            |
| A-106| Journal of Comprehensive Pediatrics     | 2251-8150   | 2251-8177  |
| A-107| Journal of Computational and Theoretical Nanoscience | 1546-1955   | 1546-1963  |
| A-108| Journal of Computer Science             | 1549-3636   | 1552-6607  |
| A-109| Journal of Current Glaucoma Practice    | 0974-0333   | 0975-1947  |
| A-110| Journal of Drug and Alcohol Research    | 2090-8344   | 2090-8342  |
| A-111| Journal of Engineering and Applied Sciences | 1816-949X   | 1818-7803  |
| A-112| Journal of Entomology                  | 1812-5689   | 1812-5670  |
| A-113| Journal of Entrepreneurship Education   | 1098-8394   | 1528-2651  |
| A-114| Journal of Environmental Biology        | 0254-8704   | 2394-0379  |
| A-115| Journal of Environmental Science and Technology | 1994-7887   |            |
| A-116| Journal of Gastroenterology and Hepatology Research | 2224-3992   | 2224-6509  |
| No.   | Title                                                                 | Print-ISSN     | E-ISSN       |
|-------|-----------------------------------------------------------------------|----------------|--------------|
| A-117 | Journal of Gastrointestinal Oncology                                   | 2078-6891      | 2219-679X    |
| A-118 | Journal of HerbMed Pharmacology                                       |                | 2345-5004    |
| A-119 | Journal of IMAB - Annual Proceeding (Scientific Papers)               | 1312-773X      |              |
| A-120 | Journal of Intellectual Disability - Diagnosis and Treatment          |                | 2292-2598    |
| A-121 | Journal of Legal, Ethical and Regulatory Issues                       | 1544-0036      |              |
| A-122 | Journal of Low Power Electronics                                      | 1546-1998      | 1546-2005    |
| A-123 | Journal of Management Information and Decision Science                | 1524-7252      | 1532-5806    |
| A-124 | Journal of Medical Sciences                                           | 1682-4474      | 1812-5727    |
| A-125 | Journal of Pharmaceutical Sciences and Research                        | 0975-1459      |              |
| A-126 | Journal of Pharmacy and Nutrition Sciences                            | 2223-3806      | 1927-5951    |
| A-127 | Journal of Reviews on Global Economics                                |                | 1929-7092    |
| A-128 | Journal of RNAi and Gene Silencing                                    | 1747-0854      |              |
| A-129 | Journal of SAFOG                                                      | 0974-8938      | 0975-1920    |
| A-130 | Journal of Theoretical and Applied Information Technology             | 1992-8645      | 1817-3195    |
| A-131 | Journal of Thoracic Disease                                          | 2072-1439      | 2077-6624    |
| A-132 | Journal of World’s Poultry Research                                   |                | 2322-455X    |
| A-133 | JP Journal of Heat and Mass Transfer                                  | 0973-5763      |              |
| A-134 | Jundishapur Journal of Microbiology                                  | 2008-3645      | 2008-4161    |
| A-135 | Jundishapur Journal of Natural Pharmaceutical Products               | 1735-7780      | 2228-7876    |
| No.  | Title                                                                 | Print-ISSN   | E-ISSN    |
|------|------------------------------------------------------------------------|--------------|-----------|
| A-136| Materials Express                                                     | 2158-5849    | 2158-5857 |
| A-137| Nephro-Urology Monthly                                               | 2251-7006    | 2251-7014 |
| A-138| Oncotarget                                                            | 1949-2553    |           |
| A-139| OnLine Journal of Biological Sciences                                 | 1608-4217    | 2410-8561 |
| A-140| Open Access Macedonian Journal of Medical Sciences                    |              | 1857-9655 |
| A-141| Open Agriculture Journal                                             |              | 1874-3315 |
| A-142| Open AIDS Journal                                                    | 1874-6136    |           |
| A-143| Open Anesthesiology Journal                                          | 1874-3218    |           |
| A-144| Open Biochemistry Journal                                            | 1874-091X    |           |
| A-145| Open Bioinformatics Journal                                          | 1875-0362    |           |
| A-146| Open Biomarkers Journal                                              | 1875-3183    |           |
| A-147| Open Biomedical Engineering Journal                                   | 1874-1207    |           |
| A-148| Open Biotechnology Journal                                           | 1874-0707    |           |
| A-149| Open Cardiovascular Medicine Journal                                  | 1874-1924    |           |
| A-150| Open Chemical Engineering Journal                                     | 1874-1231    |           |
| A-151| Open Civil Engineering Journal                                       | 1874-1495    |           |
| A-152| Open Construction and Building Technology Journal                     | 1874-8368    |           |
| A-153| Open Cybernetics and Systemics Journal                               | 1874-110X    |           |
| A-154| Open Dentistry Journal                                               | 1874-2106    |           |
| A-155| Open Dermatology Journal                                             | 1874-3722    |           |
| A-156| Open Ecology Journal                                                 | 1874-2130    |           |
| A-157| Open Electrical and Electronic Engineering Journal                   | 1874-1290    |           |
| A-158| Open Fuels and Energy Science Journal                                | 1876-973X    |           |
### Table 8 (continued)

