

Postprint of a Study on the Definition of OA Predatory Journals in the Context of Global Over-commercialization of Scientific Journals

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Abstract

[Purpose] With the rapid development of global open access (OA) publishing, the re-emergence of predatory journal characteristics has caused anomalies that have attracted widespread attention, necessitating a re-examination of the definition of predatory OA journals and their predatory motivations.

[Methods] Through investigating the developmental history of international definitions of predatory journals and analyzing multi-dimensional global OA publishing data, this study examines the current state of OA's progression toward monetization and excessive commercialization, as well as new predatory characteristics.

[Results] This paper systematically reviews the international consensus framework for defining predatory journals and defines the concept of predatory OA journals from three dimensions: "predatory motivations," "predatory behaviors," and "predatory consequences."

[Conclusion] It is recommended to develop China's OA investment quotas and quality control thresholds, establish a cost framework and development pathway for China's OA publishing, and enhance the quality of OA dissemination.

Full Text

Research on the Definition of Open Access Predatory Journals in the Context of Global Scientific Journal Over-Commercialization

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Abstract: [Purposes] With the rapid development of global open access (OA) publishing, the characteristics of “predatory journals” have re-emerged, causing anomalies that have attracted widespread attention. It is necessary to re-examine the definition of OA predatory journals and their predatory motivations. [Methods] By investigating the evolution of international definitions of predatory journals and analyzing multi-dimensional global OA publishing data, this study examines the current state of OA monetization and over-commercialization, as well as emerging predatory characteristics. [Findings] This paper synthesizes the international consensus framework for defining predatory journals and proposes a conceptual definition of “OA predatory journals” from three dimensions: “predatory motivation,” “predatory behavior,” and “predatory consequences.” [Conclusions] We recommend developing China’s OA investment quotas and quality control thresholds, establishing a national OA cost framework and development pathway, and enhancing the quality of OA dissemination.

Keywords: predatory journals; global OA market; predatory characteristics; OA predatory journals

In recent years, the international scientific community’s attention to and research on predatory publishing have continued to expand and deepen [1]. Leading journals such as *Nature* and *Science* have published multiple articles discussing the phenomenon, harms, and identification of “predatory journals” [2][3]. Initially, predatory behavior primarily affected academic communities in Africa and Asia [4], but it has now become rampant globally [5]. According to a 2022 survey report by the InterAcademy Partnership (IAP) titled *Combating Predatory Journals and Conferences*, which cited data from Cabells, conservative estimates indicate that the number of predatory journals worldwide has exceeded 15,500 and is growing rapidly. Among more than 1,800 respondents from 112 countries and regions, over 80% reported that predatory journals and conferences have become a serious problem or are worsening in severity in their countries or regions [6].

In UNESCO’s 2021 *Recommendation on Open Science*, the organization called for preventing “the unfair extraction of profits from publicly funded scientific activities” and supporting “non-commercial publishing models and cooperative publishing models without Article Processing Charges (APCs),” emphasizing the necessity of placing academic communities above commercialization [7]. The 2023 International Open Access Week adopted the theme “Community over Commercialization,” noting that “when commercial interests are prioritized over the interests of academic communities, many concerning issues arise,” and encouraging frank discussions about which OA approaches prioritize the public and academic good and exploring the importance of academic community control over knowledge sharing systems [8]. At the end of 2023, UNESCO released

the *Global Open Science Outlook 2023* report, which continued to highlight that “while open science has many benefits, its adoption also has potential unintended consequences, including an increase in predatory behaviors within open science solutions. Although not specifically targeting open science, suspicious or fraudulent behaviors exploit the monetization and commercialization of academic research” [9]. In response to these emerging issues in OA journal publishing, this paper re-examines the concept and consensus surrounding predatory journals, analyzes APC predatory behaviors and consequences in the global OA market based on 2023 global OA publishing data, defines “OA predatory journals,” and reconsiders the future direction of OA development.

1. The Emergence and Evolution of the “Predatory Journal” Concept

1.1 Definitions of “Predatory Journals”

American university librarian Jeffrey Beall first introduced the concept of “predatory publishers/journals” in 2010 and published a list of “potential, possible, or probable predatory scholarly open-access journals and publishers” (known as Beall’s List) on his blog in 2012. Although the list ceased updates in 2017, the term “predatory publishers/journals” has persisted and been adopted by Cabells for its predatory database [10]. Beall defined predatory publishing as “publishing counterfeit journals to exploit the author-pays open access model. These predatory publishers are dishonest, lack transparency, and aim to deceive researchers, particularly those lacking experience in scholarly communication.” This definition focuses on the relationship between commerce and academic communities.

