THE PREDATORY JOURNAL: VICTIMIZER OR VICTIM?

| T. Grandon Gill | University of South Florida, Tampa, FL, USA | grandon@usf.edu |

ABSTRACT

Aim/Purpose	Labeling a journal as "predatory" can do great damage to the journal and the individuals that have contributed to it. This paper considers whether the predatory classification has outlived its usefulness and what might replace it.
Background	With the advent of open access publishing, the term "predatory" has increasingly been used to identify academic journals, conferences, and publishers whose practices are driven by profit or self-interest rather than the advancement of science. Absent clear standards for determining what is predatory and what is not, concerns have been raised about the misuse of the label.
Methodology	Mixed methods: A brief review of the literature, some illustrative case studies, and conceptual analysis.
Contribution	The paper provides recommendations for reducing the impact of illegitimate journals.
Findings	Current predatory classifications are being assigned with little or no systematic research and virtually no accountability. The predatory/not predatory distinction does not accommodate alternative journal missions.
Recommendations for Researchers	The distinction between legitimate and illegitimate journals requires consideration of each journal's mission. To serve as a useful guide, a process akin to that used for accrediting institutions needs to be put in place.
Impact on Society	Avoiding unnecessary damage to the careers of researchers starting out.
Future Research	Refining the initial classification scheme proposed in the paper.
Keywords	predatory journals, peer review, replication, complexity, scientific research

INTRODUCTION

What makes a journal or publisher "predatory"? Since University of Colorado librarian Jeffrey Beall first popularized the term in a 2012 *Nature News* article, research interest in this question has grown, as illustrated in Figure 1. With the growth in the predatory label's popularity, the number of journals

and publishers characterized as "predatory" or "potentially predatory" has grown correspondingly. What is less clear is whether the characterization is always, or even mostly, warranted. Since being classified as predatory does indisputable damage to a journal's reputation and that of the authors that have published in it—often unknowingly—the question posed by this paper is one that should be of great interest to researchers across nearly every discipline.
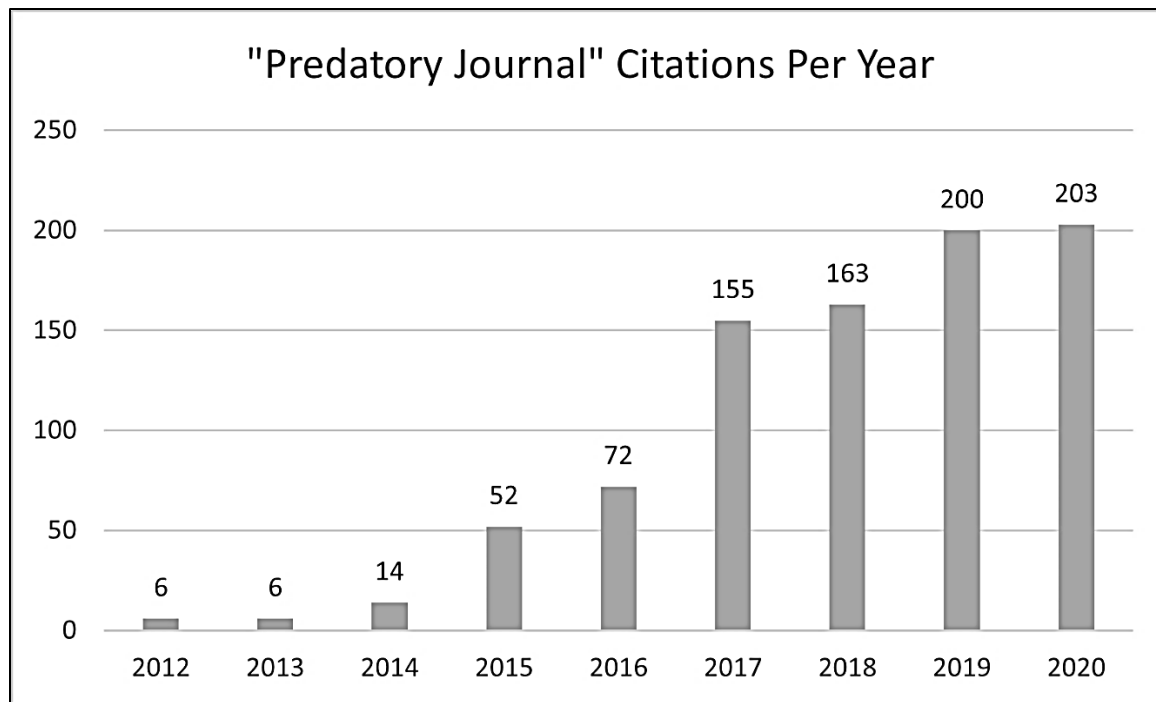

Figure 1: Article counts from Google Scholar search of "predatory journal" compiled using Harzing's "Publish or Perish".

I begin this article with an overview of the rapidly growing body of literature that addresses predatory journals and publishing practices. Of particular interest in this review were the following:

1. The attributes or indicators that cause a journal to be characterized as predatory.
2. The perceived stakeholders that are damaged by predatory journals, with emphasis placed on concrete examples of damage.
3. The domain of concern (e.g., humanities, life sciences, social sciences, etc.), where specified.
4. The geographic region of concern, where specified.
5. The underlying research approach (e.g., empirical, conceptual, opinion).

The review is followed by an analysis of some of the key elements that lead to a journal being placed on a list of predatory journals, as identified in the literature review. Most significant among these are publication fees, the peer review process, focus, and quality of the editorial board. In each of these cases, I propose that policies that may be indicative of predatory objectives in one context can represent sensible choices in another context.

To illustrate the challenge of distinguishing what is predatory from what is not, I then present two case studies of organizations that have been tarnished with the "predatory" or "potentially predatory" label. Based on my own observations and experiences, I present the argument that such a label makes little sense. To the contrary, these organizations go to great effort and expense to offer value to the research community through their mentoring activities and the opportunities they provide to researchers with limited access to the resources of the well-funded research-intensive institutions of the Western world. Building upon the cases, I then propose that the predatory/non-predatory classification should be eliminated entirely. Instead, a legitimate/illegitimate distinction would better address

the genuine need to identify bad actors in the journal world. I further propose that within the space of legitimate journals, mission-specific categories—such as competitive, exploratory, translational, and developmental—be established. Journals should then be assessed according to the consistency of their practices with the mission categories that they have adopted. Such an approach would parallel that used by agencies in accrediting institutions. I conclude the paper with some specific recommendations on how to reduce the damage inflicted by illegitimate journals.

LITERATURE REVIEW

As shown previously in Figure 1, the amount of literature examining the nature and impact of predatory journals is expanding rapidly. In this section, I briefly consider what has been written. I begin by describing the methodology employed, then present a summary of key findings. I conclude the section with proposed approaches to addressing the problem and summarize research expressing concerns about the process through which these so-called predatory journals are currently identified.

METHODOLOGY

In conducting the literature review, my goal was to understand better how the academic community perceived the challenge presented by predatory journals. Given the relatively recent nature of most of the literature (e.g., more than 80% of the articles identified in Figure 1 were published in the past 4 years), seminal contributions could not be identified—aside from Beall's (2012) original one-page article. For that reason, I followed a protocol that seemed likely to yield a relatively broad overview of the perceptions of the research community. The protocol was as follows:

1. All the articles listed in the top 10 pages of a Google Scholar search conducted at the end of December 2020 were identified (100 articles total).

2. Electronic copies of all articles were retrieved, excepting books, articles not accessible through my institution's library, and articles that were clearly not relevant. This process reduced the number to 87 articles.

3. I skimmed each article looking for key elements:

    a. *What broad area was the article applied to?* Examples included life sciences, such as medicine, biology, and nursing (40), library or information science (36), social sciences (7), general research (3), and engineering (1).

    b. *Was the article tied to a specific locality?* 10 articles were tied to a specific region. These included India, Africa, Middle East, Pakistan, and Italy.

    c. *What stakeholders were potentially damaged by predatory publishing?* Examples were authors (35), institutions (17), publishers (7), reviewers (2), and the broader community (1). Nearly half (40) expressed explicit concerns regarding the impact of these journals on the field (i.e., the underlying science) in which they were published, and nearly all appeared to express the concern implicitly.

    d. *Were empirical findings were presented?* Thirty-two articles described empirical research conducted by the authors, usually bibliometric in nature.

    e. *Was a solution to the problem of predatory publications proposed?* 11 articles proposed one or more potential solutions.

    f. *Were concerns expressed regarding the validity and reliability of how journals were classified?* 22 articles expressed concerns about the process, particularly the danger of labeling a legitimate journal as predatory.

4. Results were tabulated in a spreadsheet. An additional column was added for illustrative quotes from each article.

KEY FINDINGS

In analyzing the research literature relating to predatory publishing, a set of commonly discussed themes emerged:

- Indicators of a predatory journal
- Awareness of predatory journals
- Damage inflicted on various stakeholders by predatory journals
- Proposals for reducing predatory publishing
- Reservations relating to the current conceptions of predatory publishing.

These themes are now briefly explored.

Indicators of a predatory journal

The most referenced indicators of a predatory journal are summarized in Table 1. Many of these are also included in a list of criteria for determining predatory open-access publishers developed by Jeffrey Bell (2015a).

Table 1: Common Indicators of a Predatory Journal

Indicator	Description	Illustrative Quotes
Publication Fees	The journal charges a publication fee inconsistent with its costs and may hide the existence of the fee until after an article is accepted.	"Some predatory publishers spam researchers, soliciting manuscripts but failing to mention the required author fee. Later, after the paper is accepted and published, the authors are invoiced for the fees, typically US$1,800. Because the scientists are often asked to sign over their copyright to the work as part of the submission process (against the spirit of open access) they feel unable to withdraw the paper and send it elsewhere." Beall, 2012, p. 179)
Peer Review	Peer review processes are inadequate, not followed or inadequately disclosed.	"Predatory journals have, at last, had the tables turned on them with stings to show their peer review processes are flawed or, more commonly, non-existent. This is critical as too many seem unaware of the lack of peer review and the damage that causes. A particularly classic example, if you can excuse the salty language, is the paper by David Mazieres and Eddie Kohler published in the journal International Journal of Advanced Computer Technology and entitled 'Get me off your f****** mailing list.' That particular paper literally consisted of nothing more than repeating the text of the article's title, including the expletive, hundreds of times. The manuscript was accepted for publication." (Roberts, 2016b, p. 619)
Speed of Publication	Very rapid submission to publication times experienced or advertised.	"Predatory journals may seem attractive, with their scaled-down publication times (in return for payment), but are really not to be recommended: such speedy treatment does not allow time for proper reviewing, and there is little assurance that the publication will stay in the scientific field for very long." (Laccourreye et al., 2018; p. 39)
Failure to Follow Publishing and Preservation Standards	Journals do not assign DOIs to articles and fail to ensure they are archived for future readers.	"Few predatory publishers practice digital preservation according to established standards, and fewer, I think, even know what it is. I suspect that few back up their content, and I have documented cases of publishers disappearing from the Internet, their content forever lost." (Beall, 2015b; p. 474-475)