| No.   | Title                                        | Print-ISSN   | E-ISSN   |
|-------|----------------------------------------------|--------------|----------|
| A-159 | Open Hypertension Journal                    | 1876-5262    |          |
| A-160 | Open Materials Science Journal               | 1874-088X    |          |
| A-161 | Open Medicinal Chemistry Journal             | 1874-1045    |          |
| A-162 | Open Microbiology Journal                    | 1874-2858    |          |
| A-163 | Open Neurology Journal                       | 1874-205X    |          |
| A-164 | Open Nursing Journal                         | 1874-4346    |          |
| A-165 | Open Ophthalmology Journal                   | 1874-3641    |          |
| A-166 | Open Ornithology Journal                     | 1874-4532    |          |
| A-167 | Open Pain Journal                            | 1876-3863    |          |
| A-168 | Open Petroleum Engineering Journal           | 1874-8341    |          |
| A-169 | Open Psychology Journal                      |              | 1874-3501|
| A-170 | Open Public Health Journal                   | 1874-9445    |          |
| A-171 | Open Respiratory Medicine Journal            | 1874-3064    |          |
| A-172 | Open Rheumatology Journal                    | 1874-3129    |          |
| A-173 | Open Sports Sciences Journal                 | 1875-399X    |          |
| A-174 | Open Transportation Journal                  | 1874-4478    |          |
| A-175 | Open Urology and Nephrology Journal          | 1874-303X    |          |
| A-176 | Otorhinolaryngology Clinics                  | 0975-444X    |          |
| A-177 | Pakistan Journal of Biological Sciences      | 1028-8880    | 1812-5735|
| A-178 | Pakistan Journal of Nutrition                | 1680-5194    |          |
| A-179 | Pharmacologyonline                           | 1827-8620    |          |
| A-180 | Plant OMICS                                  | 1836-0661    | 1836-3644|
| A-181 | Plant Pathology Journal                      | 1812-5387    | 1812-5425|
| A-182 | Problems and Perspectives in Management      | 1727-7051    | 1810-5467|
| No. | Title                                                                 | Print-ISSN   | E-ISSN     |
|-----|------------------------------------------------------------------------|--------------|------------|
| A-183 | Problems of Education in the 21st Century                             | 1822-7864    | 2538-7111  |
| A-184 | Quantitative Imaging in Medicine and Surgery                          | 2223-4292    | 2223-4306  |
| A-185 | Research Journal of Biotechnology                                     | 0973-6263    |            |
| A-186 | Research Journal of Chemistry and Environment                          | 0972-0626    |            |
| A-187 | Research Journal of Immunology                                        | 1994-7909    | 2077-2211  |
| A-188 | Research Journal of Obstetrics and Gynecology                          | 1994-7925    | 2077-222X  |
| A-189 | Shiraz E Medical Journal                                              | 1735-1391    |            |
| A-190 | Sport Science                                                          | 1840-3662    | 1840-3670  |
| A-191 | Stem Cell Investigation                                                | 2306-9759    | 2313-0792  |
| A-192 | Studies on Ethno-Medicine                                              | 0973-5070    |            |
| A-193 | Tehnicki Vjesnik                                                      | 1330-3651    |            |
| A-194 | Translational Andrology and Urology                                   | 2223-4683    | 2223-4691  |
| A-195 | Translational Cancer Research                                         | 2218-676X    | 2219-6803  |
| A-196 | Translational Gastroenterology and Hepatology                         | 2415-1289    |            |
| A-197 | Translational Pediatrics                                              | 2224-4336    | 2224-4344  |
| A-198 | Trauma Monthly                                                         | 2251-7464    | 2251-7472  |
| A-199 | Trends in Bioinformatics                                              | 1994-7941    | 2077-2254  |
| A-200 | World Journal of Clinical Oncology                                   | 2218-4333    |            |
| A-201 | World Journal of Dentistry                                            | 0976-6006    | 0976-6014  |
| A-202 | World Journal of Diabetes                                             | 1948-9358    |            |
| A-203 | World Journal of Endocrine Surgery                                    | 0975-5039    | 0975-7902  |
| No. | Title                                               | Print-ISSN      | E-ISSN      |
|-----|-----------------------------------------------------|-----------------|-------------|
| A-204 | World Journal of Gastrointestinal Oncology        |                  | 1948-5204   |
| A-205 | World Journal of Hepatology                        |                  | 1948-5182   |
| A-206 | World Journal of Laparoscopic Surgery               | 0974-5092       |             |
| A-207 | World Journal of Oncology                          | 1920-4531       | 1920-454X   |
| A-208 | World Journal of Stem Cells                         |                  | 1948-0210   |
| A-209 | World’s Veterinary Journal                         |                  | 2322-4568   |
| A-210 | WSEAS Transactions on Applied and Theoretical Mechanics | 1991-8747       |             |
| A-211 | WSEAS Transactions on Business and Economics        | 1109-9526       |             |
| A-212 | WSEAS Transactions on Environment and Development   | 1790-5079       |             |
| A-213 | WSEAS Transactions on Fluid Mechanics               | 1790-5087       |             |
| A-214 | WSEAS Transactions on Mathematics                   | 1109-2769       |             |
| A-215 | WSEAS Transactions on Systems and Control           | 1991-8763       |             |

