

Research on the Definition of OA Predatory Journals in the Context of Global Scientific Journal Over-commercialization

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Abstract

Purpose: With the rapid development of global OA publishing, the re-emergence of “predatory journal” characteristics and resulting anomalies have attracted widespread attention, necessitating a re-examination of the definition of OA predatory journals and their predatory motivations.

Method: 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: We synthesize the international consensus framework for defining “predatory journals” and define the concept of “OA predatory journals” from three aspects: “predatory motivation,” “predatory behavior,” and “predatory consequences.”

Conclusion: We recommend developing China’s OA investment quotas and quality control thresholds, establishing China’s OA cost framework and development pathway, and improving OA dissemination quality.

Full Text

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

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Abstract: [Purpose] With the rapid expansion of global open access (OA) publishing, the re-emergence of “predatory journal” characteristics has triggered widespread concern over anomalous practices, necessitating a renewed examination of the definition of OA predatory journals and their underlying predatory motivations. [Methods] This study investigates the historical evolution of international definitions of predatory journals and analyzes multi-dimensional global OA publishing data to examine the current state of OA monetization and over-commercialization, as well as emerging predatory characteristics. [Findings] We synthesize an international consensus framework for defining predatory journals and propose a conceptual definition of “OA predatory journals” from three dimensions: predatory motivation, predatory behavior, and predatory consequences. [Conclusions] We recommend establishing national guidelines for OA investment quotas and quality control thresholds, developing a framework for China’s OA costs and development pathways, 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 has increasingly focused on predatory publishing, with numerous articles in *Nature* and *Science* discussing its phenomena, harms, and identification methods [2][3]. Initially affecting primarily African and Asian academia [4], predatory practices have now become rampant globally [5]. According to 2022 data from Cabells cited in the InterAcademy Partnership (IAP) report *Combating Predatory Journals and Conferences*, conservative estimates indicate that over 15,500 predatory journals exist worldwide, with rapid growth continuing. Among more than 1,800 respondents from 112 countries/regions, over 80% reported that predatory journals and conferences have become a serious problem or are worsening in their regions [6].

In its 2021 *Recommendation on Open Science*, UNESCO 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 prioritizing scholarly communities over 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 scholarly communities, many concerning issues arise,” and encouraging frank discussions about which OA approaches prioritize the public and academic good while exploring the importance of community-controlled knowledge-sharing systems [8]. By late 2023, UNESCO’s *Global Open Science Outlook 2023* further warned that “while open science has many benefits, its adoption also has potential unintended consequences, including increased predatory behavior in open

science solutions—not specifically targeting open science, but exploiting 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 data, defines “OA predatory journals,” and reconsiders the direction of OA development.

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

1.1 Definitions of “Predatory Journals”

American academic 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” (the Beall list) on his blog in 2012. Although the list ceased updates in 2017, the term “predatory publishers/journals” persisted and was subsequently 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 inexperienced in scholarly communication.” This definition focused on the relationship between commerce and community.

Subsequent researchers proposed various definitions. Drawing on Merriam-Webster’s definition of “predatory” and emphasizing economic exploitation, Sharma et al. defined predatory journals as those that “exploit researchers for economic gain by charging APCs 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 that predatory OA publishers exploit researchers and the OA system by simulating OA journal operations, publishing works from anyone willing to pay while disregarding peer review systems. They profit through unsolicited email invitations, neglect of peer review, sham review processes, and manipulating authors into signing away rights during submission to prevent retraction [13]. From a predatory ratio calculation perspective, 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 publishing fees [14]. Domestic research by Wang Lingfeng, Yuan Xiaoqun, Tang Gengyan, and others measured the predatory nature of international English-language and Chinese journals from perspectives of journal quality and publication fees, concluding that characteristics such as short review times, low quality, and high 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 and fake journals represent common tactics employed by predatory journals and constitute one category of them. 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 within established databases and maliciously infiltrated predatory journals. Additionally, “resource-lacking journals” from underdeveloped regions may fail to meet publishing best practices, but they differ from predatory journals in that they lack fraudulent intent or behavior. Such journals play important roles in disseminating research on regionally significant topics.

1.2 Emerging International Consensus on “Predatory Journals”

Several international organizations and prominent institutions have established positions on predatory journals (Table 1). In 2018, stakeholders including researchers, publishers, policymakers, and librarians from ten countries/regions convened in Ottawa, Canada, reaching a consensus definition: entities that “prioritize their own interests at the expense of scholarship, 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, proposing that predatory journals fail to comply with publishing norms, adopt the “gold open access” model (where authors pay publication fees), and deliberately misrepresent editorial and peer review standards, journal operations, 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, defining 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 profit-seeking itself is not problematic, but these journals exist solely for profit without any commitment to publishing ethics or integrity. Predatory publishers deceive authors (and their funders and institutions) by charging publication-related fees without providing expected or industry-standard services [20]. COPE also proposed 16 principles of transparency and best practice in scholarly publishing as a framework for identifying potentially fraudulent journals—the more principles violated, the stronger the predatory suspicion. The InterAcademy Partnership (IAP) released its research

report *Combatting Predatory Journals and Conferences*, noting significant confusion and misunderstanding about predatory journal definitions 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 practices, and even to well-intentioned but low-quality practices [6].