Inadequate Quality Control	Articles were published with significant grammatical and spelling errors that should have been caught with rudimentary proofing.	"Two hundred thirty-three articles (65.6%) had documented errors in writing and included all the errors on the review form, plus others such as the use of colloquial language, overuse of abbreviations, incomplete sentences, and awkward phrasing. The obvious inadequate use of the English language is one red flag that should alert readers to the fact that many of the articles in predatory journals are not suitable as citations or as evidence to guide practice. Many of the articles that reflected inadequate English were by authors for whom English is likely a second language. However, blatant grammatical problems also occurred in articles from English-language countries written by authors with Eurocentric names. Although perfection in publication is an elusive goal, there should be processes in place, including copyediting, that ensures that the final published article is factually correct and professionally presented." (Oermann et al., 2018, p. 9)
Inadequate Verification of Submission Authenticity	Failure to take basic steps to prevent plagiarism and misattribution.	"We discovered one journal that published plagiarized content from another and vice versa. This was identified by a member of the review team who found one article to be very similar to an article already reviewed. Further investigation (reading the articles side by side) revealed that the title was modified, different authors were listed, and the location and affiliation of the authors were changed. The first and second sentences of the abstract and of the article were slightly rewritten, but beyond that, the rest of the text was identical. This prompted us to rereview the randomly selected articles from the two journals wherein it was found that all the content was plagiarized in this way. A spot check of additional articles in the journals suggested that they contained 100% plagiarized content, which between them accounted for 163 published articles. Interestingly, these journals were published by different publishers. Both journals have names that are similar to the titles of legitimate, nonpredatory journals— in one case, the name varies by only one letter, creating an additional layer of confusion for a reader." (Oermann et al., 2018, p. 9)
Failure to Safeguard Intellection Property	Reviewers or editors take authors ideas and use them without proper attribution and may even interfere with a manuscript's publication for their personal benefit.	"A study conducted by Resnik et al. reported unethical and unfortunate evidences [sic] of predatory reviewers stealing original authors' ideas and purposely delaying their publications. It was reported that among study participants including researchers, research staff, postdoctoral trainees, and technicians working at the National Institute of Environmental Health Sciences, 6.8% of the respondents reported experiencing predatory reviewers breaching the confidentiality of their manuscript submission, they also reported that predatory reviewers unethically used their ideas or data without their will and permission to gain personal benefits. About 9.2% respondents claimed that reviewers unethically delayed their review process so that he or she could publish their own research on the same topic with similar idea or even may reject manuscript that carries major advances and innovations." (Sharma & Verma, 2018; p. 228)
Falsified Editorial Board	To increase their credibility, journals list well-known scholars on their board without permission.	"I also get e-mails from the predators' victims. Some have been named as members of editorial boards without their knowledge or permission." (Beall, 2012, p. 179) "Still other reputable individuals have found their names listed on journal Web sites, without their permission or knowledge, as members of bogus editorial boards." (Nahai, 2015, p. 1042)

Excepting the last of these (falsifying the editorial board), none of the Table 1 criteria necessarily demonstrate predatory intent *on the publisher's part* except in the most egregious cases. For example, a journal or publisher that cannot afford plagiarism detection applications may accidentally publish

plagiarized work. For example, Retraction Watch (2013) reports that in a single year, both the *Journal of Business Ethics* and the *Journal of Academic and Business Ethics* had to retract articles where blatant plagiarism was detected. The process of preparing publications for third-party archiving can be quite challenging. Ensuring all peer reviews are done at a high level requires continuous monitoring and mentoring of the activities of volunteers who may be receiving little or no credit for their efforts. A publisher is unlikely to have much control over a reviewer's decision to steal another author's work; what the publisher can control is the actions taken upon detecting such an incident. Getting articles professionally proofed can be expensive, while requiring editors to perform that task often results in errors slipping through. The careful reader will notice that even among the direct quotes from the research gathered for this article, several grammatical errors were detected (indicated by [sic]).

Publication fees, also known as article processing charges (APC), present a particularly ambiguous case. These charges can be an important source of operating revenue for open access journals that neither charge libraries nor individuals for their publications. Many of the articles examined for this study presume that acquiring these fees is the principal motivation for predatory practices. For example:

> Predatory journals recruit articles through aggressive marketing and spam emails, promising quick review and open access publication for a price. There is little if any quality control and virtually no transparency about processes and fees. Their motive is financial gain, and they are corrupting the communication of science. (Clark & Smith, 2015, p. 1)

The situation is not so black and white, however. Many well respected, widely read journals such as *Science* and *Nature* charge fees in the thousands of US dollars, with an additional charge if authors choose to have their work published open access. An empirical study of open access journals found that the mean APC charged by journals in the Directory of Open Access Journals (DOAJ) was around $900-$1000 USD (Shen, & Björk, 2015, p. 13). Indeed, when examining whether to institute an APC for its journals several years ago, the *Informing Science Institute* was advised by a well-respected librarian that the institute would lack credibility if they did *not* initiate a publication fee.

The irony here is that the research literature appears to be more concerned about APCs that are too low than APCs that are too high. For example:

> Finally, authors should be cautious when the listed APC of a biomedical journal is under $150 USD. This is very low in comparison to presumed legitimate, fully open access biomedical journals for which the median APC is at least 18 times more ... extremely low APCs may simply be a way for potential predatory journals to attract as many submissions as possible in order to generate revenue and presumably to build their content and reputation. (Shamseer et al., 2017, p. 11).

> The APCs by predators are, nevertheless, much lower than the APCs by more credible OA publishers, which on the other hand often offer waivers from the charges to authors from developing countries. (Shen, & Björk, 2015, p. 13).

By charging low fees, however, the economic motivation to engage in predatory practices seems quite low. For example, one study of Indian open access journals found that the median annual revenue garnered from publication fees (computed by multiplying the published fee by the number of publications) was $2752 USD (Xia, 2015, p. 73).

Awareness of predatory journals

A frequently stated concern in the literature was that authors and institutions might not be aware of the predatory nature of the journals they submit to or publish in. Some quotes from the articles illustrate this from both the empirical and personal perspective:

> Young researchers are inexperienced in the process of publishing and therefore unaware of predatory journals. In this situation, companies publishing predatory journals offer the

young scientists, who are often frustrated by a series of rejections, rapid peer review processes and publication times. (Richtig et al., 2018, p. 1447)

We surveyed participants of writing workshops at veterinary and medical schools and an international conference over a 1-year period. ... Of the 142 respondents who answered, 33 (23.0%) indicated awareness of the term "predatory journal"; 34 (23.9%) were aware of the Directory of Open Access Journals; 24 (16.9%) were aware of the Science "sting" article about predatory journals; and 7 (4.8%) were aware of Beall's list. Most (93/144, 64.5%) definitions of predatory journals described poor but not predatory journal practices, and some respondents misunderstood the term completely. Mentors should help novice authors to be aware of predatory journals and to distinguish between legitimate and illegitimate open-access journals, thus selecting the best journal for their work. (Christopher & Young, 2015, p. 1)

My first paper was published in December 2014 in a predatory journal without my approval. Although the journal was very new, it claimed to be an international, open access journal with a high impact factor, broad indexing, and a rigorous peer review. The title of the paper published in that journal was "Perceptions, practices, and use of Facebook: a cross-sectional survey on physiotherapy students in Pakistan." Within 2 weeks of submission, the reviewer's comments were received, which did not add anything to improve the content of the manuscript, and the article was accepted with an invoice for article processing charges. I did not agree to pay anything to the journal (since the fee was not disclosed ahead of time), nor did I sign a copyright agreement with them. Being unaware of this phenomenon, I was duped at the beginning of my publishing career, and the paper was published in the predatory journal without my consent. (Memon, 2018, p. 146)

What is not discussed at length in the literature is the authors' responsibility to objectively assess the quality of the process after a manuscript is submitted. In the third quote, for example, precisely what happened is a bit vague. The author reports getting back entirely useless peer reviews in two weeks along with an invoice for a previously undisclosed APC. All of these suggest a "textbook" predatory journal, a fact that the author apparently recognized. What is unstated is if the author actually paid the APC. If so, then the author bears some responsibility for the publication since many red flags were ignored. If not, by publishing an article without receiving an APC, the journal operated in a very atypical way if its motivation was purely economic. In either case, the journal was almost certainly predatory (as we understand the term). In the case where it went ahead and published the article without the author's permission and without holding the copyright, it was also guilty of a criminal violation of intellectual property law. Unfortunately, where organizations are willing to engage in criminal conduct, addressing the problem through regulations, requiring transparency, and demanding accepted practices may have little effect. Criminals have little problem with using deception, anonymity, and international borders to shield their activities.

Damage inflicted to stakeholders

The question of pre-existing awareness of predatory journals is important because of the potential damage and penalties that publication in predatory journals can inflict. Examples of concerns expressed in the literature for different stakeholders are presented in Table 2.

In considering these findings, it is worth pointing out that much of the damage described in the literature—particularly as it applies to authors, reviewers, and institutions—stems from association with a journal labeled as predatory. It is the label, rather than the underlying content of the paper, that does the damage. The difficulty this presents is that of Type 1 error: a journal or publisher mistakenly classified as predatory when, in fact, it is not.

Table 2: Examples of Stakeholders Damaged by Predatory Publishing

Stakeholder	Description	Illustrative Quotes
Field of Study	General damage inflicted on science	"Predatory journals threaten science, scientists and the effective communication of science." (Beall, 2016, p. 78) "Predatory publishers are thus undermining the core business of generating evidence to improve global health. The journals also pollute the evidence base on which clinical practice and public health policy depend, and, as Beall points out, the weak or absent review systems mean that predatory journals can be 'reservoirs of author misconduct,' including plagiarism, falsified data, and image manipulation." (Clark & Smith, 2015, p. 1) "Predatory journals challenge the establish [sic] regime of academic knowledge production from the inside." (Dobusch & Heimstädt, 2019, p. 616) "Entire fields of scientific research are now be [sic] susceptible to a pollution of the literature by unverified research or even fake articles published in fake journals being incorporated into legitimate meta-analyses. All that is needed is for a careless author of a review article, or a meta-analysis, to cite one of these articles from a predatory journal to create a distortion to the published record and, thus, potentially cause future misdirection of research." (Roberts. 2016a, p. 1831)
Authors	Loss of reputation, position or status as a result of publishing in a predatory journal	"By publishing in a predatory journal, researchers immediately render their work unusable, illegitimate, and stigmatized. Funders will not recognize the publication and there is a risk reputations can be tainted by association with such an untrustworthy publication." (Roberts, 2016a, p. 1831) "Unfortunately however, naive authors may not appreciate the negative consequences of publishing their research findings in predatory journals, such consequences may include loss of the manuscript, 'negative scars" in their publication records, career damage, lost or disappearance of predatory journals altogether." (Al-Khatib, 2016; p. 282) "Increased attention should be paid as to where papers have been published. A publication in a predatory journal might not be neutral on a CV and might even be an active demerit that harms the reputation of everyone, especially young scientists, listed on the article." (Richtig et al., p. 1447)
Publishers	Legitimacy of scientific publishing is called into question	"Predatory journals threaten the integrity of the scientific system by undermining the aims of open access, creating confusion around those journals that operate ethically under the APC model. They harm the reputation of reviewers and editors whose names they include without permission, of authors, mainly inexperienced ones, that publish their work in them out of ignorance, and of journals that start their trajectory with this model but are not yet established enough to be indexed in prestigious databases." (Abad-Garcia, 2019, p. 56.e5)

Community	Non-academics who might be impacted by research	"When 'Jane' turned to alternative medicine, she had already exhausted radiotherapy, chemotherapy and other standard treatments for breast cancer. Her alternative-medicine practitioner shared an article about a therapy involving vitamin infusions. To her and her practitioner, it seemed to be authentic grounds for hope. But when Jane showed the article to her son-in-law (one of the authors of this Comment), he realized it came from a predatory journal — meaning its promise was doubtful and its validity unlikely to have been vetted." (Grudniewicz et al., 2019 p. 210)
Reviewers	Collateral damage to a reviewer's career by being affiliated with predatory journal.	"Being asked to serve on an editorial board or as an editor of a journal is a recognition of one's expertise; however, before accepting any invitation, it is critical to assess the quality of the journal, as serving in the editorial board of PJ [predatory journal] is useless as well as detrimental to the researcher's career." (Forereo et al., 2018, p. 586)
Institutions	Failure to properly assess faculty contributions leading to invalid hiring, promotion and tenure decisions	"The professor was awarded tenure in the spring semester. No one noticed the fact that all 15 of the articles listed in his application appeared in "pay-to-publish" journals—publication outlets that masquerade as serious, legitimate scholarly periodicals but in reality are mostly financial scams. In short, the professor had bought his way to tenure." (McLeod et al., 2018, p. 121) "Undeserved promotion of faculty, on the grounds of publications in predatory journals, will also discourage genuine ones who are sincerely working for making impactful contributions. This will contribute to increased job dissatisfaction and more brain drain from developing countries. Moreover, academics promoted on the grounds of publication in predatory journals end up being assigned administrative and academic positions where they will be dealing with complex issues without having the necessary experiences and intellectual capacity, further contributing to declining excellence. Such professors are wittily dubbed 'zombie professors' in many countries in Africa, implying that they are professors only in their titles and not in intellectual status and contributions." (Balehegn, 2017, p. 98) "I think that, since the advent of predatory publishing, there have been tens of thousands of researchers who have earned Masters and Ph.D. degrees, been awarded other credentials and certifications, received tenure and promotion, and gotten employment – that they otherwise would not have been able to achieve – all because of the easy article acceptance that the pay-to-publish journals offer." (Beall, 2017, p. 275)

Proposals for addressing predatory publishing

A variety of solutions have been proposed to address the problem of predatory journals. To the extent that concerns arise from the label, one recommendation is to abandon the label altogether. For example:

> A potential solution to reduce the publisher or perish pressure (and, relatedly, the shortcut through predatory journals) may exist at the institutional level: the San Francisco Declaration on Research Assessment (DORA) developed in 2012, aims to improve the ways in which the outputs of scholars are evaluated. The DORA recommendations include ground-breaking concepts:

> (1) Journal-based metrics should not be used as measure of the quality of individual research articles to assess an individual scientist's contributions, or in hiring, promotion, or funding.