**Inactive Potentially Predatory Journals**

| IA-1  | Acta Medica International                          | 2349-0578       | 2349-0896   |
| IA-2  | Advances and Applications in Fluid Mechanics        | 0973-4686       |             |
| IA-3  | Advances in Ecological Sciences                     | 1369-8273       |             |
| IA-4  | Advances in Environmental Biology                   | 1995-0756       | 1998-1066   |
| IA-5  | Advances in High Performance Computing              | 1368-7638       |             |
| IA-6  | Advances in Information Sciences and Service Sciences | 1976-3700       | 2233-9345   |
| No. | Title                                           | Print-ISSN  | E-ISSN    |
|-----|-------------------------------------------------|-------------|-----------|
| IA-7| Advances in Natural and Applied Sciences        | 1995-0772   |           |
| IA-8| African Journal of Agricultural Research        | 1991-637X   |           |
| IA-9| African Journal of Biotechnology                | 1684-5315   |           |
| IA-10| African Journal of Microbiology Research        | 1996-0808   |           |
| IA-11| African Journal of Pharmacy and Pharmacology    | 1996-0816   |           |
| IA-12| American-Eurasian Journal of Sustainable Agriculture | 1995-0748 | 1998-1074 |
| IA-13| Archives of Inequalities and Applications       | 1542-6149   | 1542-6181 |
| IA-14| Australian Journal of Basic and Applied Sciences| 1991-8178   |           |
| IA-15| Biotechnology                                   | 0733-222X   |           |
| IA-16| Educational Research and Reviews                | 1990-3839   |           |
| IA-17| Experimental and Clinical Cardiology            | 1205-6626   |           |
| IA-18| Far East Journal of Mathematical Sciences       | 0972-0871   |           |
| IA-19| Genetic Engineering and Biotechnology Journal   | 2150-3516   |           |
| IA-20| HealthMED                                       | 1840-2291   |           |
| IA-21| Immunome Research                               | 1745-7580   |           |
| IA-22| Information Technology Journal                  | 1812-5638   | 1812-5646 |
| IA-23| International Journal of Advancements in Computing Technology | 2005-8039 |           |
| IA-24| International Journal of Applied Environmental Sciences | 0973-6077 | 0974-0260 |
| No. | Title                                                                 | Print-ISSN   | E-ISSN       |
|-----|-----------------------------------------------------------------------|--------------|--------------|
| IA-25 | International Journal of Burns and Trauma                             | 2160-2026    |              |
| IA-26 | International Journal of Clinical and Experimental Medicine           | 1940-5901    |              |
| IA-27 | International Journal of Clinical and Experimental Pathology         | 1936-2625    |              |
| IA-28 | International Journal of Collaborative Research on Internal Medicine and Public Health | 1840-4529    |              |
| IA-29 | International Journal of Computational and Mathematical Sciences      | 2070-3910    |              |
| IA-30 | International Journal of Design and Nature                            | 1744-3687    | 1744-3679    |
| IA-31 | International Journal of Digital Content Technology and its Applications | 1975-9339    |              |
| IA-32 | International Journal of Ecodynamics                                 | 1743-5242    |              |
| IA-33 | International Journal of Genetics and Molecular Biology               | 2006-9863    |              |
| IA-34 | International Journal of Health Research                             | 1596-9886    | 1596-9819    |
| IA-35 | International Journal of Imaging and Robotics                        | 2231-525X    |              |
| IA-36 | International Journal of Information Processing and Management       | 2093-4009    | 2233940X     |
| IA-37 | International Journal of Molecular Epidemiology and Genetics         | 1948-1756    |              |
| IA-38 | International Journal of Perioperative Ultrasound and Applied Technologies | 2277-7466   | 2277-7474    |
| IA-39 | International Journal of Pharmaceutical and Phytopharmacological Research | 2250-1029    | 2249-6084    |
| No. | Title                                                                 | Print-ISSN     | E-ISSN       |
|-----|------------------------------------------------------------------------|----------------|--------------|
| IA-40 | International Journal of Physical Sciences                           | 1992-1950      |              |
| IA-41 | International Journal of Physiology, Pathophysiology and Pharmacology | 1944-8171      |              |
| IA-42 | International Journal of Tomography and Simulation                   |                | 2319-3336    |
| IA-43 | International Series on Advances in Boundary Elements                 | 1460-1419      |              |
| IA-44 | Internet Journal of Academic Physician Assistants                    | 1092-4078      |              |
| IA-45 | Internet Journal of Advanced Nursing Practice                        | 1523-6064      |              |
| IA-46 | Internet Journal of Asthma, Allergy and Immunology                   | 1532-0642      |              |
| IA-47 | Internet Journal of Biological Anthropology                          | 1939-4594      |              |
| IA-48 | Internet Journal of Cardiology                                        | 1528-834X      |              |
| IA-49 | Internet Journal of Cardiovascular Research                           | 1540-2592      |              |
| IA-50 | Internet Journal of Dermatology                                      | 1531-3018      |              |
| IA-51 | Internet Journal of Epidemiology                                     | 1540-2614      |              |
| IA-52 | Internet Journal of Hematology                                       | 1540-2649      |              |
| IA-53 | Internet Journal of Internal Medicine                                | 1528-8382      |              |