Subsequently, different researchers have proposed various definitions. Drawing from the Merriam-Webster definition of “predatory” and emphasizing economic predation, Sharma et al. defined predatory journals as those that charge APCs to exploit researchers for economic gain while failing to meet publishing standards [11]. From a publishing norms perspective, Cobey et al. identified 38 characteristics across six dimensions: journal operations, articles, editorial and peer review processes, communication, article processing fees and dissemination, and indexing and archiving [12]. Carroll et al. further argued from the perspective of profit-driven publishing without limits that predatory OA publishers exploit researchers and the OA system by mimicking OA journal operations, publishing works from anyone willing to pay, disregarding peer review systems, and employing practices such as unsolicited email invitations, ignoring peer review protocols, sham review processes, and manipulating authors into signing away their rights upon submission to prevent withdrawal [13]. From a calculative perspective on predatory metrics, Dadkhah et al. categorized journals as predatory, journals with predatory practices, or non-predatory based on indicators across four dimensions: editorial membership criteria, review processes and publication, declarations, OA policies, and publication fees [14].

Domestic research has also contributed perspectives. Scholars such as Lingfeng Wang, Xiaoqun Yuan, and Gengyan Tang have measured the predatory nature of international English journals and Chinese journals from angles including journal quality and publication fees, arguing that characteristics such as short review times, low journal quality, and large publication volumes diminish the impact of OA journals [15][16][17].

Terms such as questionable journals, illegitimate journals, deceptive journals, dark journals, and journals “operating in bad faith” are frequently used as synonyms for predatory journals [18], while pseudo-journals, fake journals, opportunistic journals, and early warning journals are often conflated with predatory journals. Manca et al. consider “predatory journals” the most widely used term in academia that appropriately describes misconduct in journal publishing. Questionable journals and fake journals are common tactics employed by predatory journals and constitute a type of predatory journal. Early warning journals overlap with predatory journals but are not identical; predatory journals primarily refer to illegal and deceptive journals without scope limitations, whereas early warning journals mainly refer to low-quality legitimate journals in established databases and maliciously infiltrated predatory journals. There is also a category of “resource-lacking journals” from underdeveloped regions that may fail to meet best publishing practices, but these differ from predatory journals in that they lack fraudulent intent or behavior. Such journals play an important role in ensuring the dissemination of research on topics of regional significance.

1.2 International Consensus on “Predatory Journals”

Several international organizations and prominent institutions have established positions on predatory journals (Table 1). In 2018, representatives from ten countries and regions—including researchers, publishers, policymakers, and librarians—convened a summit in Ottawa, Canada, and reached a consensus definition: entities that “prioritize their own interests at the expense of scholarly interests, characterized by false or misleading information, deviation from best editorial and publishing practices, lack of transparency, and aggressive or indiscriminate solicitation” [19]. In 2019, the American Medical Writers Association, European Medical Writers Association, and International Society for Medical Publication Professionals (AMWA–EMWA–ISMPP) issued a joint position statement on predatory publishing, stating that predatory journals fail to comply with publishing norms, adopt the “gold open access” publication model (where authors pay publication fees), and deliberately misrepresent editorial and peer review norms, journal operational methods, and aspects of APCs, dissemination, citation, and archiving for profit.

In 2018, the Committee on Publication Ethics (COPE) held a forum on predatory publishing and released a discussion document in 2019, which defined predatory publishing generally as “the systematic publication of purported scholarly content (journals and articles, monographs, books, or conference proceedings)

for profit through deception or fraud, without regard for quality assurance.” The document clarified that the issue is not profit itself, but that these journals exist solely for profit without any commitment to publishing ethics or integrity, deceiving authors (and their funders and institutions) by charging publication-related fees without providing expected or industry-standard services [20]. COPE proposed 16 principles of transparency and best practice in scholarly publishing as a framework for identifying potentially fraudulent journals; the more principles a journal violates, the greater its predatory suspicion. The InterAcademy Partnership (IAP) released the research report *Combating Predatory Journals and Conferences*, noting significant confusion and misunderstanding about the definition of predatory journals among all key stakeholder groups. To address this, the study developed a definitional framework using a mapping approach to describe a broad spectrum of dynamic predatory behaviors ranging from deception and fraud to varying degrees of unacceptable misconduct and unethical behavior, and even to well-intentioned low-quality practices [6].