(2) Especially for early-stage researchers, the scientific content of an article is much more important than publication metrics or the identity/standings of the journal in which it was published. To date 1553 organizations and 15,006 individuals signed the DORA. (Cortegiani et al., 2020, p. 195)

Some additional proposed solutions are summarized in Table 3.

Table 3: Examples of Proposed Approaches for Addressing Predatory Journals

Solution	Description	Comment
Retraction Letters	Provide a mechanism whereby authors who discover they have appeared in predatory journals to publicly retract their article if the journal refuses to do so.	"Predatory journals will usually not be willing to retract papers, or might ask for 'retraction fees.' Even when a retraction is denied, authors can upload the retraction letters attached to their papers on institutional or personal archiving services, such as Google scholar citation page, Research Gate, and Academia, etc. This will be viewed as an ultimate display of commitment to science, quality, and professionalism on the part of the author and the institution." (Balehegn, 2017, p. 99)
Rating System	Rather than a simple predatory/non-predatory distinction, provide a system of points that assesses the degree to which a journal has predatory features.	"We introduce a new metric, the Predatory Rate, PR, for ranking journals. This metric helps us to do judgment about predatory journals and let editors to evaluate their journals against predatory practices. Academic databases could use this metric to indicate the journal predatory rate in their evaluation process. According this metric, journals would be classified in three groups as follows: predatory journals, journal with predatory practice, and non-predatory ones, also in order to help a journal with predatory practice to be converted to a non-predatory one." (Dadkhah & Bianciardi, 2016, p. 4)
Predatory List Committee	A committee assesses journals and keeps the list updated. A similar proposal involves establishing a global collective to oppose predatory journals.	"Kscien has recruited a special committee consisting of 23 young researchers under the title of (Predatory List Committee (PLC)). The members were trained and passed through several specified workshops to expand their knowledge regarding predatory journals and publishers. They are working unceasingly to keep the list refurbished, expose current tricks invented by the predators and guide authors. The list is designed to be updated daily." (Kakamad et al., 2019, p. 6) "A global collective effort to protect authors from predatory journals and publishers" (Al-Khatib, 2016; p. 282)
Open Peer Review	By making peer review more open and posting reviews and comments publicly, the quality of a journals processes becomes more transparent.	"The rise of predatory publishing should be a trigger to experiment with more open forms of peer review. OPR practice can not only curb predatory journals but also can lead to more rigorous (through dialogue within the academic community) and relevant (through dialogue with other interested parties) management research." (Dobusch & Heimstädt, 2019, p. 616)
Web Page Feedback	An application that provides feedback to potential authors on each journal's web page; feedback would be determined by a committee of stakeholders.	"We envision a plug-in tool that researchers could click to get immediate feedback about a journal page they are visiting and whether it has characteristics of predatory journals. This feedback could provide them with the relevant information to determine if the journal suits their needs and/or meets any policy requirements to which they must adhere (e.g., digital preservation, indexing)." (Cobey et al., 2018, p. 15)

Reservations regarding the predatory journal label

Over a quarter of the articles surveyed expressed significant reservations about the predatory journal label. These concerns tended to fall into two broad categories: concerns about the label itself and concerns about how lists of such journals were constructed.

With respect to the limitations of the predatory label, one article summarized these as follows:

> Key points
>
> - The term 'predatory journal' hides a wide range of scholarly publishing misconduct.
> - The term 'predatory journal' unhelpfully bundles misconduct with poor quality.
> - The term 'predatory journal' blinds us to important possibilities, needs, and questions arising in the developing scholarly landscape.
> - The current scholarly publishing environment cannot rely on such a simplified classification of journals into predatory or not. (Eriksson & Helgesson, 2018, p. 181)

On the issue of the range of misconduct, it must be recognized that many of the sins attributed to predatory journals—such as plagiarism, theft of ideas, and falsification of results—are, in fact, committed by authors or reviewers. They sometimes impact even the most reputable journals. Consider the following quote:

> Predatory journals also can be abused to hide potential conflict of interests: a very famous case – although not published in a predatory journal – was the case of Wakefield in the Lancet. This case demonstrates how one falsified study can continue to have tremendous effects on public health for decades. In his work, Wakefield linked the MMR vaccine with autism in children, which later was proven to be a false claim and led to the retraction of the article in 2004. However, the retracted articles still get continuously cited, although its claims have been proven wrong. (Richtig et al., 2018, p. 1447)

In the entire body of predatory publishing literature that I examined this is the most concrete example of damage caused by invalid research. Ironically, the authors used it to illustrate one of the dangers presented by predatory journals despite the fact that (a) the fraudulent nature of the submission would have likely eluded the attention of almost any reviewer, and (b) the impact of the article on the community was almost certainly driven by the prestige of *the Lancet*.

For other predatory behaviors, such as intentionally hiding APCs and listing board member without permission, journals and publishers must clearly be held accountable. This leads us to the second item, bundling misconduct with poor quality. Unfortunately, objective measures of article quality are limited and may vary considerably across disciplines. What might be viewed as ludicrous junk science in one discipline could be hailed as solid postmodern research in another. It seems unlikely that a binary choice of predatory/non-predatory distinction can capture the variation between journals and disciplines, which is the basis of Eriksson & Helgesson's (2018) fourth point.

With respect to the process through which predatory journal/publisher lists are constructed, serious concerns have been raised. Many researchers have complained about Beall's list, which has been characterized as being instrumental in the fight against predatory journals (Strielkowski, 2017, p. 416). These involved both the criteria used (e.g., see Beall, 2015a) and transparency. For example:

> The effort involved in developing Beall's list was impressive and it was a reasonable starting point for someone who wanted to investigate a journal's or publisher's authenticity. However, Beall did not list the specific criteria he used to categorize a given journal as predatory and he mistakenly black-listed some legitimate journals and publishers, particularly those from low and middle income countries (LMICs). (Laine & Winkler, 2017, p. 287)

> Like Batman, Beall is mistrusted by many of those he aims to protect. "What he's doing is extremely valuable," says Paul Ginsparg, a physicist at Cornell University who founded

> arXiv, the preprint server that has become a key publishing platform for many areas of physics. "But he's a little bit too trigger-happy." (Bohannon, 2013, p. 62)

> Beall's list was not objective and that his criteria for including journals were not transparent. (Das & Chatterjee, 2018, p. 198)

There were also complaints that Beall's list was biased in its focus on open access journals. For example:

> Any list such as Beall's will have both type I errors (journals being wrongly included) and type II errors (journals being wrongly excluded). However, for this research, Beall's focus on open access journals also creates an additional potential bias. Other publishers may follow similar practices but be protected from scrutiny by pay walls. Thus, relying on Beall's list may result in undercounting of articles in journals with predatory practices. (Pyne, 2017, p. 143)

> This study demonstrates the subjective nature of the Criteria by which Beall constructs his lists. Furthermore, it highlights the finding that well-regarded academic journals, whether OA or not, can be considered as possible predatory journals, even when LIS professionals apply the Criteria. (Olivarez et al., 2018, p. 62)

Finally, the fairness of the list, and the process by which the list could be modified, is questioned. For example:

> It seems that the objective of the Beall's list is to make the list larger, however there should be a (real) chance to remove items. The way Jeffrey Beall was the "judge jury and executioner" in his 'verdict' on whether a journal or publisher is (potentially) predatory has been questioned on several occasions (Keller, 2019, p. 20)

The last of these issues has become particularly problematic in recent years. In early 2017, Jeffrey Beall discontinued his blog and stopped updating his list. Another individual, who has chosen to remain anonymous, took over the list and continues to update it as of the time of this writing. That website describes the author as follows:

> I am not Jeffrey Beall. I prefer my identity to be anonymous, largely for the reasons that Beall mentioned in his recent article. … However, I can tell you that I am a postdoctoral researcher in one of the European universities and have hands-on experience with predatory journals.

> I will keep the list updated as much as possible, although I suspect I simply won't have time to do as thorough job as Beall. Hopefully, people will point me to the new, possibly predatory journals and publishers. However, expect the list's applicability to diminish over time. That is why I strongly suggest anyone that deals with publishing academic articles to read the information available on ThinkCheckSubmit.org, which has tips about how to publish in a journal that is not predatory. I would also suggest you read Beall's criteria for identifying a predatory publisher.

The upshot of this is that lacking transparent mechanisms to ensure the accuracy of the list, journals or publishers placed on the list have no way to defend themselves.

CASE STUDIES

In this section, I present two case studies—one a publisher, one a journal—that ended up on the anonymous copycat version of Beall's list.

INFORMING SCIENCE INSTITUTE

The *Informing Science Institute* was established in 1998 to serve as a community of researchers seeking to share ideas about information systems across disciplines that have traditionally operated in silos. Its

philosophy was expounded in an article written by Eli Cohen (1999) titled "Conceptualizing Information Systems as a Field of the Discipline Informing Science: From Ugly Duckling to Swan". Its origins and history are described in a research article (Murphy, 2020) and a case study (Koch & Johnson, 2018).

About the Informing Science Institute

The institute's philosophy and research focus are described on the institute's website as follows (Informing Science Institute, 2021):

> *Informing Science Institute Philosophy*
>
> The Informing Science Institute is a mentoring organization. One of the Informing Science Institute's core principles is helping our fellow colleagues to become better and better: better as an author, as a reviewer, as an editor, and as an editor-in-chief. We use the peer review process of our journals to support author colleagues by providing them with constructive suggestions on ways to improve their work even if a submitted article is not accepted for publication. Our Editors-in-Chief assist reviewers and editors by being coaches and guides to the authors, reviewers, and editors.
>
> *ISI Research Topics*
>
> ISI encourages the sharing of knowledge and collaboration among the wide variety of fields, often using information technology to advance the multidisciplinary study of informing science. These areas can include Business, Communications, Communicating Meaning, Community and Society, Computer Science, Data Management, Distance Education, eCommerce, Education, eLearning, Government, Health Care, History, Information and Library Science, Journalism, Justice and Law, Mathematics, Management, Philosophical Issues, Psychology, Public Policy, Sociology, and Human Resources.

In the more than two decades since the institute was established, it has grown to publish 14 journals (including several partner journals). As of 2020, it had published "more than 4100 articles by over 4500 authors from over 600 universities" (Murphy, 2020, p. 165). Its constituency is highly global, as illustrated in Figure 2.