| IA-54 | Internet Journal of Law, Healthcare and Ethics                       | 1528-8250      |              |
| IA-55 | Internet Journal of Mental Health                                     | 1531-2941      |              |
| IA-56 | Internet Journal of Oncology                                         | 1528-8331      |              |
| No. | Title                                                                 | Print-ISSN | E-ISSN         |
|-----|----------------------------------------------------------------------|------------|---------------|
| IA-57 | Internet Journal of Pain, Symptom Control and Palliative Care      | 1528-8277 |               |
| IA-58 | Internet Journal of Pediatrics and Neonatology                      | 1528-8374 |               |
| IA-59 | Internet Journal of Pharmacology                                    | 1531-2976 |               |
| IA-60 | Internet Journal of Pulmonary Medicine                             | 1531-2984 |               |
| IA-61 | Internet Journal of Third World Medicine                            | 1539-4646 |               |
| IA-62 | Internet Journal of Toxicology                                     | 1559-3916 |               |
| IA-63 | Internet Journal of Tropical Medicine                              | 1540-2681 |               |
| IA-64 | Journal of Applied Sciences Research                               | 1816-157X |               |
| IA-65 | Journal of Biobased Materials and Bioenergy                        | 1556-6560 | 1556-6579     |
| IA-66 | Journal of Biomaterials and Tissue Engineering                     | 2157-9083 | 2157-9091     |
| IA-67 | Journal of Clinical and Analytical Medicine                        | 1309-0720 | 1309-2014     |
| IA-68 | Journal of Convergence Information Technology                      | 1975-9320 |               |
| IA-69 | Journal of Epithelial Biology and Pharmacology                     | 1875-0443 |               |
| IA-70 | Journal of Holography and Speckle                                  | 1546-900X |               |
| IA-71 | Journal of Medical Imaging and Health Informatics                   | 2156-7018 | 2156-7026     |
| IA-72 | Journal of Medicinal Plant Research                                | 1996-0875 |               |
| IA-73 | Journal of Nanoneuroscience                                        | 1939-0637 | 1939-0653     |
| IA-74 | Journal of Nanoscience and Nanotechnology                         | 1533-4880 |               |
| No. | Title                                                   | Print-ISSN   | E-ISSN   |
|-----|---------------------------------------------------------|--------------|----------|
| IA-75 | Journal of Next Generation Information Technology     | 2092-8637    |          |
| IA-76 | Journal of Scanning Probe Microscopy                   | 1557-7937    |          |
| IA-77 | JP Journal of Algebra, Number Theory and Applications  | 0972-5555    |          |
| IA-78 | JP Journal of Geometry and Topology                    | 0972-415X    |          |
| IA-79 | Metalurgia International                              | 1582-2214    |          |
| IA-80 | Nanoscience and Nanotechnology Letters                 | 1941-4900    | 1941-4919|
| IA-81 | Open Allergy Journal                                  | 1874-8384    |          |
| IA-82 | Open Andrology Journal                                | 1876-827X    |          |
| IA-83 | Open Applied Mathematics Journal                       | 1874-1142    |          |
| IA-84 | Open Arthritis Journal                                | 1876-5394    |          |
| IA-85 | Open Atmospheric Science Journal                       |              | 1874-2823|
| IA-86 | Open Autoimmunity Journal                             | 1876-8946    |          |
| IA-87 | Open Automation and Control Systems Journal            | 1874-4443    |          |
| IA-88 | Open Bioactive Compounds Journal                       | 1874-8473    |          |
| IA-89 | Open Biology Journal                                  | 1874-1967    |          |
| IA-90 | Open Bone Journal                                     | 1876-5254    |          |
| IA-91 | Open Breast Cancer Journal                            | 1876-8172    |          |
| IA-92 | Open Cancer Immunology Journal                         | 1876-4010    |          |
| IA-93 | Open Cancer Journal                                   | 1874-0790    |          |
| IA-94 | Open Cardiovascular Imaging Journal                    | 1876-5386    |          |
| IA-95 | Open Catalysis Journal                                | 1876-214X    |          |
| IA-96 | Open Chemical and Biomedical Methods Journal           | 1875-0389    |          |
| No.  | Title                                           | Print-ISSN  | E-ISSN  |
|------|------------------------------------------------|-------------|---------|
| IA-97| Open Clinical Cancer Journal                    | 1874-1894   |         |
| IA-98| Open Clinical Chemistry Journal                 | 1874-2416   |         |
| IA-99| Open Clinical Trials Journal                    | 1876-8210   |         |
| IA-100| Open Colorectal Cancer Journal                  | 1876-8202   |         |
| IA-101| Open Communication Journal                      | 1874-916X   |         |
| IA-102| Open Complementary Medicine Journal             | 1876-391X   |         |
| IA-103| Open Conservation Biology Journal               | 1874-8392   |         |
| IA-104| Open Critical Care Medicine Journal             | 1874-8287   |         |
| IA-105| Open Diabetes Journal                           | 1876-5246   |         |
| IA-106| Open Drug Delivery Journal                      | 1874-1266   |         |
| IA-107| Open Drug Discovery Journal                     | 1877-3818   |         |
| IA-108| Open Drug Metabolism Journal                    | 1874-0731   |         |
| IA-109| Open Drug Safety Journal                        | 1876-8180   |         |
| IA-110| Open Environmental Sciences                     | 1876-3251   |         |