These consensus primarily evaluate potential predatory suspicions from the perspective of journal and article publishing processes, involving editorial work, review, publication, policies, and fees. The commonalities in these descriptions of predatory journals from various parties in Table 1 include: (1) explicit predatory purpose, sacrificing scholarly interests for their own benefit; (2) concealed fraudulent intentions, such as exploiting OA models, fabricating editorial boards, opaque fee policies, and lack of integrity information; (3) disregard for editorial and publishing norms, offering authors “faster” and “less demanding” publishing processes; and (4) unscrupulous market promotion, failing to provide industry-standard services, making unrealistic publication promises to compete for manuscript sources, and even harming relevant policies and social interests.

[Figure 1: see original paper] International consensus on defining characteristics of predatory journals

2. Predatory Characteristics of Journals in the 2023 Global OA Market

As global open science advances, OA has become the primary mechanism for open science, with many countries and regions implementing open science and OA policies that have accelerated the rapid development of the global OA publishing market. Since the inception of Beall’s List, OA journals have been the “hardest hit” area for predatory journals, though assessments have focused more on publishing angles. For example, Stefan Eriksson identified two types of predatory journals under the “predatory journal” definition: deceptive journals that violate research integrity (All European Academies, 2017) and low-quality journals identifiable through cumulative criteria. By the end of 2023, the Directory of Open Access Journals (DOAJ) had indexed over 20,000 OA journals, while Web of Science (WoS) had indexed more than 7,700 OA journals from 804 publishers [21]. As UNESCO’s 2023 *Global Open Science Outlook* report

noted, the increase in predatory behaviors in open science solutions primarily exploits the monetization and commercialization of academic research [9], with APC-charging OA models increasing costs for communities and institutions to participate in OA. Based on WoS data, global OA publishing dynamics, and the *2023 Global OA Journals and APC Monitoring Report* published by the author team (an annual continuing report), this paper analyzes the definitional and emerging characteristics of journal predation in OA publishing.

2.1 Predatory Behavior Characteristics in the 2023 Global OA Market

(1) Sustained High Growth Data in the 2023 Global OA Publishing Market

APC Price Increases for OA Journals

In 2023, the average APC for global OA journals was \$2,957, representing an annual increase of 7.4%. However, 269 OA journals experienced APC price increases of 40% annually. Twenty-seven OA journals had APC prices exceeding the 2022 global average AND annual increases exceeding 40% (Table 2), including 11 journals from Elsevier and *New Phytologists* from Wiley, which showed the highest increase.

OA Article Publication Volume

In 2023, 1,396 OA journals experienced annual increases in OA article volume of 40%. Twenty-six OA journals published 300 articles in 2022 AND had annual increases 40% in 2023 (Table 3), with Wiley, Springer Nature, and MDPI each having six journals on this list. The OA journal with the highest annual increase was *Heliyon* from Elsevier.

Global APC Revenue

In 2023, global APC revenue reached \$2.67 billion, a 20.3% increase from 2022. Sixteen OA journals had APC revenue $\geq$ \$10 million in 2022 AND annual increases 30% in 2023 (Table 4), including nine journals from MDPI. The OA journal with the highest annual increase was *Heliyon* from Elsevier.

(2) APC Predatory Motivations in “Abnormal” OA Journal Behaviors in 2023

Comprehensive analysis of APC prices, OA article volumes, and total APC revenue reveals potential predatory motivations in OA journals. Examining the top 10 OA journals by global APC revenue in 2023 (Table 5) shows these ten journals collectively earned \$331 million, accounting for 12.4% of total global APC revenue. MDPI's *International Journal of Molecular Sciences* ranked first in APC revenue, exhibiting the behavior of “high average APC and large publication volume.” In contrast, Springer Nature's *Nature Communications* and *Scientific Reports* ranked second and third respectively, but with opposite strategies: *Nature Communications* shows “high price, low volume, many Chinese authors” (low article volume but APC prices 2-3 times higher than other journals

in Table 5, with Chinese authors comprising 37% of publications), while *Scientific Reports* demonstrates “low price, high volume, global reach” (low APC but high publication volume). MDPI’s *Sustainability* and *Applied Sciences-Basel* ranked fourth and fifth, both showing “average price, high volume, many Chinese authors” (high publication volumes ranking third and fourth globally, with Chinese authors exceeding 40% of total publications in both journals). PLOS’s *PLOS ONE* ranked ninth, exhibiting “low price, high volume” behavior. Comprehensive analysis of global data on journal APC prices and OA article volumes (Figure 2 [Figure 2: see original paper]) and Chinese data (Figure 3 [Figure 3: see original paper]) indicates that the top 10 publishers by global APC revenue in 2023 employ game strategies involving “journal APC prices,” “OA article volumes,” and “regional targeting” to maximize their global APC revenue.