Beyond its publishing activities, the institute was also dissatisfied with available options for managing the peer-review process. While both open source and commercial tools could accept submissions and manage review assignments, they lacked key capabilities that the institute wanted for its mentoring missions. Consistent with its stated mission, it felt that the ability to provide developmental feedback to reviewers and editors on their performance was critical if the researchers in these roles were to improve in their performance. To address this, at considerable expense in time, money, and effort, the institute contracted to develop its own peer reviewing and publication system. The current version of the system requires editors to provide feedback both to reviewers and authors, and each editor-in chief is further required to provide feedback to editors on their performance. The system supports many features that are not readily available in existing alternatives, such as collaborative authoring, automatic assignment of DOIs, many different automatic messaging alternatives to generate reminders, and a user-friendly interface that supports both journals and conferences. The system also supports partner journals and partner conferences, which pay a use fee well below that of widely used commercial peer review products, such as Manuscript Central.
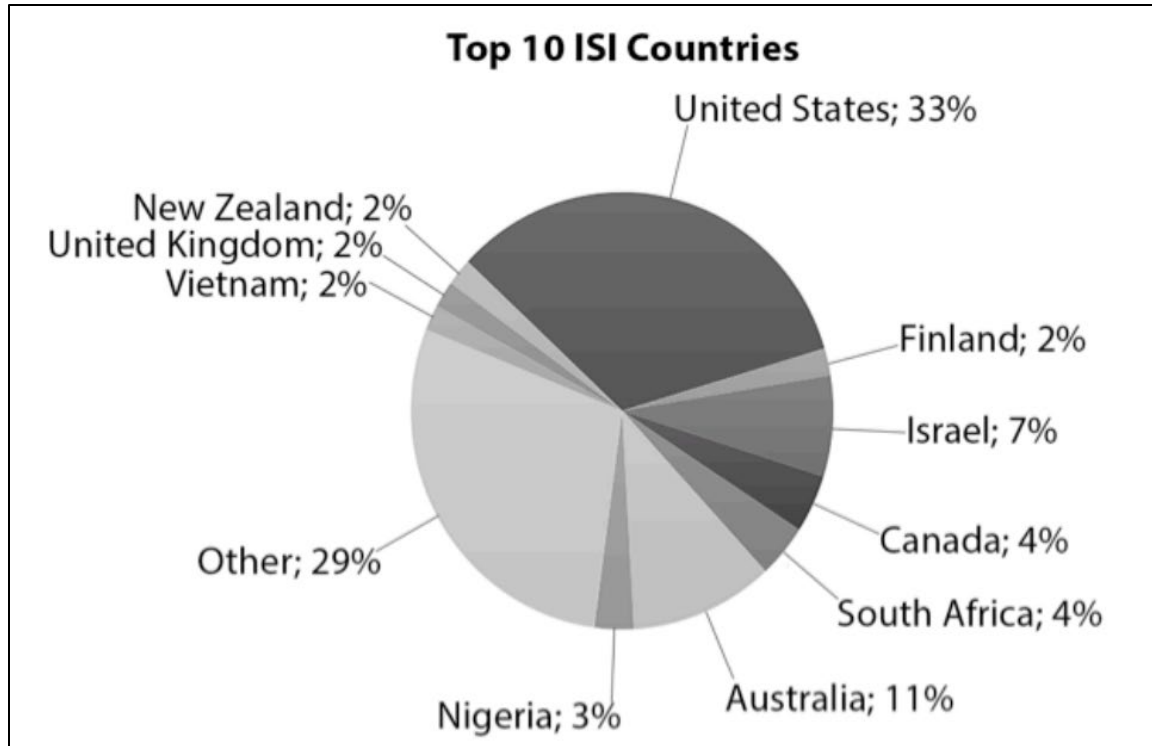
Top 10 ISI Countries

United States; 33%

New Zealand; 2%
United Kingdom; 2%
Vietnam; 2%

Finland; 2%

Israel; 7%

Canada; 4%

Other; 29%

South Africa; 4%

Nigeria; 3%

Australia; 11%

Figure 2: The Percentage of Articles with Authors Representing Various Countries
(from Murphy, 2020, p. 170)

The institute requires its journals, including its partner journals, to be open access and to subscribe to its stated philosophy of mentoring authors, reviewers, and editors. For its first two decades, no APC was charged for any of the institute's publications. In 2016, one of the institute's governors was tasked with investigating how to achieve better visibility across the research communities it seeks to serve. Based on the advice of an Australian research librarian—who asserted that having an APC was critical to building the credibility of its publications—the institute decided to levy a fee of $75 per article in 2018. That amount was chosen based upon the cost it was paying for proofing ($50/article) and was waived for members of the institute—regardless of how many articles were submitted and published over the course of a year. Not coincidentally, the cost of an annual membership was also set at $75. Not surprisingly, most authors chose to become members.

On 18 November 2018, in response to what the institute thought was a routine application to the Directory of Open Access Journals (DOAJ), it received the following correspondence:

> Following your applications for journals to be listed in DOAJ, our staff has undertaken a detailed review of your journals. This review has produced evidence of poor editorial conduct.
>
> In particular, we found evidence of:
>
> - Editorial board members linked to questionable publishers
> - Anonymous website registration
>
> We conclude that your journals do not adhere to many of the principles of good publishing practice.
>
> It is therefore the decision of the DOAJ management to reject the applications for your journals and remove any journals already included in DOAJ from Informing Science Institute or any affiliated publishers.

When the institute appealed the decision, it offered to change the website registration (something the domain registrar specifically warned against doing), also pointing out that the organization's leadership and the business address of the institute (the executive director's place of residence) were easily found on the institute's website. It also asked for further clarification on the editorial board members in question. The DOAJ denied the appeal and indicated that they could not release the names of suspect members owing to privacy concerns. They would also not name the "questionable" journals.

Subsequently, on January 19, 2019, the Informing Science Institute was added to the list of "possible predatory publisher" on the anonymous copycat Beall's site. No explanation was given, nor was there any response to a query submitted on the site's contact form. Inclusion on the list has led several authors to withdraw their unpublished manuscripts that had already been accepted after going through the full peer review and revision process.

It is telling that Beall himself recognizes the potential value of research communities run by volunteers and guided by a common purpose:

> There are many tight-knit communities of researchers centered on a field or sub-field who cooperatively edit journals — both subscription and open-access — and whose voluntarism and tight editorial control makes each of these community-supported journals successful. Such communities enable effective and meaningful communication among peers, and such journals should be models for all scholarly fields. (Beall, 2018, p. 3)

From my perspective, the Informing Science Institute is precisely the type of organization Beall described. To explain that perspective, I now turn to considering how my involvement with the institute has impacted my professional research career.

Personal reflections

Owing to the lack of transparency from an anonymous Beall's list copycat and DOAJ organizations, it is difficult to fathom the underlying processes that led to the decisions to exclude the institute. What I can describe, however, is my experience as a researcher involved with the institute and as an active participant in the organization. Some key elements of the relationship include the following:

- My first publication in the journal *Informing Science* (Gill & Hicks, 2006) has been cited well over 100 times according to Google Scholar. While this would not be a particularly impressive number for a top tier journal in my field, it would be extremely atypical for a predatory journal article, since these tend to be cited only rarely (Björk, et al., 2020). In total, my citations in the institute's publications exceed 800. My original article has also been central to my research agenda for the past 15 years.

- My second publication in *Informing Science*, co-authored with one of the most cited researchers in my field (Gill & Bhattacherjee, 2007), led directly to two publications in the premier journal in my discipline, *MIS Quarterly* (Gill & Bhattacherjee, 2009a, 2009b).

- A publication I co-authored in the *International Journal of Doctoral Studies* (Gill & Hoppe, 2009) has been cited more than 80 times. It led to an interview with *Bloomberg BusinessWeek* and was instrumental in the establishment of a highly successful Doctor of Business Administration program at my university; a program that I now lead.

- In collaboration with the institute, I served as principal investigator on a $170,000 grant from the U.S. *National Science Foundation* to develop case studies for a capstone course; the institute provided an outlet for these cases through launching the *Journal of IT Education: Discussion Cases*. The *Informing Science Press* also published a book I wrote on case writing (Gill, 2011), fulfilling another deliverable requirement of the grant.

- I received a $58,000 Department of Defense grant to investigate the informing flows of a week-long event (Murphy et al., 2015).

- I received a core Fulbright award to help South African faculty members learn how to write ICT for development case studies; the invitations I received to work with six South African universities were all set up by colleagues from the institute. It led to a book published by the *Informing Science Press* (Twinomurinzi, et al., 2018).

- I served as principal investigator on a subsequent $300,000 grant from the U.S. *National Science Foundation* to develop a series of cybersecurity case studies. Once again, the institute served as a partner organization for the grant. The cases developed led to a book published by the *Informing Science Press* (Gill, 2018).

The list that I have provided is far from complete. Given the positive impact of my involvement with the institute on my professional career—along with my direct observation of the selfless activities of the many individuals who volunteer their time and intellect to the institute—it is unfathomable to me that it could be considered predatory by any measure.

JOURNAL OF SYSTEMICS, CYBERNETICS, AND INFORMATICS

The *Journal of Systemics, Cybernetics, and Informatics* is an open journal published by the *International Institute of Informatics and Systemics (IIIS)*. Its content consists primarily of articles fast-tracked from two annual conferences organized by IIIS and held in Orlando, Florida. Because conference submissions often end up in related journals, many researchers lump predatory journals and conferences together (e.g., Cortegiani et al., 2020; Sonne et al., 2020). The journal has been blacklisted by Cabell's International and rejected by the DOAJ (Strinzel, et al., 2019).

Background

The IIIS was established by Dr. Nagib Callaos, then dean of research at Venezuela's Simon Bolivar University, one of the leading universities in South America. Its principal goal was to foster communications between disciplines and, particularly, between the separate worlds of the academy and practice. To accomplish this, IIIS runs two annual multi-conferences. These conferences seek contributions across a very wide range of topics.

The conferences IIIS organized in Orlando several times a year were highly successful, attracting over a thousand participants in the larger summer session. Then, in 2005, the situation changed. Three graduate students from Massachusetts Institute of Technology submitted a computer-generated paper using a tool called SCIgen that produced nonsensical but superficially plausible-looking papers (Massachusetts Institute of Technology [MIT], 2015). When the paper was assigned to multiple reviewers, none of them responded. Such withdrawal by reviewers is not uncommon when they feel that they cannot adequately review a submission. Callaos himself could not make sense of it but, given the resumes of the authors, decided to accept it for presentation at the conference—*communicating clearly to the authors that it was unreviewed.*

The result was a media storm, with outlets including Boston Globe, CNN, and the BBC picking up the story (MIT, 2015). The detail they omitted was the "unreviewed" part.

Given the nature of the conference, I am not at all surprised that the authors were invited to present. The whole purpose of the conference is to inspire communication. Given the credentials of the authors, allowing them to present their work would—hypothetically—offer the opportunity to provide them with feedback on how to communicate their ideas better. *The decision was not, as the media implied, a failure of the peer-review process.*

The fallout from the episode was severe. Attendance at subsequent conferences fell between 80 and 90 percent. Despite the setback, the conferences and journal continued, although never returning to their prior attendance levels. In the subsequent years, Callaos directed much of his focus on issues that relate to academic communications, particularly peer review. To make the peer review process more effective, he instituted a two-stage process. First, an author would need to get one or more

colleagues to review the manuscript and attest to its quality. The manuscript would then go through the more traditional double-blind peer-review process. Finally, he would check over the manuscript himself. In cases where the manuscript was deemed to be particularly outstanding, authors were offered the opportunity to present at a plenary session on a topic of their own choosing.

Personal reflections

I have had the opportunity to participate in the IIIS conferences at least 15 times over the past 10 years, mainly as a plenary speaker and discussion leader. My observation is that the 2005 incident resulted from a complete misunderstanding of the nature of the conference by the students involved. In engineering-related disciplines, conferences are often the principal means through which new knowledge is disseminated. In many cases, these conferences are highly competitive and count as much as journal publications (or more). Thus, it is somewhat understandable why an engineering conference "having loose standards" (MIT, 2015) might be of concern, and perhaps even targeted for ridicule.

The IIIS Conferences, however, are not engineering conferences, nor do they intend to be. Rather, they were set up to provide a venue for different disciplines to communicate with each other. The first day of each conference is generally set aside for workshops and "conversational sessions" where participants gather in a room and discuss communications-related topics such as the validity of peer review and breaking down the barriers between academic research and practice. The remainder of the conference is devoted to paper presentations and numerous plenary sessions. The latter are presented by invited speakers and by researchers whose submissions were singled out as being outstanding, as noted previously. Given these objectives and structure, such a conference needs to be evaluated in a manner entirely different from how one might judge an engineering or management research conference.

My experience has been that the conference offers content that is both thoughtful and extraordinarily diverse. Presenters that I have found particularly interesting include a Japanese professor of medicine and engineering who bring his students to the conference each year to present their work, a veterinary oncologist who travels the country to visit with rottweilers that have lived unexpectedly long lives so as to understand the aging process better, a digital custodian of the record of Alexander von Humboldt who talks about the remarkable career of this explorer/scientist and how it is being made accessible to the global community, a physicist who has built his pattern detection software based on our understanding of how the brain works and seeks to understand better how music impacts our thinking, a group of U.S. and European researchers who are applying the principles of cybernetics to understanding science. And many more.

Participation in the conference has also proved to be an asset to my professional career. In the late 1990s, Dr. Callaos hosted a track on informing science at his conference, located in Venezuela at the time. That was the debut of informing science at a conference venue. In 2010, he asked Eli Cohen, the founder of the Informing Science Institute, to give a plenary presentation at the conference. Cohen, in response, sent him a copy of a book I had just published with the institute (Gill, 2010) and suggested that I be invited as well. Callaos was so taken with the book that he created special conference track built around it. When I later published a book on the case method, he created a track for cases as well.