| IA-111| Open Enzyme Inhibition Journal                  | 1874-9402   |         |
| IA-112| Open Epidemiology Journal                       | 1874-2971   |         |
| IA-113| Open Gene Therapy Journal                       | 1875-0370   |         |
| IA-114| Open General and Internal Medicine Journal      | 1874-0766   |         |
| IA-115| Open Genomics Journal                           | 1875-693X   |         |
| IA-116| Open Geography Journal                          | 1874-9232   |         |
| IA-117| Open Glycoscience                               | 1875-3981   |         |
| IA-118| Open Health Services and Policy Journal         | 1874-9240   |         |
| IA-119| Open Heart Failure Journal                      | 1876-5351   |         |
| IA-120| Open Hematology Journal                         | 1874-2769   |         |
| No. | Title                                                   | Print-ISSN | E-ISSN     |
|-----|---------------------------------------------------------|------------|------------|
| IA-121 | Open Immunology Journal                               | 1874-2262  |            |
| IA-122 | Open Longevity Science                                 | 1876-326X  |            |
| IA-123 | Open Lung Cancer Journal                               | 1876-8199  |            |
| IA-124 | Open Magnetic Resonance Journal                       | 1874-7698  |            |
| IA-125 | Open Mathematics Journal                               | 1874-1177  |            |
| IA-126 | Open Mechanical Engineering Journal                    | 1874-155X  |            |
| IA-127 | Open Mechanics Journal                                 | 1874-1584  |            |
| IA-128 | Open Medical Devices Journal                           | 1875-1814  |            |
| IA-129 | Open Medical Imaging Journal                           | 1874-3471  |            |
| IA-130 | Open Nanomedicine Journal                              | 1875-9335  |            |
| IA-131 | Open Natural Products Journal                          | 1874-8481  |            |
| IA-132 | Open Neuroendocrinology Journal                        | 1876-5289  |            |
| IA-133 | Open Neuropsychopharmacology Journal                   | 1876-5238  |            |
| IA-134 | Open Neuroscience Journal                              | 1874-0820  |            |
| IA-135 | Open Neurosurgery Journal                              | 1876-5297  |            |
| IA-136 | Open Nuclear Medicine Journal                          | 1876-388X  |            |
| IA-137 | Open Nutraceuticals Journal                            | 1876-3960  |            |
| IA-138 | Open Obesity Journal                                   | 1876-8237  |            |
| IA-139 | Open Parasitology Journal                              | 1874-4214  |            |
| IA-140 | Open Pharmacoeconomics and Health Economics Journal    | 1876-8245  |            |
| IA-141 | Open Pharmacology Journal                              | 1874-1436  |            |
| IA-142 | Open Political Science Journal                         | 1874-9496  |            |
| IA-143 | Open Prostate Cancer Journal                           | 1876-8229  |            |
| IA-144 | Open Proteomics Journal                                | 1875-0397  |            |
| IA-145 | Open Signal Processing Journal                         | 1876-8253  |            |
| No.  | Title                                                                 | Print-ISSN | E-ISSN   |
|------|------------------------------------------------------------------------|------------|----------|
| IA-146 | Open Spine Journal                                                    | 1876-5327  |          |
| IA-147 | Open Stem Cell Journal                                                | 1876-8938  |          |
| IA-148 | Open Structural Biology Journal                                       | 1874-1991  |          |
| IA-149 | Open Surgical Oncology Journal                                        | 1876-5041  |          |
| IA-150 | Open Tissue Engineering and Regenerative Medicine Journal              | 1875-0435  |          |
| IA-151 | Open Toxicology Journal                                               | 1874-3404  |          |
| IA-152 | Open Toxicology Journal                                               | 1875-4147  |          |
| IA-153 | Open Translational Medicine Journal                                   | 1876-3995  |          |
| IA-154 | Open Transplantation Journal                                          | 1874-4184  |          |
| IA-155 | Open Transport Phenomena Journal                                      | 1877-7295  |          |
| IA-156 | Open Tropical Medicine Journal                                        | 1874-3153  |          |
| IA-157 | Open Vaccine Journal                                                  | 1875-0354  |          |
| IA-158 | Open Women’s Health Journal                                          | 1874-2912  |          |
| IA-159 | Pharmaceutical Reviews                                                | 1918-5561  |          |
| IA-160 | Plant Pathology Journal                                               | 1812-5387  | 1812-5425|
| IA-161 | Scholarly Research Exchange                                           | 1687-8299  | 1687-8302|
| IA-162 | Science of Advanced Materials                                         | 1947-2935  | 1947-2943|
| IA-163 | Scientific Research and Essays                                        | 1992-2248  |          |
| IA-164 | Stem Cell                                                             | 1945-4570  | 1945-4732|
| IA-165 | Technics Technologies Education Management                             | 1840-1503  |          |
| IA-166 | Vascular Disease Prevention                                            | 1567-2700  |          |
| IA-167 | World Academy of Science, Engineering and Technology                  | 2010-376X  | 2010-3778|
| IA-168 | World Journal of Cardiology                                           | 1949-8462  |          |
## Table 8 (continued)