2.2 “Predatory Consequences” in the Global OA Publishing Market

Publishers’ publishing quality and OA motivations have been questioned as they accelerate OA publishing. In March 2023, the Royal Astronomical Society announced that all its journals would become open access from 2024. In March, Hindawi’s *Oxidative Medicine and Cellular Longevity* was removed from the Web of Science SCI list by Clarivate. In April, all editorial board members of *NeuroImage*, a top journal in neuroimaging, resigned collectively because Elsevier refused to reduce article APCs, planning to establish a new non-profit open access journal. In May, UK universities reached a new three-year read-and-publish agreement with Springer Nature. In July, MDPI increased APCs for over 90 journals. Editorial board members of the renowned peer-reviewed journal *Critical Public Health* announced their resignation. In November, the Swiss National Science Foundation announced it would no longer fund OA articles in special issues from February 2024. In December, Wiley announced it would discontinue the Hindawi sub-brand.

Multiple parties have suffered reputational and economic damage from retractions. In November 2023, the *International Journal of Electrical Engineering & Education* retracted 80 articles [22]. In September 2023, Frontiers retracted 36 articles, with the number climbing to 299 by December 19. In 2023, global publishers issued nearly 14,000 retraction notices, with approximately three-quarters involving Chinese co-authors. Wiley disclosed that Hindawi’s issues caused the company’s quarterly revenue in 2023 to decrease by \$18 million compared to the same period last year. As of December 26, 2023, Hindawi had retracted 9,408 articles since June 2022 (8,315 by Chinese authors), with retraction reasons almost entirely related to compromised OA publishing processes [23].

Research institutions and funding agencies have taken action to reduce OA costs, funding issues, and low-quality publications. In March 2023, the German Technical University Alliance released recommendations for strengthening the diamond OA ecosystem. In October, the Global Diamond Open Access Summit was held. The 2023 International Open Access Week theme was “Community

over Commercialization.” In November, negotiations between Switzerland and Elsevier reached an impasse, with transformative agreements facing termination. The Swiss National Science Foundation (SNSF) announced it would no longer fund open access articles in special issues from February 2024. Anhui Provincial Hospital issued a notice placing all journals from Hindawi, MDPI, and Frontiers on a “warning list,” stating they “do not recommend submission, will not reimburse page charges, and will not include in research performance evaluations.” In November, China’s Ministry of Education Department of Science, Technology, and Informatization issued a notice requiring universities to conduct self-inspections of retracted papers, with *Nature* reporting this as China’s first nationwide investigation of retractions and research misconduct [24].

3. Redefining “Journal Predation” in the Global OA Market

Based on the international definitional framework for journal predation shown in Figure 1, this paper organizes the characteristics of “predatory journals” motivated by maximizing APC profits in the current global OA market across three levels: “predatory motivation,” “predatory behavior,” and “predatory consequences.”

[Figure 4: see original paper] Characteristics of “OA Predatory Journals”

(1) Predatory Motivation: APC Profit Supremacy

Journals exploit the gold open access author-pays model and MEGA journal large-scale publishing model purely for profit maximization, disregarding any publishing ethics, integrity, or research integrity requirements, and failing to provide publishing quality and services commensurate with their fees. Examples include international publishers accelerating OA journals as “trial balloons,” continuously experimenting with combinations of journal numbers and OA article volumes to maximize APC revenue, and temporarily increasing APC prices annually.

(2) Predatory Behavior: Fraudulent Strategies, Publishing Norm Violations, and Unethical Marketing

OA publishers establish global APC revenue maximization strategies with deceptive, concealed, and misleading intentions. Publishers’ APC policies lack transparency, and they maximize APC revenue through methods such as increasing average APCs, acquiring fully OA publisher journals, expanding OA article volumes, publishing special issues, expanding new read-and-publish agreements, and establishing aggressive Chinese market publishing plans. OA predatory journals frequently employ fraudulent, false, or misleading information, unscrupulously solicit author submissions, operate with non-transparent business processes, and omit author proofreading steps.