The tracks created for the conference proved invaluable to me. For example, one of the presenters—a professor and later dean of a prestigious Central American business school—talked about the potential impact of discussion cases on practice. He also attended a workshop on case writing that I facilitated. Subsequently, he served as the editor of a special section of the journal Informing Science focusing on the impact of cases on practice. He also served as the editor of a special issue of the journal *Management Decision* honoring my contributions to the field (Ickis, 2014). A faculty member from the Naval Postgraduate School in Monterey attended the conference after reading about informing science. He later invited me to a unique field event that brought together active-duty military

personnel, academics, and individuals with unclassified technologies that might have applicability to the armed forces or emergency services. Subsequently, I was awarded a DoD grant to study the event as an informing system. During both my NSF case development grants, the conference was offered as a venue for the case writing workshops that I had promised to deliver. During one of these early workshops, a faculty member from Vietnam invited me to speak at a Ho Chi Minh City conference and offer an extended version of the workshop. A year after the presentation, I served as editor of a collection of cases developed by the faculty and students as his institution, published in book form (Gill, 2014). This experience served as the inspiration for the Fulbright project that I subsequently proposed, described in the previous case.

In terms of the journal, I published one article in the *Journal of Systemics, Cybernetics, and Informatics* cited eight times and two others in the conference proceedings, one cited 28 times, and one cited four times. None of these counts represent particularly major achievements. Still, I would also note that the journal has published one article with nearly 1000 citations and has garnered over 4400 citations overall, according to Google Scholar. According to a search performed with *Harzing's Publish or Perish*, approximately 94% of the 419 articles identified as published in the journal have at least one citation. This is well above the 50% of articles typically cited across journals that have been labeled as predatory (Björk et al., 2020).

DISCUSSION

There is no doubt that some journals and publishers intentionally mislead authors and violate numerous good research and publication practices. A considerable difference of opinion remains concerning the use of the label "predatory" and the process by which journals and publishers should be classified as such. In this section, I look at the pros and cons of classifying journals as predatory through the lens of Type 1 vs. Type 2 errors, then provide five recommendations for improving the process.

TYPE 1 VS. TYPE 2 ERROR

Assuming for the moment that it makes sense to compile a list of offending journals/publishers, the key question is the degree to which we tolerate Type 1 errors (i.e., mistakenly classifying a valid journal as predatory) compared to Type 2 errors (i.e., failing to include a predatory journal on the list). In deciding the weight given to each type of error, it makes sense to assess the relative cost of each type of error. This is likely to vary considerably by discipline. In disciplines where a predatory article can have a serious impact on the underlying science and the broader community, Type 2 errors present a clear and present danger. Currently, the use of lists such as the revised Beall's list would be consistent with this view, its high potential for Type 1 error aside (e.g., Keller, 2019). On the other hand, Type 1 errors can lead to serious career and financial costs to researchers, journals, and their editors. Where the cost of Type 2 errors is low, or the probability of Type 1 errors is very high, it would make sense to be extremely cautious in applying the predatory (or some alternative) label to a journal.

Cost of Type 2 errors in business and information systems research

Because the relative weights of Type 1 and Type 2 errors are expected to vary considerably by discipline, I focus my attention here on my research areas: business and information systems. I expect that some of these arguments could be applied more broadly to research in the social sciences.

The typical cost of Type 2 errors is difficult to compute for a variety of reasons. Looking at it in terms of cost per article, factors that need to be considered include:

1. The typical cost of an article that is inappropriately published by a predatory journal.

2. The typical cost of an article that is inappropriately published by a non-predatory journal; this may be substantially higher than item (1) since the predatory journal article is likely to be cited much less widely (Frandsen, 2017).

3. The probability that an article in a predatory journal is invalid.

4. The probability that an article in a non-predatory journal is invalid.

None of these costs or probabilities can be determined with any accuracy. To get a general sense, I consider them with respect to the stakeholder communities presented earlier in Table 2.

Science and Community Stakeholders. Within business and information systems research a good case can be made that the costs (1) and (2) are likely to be quite low with respect to the external "science" (i.e., the broadly defined business/IS research body of knowledge) and "community" (i.e., business and information systems practice) stakeholders. The source of these costs could arise from both the findings presented in an article and through the adoption of improper methodologies inspired by an article.

Invalid Findings: For the "science" stakeholder, a key issue is the degree to which the research findings—however high quality the research itself may be—are likely to replicate. In business research, it is widely recognized that context is a very important factor in determining how various factors (e.g., independent variables) impact a particular outcome (e.g., dependent variable). Perhaps for this reason, relatively few attempts to determine if relationships generalize across contexts exist. On the rare occasion where such efforts have been made (e.g., Hubbard & Vetter, 1996), the degree to which findings have failed to replicate has been appalling. This makes any proposition that a predatory paper will impact our science moot.

In the broader social sciences, greater control of context can be achieved through well-planned laboratory experiments. Thus, we would expect the degree to which they replicate to be much higher. To test this, a study of 100 well-known and widely accepted psychology studies was conducted by the Open Science Collaboration (2015). The researchers made systematic attempts to replicate each study as faithfully as possible. Although 97% of the original studies had statistically significant findings, only 39% of the findings replicated. When the new results were combined with the original results, the 97% dropped to 68%. What is critical to note here is that these were "classic" studies, ones that appeared widely in psychology textbooks and were largely treated as fact.

In considering the potential cost of an inappropriate article to the broader community, the most relevant question is the degree to which the invalid findings articles are likely to impact that community. While I have no means of estimating the impact on the overall social sciences, I have argued at length elsewhere that the impact of business and IS academic research on business practice is negligible (Gill, 2010). While not repeating those arguments here, they mainly derive from the fact that academics are primarily rewarded with respect to their ability to communicate with other academics. We measure the effectiveness of such communication mainly through the tier of the journals we publish in and the degree to which other researchers cite our research. This system provides little incentive for devoting time to impacting practice. It also means that if an article were to report findings relevant to practice, it is only likely to do so if published in a very small set of practice-targeted journals, such as the *Harvard Business Review.*

Invalid Methodologies: Excepting research directed towards the scholarship of teaching and learning (SoTL), business researchers are unlikely to be in situations where they would directly apply the findings of their own research. Costs might be incurred when subsequent authors are influenced to adopt an invalid methodology detailed in an improperly published article. The research I surveyed did express concerns about the methodological weaknesses found in predatory journal publications (e.g., Kurt, 2018). Nevertheless, I could not find any report of subsequent methodological irregularities inspired by the publication of an article in a predatory journal. I can speculate on a couple of possible explanations. First, to adopt a methodology from an article necessarily requires careful study of that article. To the extent that the article suffers from the deficiencies attributed to predatory publications, the researcher should quickly detect these and reject the article as a source of inspiration for research design. Second, if authors were to seek out a methodology to imitate, it would make sense to choose

one published in the top tier of journals rather than one they just happened to come across in some random journal. Thus, the cost to science of Type 2 error resulting from the diffusion of poorly constructed methodologies seems likely to be low.

Author, Publisher, and Institution Stakeholders. For authors and publishers, costs of Type 2 errors are likely to be dwarfed by those of Type 1 error. The authors' major risk seems to be that an illegitimate journal that is not labeled as such (Type 2 error) is later correctly labeled, thereby placing the authors' reputation at risk and causing their previously published research to be ignored. For both publishers and authors, there is also a potential opportunity cost: through submitting to a journal that is, in fact, predatory, authors lose the opportunity to have their article published in a legitimate journal more likely to garner citations; legitimate journals lose the opportunity to review and publish the authors' articles.

For institutions, the potential cost of Type 2 error is clear cut. Beall (2017) speculates on these costs particularly forcefully:

> I think that, since the advent of predatory publishing, there have been tens of thousands of researchers who have earned Masters and Ph.D. degrees, been awarded other credentials and certifications, received tenure and promotion, and gotten employment – that they otherwise would not have been able to achieve – all because of the easy article acceptance that the pay-to-publish journals offer. (p. 275)

As mentioned earlier in Table 2, McLeod et al. (2018, p. 121) presented a specific example of the impact of not knowing that journals are predatory (which is the equivalent of Type 2 error) in a promotion and tenure case where the candidate's entire research package consisted of pay-to-play journals.

The McLeod et al. (2018) example raises some interesting questions. The full version of the earlier quote is as follows:

> The department tenure committee, the dean of the college, and the university president were all impressed with the applicant's tenure packet, which listed 15 articles in prestigious-sounding journals. In addition, the professor was well liked by his colleagues and his department chair. His teaching was only "adequate," but no one seemed to mind because so many of the tenure decisions at his school depended upon an applicant's publication record—in this case, a seemingly stellar one. The recommendations from the review bodies were consistently favorable, and the professor was awarded tenure in the spring semester. No one noticed the fact that all 15 of the articles listed in his application appeared in "pay-to-publish" journals—publication outlets that masquerade as serious, legitimate scholarly periodicals but in reality are mostly financial scams. In short, the professor had bought his way to tenure. (p. 121)

There are two distinct possible interpretations of this example at the extremes, assuming that it is accurately presented. The generous interpretation is that the faculty member in question had published some strong research but had perhaps been unwise in choice of outlets (several of which were improperly categorized as predatory, since such errors happen). In this interpretation, the tenure committee examined the articles, as they would be expected to do, and the external evaluators did the same—as would be their responsibility in accepting the task. Based on this analysis and their direct observations of the individual during the roughly 5-year pre-tenure period, the faculty member's research was judged to be of sufficient quality to make up for only adequate teaching.

The other extreme alternative is that the institution in question was run by the village idiots and deserved the consequences. Under this interpretation, the faculty member in question did, in fact, buy tenure by publishing work that was not good enough for respectable journals using pay-to-play outlets. For this to happen, both the promotion and tenure committee and the external reviewers must have ignored the articles' actual content and where they were published in their decision processes. This casual attitude towards content would be indicative of collective insanity at a research-intensive university. On the other hand, any other category of university that would willfully ignore sub-

standard teaching in their promotion and tenure decisions and base their decision on mere article counts suffers from seriously misplaced priorities.

The question of which extreme interpretation is closer to the truth brings us to the earlier mentioned factors (3) and (4), the relative probabilities that an invalid article will be published by a predatory journal vs. a non-predatory journal. Central to resolving this question is the relative validity of their respective peer review processes.

Peer Review. Of all the criticisms raised against predatory journals, the inadequacy of their peer review processes is the most described. The typical scenario is described as follows: to acquire APCs from authors, predatory publishers mislead (or collude with) authors by claiming rapid peer review but, in fact, faking such reviews or sending it out to reviewers that will always accept a submission with few or no required revisions. Under this process, the quality control element of peer review and the opportunity for authors to improve their article by responding to constructive comment from the reviewers are totally absent from the process.

I do not doubt that the typical scenario just described is precisely what happens in those journals that are truly predatory. The problem arises when you accept that Type 1 and Type 2 errors in classifying journals exist. It is further compounded when weaknesses in the peer review processes of non-predatory journals are considered. I have looked at the deficiencies of peer review in greater detail elsewhere (Gill, 2010), so I will limit myself to one example.

William Starbuck (2003, 2005) was the editor-in-chief of one of the most prestigious business research journals, *Administrative Science Quarterly*. He conducted an analysis that looked at the level of consensus between peer reviewers in their rating of 500 manuscripts submitted to that journal. What he found was a correlation of 0.12, statistically significant but nearly meaningless for practical purposes. Running a simulation using data from ASQ and other journals, his midpoint estimate of the percentage of articles published that were *not* in the top 20% in terms of intrinsic value was 57% (Starbuck, 2005, p. 197).

While this high level of error in top-tier journals does not excuse the blatant disregard of peer review processes in true predatory journals, it does suggest that considerable randomness exists in whether a top tier journal ultimately accepts a manuscript. Thus, neither the publication nor the rejection of a manuscript by such a journal can be taken as indisputable evidence of its quality. Similarly, we might expect that journals labeled as predatory may have some good reviewers as well as some weak or bad reviewers.

In summary, the costs of Type 2 errors are paid primarily by the institutional stakeholder. Universities make decisions to award degrees and decisions to hire and promote under the assumption that certain journals are reputable. If they are not, the decisions are being made using false assumptions. However, what is also true is that institutions can put processes in place that minimize the likelihood of serious damage from Type 2 errors. These mainly involve looking beyond journal lists in evaluating research. As suggested by the San Francisco Declaration on Research Assessment (DORA), these mainly involve paying more attention to the actual quality of the articles themselves (Cortegiani, 2020).