These consensus frameworks primarily evaluate potential predatory characteristics from the perspective of journal and article publishing processes, involving editorial work, peer review, publication, policies, and fees. The descriptions in Table 1 reveal commonalities: (1) explicit predatory purpose of sacrificing scholarly interests for self-interest; (2) concealed fraudulent intentions, such as exploiting OA models, fabricating editorial boards, opaque fee policies, and lacking integrity information; (3) disregard for editorial and publishing norms by offering authors “faster” and “easier” publishing processes; and (4) unscrupulous market promotion that fails to provide industry-standard services, makes unrealistic publication promises to compete for manuscripts, and even harms relevant policies and social interests.

[Figure 1: see original paper]

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 the Beall list, OA journals have been the primary “disaster area” for predatory journals, though assessments have traditionally focused on publishing perspectives. For instance, Stefan Eriksson identified two types of predatory journals under the “predatory journal” definition: deceptive journals that violate research integrity (ALLEA, 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 *Global Open Science Outlook 2023* noted, predatory behavior in open science solutions is increasing, primarily by exploiting the monetization and commercialization of academic research [9], with APC-charging OA models raising costs for communities and institutions. Based on WoS data, global OA publishing dynamics, and our team’s *2023 Global OA Journals and APC Monitoring Report* (an annual continuing report), this section analyzes the definitional and emerging characteristics of predatory practices in OA publishing.

2.1 Predatory Behavior Characteristics in the 2023 Global OA Market

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

APC Price Increases in OA Journals

In 2023, the average APC for global OA journals was \$2,957, representing a 7.4% annual increase. However, 269 OA journals experienced APC increases of 40% or more. Twenty-seven OA journals exceeded the 2022 global average APC while increasing prices by over 40% (Table 2), including 11 journals from Elsevier and Wiley's *New Phytologists*, which showed the highest increase.

OA Article Publication Volume

In 2023, 1,396 OA journals saw annual publication volume increases of 40% or more. Twenty-six OA journals published 300 or more articles in 2022 and increased volume by over 40% in 2023 (Table 3), with Wiley, Springer Nature, and MDPI each contributing six journals. The journal with the highest increase was Elsevier's *Heliyon*.

Global APC Revenue

In 2023, 1,980 OA journals generated APC revenues exceeding \$10 million. Sixteen OA journals earned \$10 million or more in 2022 while increasing revenue by over 30% in 2023 (Table 4), including nine journals from MDPI. The journal with the highest revenue increase was Elsevier's *Heliyon*.

(2) Abnormal APC Predatory Motivations in 2023 OA Journal Behavior

Comprehensive analysis of APC pricing, OA publication volume, and total APC revenue reveals potential predatory motivations. Table 5 examines the top 10 OA journals by global APC revenue in 2023.

The top 10 OA journals by global APC revenue collectively earned \$331 million in 2023, accounting for 12.4% of total global APC revenue. MDPI's *International Journal of Molecular Sciences* ranked first, characterized by high average APC and large publication volume. Springer Nature's *Nature Communications* and *Scientific Reports* ranked second and third respectively, with contrasting strategies: *Nature Communications* employs a "high-price, low-volume, China-focused" model with low article output but APC prices 2-3 times higher than other journals in Table 5 and Chinese authorship reaching 37%; *Scientific Reports* uses a "low-price, high-volume, global" approach with lower APCs but high publication volume. MDPI's *Sustainability* and *Applied Sciences-Basel* ranked fourth and fifth, both exhibiting "average-price, high-volume, China-focused" strategies with high publication volumes (ranking third and fourth globally) and Chinese authorship exceeding 40% of total articles. PLOS's *PLOS ONE* ranked ninth, characterized by "low-price, high-volume" publishing. Comprehensive analysis of global APC pricing and OA publication volume data (Figure 2 [Figure 2: see original paper]) and China-specific data (Figure 3 [Figure 3:

see original paper]) demonstrates that the top 10 publishers by global APC revenue in 2023 employ strategic games involving “journal APC pricing,” “OA publication volume,” and “regional targeting” to maximize global APC revenue.