(3) Predatory Consequences: Academic and Economic Losses with Multiple Victims

Significant damage to academia occurs through rapid article acceptance with little or no peer review or quality control. Economic losses result from charging APCs at submission and imposing high withdrawal fees. These journals do not verify whether authors can afford APCs. Multiple stakeholders suffer: authors' reputations are questioned, and even legitimate, valuable research fails to disseminate and be cited normally when published in predatory journals. News about predatory journals causes the public to question the seriousness and reliability of science, further impacting the reputations of academic communities and research institutions.

Based on Figure 4, this paper attempts to redefine “predatory journals” in the current global OA market by proposing a definition of “OA journal predation”: low-quality or unlimited-scale journals that harbor predatory intentions to maximize APC revenue, exhibit fraudulent strategies, exploit academic publishing digitization, gold open access, and author-pays models, and cause academic, economic, and social losses to multiple parties.

4. Implications of the “OA Predatory Journals” Definition

This definition aligns with questions raised by IAP: What is lost when an increasing number of companies rather than researchers themselves control knowledge production? What is the cost of business models that consolidate extreme profit levels? Can commercialization support the public good? What alternatives using community-controlled infrastructure already exist to better serve the interests of the research community and the public (such as preprint servers, repositories, and open publishing platforms)? IAP's report *Combatting Predatory Journals and Conferences* identified three main drivers of predatory journals: (1) the increasing monetization and commercialization of academic careers, including the academic publishing system, where ownership and commercial interests may conflict with research integrity, and the author-pays model is particularly susceptible to abuse by predatory actors; (2) the dominance of “publish or perish” and “quantity over quality” research evaluation systems, along with institutional drivers and incentives shaping individual academic behavior; and (3) serious challenges and deficiencies in the peer review system, particularly the lack of transparency in peer review processes (whether fully open, anonymous, or hybrid) and the lack of training, competence, and recognition for peer reviewers [6].

The above definition of “predatory journals” in the OA market and its driving factors offer insights for OA development and scientific journal construction. The authors propose several specific recommendations for China's OA development and scientific journal building:

(1) Develop China's OA Warning Thresholds, Including OA Investment/Funding Ratios and Quality Provided. Determine whether fiscal funds should mandatorily require local deposit and international dissemination of data from funded projects, establish OA funding control ratios (e.g., below

10%), and coordinate these with library database subscription fees within a certain percentage of China's R&D expenditure. Determine whether quality reviews by relevant institutions are required when authors pay APCs to journals where Chinese authors publish more than 40% of articles or where APC prices are unreasonable, and ensure post-publication local storage and open access of papers.

(2) Mitigate Adverse Impacts from the International OA Publishing Market and Calculate China's OA Costs. Eliminate negative factors in the global publishing market dominated by OA publishing profits, balance China's OA costs between open scholarly communication based on OA publishing and open scholarly exchange based on OA repositories, establish a credible and controllable proactive layout for disseminating and applying China's research outputs, and reduce the passive probability of publisher-initiated retractions. Research and determine China's OA models and cost components, calculating China's OA costs based on frameworks such as "China's intended global OA contribution share," "globally reasonable APC unit prices," "annual OA article volumes and reasonable growth rates," and "annual OA conversion of library database subscription fees."

(3) Enhance OA Dissemination Quality and Publish an Annual Global OA Journal Whitelist. Separate the publishing and dissemination functions of international scientific journals, reduce Chinese authors' dependence on the publishing functions of international journals, and effectively advance the OA process for China's scientific journals. Fund the open dissemination of research papers and other outputs on autonomous dissemination platforms and academic exchange communities. Conduct annual monitoring and tracking of fully OA publishers' behaviors and strengthen analysis of OA marketization processes among traditional publishers. Establish a "Global OA Journal Whitelist" as a reference for Chinese authors selecting journals for OA publication.

OA development is approaching mainstream status, but the current rapid OA expansion creates vastly different benefits and harms for various stakeholders. Particularly, OA monetization from the publishing industry, driven by APC profit maximization that overrides academic and public interests, has created new predatory characteristics that damage the academic, economic, and social interests of multiple stakeholders. Based on a re-examination of the definitional consensus on predatory journals and analysis of annual OA publishing data, this paper attempts to propose the concept of "OA predatory journals" to anticipate future trends in international OA publishing. In July 2024, *Nature Index* published a paper emphasizing that journal hijacking phenomena seriously damage multiple stakeholders' interests, echoing the concerns raised in this study. The standardization and win-win models of the global OA market require continuous research.

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