Cost of Type 1 errors

Unlike Type 2 errors, the costs of Type 1 errors are paid primarily by author and publisher stakeholders. As illustrated by the *Informing Science Institute* and *IIIS* cases presented previously, there is a heavy price to be paid for even the possibility that a publisher, journal, or conference is predatory. In the case of *IIIS*, the impact of the 2005 incident with MIT students is still being felt more than a decade and a half later. In the Informing Science Institute cas*e*, several authors have withdrawn papers because of concerns related to how their employing institution might react. Moreover, inclusion on a predatory publishing list often leads to removal from key indexes. Such removal can have a serious impact on authors. For example, to get credit for a publication at most South African universities, the

journal needs to be included in the Scopus index (Hedding, 2019). A journal dropped from that index will lose its ability to attract authors from many countries and many universities. This is precisely why a Type 1 error can be so damaging.

More broadly, Type 1 errors serve to undermine the legitimacy of all open access publishers by overstating the presence of bad actors. By virtue of the same reputational effect, these same errors may work to benefit the for-profit publishing sector. These same publishers often own or work closely with the very indexes that are quick to drop open access journals as predatory.

For authors, Type 1 errors can be equally damaging. Being listed as an author on an article can hurt an author's reputation (Richtig et al., 2018) should the publication be unfairly labeled as predatory. As shown in the *Informing Science Institute* case, just being on the editorial board of a journal labeled predatory can impact you and your colleagues. And, because the labeling process fails every conceivable test of transparency, there is no recourse.

Balancing the error types

So how do we balance the different two types of errors when classifying predatory journals? As I stated earlier, it is likely to vary by discipline. In research domains where results are expected to replicate and where research findings can significantly impact the science or the broader community, it may make sense to be cautious. To avoid spurious research impacting the science and the broader community, minimizing Type 2 error at the expense of accepting the damage caused by Type 1 error might be the best compromise. In domains where results are highly context dependent and where reviewers rarely agree on the merits of a manuscript, reducing collateral damage to reputation and careers through minimizing Type 1 error may be the better choice.

Naturally, in the ideal world we would seek to minimize or eliminate both types of error. Unfortunately, there are tens of thousands of research journals and to make a reasonable determination of a journal's merit can, or at least should, take a considerable amount of time and careful deliberation. As noted in Table 3, one proposal has been to establish a "predatory rank" based upon a journal's characteristics (Dadkhah & Bianciardi, 2016), acknowledging that the degree to which a journal is predatory is not black and white. Unfortunately, my intuition suggests that the more predatory a journal, the more likely that it will lie about its characteristics. That means a time-consuming verification process would be required to make an accurate determination.

RECOMMENDATIONS

Given that objective, unbiased and systematic third-party validation of all journals—probably the best solution to the problem of predatory journals—is unlikely to be financially viable, what other possible solutions can be proposed? I now turn to some possible recommendations, both gathered from the literature and my own.

#1 – Drop the predatory label

A particularly creative approach to the question of predatory publishing involved taking the five stages of predation—detection, identification, approach, subjugation, and consumption—and applying them to the predatory publishing process:

> the 'detection' consists of finding authors who have published in other journals; 'identification' consists of getting their contacts; the 'approach' is stage starting with the CFPs' and ending with the author paying no attention or being subjugated; 'subjugation' is the submission stage; and 'consumption' coincides with charging the author. (Petrişor, 2016, p. 2)

The problem with the analogy is that it can be applied to practically any publisher (with the possible exception that consumption might involve requiring the authors relinquish their copyrights for those journals that do not change an APC). Also, it fails to distinguish between those journals that

intentionally mislead and exploit authors—journals that I would happily label as predatory—and those that are simply inexperienced, inept, or have a different mission (a topic I will return to later). This concern was noted in the literature several times (e.g., Cortegiani et al., 2020; Eriksson & Helgesson, 2018). Labeling a journal as predatory also implies the authors that submit to the journal are "prey". While there are many examples in the literature of authors were unaware of the nature of the journal to which they submitted (e.g., Cobey et al., 2018; Memon, 2018), there are also cases where authors are willing co-conspirators (Bagues et al., 2019).

My recommendation would be that the term "predatory" be dropped and that a distinction be made between legitimate and illegitimate journals. What would distinguish an illegitimate journal would be that it intentionally misleads authors and institutions. For example:

- It may intentionally hide its fees from authors.
- It may be vague or simply lie about its peer review practices.
- It may intentionally publish plagiarized work.
- It may pad its editorial board with individuals that have not consented to serve.
- It may lie about its metrics or the indexes it is listed in.
- It may fail to take action in cases where reviewer misconduct is identified, such as stealing another authors ideas while it is under review.

These practices and others have all been observed and mentioned in the literature. What makes a journal illegitimate is that it engages in such practices by intent.

#2 – Evaluate the quality of peer reviews

In my analysis of Type 1 vs. Type 2 error, I argued that the main cost of Type 2 error would be paid by institutions through hiring, promoting, or rewarding researchers whose publications were "pay for play." Thoughtfully evaluating the work (as opposed to where it was published) in the scholar's portfolio would arguably be the best solution. Alternatively, as a shortcut, applicants for jobs and promotion and tenure could be required to include copies of the peer reviews they received for each article they published along with the articles themselves. The quality and depth of those reviews—which can be relatively easily assessed (based on my experience as an editor)—would almost certainly allow nearly all blatantly illegitimate journals to be identified immediately. In addition, authors could be encouraged to withdraw the submission from any journal that did not provide substantive reviews before the manuscript reaches the revision and publication stage.

This recommendation parallels the open peer review (Dobusch & Heimstädt, 2019) solution proposed in the literature. While the open peer review would certainly be better at making a journal's weaknesses in peer review public, it might also raise serious privacy concerns. Many journals could refuse to participate. Authors, however, will necessarily have access to the reviews of their own submissions. Privacy and participation concerns would not be an issue in the more limited approach I recommend. It would also not be too great a departure from existing practice. At my institution, we frequently encourage job applicants to provide access to student comments from their teaching evaluations along with numeric scores.

#3 – Mission categories for journals

Within higher education, it has long been recognized that different institutions have different missions. It would not make sense to judge a university established to help a previously underserved constituency become better prepared for the workforce using the same criteria as we would for a well-funded university whose success is judged principally by its contributions to scientific research and the number of Nobel laureates on its faculty. To deal with the problem of differing missions, enlightened agencies base their decision to accredit an institution on the how an institution's practices fit with its mission. For example:

the institution (1) has a mission appropriate to higher education, (2) has resources, programs, and services sufficient to accomplish and sustain that mission, and (3) maintains clearly specified educational objectives that are consistent with its mission and appropriate to the degrees its offers, and that indicate whether it is successful in achieving its stated objectives. (SACSCOC, 2017, p. 3).

Many of the problems associated with the so-called predatory/non-predatory distinction might be alleviated if legitimate journals were to specify their mission, using a list of mission categories that they were striving to achieve. I propose the list of categories shown in Table 4 as a starting point.

Table 4: Proposed Categories for Journals

Category	Mission	Criteria for Assessing Success
Competitive	To have high impact on the scientific community.	High rejection rate, high citation rate, scrupulous adherence to accepted principles of peer review, high profile authors and editorial board from research universities, coverage of research topics with expert reviewers, high survival rate.
Developmental	To develop the research, writing and reviewing skills of participants while contributing to knowledge.	High rate of transforming manuscripts into acceptable research papers, supportive and constructive peer review, diverse board and authors that includes both high profile researchers and researchers from underserved communities, support for learning activities such as research and writing workshops, modest citation rate with occasional highly cited outliers.
Exploratory	To develop a new research area and build its visibility.	Nurtures development of a research community, citations or references to the area within mainstream disciplines, awareness of each other's research (e.g., citations to each other's papers; participation in supported activities, such as conferences), early-stage pivots to policies and mission to be expected.
Translational	To foster communication between separate communities, such as distinct disciplines or between the research community and practice	Clarity of articles, balance in membership in editorial boards and authors across the targeted communities, collaboration between authors in the targeted communities, peer review conducted by both expert and non-expert reviewers to ensure clarity, support for alternative paths of communications, such as conferences and books.

Consistency with mission could lead to a dramatic difference in how journals are operated—and what activities are considered "legitimate." For example, a journal that presents itself as competitive would likely:

1) Take pride in a high rejection rate.
2) Enforce policies to reduce potential favoritism or conflict of interest, such as:
   a) Ensuring peer review was fully anonymous.
   b) Avoiding overlapping editorial boards.
   c) Preventing individuals from reviewing others from the same institution.
   d) Preventing individuals from reviewing others that they have co-authored with in the past.
3) Only assign reviewers to a manuscript with high levels of expertise in the subject area.
4) Encourage many rounds of review before a manuscript is accepted.
5) Prevent citation counts from being gamed with policies such as:
   a) Discouraging self-citation.
   b) Avoid encouraging authors from citing each other, particularly pre-publication in situations such as papers being collected for a special issue (a practice that has been referred to as a "citation cartel"; P. Davis, 2014).
   c) Refusing to publish research whose results have been published elsewhere in a different form.

Policies like these make sense if you view research as a game and you want to be sure that no one has an unfair advantage in scoring—as measured by citation count. The problem is that (1) is a terrible idea if an important element of a journal's mission is to help authors develop their research and writing skills; (2a) and (2c) just add red tape to the development process—while implying that our reviewers are not trustworthy—and (4) would discourage authors until most drop out. (3) would be awful for a journal with a translational mission since papers promoting communication between distinct communities need to be readable by non-experts. (5b) would greatly limit authors trying to build a community in a new research area. I am not sure that (5a) makes sense in any context except when citations are solely a means to keep score. (I would rather feel that I am reading the authors' mature thoughts rather than their first stab at the topic.) (5c) ignores that different audiences are likely to attend to different communications channels and respond to different formats.

The ability to target one or more of the missions could also be of great benefit to the journals involved. The practices of the competitive mission can be very limiting. For example, I refer to the *Engaged Management Review (EMR)*, the journal of the *Executive DBA Council*. Announced in 2014, the open-access journal sought to enter a new space—practitioner-scholarship—and sought to foster communication between business research and practice communities. Natural mission categories would therefore have been exploratory and translational. The journal's policies, however, rigorously adhered to the rules of the competitive category. The founders put together an editorial board of top scholars from the business research community. They scrupulously adhered to the practices of strict peer review. By the standards of competitive journals, they did everything right.

What were the results? Almost all their first 20 submissions were either rejected or the authors dropped out, consistent with a high rejection rate. (I believe two may have eventually been published). The peer review process—in which I participated as a reviewer—seemed like a never-ending series of cycles. More than six years after their announcement, they had 14 articles published, 8 of which had a founding editor, managing editor, or senior member of the editorial board as author or co-author. Of EMR's 61 Google Scholar citations, 44 were for an article that had been widely circulated before the journal's launch. Of the 25 authors that contributed, 23 were either alumni or affiliated with one of two institutions: Georgia State University and Case Western Reserve University. We cannot know how EMR would have evolved had they adopted practices better fitted to exploratory and translational missions at the outset. However, given its limited reach, it seems that the journal is far from reaching its full potential.

The proposal that journals be allowed to specify their own mission and then tailor their processes to that mission would likely be controversial. Many researchers, particularly at more elite institutions, are likely to subscribe to a philosophy like "Researchers hold an ethical obligation to (1) publish their findings and (2) to publish their findings in high-quality scholarly journals." (Strong, 2019, p. 664). I doubt that many developmental journals would pass that test. But it would be a huge mistake to equate the journal's prestige with the potential value of the underlying research. Researchers in the developing world may lack the funding, access to top-tier conferences, and extensive training to ease their way into highly competitive journals. They may also have access to some of the most interesting and societally meaningful research contexts. With the proper mentoring and encouragement, such research may provide a valuable contribution to the literature, just as exploratory journals may one day disrupt the status quo and translational journals may provide a means through which our research informs other disciplines and even practice.

Unfortunately, there are still plenty of bad actors in the world of open-access journals. A mission-focused system will not make them go away—although forcing them to state their mission (most likely "competitive", to attract unwary authors) should make it easier to debunk their claims. It should also make it easier to avoid Type 1 errors for journals that truly are developmental, exploratory, and/or translational in their goals.