| No.   | Title                                      | Print-ISSN | E-ISSN  |
|-------|--------------------------------------------|------------|---------|
| IA-169| WSEAS Transactions on Computer Research    | 1991-8755  |         |
| IA-170| WSEAS Transactions on Electronics          | 1109-9445  |         |
Acknowledgements The authors would like to thank Dmitrii Marin (University of Waterloo, Canada) and Alexei Lutay (Russian Foundation for Basic Research, Russia) for helpful detail feedback and stimulating discussions.

References

Ajuwon, G., & Ajuwon, A. (2018). Predatory publishing and the dilemma of the nigerian academic. *African Journal of Biomedical Research, 21*(1), 1–5.

Bagues, M., Sylos-Labini, M., & Zinovyeva, N. (2017). A walk on the wild side: 'predatory' journals and information asymmetries in scientific evaluations. *IZA Discussion Papers (11041).*

Balehegn, M. (2017). Increased publication in predatory journals by developing countries’ institutions: What it entails? and what can be done? *International Information and Library Review, 49*(2), 97–100. https://doi.org/10.1080/10572317.2016.1278188.

Beall, J. (2009). Bentham open. *The Charleston Advisor, 11*(1), 29–32.

Beall, J. (2010). “Predatory” open-access scholarly publishers. *The Charleston Advisor, 11*(4), 10–17.

Beall, J. (2016a). Beall’s list: Potential, possible, or probable predatory scholarly open-access publishers. https://web.archive.org/web/20160801084124/, https://scholarlyoa.com/publishers/ (archived ed. 2016-08-1)

Beall, J. (2016b). List of standalone journals: Potential, possible, or probable predatory scholarly open-access journals. https://web.archive.org/web/20160721165856/https://scholarlyoa.com/individual-journals/ (archived ed. 2016-07-21)

Beall, J. (2017). What I learned from predatory publishers. *Biochemia Medica, 27*(2), 273–279.

Berger, M., & Cirasella, J. (2015). Beyond beall’s list: Better understanding predatory publishers. *College and Research Libraries News, 76*(3), 132–135.

Biagioli, M., & Lippman, A. (Eds.). (2020). *Gaming the Metrics: Misconduct and Manipulation in Academic Research.* The MIT Press.

Biagioli, M., Kenney, M., Martin, B., & Walsh, J. (2019). Academic misconduct, misrepresentation and gaming: A reassessment. *Research Policy, 48*(2), 401–413.