[Figure 2: see original paper] [Figure 3: see original paper]

2.2 “Predatory Consequence” Characteristics in the Global OA Publishing Market

Publishers’ motivations for accelerating OA publishing have raised questions about publication quality and OA intentions. In March 2023, the Royal Astronomical Society announced full OA for all journals starting 2024. In March, Hindawi’s *Oxidative Medicine and Cellular Longevity* was removed from the Web of Science SCI list. In April, all editorial board members of the top-tier neuroscience journal *NeuroImage* resigned collectively after Elsevier refused to reduce article APCs, planning to establish a new non-profit OA 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 prestigious 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 starting 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]. Frontiers retracted 36 articles in September 2023, 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 reduced the company’s quarterly revenue by \$18 million compared to the previous 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 address OA costs, funding, and quality issues. In March 2023, the German Technical University Alliance released recommendations for strengthening the diamond OA ecosystem. The Global Diamond Open Access Summit was held in October. The 2023 International Open Access Week theme was “Community over Commercialization.” In November, Switzerland’s negotiations with Elsevier reached an impasse, threatening the termination of transformative agreements. The Swiss National Science Foundation (SNSF) announced it would no longer fund OA articles in special issues starting February 2024. Anhui Provincial Hospital issued a notice placing all journals from Hindawi, MDPI, and Frontiers on a “caution list,” stating they “do not recommend submission, will not reimburse page charges, and will not include in research performance evaluations.” In Novem-

ber, 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 review of retractions and research misconduct [24].

3. Redefining “Journal Predatory Nature” in the Global OA Market

Based on the international definitional framework for predatory journals shown in Figure 1, this section examines current characteristics of “predatory journals” in the global OA market that seek to maximize APC profits, organized across three levels: predatory motivation, predatory behavior, and predatory consequences.

[Figure 4: see original paper]

(1) Predatory Motivation: APC Profit Supremacy

Journals exploit the gold open access author-pays model and mega-journal mass publication models purely for profit maximization, disregarding publishing ethics, integrity, and research quality requirements while failing to provide publishing quality and services commensurate with author payments. 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 maintain opaque APC policies and 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 China-market publishing programs. 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 scholarship occurs through rapid article acceptance with minimal or no peer review or quality control. Economic losses result from charging APCs upon manuscript submission and imposing high retraction fees. Publishers do not scrutinize whether authors can afford APCs. Multiple stakeholders suffer harm: authors face reputational questioning, as even legitimate and valuable research fails to achieve normal dissemination and citation when

published in predatory journals. News about predatory journals causes the public to question the seriousness and reliability of science, further damaging the reputations of academic communities and research institutions.

Based on Figure 4, this paper proposes a redefinition of “predatory journals” in the current global OA market—the “OA Journal Predatory Nature” definition: low-quality or unlimited-scale journals that possess predatory intentions to maximize APC revenue, exhibit fraudulent strategies, exploit academic publishing digitization, gold open access, and author-pays models, and cause multi-party losses in academic, economic, and social dimensions.

4. Implications of the “OA Predatory Journals” Definition

This definition aligns with IAP’s questions: What is lost when 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 research communities and public interests (such as preprint servers, repositories, and open publishing platforms)? The IAP report *Combatting Predatory Journals and Conferences* identified three primary drivers of predatory journals: (1) 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 vulnerable to predatory actors; (2) the dominance of “publish or perish” and “quantity over quality” research evaluation systems and institutional drivers shaping individual academic behavior; and (3) serious challenges and deficiencies in peer review systems, particularly lack of transparency (whether fully open, anonymous, or hybrid) and inadequate training, competence, and recognition of peer reviewers [6].

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

(1) Establish China’s OA Warning Thresholds for Investment and Quality Control. Determine whether fiscal funds should mandate local deposit and international dissemination of publications from funded projects, establish OA funding control ratios (e.g., below 10%) integrated with library database subscription budgets, and cap expenditures at a certain percentage of China’s R&D expenditure. Implement quality reviews for APC payments to journals where Chinese authorship exceeds 40% or where APC pricing is unreasonable, and require post-publication local storage and open access.

(2) Mitigate Adverse Impacts of the International OA Publishing Market by Calculating China’s OA Costs. Eliminate negative factors in the global publishing market dominated by OA profit motives. Balance China’s OA costs between open scholarly communication based on OA publishing and

open scholarly exchange based on OA repositories, establishing credible and controllable proactive arrangements for disseminating and applying research outcomes to reduce passive retraction risks. Research and determine China's OA models and cost components, calculating 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 international journals' publishing functions, and advance the OA transformation of China's scientific journals. Fund the open dissemination of research papers and other outcomes on autonomous platforms and scholarly communication communities. Conduct annual monitoring of fully OA publishers' practices and strengthen analysis of traditional publishers' OA marketization processes. Establish a "Global OA Journal Whitelist" to guide Chinese authors' journal selection for OA paper publication.

OA development has approached mainstream adoption, but its rapid growth affects stakeholders extremely unevenly. 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 systematic review of definitional consensus on predatory journals and analysis of annual OA publishing data, this paper proposes 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 severely damage multi-party interests, echoing the concerns raised in this study. The standardization and win-win models of the global OA market require continued research.

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