#4 – Institutional portfolio of journal missions

Over my thirty years as an academic, I have seen universities increasingly rely on lists directing their faculty where to publish. As an institution grows in research stature, those lists tend to get shorter. At my institution, for example, a journal must be included in Financial Times list of 50 journals (FT50) or the University of Texas Dallas list of 24 journals (UTD24) if it is to count favorably towards promotion, tenure, and significant course release. Since the two lists overlap considerably, that is a very small number of journals out of the many thousands of business journals. And, of course, they are all highly competitive.

The use of lists like these could be interpreted as a commitment to rigor. That is, of course, how we would prefer to interpret it. There is another interpretation, however. Since our focus is strictly on competitive journals, we must not care about:

- *Helping authors from underserved communities with few resources develop their research skills.* In this context, it is worth noting that one of the complaints raised against labeling journals predatory is that it disregards the needs of, and prejudices us against, researchers from developing countries (Eriksson & Helgesson, 2018). Shouldn't our senior faculty provide service by helping mentor these researchers instead of being penalized if they participate in a journal with a non-competitive mission?

- *Exploring new research areas.* It has been argued that major departures from prevailing paradigms can lead to the label of crackpot (M. Davis, 1971) and that reviewers from top-tier journals are inclined to be overly conservative (Pfeffer, 2007). Are we discouraging academic entrepreneurs by discounting startup journals in new areas?

- *Communicating our research to practice.* Since there is scant evidence that our current academic research publications are ever reaching practice, at least in business and information systems, should we not be publishing in outlets specifically intended for such purposes, whatever their academic rank?

Framed in this way, a case can be made that each institution or department would do well to establish a portfolio target for its publications. For example, a 60-20-10-10 target might mean that it would like to see 60% of its research activities directed towards competitive journals, 20% towards developmental journals (e.g., editing, reviewing, and co-authoring with local researchers), 10% towards exploratory research, and 10% towards research intended to inform practice.

Under such a portfolio system—whose specific goal percentages would vary dramatically depending upon the nature and mission of the institution—individuals would be free to choose where they wanted to expend their efforts. For example, those researchers who were most concerned with increasing their value on the academic job market and reducing the time they spend teaching would, quite naturally, focus on competitive publications. However, that would be fine since it would make more room for other researchers who wished to pursue alternative objectives. Over the long run, institutions could also move towards their targets through their hiring decisions.

Unfortunately, there is no obvious way to require institutions to adopt such a system. For faculty, particularly a school's most prolific researchers, the current system works just fine. The most likely path through which such a system could be instituted is at the behest of the accrediting agencies. Such a path is not out of the question since these agencies are currently emphasizing the consistency of a college's policies and practices with its stated mission.

#5 – Crowd-sourcing journal ratings

At the beginning of this section, I suggested that the best way to minimize the threat posed by illegitimate journals would be to have each journal periodically evaluated by an independent agency. Effectively, this process would mirror the process used in institutional accreditation.

Realistically, I believe such a plan is impractical. The number of journals likely outnumbers institutions by an order of magnitude. Unlike universities, journals frequently come and go. Institutions seeking accreditation pay for the process. Few open access journals have the resources necessary to pay for the in-depth inspection needed if Type 1 and Type 2 errors are to be minimized. Assuming 50,000 journals and a bare minimum of 20 hours to do a careful evaluation—as suggested by the cases I have presented, such an evaluation would need to go well below each journal's surface features—across the entirely of academia we could be talking about a hundred million person-hours at a likely cost in the hundreds of millions USD.

A less objective but more plausible approach would be to crowd-source journal evaluations, analogous to what was proposed by Cobey et al. (2018). Regrettably, such a process would be rife with opportunities for manipulation and fraud. Nevertheless, similar challenges with rating systems face sites such as those used for restaurants (e.g., Yelp), products (e.g., Amazon), and sellers (e.g., Amazon, eBay). Some degree of control could be achieved by practices such as:

- Including some journal-supplied statistics as well as reviews.
- Requiring raters to register with the crowd-sourced site.
- Verifying status for certain types of ratings (e.g., author ratings, reviewer ratings, editor ratings). For example, only someone who had an article published in the journal would be able to provide a rating, and written response to a question like "How helpful was the review process?"
- Requiring a username on all reviews.
- Allowing users to rate other reviews as helpful or not helpful.
- Allowing journal officers to reply to reviews.
- Moderating review content before public posting.
- Providing a mechanism for banning individuals found to deceive or abuse the review system knowingly.

To keep the site from turning into little more than a beauty pageant, rating criteria would vary by each journal's self-classified mission category or categories. That way, a criterion such as "percent of initial submissions ultimately achieving publication" might have a slightly negative weight in an overall rating for a competitive journal while having a slightly positive weight for a developmental journal.

I suspect that the initiation of such a system would be opposed by organizations that already provide indexing and rating services, such as the Journal Citation Report (JCR) published by Clarivate Analytics. However, part of what these services do is substantially limit the number of journals that are indexed. In doing so, they avoid many illegitimate journals. They also eliminate many legitimate journals that simply have an alternative mission.

In the long run, I believe that indexing services that capture nearly all articles, such as Google Scholar and Microsoft Academic, can achieve a competitive advantage through the network effect. Thus, if a crowd-sourcing system for rating journals were to be developed, Google or Microsoft could benefit by developing or underwriting its development. Other plausible developers might include research portal sites, such as Researchgate.net. These sites already collect information on papers and researchers.

CONCLUSIONS

Nobody wants shoddy or falsified research to compromise the science of their discipline. It, therefore, seems almost scandalous to suggest that the individuals volunteering their time to identify so-called predatory journals may be doing more harm than good. The question revolves around the relative costs of making Type 1 errors (classifying a legitimate journal as predatory) versus Type 2 errors (failing to identify a predatory journal). These costs are likely to vary considerably according to discipline. I, therefore, confine my arguments to my own research areas—the business and information

systems literatures—where the impact of academic research on practice is arguably minimal. For these:

- *The cost of Type 2 errors is low.* There is virtually no hard evidence that existing so-called predatory journals damage the overall body of disciplinary research—mainly because they are largely ignored. Where damage may be occurring is to institutions that do not recognize journals as illegitimate and weigh them heavily in their recruiting and promotion, and tenure decisions. It may sound harsh, but if a university places such a heavyweight on research in its hiring and P&T decisions, then they should—at least—read the research that is the basis of their decision.

- *The cost of Type 1 errors is high.* There is strong evidence that a misapplied predatory label can be devastating to a journal or publisher, as illustrated by a couple of cases. The same applies to authors that have published in the journal, even if they did so before the label was applied.

- *Current approaches to identifying predatory journals are superficial at best.* They are also not transparent and provide little or no means of appeal. Because journals can exist for many purposes, a proper determination that a journal is illegitimate should be done carefully.

Despite these concerns, the fact remains that a great many illegitimate journals exist, engaging in many deceptive practices to acquire revenue or prestige. While their existence may not jeopardize the world of science, they can and do exploit those researchers who can probably least afford it. Just ignoring these journals is therefore not a very satisfactory solution.

I offer five recommendations that could help minimize the problem caused by illegitimate journals:

1. *Stop referring to journals as predatory and focus on identifying only those journals that are indisputably illegitimate.* Illegitimacy can be determined by intentional acts such as lying on their website, knowingly failing to live up to standards they have promised to uphold, violating intellectual property rights, engaging in what amounts to identity theft by listing editors that have not agreed to serve, hiding their fees, and so on.

2. *Have authors include copies of all the peer reviews that their published articles have received whenever a significant career decision is being made.* Because the common thread spanning nearly all illegitimate journals is their weakness in providing constructive peer reviews, the quality of reviews is a far better indicator of a journal's legitimacy than whether or not it a appears on a list.

3. *Require journals to specify what specific mission(s) they intend to fulfill and how their editorial policies are consistent with their stated mission(s).* I proposed an initial set of mission categories: competitive, developmental, exploratory, and translational. I argue that a journal's policies need to vary substantially according to a mission, and that some policies that might suggest illegitimacy in a competitive journal may be viewed as best practices in a category such as developmental or translational.

4. *Have institutions or departments specify portfolio targets for different categories of journals.* A university would be well within its rights to indicate that it only wanted its faculty to publish in competitive journals. But that would only be consistent with an overall mission that ignores helping less fortunate colleagues in developing countries improve their research, exploring ideas that fall outside prevailing paradigms and seeking to impact practice with their research.

5. *Crowdsourcing journal ratings.* Because creating a set of objective agencies to rate journals and identify illegitimate ones would likely be unacceptably expensive, using crowdsourcing with a variety of built-in safeguards might provide a reasonable approximation at a cost several orders of magnitude less. Consistent with recommendations (3) and (4), the items on which each journal was rated would depend on its mission.

REFERENCES

Abad-García, M. F. (2019). Plagiarism and predatory journals: A threat to scientific integrity. *Anales de Pediatría* (English Edition), *90*(1), 57-e1. https://doi.org/10.1016/j.anpede.2018.11.006

Al-Khatib, A. (2016). Protecting authors from predatory journals and publishers. *Publishing Research Quarterly, 32*(4), 281-285. https://doi.org/10.1007/s12109-016-9474-3

Bagues, M., Sylos-Labini, M., & Zinovyeva, N. (2019). A walk on the wild side: 'Predatory'journals and information asymmetries in scientific evaluations. *Research Policy, 48*(2), 462-477. https://doi.org/10.1016/j.respol.2018.04.013

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

Beall, J. (2012). Predatory publishers are corrupting open access. *Nature News, 489*(7415), 179. https://doi.org/10.1038/489179a

Beall, J. (2015a). *Criteria for determining predatory open-access publishers.* https://beallslist.net/wp-content/uploads/2019/12/criteria-2015.pdf

Beall, J. (2015b). Predatory journals and the breakdown of research cultures. *Information Development, 31*(5), 473-476. https://doi.org/10.1177/0266666915601421

Beall, J. (2016). Best practices for scholarly authors in the age of predatory journals. *The Annals of The Royal College of Surgeons of England, 98*(2), 77-79. https://doi.org/10.1308/rcsann.2016.0056

Beall, J. (2017). What I learned from predatory publishers. *Biochemia Medica, 27*(2), 273-278. https://doi.org/10.11613/BM.2017.029

Beall, J. (2018). Predatory journals exploit structural weaknesses in scholarly publishing. *4open, 1*, 1. https://doi.org/10.1051/fopen/2018001

Björk, B. C., Kanto-Karvonen, S., & Harviainen, J. T. (2020). How frequently are articles in predatory open access journals cited. *Publications, 8*(2), 17. https://doi.org/10.3390/publications8020017

Bohannon, J. (2013). Who's afraid of peer review? *Science 342*(6154). 60-65. https://doi.org/10.1126/science.342.6154.60

Christopher, M. M., & Young, K. M. (2015). Awareness of "predatory" open-access journals among prospective veterinary and medical authors attending scientific writing workshops. *Frontiers in Veterinary Science, 2*, 22. https://doi.org/10.3389/fvets.2015.00022

Clark, J., & Smith, R. (2015). Firm action needed on predatory journals. *BMJ, 350*, h210. https://doi.org/10.1136/bmj.h210

Cobey, K. D., Grudniewicz, A., Lalu, M. M., Rice, D. B., Raffoul, H., & Moher, D. (2019). Knowledge and motivations of researchers publishing in presumed predatory journals: a survey. *BMJ open, 9*(3), e026516. https://doi.org/10.1136/bmjopen-2018-026516

Cobey, K. D., Lalu, M. M., Skidmore, B., Ahmadzai, N., Grudniewicz, A., & Moher, D. (2018). What is a predatory journal? A scoping review. *F1000Research, 7.* https://doi.org/10.12688/f1000research.15256.1

Cohen, E.B. (1999). Conceptualizing information systems as a field of the discipline informing science: From ugly duckling to swan. *Journal of Computing and Information Technology, 7*(3), 213-219.