Bloudoff-Indelicato, M. (2015). Backlash after frontiers journals added to list of questionable publishers. *Nature, 526*(7575), 613. https://doi.org/10.1038/526613f.

Bohannon, J. (2013). Who’s afraid of peer review? *Science, 342*(6154), 60–65.

Colwell, R., Blouw, M., Butler, L., Cozzens, S., Feller, I., Gingras, Y., & Makarow, M. (2012). Informing research choices: Indicators and judgment. The Expert Panel on Science Performance and Research Funding.

Cortegiani, A., Ippolito, M., Ingoglia, G., Manca, A., Cugusi, L., Severin, A., Strinzel, M., Panzarella, V., Campisi, G., Manoj, L. et al. (2020) Citations and metrics of journals discontinued from scopus for publication concerns: the ghos(t)copus project [version 2]. F1000Research 9:415, https://doi.org/10.12688/f1000research.23847.2.

Crawford, W. (2014). Ethics and access 1: The sad case of Jeffrey Beall. *Cites and Insights, 14*(4), 1–14.

Cyranoski, D. (2018). China awaits controversial blacklist of ‘poor quality’ journals. *Nature, 562*(7728), 471–472. https://doi.org/10.1038/d41586-018-07025-5.

Dahler-Larsen, P. (2011). *The Evaluation Society.* Stanford: Stanford University Press.

Davis, P. (2009). Open access publisher accepts nonsense manuscript for dollars. Retrieved from The Scholarly Kitchen: https://scholarlykitchen.sspnet.org/2009/06/10/nonsense-for-dollars/

Eriksson, S., & Helgesson, G. (2016). Where to publish and not to publish in bioethics. Retrieved from The Ethics Blog: https://ethicsblog.crb.uu.se/2016/04/19/where-to-publish-and-not-to-publish-in-bioethics/

Eriksson, S., & Helgesson, G. (2017). The false academy: Predatory publishing in science and bioethics. *Medicine, Health Care and Philosophy, 20*(2), 163–170. https://doi.org/10.1007/s11019-016-9740-3.

Esposito, J. (2013). Esposito J (2013) Parting company with jeffrey beall. Retrieved from The Scholarly Kitchen: https://scholarlykitchen.sspnet.org/2013/12/16/parting-company-with-jeffrey-beall/

Gläser, J., Lange, S., Laudel, G., & Schimank, U. (2010). Informed authority? the limited use of research evaluation systems for managerial control in universities. In R. Whitley, J. Gläser, & L. Engwall (Eds.), *Reconfiguring Knowledge Production: Changing Authority Relationships in the Sciences and Their Consequences for Intellectual Innovation* (pp. 149–369). Oxford: Oxford University Press.

Guerrero-Bote, V., & Moya-Anegón, F. (2012). A further step forward in measuring journals’ scientific prestige: The sjr2 indicator. *Journal of Informetrics, 6*(4), 674–688. https://doi.org/10.1016/j.joi.2012.07.001.
Harzing, A. W., & Alakangas, S. (2016). Google scholar, scopus and the web of science: a longitudinal and cross-disciplinary comparison. *Scientometrics, 106*(2), 787–804. https://doi.org/10.1007/s11192-015-1798-9.

Ibba, S., Pani, F., Stockton, J., Barabino, G., Marchesi, M., & Tigano, D. (2017). Incidence of predatory journals in computer science literature. *Library Review, 66*(6–7), 505–522. https://doi.org/10.1108/LR-12-2016-0108.

Kruskal, W. H., & Wallis, W. A. (1952). Use of ranks in one-criterion variance analysis. *Journal of the American Statistical Association, 47*(260), 583–621. https://doi.org/10.1080/01621459.1952.10483441.

Leydesdorff, L., Wouters, P., & Bornmann, L. (2016). Professional and citizen bibliometrics: Complementarities and ambivalences in the development and use of indicators—a state-of-the-art report. *Scientometrics, 109*(3), 2129–2150. https://doi.org/10.1007/s11192-016-2150-8.

Lin, S., & Zhan, L. (2014). Trash journals in China. *Learned Publishing, 27*(2), 145–154. https://doi.org/10.1087/20140208.

Machacek, V., & Srholec, M. (2017). Predatory journals in scopus. Project report, http://idea-en.cERGE-EI.cz/files/IDEA_Study_2_2017_Predatory_journals_in_Scopus/mobile/index.html#p=3, available at: http://idea-en.cERGE-EI.cz/files/IDEA_Study_2_2017_Predatory_journals_in_Scopus/mobile/index.html#p=3.

Machacek, V., & Srholec, M. (2019). Predatory publications in scopus: Evidence on cross-country differences.

Moed, H., Bar-Ilan, J., & Halevi, G. (2016). A new methodology for comparing google scholar and scopus. *Journal of Informetrics, 10*(2), 533–551. https://doi.org/10.1016/j.joi.2016.04.017.