Cortegiani, A., Manca, A., & Giarratano, A. (2020). Predatory journals and conferences: why fake counts. *Current Opinion in Anesthesiology, 33*(2), 192-197. https://doi.org/10.1097/ACO.0000000000000829

Dadkhah, M., & Bianciardi, G. (2016). Ranking predatory journals: Solve the problem instead of removing it! *Advanced Pharmaceutical Bulletin, 6*(1), 1. https://doi.org/10.15171/apb.2016.001

Das, S., & Chatterjee, S. S. (2018). Cabell's blacklist: A new way to tackle predatory journals. *Indian Journal of Psychological Medicine, 40*(2), 197-198. https://doi.org/10.4103/IJPSYM.IJPSYM_290_17

Davis, M. (1971). That's interesting! Towards a phenomenology of sociology and a sociology of phenomenology. *Philosophy of the Social Sciences, 1*, 309-344. https://doi.org/10.1177/004839317100100211

Davis, P. (2014). When a journal sinks, should the editors go down with the ship? *The Scholarly Kitchen, 6*(October). https://scholarlykitchen.sspnet.org/2014/10/06/when-a-journal-sinks-should-the-editors-go-down-with-the-ship/

Dobusch, L., & Heimstädt, M. (2019). Predatory publishing in management research: A call for open peer review. *Management Learning, 50*(5), 607-619. https://doi.org/10.1177/1350507619878820

Eriksson, S., & Helgesson, G. (2018). Time to stop talking about 'predatory journals'. *Learned Publishing, 31*(2), 181-183. https://doi.org/10.1002/leap.1135

Forero, D. A., Oermann, M. H., Manca, A., Deriu, F., Mendieta-Zerón, H., Dadkhah, M., Bhas, R., . Deshpande, S. N., Wang, W., & Cifuentes, M. P. (2018). Negative effects of "predatory" journals on global health research. *Annals of Global Health, 84*(4), 584. https://doi.org/10.29024/aogh.2389

Frandsen, T. F. (2017). Are predatory journals undermining the credibility of science? A bibliometric analysis of citers. *Scientometrics, 113*(3), 1513-1528. https://doi.org/10.1007/s11192-017-2520-x

Gill, T.G. (2010). *Informing business.* Informing Science Press.

Gill, T.G. (2011). *Informing with the case method.* Informing Science Press.

Gill, T.G. (Ed.). (2014). *Information technology in Vietnam (and Southeast Asia): Discussion cases*, Informing Science Press. 2014.

Gill, T.G. (Ed.). (2018). *Cybersecurity discussion cases.* Informing Science Press.

Gill, T. G., & Bhattacherjee, A. (2007). The informing sciences at a crossroads: The role of the client. *Informing Science: The International Journal of an Emerging Transdiscipline, 10*, 17-39. https://doi.org/10.28945/454

Gill, G., & Bhattacherjee, A. (2009a). Whom are we informing? Issues and recommendations for MIS research from an informing sciences perspective. *MIS Quarterly, 33*, 217–235. https://doi.org/10.2307/20650290

Gill, G., & Bhattacherjee, A. (2009b) Fashion waves versus informing: Response to Baskerville and Myers. *MIS Quarterly, 33(4)*. 667-671. https://doi.org/10.2307/20650321

Gill, T. G., & Hicks, R. C. (2006). Task complexity and informing science: A synthesis. *Informing Science: The Journal of an Emerging Transdiscipline, 9*, 1-13. https://doi.org/10.28945/3045

Gill, T. G., & Hoppe, U. (2009) The business professional doctorate as an informing channel: A survey and analysis. *International Journal of Doctoral Studies, 4*, 27-57. https://doi.org/10.28945/44

Grudniewicz, A., Moher, D., Cobey, K. D., Bryson, G. L., Cukier, S., Allen, K., Ardern, C., Balcom, L., Barros, T., Berger, M., Ciro, J. B., Cugusi, L., Donaldson, M. R., Egger, M., Graham, I.D., Hodgkinson, M., Khan, K. M., Mabizela, M., Manca, A., … Lalu, M. M. (2019). Predatory journals: No definition, no defence. *Nature, 576*(7786), 210-212. https://doi.org/10.1038/d41586-019-03759-y

Hedding, D. W. (2019). Payouts push professors towards predatory journals. *Nature, 565*(7737), 267-268. https://doi.org/10.1038/d41586-019-00120-1

Hubbard, R., & Vetter, D.E. (1996). An empirical comparison of published replication research in accounting, economics, finance, management, and marketing. *Journal of Business Research, 35*, 153-164. https://doi.org/10.1016/0148-2963(95)00084-4

Ickis, J. (2014), The contributions of T. Grandon Gill. *Management Decision, 52*(9). https://doi.org/10.1108/MD-07-2014-0448

Informing Science Institute. (2021). *About.* https://www.informingscience.org/About

Kakamad, F. H., Mohammed, S. H., Najar, K. A., Qadr, G. A., Ahmed. J. O., Mohammed, K. K., Salih, R. Q., Hassan, M. N., Mikael, T. M., Kakamad, S. H., Baba, H. O., Aziz, M. S., Rahim, H. M., Ahmmad, D. R., Hussein, D. A., Ali, R. A., Hammood, Z. D., Essa, R. A., & Hassan, H. A. (2019). Kscien's list; A new strategy to hoist predatory journals and publishers. *International Journal of Surgery Open 17*, 5-7. https://doi.org/10.1016/j.ijso.2019.01.002

Keller, R. C. A. (2019). *Predatory journals and publishers: A menace to science and society? Or…. A personal perspective.* Nijmegen. https://doi.org/10.13140/RG.2.2.20315.92969

Koch, C., & Johnson, J. (2018). Informing Science Institute. *Muma Case Review, 3*(6), 1-26. https://doi.org/10.28945/4123

Kurt, S. (2018). Why do authors publish in predatory journals? *Learned Publishing, 31*(2), 141-147. https://doi.org/10.1002/leap.1150

Laccourreye, O., Rubin, F., & Maisonneuve, H. (2018). "Predatory" journals threatening the scientific medical press. *European Annals of Otorhinolaryngology, Head and Neck Diseases, 135*(1), 37-39. https://doi.org/10.1016/j.anorl.2017.08.003

Laine, C., & Winker, M. A. (2017). Identifying predatory or pseudo-journals. *Biochemia Medica, 27*(2), 285-291. https://doi.org/10.11613/BM.2017.031

Massachusetts Institute of Technology. (2015). How three MIT students fooled the world of scientific journals. *Phys.org.* https://phys.org/news/2015-04-mit-students-world-scientific-journals.html

McLeod, A., Savage, A., & Simkin, M. G. (2018). The ethics of predatory journals. *Journal of Business Ethics, 153*(1), 121-131. https://doi.org/10.1007/s10551-016-3419-9

Memon, A. R. (2018). How to respond to and what to do for papers published in predatory journals. *Science Editing, 5*(2), 146-149. https://doi.org/10.6087/kcse.140

Murphy W. F. (2020). The Informing Science Institute: The informing system of a transdiscipline. *Informing Science: The International Journal of an Emerging Transdiscipline, 23*, 165-209. https://doi.org/10.28945/4674

Murphy, W. F., Sanchez-Murphy, S., Buettner, R., & Gill, T.G. (2015). Case study of a complex informing system: Joint Interagency Field Experimentation (JIFX). *Informing Science: The Journal of an Emerging Transdiscipline, 18*, 63-109. https://doi.org/10.28945/2289

Nahai, F. (2015). The rise of predatory journals: What difference does it make? *Aesthetic Surgery Journal, 35*(8), 1042-1043. https://doi.org/10.1093/asj/sjv085

Oermann, M. H., Nicoll, L. H., Chinn, P. L., Ashton, K. S., Conklin, J. L., Edie, A. H., Amarasekara, S., & Williams, B. L. (2018). Quality of articles published in predatory nursing journals. Nursing Outlook, 66(1), 4-10. https://doi.org/10.1016/j.outlook.2017.05.005

Olivarez, J. D., Bales, S., Sare, L., & vanDuinkerken, W. (2018). Format aside: Applying Beall's criteria to assess the predatory nature of both OA and non-OA library and information science journals. *College & Research Libraries, January*, 52-67. https://doi.org/10.5860/crl.79.1.52

Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. *Science 349*(6251), aac4716. https://doi.org/10.1126/science.aac4716

Petrişor, A. I. (2016). Evolving strategies of the predatory journals. *Malaysian Journal of Library & Information Science, 21*(1), 1-17. https://doi.org/10.22452/mjlis.vol21no1.1

Pfeffer, J. (2007). A modest proposal: How we might change the process and product of managerial research. *Academy of Management Journal, 50*(6), 1334-1345. https://doi.org/10.5465/amj.2007.28166117

Pyne, D. (2017). The rewards of predatory publications at a small business school. *Journal of Scholarly Publishing, 48*(3), 137-160. https://doi.org/10.3138/jsp.48.3.137

Retraction Watch. (2013). *Oh the irony: Business ethics journal paper retracted for plagiarism.* https://retraction-watch.com/2013/03/08/oh-the-irony-business-ethics-journal-paper-retracted-for-plagiarism/

Richtig, G., Berger, M., Lange-Asschenfeldt, B., Aberer, W., & Richtig, E. (2018). Problems and challenges of predatory journals. *Journal of the European Academy of Dermatology and Venereology, 32*(9), 1441-1449. https://doi.org/10.1111/jdv.15039

Roberts, J. (2016a). Predatory journals: Illegitimate publishing and its threat to all readers and authors. *The Journal of Sexual Medicine, 13*(12), 1830-1833. https://doi.org/10.1016/j.jsxm.2016.10.008

Roberts, J. (2016b). Predatory journals: Think before you submit. *Headache: The Journal of Head and Face Pain 56*(4), 618-621. https://doi.org/10.1111/head.12818

SACSCOC (2017). *The principles of accreditation: Foundations for quality enhancement.* https://sacscoc.org/app/uploads/2019/08/2018PrinciplesOfAcreditation.pdf

Shamseer, L., Moher, D., Maduekwe, O., Turner, L., Barbour, V., Burch, R., Clark, J., Galipeau, J., Roberts, J. & Shea, B. J. (2017). Potential predatory and legitimate biomedical journals: can you tell the difference? A cross-sectional comparison. *BMC medicine, 15*(1), article 28. https://doi.org/10.1186/s12916-017-0785-9

Sharma, H., & Verma, S. (2018). Predatory journals: the rise of worthless biomedical science. *Journal of Postgraduate Medicine, 64*(4), 226. https://doi.org/10.4103/jpgm.JPGM_347_18

Shen, C., & Björk, B. C. (2015). 'Predatory'open access: A longitudinal study of article volumes and market characteristics. *BMC Medicine, 13*(1), 230. https://doi.org/10.1186/s12916-015-0469-2

Sonne, C., Ok, Y. S., Lam, S. S., Rinklebe, J., Alstrup, A. K., & Kim, K. H. (2020). First predatory journals, now conferences: The need to establish lists of fake conferences. *Science of the Total Environment, 715*, 136990. https://doi.org/10.1016/j.scitotenv.2020.136990

Starbuck, W. H. (2003). Turning lemons into lemonade: Where is the value in peer reviews? *Journal of Management Inquiry, 12*(4), 344-351. https://doi.org/10.1177/1056492603258972

Starbuck, W. H. (2005). How much better are the most-prestigious journals? The statistics of academic publication. *Organization Science, 16*(2), 180-200. https://doi.org/10.1287/orsc.1040.0107

Strielkowski, W. (2017). Predatory journals: Beall's List is missed. *Nature, 544*(7651), 416-416. https://doi.org/10.1038/544416b

Strinzel, M., Severin, A., Milzow, K., & Egger, M. (2019). Blacklists and whitelists to tackle predatory publishing: a cross-sectional comparison and thematic analysis. *MBio, 10*(3). https://doi.org/10.1128/mBio.00411-19

Strong, G. (2019). Understanding quality in research: Avoiding predatory journals. *Journal of Human Lactation, 35*(4), 661-664. https://doi.org/10.1177/0890334419869912

Twinomurinzi, H., Mzazi, V.Z., & Gill, T.G. (Eds.). (2018). *Transforming society using ICT: Contemporary discussion cases from Africa.* Informing Science Press.

Xia, J. (2015). Predatory journals and their article publishing charges. *Learned Publishing, 28*(1), 69-74. https://doi.org/10.1087/20150111

AUTHOR

Grandon Gill is a professor in the Information Systems and Decision Sciences Department of the University of South Florida. He is also the Academic Director of the Doctor of Business Administration Program at the Muma College of Business. He is Editor-in-Chief of the Muma Business Review and the past Editor-in-Chief of Informing Science: The International Journal of an Emerging Transdiscipline and the Journal of IT Education: Discussion Cases, also serving as a Governor and Fellow of the Informing Science Institute, where he was elected President in 2019. He was also the inaugural recipient of the Zbigniew Gackowski Award for informing science research.