Moed, H., Markusova, V., & Akoev, M. (2018). Trends in russian research output indexed in scopus and web of science. *Scientometrics, 116*(2), 1153–1180. https://doi.org/10.1007/s11192-018-2769-8.

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of web of science and scopus: a comparative analysis. *Scientometrics, 106*(1), 213–218. https://doi.org/10.1007/s11192-015-1765-5.

Mouton, J., & Valentine, A. (2017). The extent of South African authored articles in predatory journals. *South African Journal of Science, 113*(7–8), 1–9.

Nwagwu, W. E., & Ojemeni, O. (2015). Penetration of Nigerian predatory biomedical open access journals 2007–2012: A bibliometric study. *Learned Publishing, 28*(1), 23–34.

Önder, Ç., & Erdil, S. (2017). Opportunities and opportunism: Publication outlet selection under pressure to increase research productivity. *Research Evaluation, 26*(2), 66–77. https://doi.org/10.1093/reseval/rvx006.

Rijcke, S., Wouters, P. F., Rushforth, A. D., Franssen, T. P., & Hammarfelt, B. (2016). Evaluation practices and effects of indicator use—a literature review. *Research Evaluation, 25*(2), 161–169. https://doi.org/10.1093/reseval/rvv038.

Roland, M. C. (2007). Publish and perish. Hedging and fraud in scientific discourse. *EMBO Reports, 8*(5), 424–428. https://doi.org/10.1038/sj.embor.7400964.

Savina, T., & Sterligov, I. (2016). Potentially predatory journals in scopus: Descriptive statistics and country-level dynamics [nwb2016 presentation slides. In 21st Nordic Workshop on Bibliometrics and Research Policy, https://doi.org/10.6084/m9.figshare.4249394.v1.

Shamseer, L., Moher, D., Maduekwe, O., Turner, L., Barbour, V., Burch, R., et al. (2017). Potential predatory and legitimate biomedical journals: Can you tell the difference? A cross-sectional comparison. *BMC Medicine, 15* (28). https://doi.org/10.1186/s12916-017-0785-9.

Shen, C., & Björk, B. C. (2015). “Predatory” open access: a longitudinal study of article volumes and market characteristics. *BMC Medicine, 13*, 230. https://doi.org/10.1186/s12916-.

Steele, C., Butler, L., & Kingsley, D. (2006). The publishing imperative: the pervasive influence of publication metrics. *Learned Publishing, 19*(4), 277–290. https://doi.org/10.1087/095315106778690751.

Sterligov, I. (2020). Why blacklists matter. In *Corruption in Higher Education, Brill Sense*, p 49–56. https://doi.org/10.1163/9789004433885_008.

Sterligov, I., & Savina, T. (2016). Riding with the metric tide: “predatory” journals in scopus. *Higher Education in Russia and Beyond, 1*(7), 9–12.

Waltman, L. (2016). A review of the literature on citation impact indicators. *Journal of Informetrics, 10*(2), 365–391. https://doi.org/10.1016/j.joi.2016.02.007.

Waltman, L., Eck, N., Leeuwren, T., & Visser, M. (2013). Some modifications to the snip journal impact indicator. *Journal of Informetrics, 7*(2), 272–285. https://doi.org/10.1016/j.joi.2012.11.011.

Weingart, P. (2005). Impact of bibliometrics upon the science system: Inadvertent consequences? *Scientometrics, 62*(1), 117–131. https://doi.org/10.1007/s11192-005-0007-7.

Wilsdon, J., Allen, L., Belfiore, E., Campbell, P., Curry, S., Hill, S., Jones, R., Kain, R., Kerridge, S., Thelwall, M., Tinkler, J., Viney, I., Wouters, P., Hill, J., & Johnson, B. (2015). The metric tide. Report of
the Independent Review of the Role of Metrics in Research Assessment and Management https://doi.org/10.13140/RG.2.1.4929.1363.

Wouters, P., Thelwall, M., Kousha, K., Waltman, L., Rijcke de, S., Rushforth, A., & Franssen, T. (2015). The metric tide: Literature review (supplementary report i to the independent review of the role of metrics in research assessment and management. HEFCE https://doi.org/10.13140/RG.2.1.5066.3520.

Xia, J., Harmon, J., Connolly, K., Donnelly, R., Anderson, M., & Howard, H. (2015). Who publishes in “predatory” journals? Journal of American Society for Information Science and Technology, 66(7), 1406–1417. https://doi.org/10.1002/asi.23265.

Xia, J., Li, Y., & Situ, P. (2017). An overview of predatory journal publishing in asia. Journal of East Asian Libraries 2017(165):4, https://scholarsarchive.byu.edu/jeal/vol2017/iss165/4., available at: