A Review of Predatory Journals from the Perspective of Research Integrity

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Abstract

Purpose/Significance: To systematically review domestic and international research on predatory journals and provide references for future related studies. Method/Process: This study employs literature review and web-based investigation methods to examine predatory journals from aspects including basic theory, characteristic indicators, country distribution, and operational models. Results/Conclusion: Predatory journals have spawned a series of related concepts with profound theoretical roots; they exhibit new characteristics with the development of the times, thus requiring more intelligent methods to identify and track such journals; scientifically underdeveloped developing countries are the main origin and victims of predatory journals; predatory journals imitate the operational models of legitimate journals in their establishment, profit-making, and dissemination processes, which increases the difficulty of governance. Future research can focus on five aspects: conceptual definition of predatory journals, tracking of predatory behavioral characteristics, AI-assisted precise identification, improving peer review mechanisms, and cross-national exchange and cooperative governance.

Full Text

Preamble

A Review of Predatory Journal Research from the Perspective of Research Integrity

Liu Yi[1], Chen Fuyou[2], Meng Ping[2], Wen Tingxiao[3]

Abstract:

[**Purpose/Significance**] This paper systematically reviews representative research on predatory journals both domestically and internationally, providing a reference framework for future studies. [**Method/Process**] Employing literature review and web-based investigation methods, we examine predatory jour-

nals across four dimensions: foundational theory, characteristic indicators, geographical distribution, and operational models. [**Results/Conclusion**] Predatory journals have spawned a series of related concepts with profound theoretical roots. As they evolve with the times, predatory journals exhibit new characteristics that demand more intelligent methods for identification and tracking. Developing countries with less-developed research systems serve as both the primary originators and victims of predatory journals. By mimicking the operational models of legitimate journals throughout their establishment, profit generation, and dissemination processes, predatory journals increase the difficulty of governance. Future research should focus on five key areas: conceptual definition of predatory journals, tracking of predatory behavioral characteristics, AI-assisted precision identification, improvement of peer review mechanisms, and transnational collaborative governance.

Keywords: predatory journal; hijacked journal; journal blacklist; open access; peer review
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1. Introduction

In 2010, J. Beall, a librarian at the University of Colorado, created a list of "potential, possible, or probable predatory" publishers and journals, arguing that predatory journals were undermining open access and fostering unethical behavior among scientists [1]. Subsequently, *Nature* and *Science* provided extensive

coverage on quality assessments of predatory journals [2], emerging scams [3], and their detrimental impacts [4], making predatory journals a hot topic in scientific circles [5]. A 2022 *Nature* report revealed that global predatory journals had exceeded 15,500, affecting at least 1 million researchers and wasting billions of dollars in research funding, with over 80% of surveyed researchers considering predatory journals a serious problem [6]. Academician Zhu Bangfen [7] described China's research integrity issues using "two unprecedented phenomena": unprecedented breadth and severity, and unprecedented societal attention, proposing "self-inspection, self-correction, and self-purification" to curb academic misconduct and promote responsible research conduct.

Research integrity is the cornerstone of scientific and technological innovation and a prerequisite for China to become a scientific powerhouse and gain international academic discourse power. Studying predatory journals holds significant importance across multiple levels: at the national level, it aids in building China into a research powerhouse by fostering a clean and upright research environment; at the academic level, it protects the credibility and reliability of research outputs and safeguards academic reputation; at the institutional level, it enables rational allocation of limited research funds and establishes better funding orientation; at the journal level, it maintains a healthy publishing ecosystem and cultivates high-quality first-tier academic journals; and at the scholar level, it helps identify deceptive journal practices, avoiding the "predatory publishing" trap and preventing waste of research effort.

In recent years, China has pursued a dual approach: vigorously promoting journal internationalization to build world-class Chinese journals with distinctive characteristics while strengthening quality oversight to purify the publishing ecosystem and intensify crackdowns on predatory journals. In 2018, the General Office of the CPC Central Committee and the State Council issued "Opinions on Further Strengthening Research Integrity Construction" [8], explicitly proposing the establishment of an early warning mechanism for academic journals and encouraging institutions to publish early warning lists of domestic and international academic journals, with those causing adverse impacts to be blacklisted—a milestone in China's research integrity construction that *Nature* hailed as China's strongest reform against academic misconduct, setting an example for the world [9]. In 2020, the Ministry of Science and Technology issued the "Notice on Several Measures to Break the 'Paper-Only' Unhealthy Orientation in Science and Technology Evaluation (Trial)," proposing to blacklist international scientific journals with poor academic reputation that prioritize commercial interests, demonstrating the government's attitude and determination to safeguard research integrity. In 2021, the Publicity Department issued the "Notice on Conducting Special Inspections on Journals' Indiscriminate Paper Publishing," organizing special inspections on journals that one-sidedly pursue economic interests, indiscriminately publish papers, have low publication quality, and engage in various violations.

Domestic and international scholars have conducted extensive research on preda-

tory journals. K.D. Cobey et al. [10] reviewed definitions of predatory journals; Z. Sarfraz et al. [11] identified four distinguishing factors between legitimate and predatory journals: journal characteristics, academic and professional standards, international dissemination, and scholar-related factors; Ding Han [12] and Yuan Zihan et al. [13] reviewed characteristics, harms, and governance measures; Yuan Xiaoqun et al. [14] compared OA journals and predatory journals across publication nature, processes, geographical distribution, and impact. However, existing research has three main gaps: First, scholars hold divergent views on defining predatory journals, with few studies deeply analyzing their theoretical roots. Second, predatory journals constitute a dynamic system [15] that adjusts its predatory behaviors in response to academic countermeasures, necessitating timely summaries of behavioral characteristics and monitoring of country-specific developments. Third, few studies analyze the operational models behind predatory journals, yet understanding these models is essential for cutting off their production and dissemination chains and achieving precise strikes.

This study aims to clarify relevant concepts and theoretical foundations of predatory journals, summarize their characteristic indicators and major lists, overview their global distribution from publishing, authorship, reviewing, and citation perspectives, and explore their primary operational models. Finally, we propose future research directions, hoping to provide references for effective governance of this "cancer" plaguing scientific publishing.

This study employs literature review and web-based investigation. Literature review follows research logic and context, obtaining key documents through thematic searches and tracking citations for comprehensiveness. To ensure comprehensiveness, authority, and representativeness, we used CNKI for Chinese data with the theme "predatory journals OR Beall's list OR journal blacklist OR negative journals OR mega OA journals OR early warning journals," excluding notices and conference materials, yielding 94 Chinese articles. For foreign literature, we searched the WoS Core Collection with TS="Predatory journal*" OR TS="Beall's list" OR TS="Blacklist journal*" OR TS="Negative journal*" OR TS="OA Mega* journal*," obtaining 663 articles. We used CNKI and WoS citation analysis functions to track additional literature, supplemented by Google Scholar, and manually screened titles and abstracts, ultimately selecting 171 representative articles (52 Chinese, 119 English) from October to December 2022. Web-based investigation focused on compiling predatory journal assessment lists and collecting operational model materials, including Beall's List, Kscien List, Cabells Blacklist, CAS International Early Warning Journals, university and hospital blacklists, typical predatory publishers like OMICS and Waset, and large international ghostwriting sites like International Publisher LLC. Based on literature and web data, we analyzed predatory journals' theoretical foundations, characteristic indicators, country distribution, and operational models, and explored future research prospects to provide references for effective governance.

2.1 Definition Analysis

J. Beall [1] initially described predatory publishers as those that "publish counterfeit journals using the author-pays open access model," characterized by "dishonesty, lack of transparency, low publication quality," and an intent "to deceive researchers." Typical definitions of predatory journals include: (1) **Dictionary-based definitions**: H. Sharma et al. [16] defined them based on Webster's concept of "predatory" as journals that charge Article Processing Charges (APC) to exploit scholars for economic gain while failing to meet publication standards. (2) **Country-specific definitions**: Jiang Xiaoyuan et al. [17] defined international predatory journals as those seeking quick profits through open access, while domestic predatory journals in China do not use open access as a charging condition. Consequently, Tang Gengyan et al. [18] defined Chinese predatory journals as those that "abandon editorial principles, forget their founding mission, and purely aim to exploit authors' manuscript processing fees." These national differences primarily stem from varying operational models. (3) **Delphi-based definitions**: In 2019, 43 participants from over 10 countries across publishing, funding, policy-making, research, institutions, and libraries used the Delphi method to define predatory journals and publishers as "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]. This definition gained wide recognition internationally.

However, some scholars argue against using the sensational term "predatory" [20], as peer review quality is ambiguously defined, creating a gray zone between predatory and legitimate journals that is difficult to assess [21]. Moreover, not all predatory journals are truly predatory [22], and using these lists to evaluate research and scholars may cause academic bias [23]. Some view the term as unhelpful for identifying misconduct and poor-quality journals, or even as discriminatory and stigmatizing [24]. Additionally, simplistic blacklisting is detrimental to the complex and increasingly diverse global academic publishing landscape [25]. Domestic scholars Bu Yi and Min Chao translated "predatory journal" as "unethical journal" [26], while some argue these "bad journals" have their place and logic in the academic ecosystem, and legitimate journals should not be dismissed [27].

2.2 Related Concepts

Numerous concepts relate to or resemble predatory journals, sharing commonalities yet retaining differences. Clarifying these diverse terminologies helps stakeholders avoid confusion.

Journals that imitate legitimate journals for predatory purposes include:

(1) **Illegal Journals**: Relative to legitimate journals, these are generally un-

approved by China's State Administration of Press and Publication and not formal "internal publications" [28], sometimes even containing illegal political or pornographic content, though not necessarily for direct economic gain. (2) **Hijacked Journals**: These mimic or clone legitimate journals' titles or website domains to lure scholars [29], a common predatory tactic. A. Abalkina [30] proposed webpage detection methods to identify hijacked journals. (3) **Fake/False Journals**: These may lack real websites or forge impact factors, peer review processes, editorial boards [31], and use worthless misleading metrics like "Global Impact Factor," "Universal Impact Factor," or "Citefactor" [32]—common smokescreens for predatory deception.

Controversial concepts often associated with predatory journals include:

(1) **OA Mega Journals (OAMJ)**: OAMJ represents a simple yet effective publishing model featuring high volume, rapid publication, and APC charges. However, scholars question whether OAMJ peer review is robust enough for post-publication review models [33]. Jiang Xiaoyuan et al. [34] view open access as a scientific publishing utopia promoted by Western knowledge giants for massive profits. In reality, some OAMJs use relatively low academic quality control processes for bulk publishing and huge profits, leading to constant questioning of their motivations [35]. Some scholars argue that large OA publishers like MDPI engage in radical fee extraction that, while not predatory, may become more predatory over time given current methods and growth rates [36]. (2) **Emergent Journals**: Due to imbalances in the global knowledge system, some developing countries' research is just beginning and faces resource constraints, making high-quality publication difficult. These aspiring journals may have below-average peer review quality but are science-oriented, fundamentally differing from profit-oriented predatory journals with fake or absent peer review [37]. Classifying them as predatory could undermine their important regional dissemination role [38]. Academic publishing infrastructure projects like Brazil's SciELO and Mexico's Redalyc allow cost-appropriate journal dissemination to prevent misclassification of well-intentioned emergent journals and lower research access barriers for disadvantaged scholars [3]. (3) **Early Warning Journals**: CAS defines early warning journals as those with high-risk characteristics and potential quality issues, categorizing them into high, medium, and low risk based on indicator data [39]. China's Ministry of Education also proposes listing international scientific journals with poor academic reputation, excessive APCs, abnormal manuscript distribution, or abnormal growth in publication volume [40]. Academic predation is not a simple binary phenomenon but a spectrum of types and illegitimacy degrees based on dual assessment of academic and economic legitimacy [41]. Early warning journals and predatory journals lack a clear dividing line. Semantically, "early warning" is more rigorous, avoiding discriminatory and stigmatizing controversies. In purpose, early warning journals focus on cautionary functions and helping journals rectify improper behavior rather than complete resistance. In severity, early warning journals have graded risk levels (high, medium, low) based on

indicators, representing a gray zone between legitimate and predatory journals that can transform under certain conditions—this gradation of potential risk is the fundamental difference from predatory journals.

2.3 Theoretical Foundations

Analyzing the theoretical foundations of phenomena helps dissect their essence. Predatory journals' emergence, development, and growth have deep theoretical roots spanning economics, management, psychology, communication, and library and information science.

(1) **Capital Profit-Seeking**: Marx wrote in *Das Kapital*, "With adequate profit, capital is very bold." Traditional academic journals prioritize knowledge exchange with relatively simple profit models, while the massive profits from open access business models have whetted the appetite of Western publishing giants. Capital's profit-seeking nature is the fundamental driver of predatory journals [42].

(2) **Stakeholder Theory**: This theory holds that organizational goal achievement is influenced by stakeholder input and participation. Based on this theory, predatory journals' key stakeholders include authors, predatory journals themselves, publishers, funding agencies, researchers, and society [43]. When certain groups (e.g., predatory journals, publishers, scholars under evaluation pressure) defend their interests, this expanding interest group gradually forms a stable predatory publishing industry structure.

(3) **Broken Windows Theory**: This theory posits that unchecked undesirable phenomena in an environment induce imitation and escalation. When some publishers operate in gray zones, earning high profits by damaging the academic ecosystem without effective regulatory oversight or severe penalties, more journals emulate their illegal practices, necessitating strengthened external supervision [44].

(4) **Gatekeeper Theory**: This theory suggests that in information dissemination, gatekeepers decide whether information enters or continues through channels, effectively filtering content. Predatory journals typically lack standard, science-based peer review [45], with ineffective gatekeeping from editorial board members through peer review processes.

(5) **Knowledge Gap Theory**: This theory posits that higher socioeconomic status individuals acquire scientific knowledge faster and in greater quantities than lower-status individuals, with the knowledge gap widening rather than narrowing. Predatory journal growth directly relates to Western knowledge "hegemony" and "uneven power distribution" [46], making developing countries disaster-stricken areas for predatory journals.

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3. Characteristic Indicators of Predatory Journals

Characteristic indicators concretize abstract concepts. Understanding quantitative and qualitative features of predatory journals enables effective identification and monitoring methods, advancing research from theory to practice.

3.1 Characteristic Elements

In 2015, J. Beall [47] improved the third edition of identification criteria for predatory open-access publishers, summarizing four major characteristics: editorial board, business operations, research integrity, and others. C. Vlăduț et al. [37] identified 10 features for recognition: fee standards, publication volume, editorial board credibility, website quality, publication ethics guidelines, and information authenticity. K.D. Cobey et al. [10] extracted 109 characteristic elements from 38 closely related studies, categorized into six groups: journal operations (deceptive or non-transparent, low quality standards, unethical practices), articles (publications from specific countries, poor quality, few citations), editorial and peer review (low-quality review, fake editorial boards), communication (deceptive solicitations, email solicitations), and indexing (false claims of DOAJ indexing). However, some studies note that high-quality indexing is insufficient for identification, as predatory journals have infiltrated reputable databases like PubMed, Scopus, and WoS [48]. S. Cukier et al. [49] searched commercial databases, university libraries, and YouTube for predatory characteristic lists, ultimately identifying 93 features to help identify predatory journals or publishers, with over 75% overlapping with Cobey et al.'s six categories. Current checklists lack clear, strict identification guidelines, and excessive lists cause confusion. What is needed now is a threshold-based assessment tool for potentially predatory journals.

Domestic scholar Tang Gengyan [18] used grounded theory to categorize Chinese predatory journal characteristics into three major groups and 15 specific features: service quality (editorial level, review status), impact (journal influence level), and business operations (business conditions, publication status). Ding Han [12] identified six major features: publication cycle, editorial board lists, counterfeit websites, forged metrics, acquisition of established journals, and geographical targeting of victims. Synthesizing domestic and international research reveals that predatory forms continuously adjust to market supervision, with characteristic elements evolving accordingly. Yet the profit-oriented purpose remains unchanged, generating distinct features from science-oriented professional journals. Identification requires peeling back layers to see the essence. Among numerous characteristics, **APC fees, suspicious editorial boards, and lack of formal peer review procedures are most typical** [50].

3.2 Identification Methods

3.2.1 Qualitative Identification Methods Qualitative methods rely on the identifier's knowledge base, supplemented by research and data collection, with

subjective judgment based on personal cognition.

(1) **Sting Operations**: Deliberately submitting obviously flawed papers to test whether journals conduct rigorous substantive review. J. Bohannon [51] submitted a fabricated paper with flawed research design to 304 journals, with over half agreeing to publish, including 82% of journals on Beall's List. This method is highly accurate but demands professional expertise, is time-consuming, and difficult to implement across disciplines.

(2) **Expert Judgment**: Industry experts' experience forms the basis of the well-known Beall's List, which primarily relied on personal assessment of journals' and publishers' predatory behaviors. The Kscien List, a replacement for the discontinued Beall's List, is maintained by a special committee of 23 young researchers [52]. Scholarly submission experience also exposes problems throughout the review process, but the entire process from writing to submission is time-consuming and unsuitable for identifying predatory journals across all fields. Expert judgment is highly dependent on individual cognition and may yield inconsistent opinions.

(3) **Peer Review Methods**: M. Dadkhah et al. [53] developed the PedCheck tool, collecting user reviews of journals from Reddit to help scholars understand others' perspectives and called for establishing a community-based knowledge base of predatory or suspicious journals for timely updates.

3.2.2 Quantitative Identification Methods While hijacked journals can be identified through SEO optimization, domain detection, and classification algorithms, no practical, user-friendly computer algorithm yet exists for automatically detecting predatory journals [54]. Quantitative methods that assist or simplify judgment include:

(1) **Machine Learning Algorithms**: Weng Kaixin [55] used datasets of predatory and legitimate journal websites, analyzing characteristic words with unrigorous or erroneous grammar, training models using Bayesian, SVM, logistic regression, and random forest algorithms to build a predatory journal classification system with 90% accuracy. M. Dadkhah et al. [54] proposed the Jourchain concept, forming a semi-private journal blockchain with predatory journal experts and public scholars, continuously expanding blockchain records to improve identification accuracy.

(2) **Composite Indicators**: Wang Lingfeng et al. [56] defined the JPI Index (actual APC per paper / reasonable APC per paper), with values >1 indicating predatory journals. Huang Jinxia's team, long focused on OA resources, used least squares fitting functions to warn against premium and abnormal journals based on APC price and journal influence, providing the APCCheck platform for querying APC fee reasonableness [57]. Quantitative methods are simple, objective, fast, and standardized, but their authenticity, methodological rationality, and result acceptance require improvement.

3.3 Assessment Lists

For most scholars, quickly and accurately identifying predatory journals from complex characteristic elements is difficult. Therefore, institutions and individuals have developed representative predatory journal lists based on major characteristics and reasonable assessment methods.

(1) **Institutional Lists**: In 2016, the Institute of Scientific and Technical Information of China (ISTIC) released a list of "journals requiring key monitoring and evaluation by research management departments" at its annual Chinese S&T paper statistics conference. The list was later reposted by self-media as "high-risk list" or "SCI blacklist," causing academic shock. ISTIC clarified it was for internal reference only, not a qualitative blacklist. Scholars questioned its indicators as unreasonable, unobjective, and unscientific, while others agreed some listed journals were indeed "notorious" [58-59]. To avoid media focus shifting and academic issues becoming sensationalized, ISTIC's monitoring list now remains internal for specific departments, using top-down policy intervention to guide submissions. At the end of 2020, the National Science Library, Chinese Academy of Sciences (CAS) first publicly released the "International Early Warning Journal List," using expert consultation to determine analysis dimensions and evaluation indicators including: publication volume, author internationalization, rejection rate, APC, journal transcendence index, self-citation rate, and retraction information. Based on objective indicator data, it generates high, medium, and low three-tier warning lists, released for three years (2020, 2021, 2023) [39]. ISTIC and CAS lists serve different audiences and employ different approaches: ISTIC's list, commissioned officially, provides references for management decision-making with internal indicator data (top-down reform), while CAS's list is open to all users with transparent indicators and publicly accessible data, using mass supervision to regulate journals and database vendors (bottom-up reform).

(2) **Individual/Social Organization Lists**: The most famous individual list, Beall's List, was forced to shut down in January 2017 after J. Beall and his university received numerous complaints from affected publishers and scholars [60]. Later, scholars and information managers created beallslist.net to archive the list [61], but without adding new journals, only occasionally updating links or notes based on journal performance.

(3) **Commercial Lists**: In July 2017, academic company Cabells established a commercial fee-based whitelist/blacklist system, assigning scores based on severity across dimensions including integrity, peer review, publishing practices, indexing and metrics, fees, access and copyright, business practices, and website quality, ultimately categorizing journals as severe, moderate, or minor [62].

(4) **University/Institution Lists**: Some universities' technology offices, libraries, or academic committees develop their own warning lists based on

specific circumstances, such as Fudan University Obstetrics and Gynecology Hospital (2018), Huaqiao University (2018), and Kunming University (2019). Sun Yat-sen University even listed 18 CSSCI journals in its "blacklist" in the "Principles for Important Journal Catalogs in Humanities and Social Sciences (Trial)" (2014 revision).

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4. Country Distribution of Predatory Journals

Academia should reduce support for predatory journals by not publishing in them, not citing their articles, not serving as reviewers, and not joining editorial boards [63]. This section examines the distribution of predatory journals across publishing, authorship, reviewing, and citation countries.

4.1 Publishing Countries

J. Bohannon's [51] sting operation identified four geographical clusters of predatory publishers: India, Nigeria, the US, and UK. Some predatory journals are nominally created in Western countries (e.g., using US email or mailing addresses) but actually operate in developing countries [64]. J. Xia et al. [50] randomly sampled 300 predatory journals, finding most originated from India, considered a preferred country for predatory publishers. Some journals nominally from the US, UK, or Canada may actually be Indian journals. J. Xia et al. [65] also found Nigeria, Iran, Turkey, and Malaysia among top predatory journal sources. India-based OMICS and Turkey-based Waset are particularly notorious. India's rampant predatory journals stem from its education system's extensive diversity and complexity, with inadequate research quality oversight enabling rapid predator infiltration [66]. CAS Early Warning List analysis shows no Chinese SCIE journals were selected [67], yet Cabells' 2019 predatory report identified 276 predatory journals from mainland China or Hong Kong, accounting for 2% of the total [66].

4.2 Authorship Countries

Although 62% of predatory journals are based in India, Indian scholars account for only 10.4% of publications in them. However, India, Nigeria, and Turkey remain the top authorship countries [68]. Bagues M et al. [69] surveyed 46,000 Italian researchers, finding about 5% had published in predatory journals, showing both developed and developing countries are affected. A. Kerr et al. [70] found approximately 50% of South Africa's predatory publications were by professors or associate professors, linked to South Africa's 2005 publication subsidy policy. U. Sughra et al. [71] summarized 10 reasons for publishing in predatory journals, including deliberate choice, lack of discernment, rapid publication, promotion needs, paper accumulation, and evaluation pressure. J. Xia et al. [50] attributed this to local economic, cultural, and political factors. G. Tang et

al. [72] identified research discrimination, background, self-awareness, and personal needs as main reasons Chinese humanities and social sciences master's students publish in Chinese predatory journals.

A 2021 study by V. Macháček et al. [73] found that regions with most predatory journal publications concentrate in Asia and North Africa, with the most and least developed countries relatively less affected, while countries with emerging research systems, medium economic development, and large research systems are most vulnerable—a dire warning for developing countries with high investment but insufficient governance capacity. The study found China's predatory journal publications accounted for only 3.66% of its total output, but the absolute number is staggering: 44,000 articles had at least one Chinese coauthor, meaning nearly 1 in 4 predatory journal papers had Chinese involvement, the highest global proportion. *Nature* reported this finding [74], drawing industry attention. Publisher Frontiers demanded retraction, claiming the journal list was inaccurate and data sources unverified. In September 2021, *Scientometrics* retracted the article citing language bias and lack of control groups, despite authors' disagreement, which scholars viewed as a journal succumbing to publisher pressure, prioritizing commercial interests over scientific standards. In 2022, L. Waltman decided to publish a revised version addressing editorial concerns in his journal *Quantitative Science Studies* [75]. In December 2022, *Scientometrics* co-editor-in-chief Zhang Lin replied to G. Abramo's letter questioning the retraction, stating the journal would strengthen cooperation with its excellent reviewer committee [76]. This case exemplifies deep academic debate among academia, publishers, and journals triggered by predatory journal research.

4.3 Reviewing Countries

Predatory journals' hallmark is absent or lax peer review. M. Downes [77] examined 966 allegedly predatory open-access publishers, finding about 4,000 Australian scholars on their editorial boards, but 1/4 were unaware of their membership. A. Severin et al. [78] linked Cabells' predatory journals with Publons peer review data, finding 1,160 predatory journals published 6,077 reviews (3.31% of all comments), with predatory journals averaging only ~5 reviews versus 28 for whitelisted journals. Most scholars (~90.00%) never submitted reviews for predatory journals, while only 0.26% and 0.35% submitted primarily or exclusively to predatory journals. While most Publons reviewers are affiliated with Europe and Central Asia (45.5%), regions with highest predatory journal review shares are Sub-Saharan Africa (21.8%), Middle East and North Africa (13.9%), and South Asia (7.0%), followed by North America (2.1%). Economically, low-income countries have the highest predatory review proportion (27.0%) and high-income countries the lowest (1.5%). Currently, predatory journal reviewing concentrates among low-income, young, and inexperienced researchers, similar to authorship patterns.

4.4 Citation Countries

Predatory journals may spread erroneous knowledge and reduce scientific credibility, with severity depending on their academic exchange breadth and dissemination speed. At the 6th World Conference on Research Integrity in Hong Kong (2019), R. Anderson [79] reported 7 predatory journals indexed in WoS, Science Direct, and PLoS One, with 2 having high WoS citation rates (25% and 37% of articles cited at least once), showing database indexing significantly affects whether predatory journals are cited. T.F. Frandsen [80] analyzed 124 predatory journals from Beall's List, finding average citations per journal of only 10. South Asia was the largest citing region, but Southeast Asia and the Middle East ranked second in overall citing author distribution, while Southeast Asia and Europe ranked second in first-author distribution. India and Malaysia were top citing countries, accounting for 48.9% of citing authors, while Chinese scholars accounted for 2.5%. Predatory journals have low citation rates, and emerging research regions and developing countries often become recipients of predatory research, potentially widening the East-West scientific culture gap.

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5. Operational Models of Predatory Journals

The problem with predatory journals is not falsifying paper content but falsifying journal systems, commodifying journal institutions and breaking academic community consensus [81]. This makes predatory journals highly deceptive with diverse establishment forms.

5.1 Establishment Models

(1) **Open Access-Based Establishment**: Some predatory journals exploit the "author-pays, reader-free" open access model, neglecting journals' essential nature as academic exchange platforms to maximize commercial interests. India-based OMICS, the most notorious predatory publisher, publishes over 700 open-access journals [82], most using fraudulent means or deliberately lowering quality standards to collect APC fees.

(2) **Forging or Imitating Legitimate Journals**: These borrow well-known journals' titles or ISSNs, creating highly similar website domains [29]. As they operate primarily online, they can quickly register new domains to deceive readers even after being reported.

(3) **Changing Names or Publishers**: Due to academic journals' financial unsustainability, predatory publishers take over legitimate journals, transforming them into profit-oriented predatory models. In 2018, OMICS was fined $50 million for commercial fraud and permanently banned from most profit activities [82]. In 2020, some OMICS journals changed names and websites, launching the "Hilaris" brand, deleting OMICS associations to evade regulation. These are merely superficial changes—DOIs, ISSNs, and

even editors-in-chief remain unchanged, only omitting OMICS mentions [3].

5.2 Profit Models

Predatory journals primarily aim to accumulate wealth, with profit maximization as their foremost consideration. Common profit models include:

(1) **Article Processing Charges (APC)**: APCs are fees paid by institutions or authors under open access to cover publishing and management costs. J. Xia [65] found 72% of predatory journals charge APCs, with predatory behavior necessarily related to APC collection. However, most predatory journals charge relatively low APCs, so APC alone should not measure predatory nature. L. Shamseer et al. [83] found predatory journals' APC (median $100) was much lower than legitimate OA journals (median $1,865) and subscription-based hybrid journals (median $3,000). C. Shen et al. [84] found significant gaps between large and small predatory publishers' APCs, with small publishers (average $104) gradually dominating the market over large ones (average $800). Large predatory publishers like OMICS charged an average APC of $1,194 across 675 journals in 2022 [85].

(2) **High Volume + High Page Fees**: Combining large publication volumes with high page fees is the main profit expansion model for Chinese predatory journals [18]. In October 2021, China's Publicity Department issued a notice requiring CNKI, VIP, and Wanfang databases to inspect and rectify, resulting in over 400 journals being delisted. Yet such journals persist. For example, Hubei Changjiang Press Media Company applied for two journals—*Science and Education Guide* and *Science and Education Guide (Electronic Edition)*—using the same ISSN but different CN numbers, publishing over 2,000 and 4,000 articles respectively in 2021. Shanxi Education Media Group's *Modern Vocational Education* published approximately 5,700 papers in 52 issues in 2021 . With online claims of $1,200 per page, these journals could collect tens of millions in page fees annually.

(3) **Ghostwriting and Name-Change Services**: Beyond conventional models, predatory journals collude with intermediaries, forming complete industrial chains from demand matching, ghostwriting, guidance, to publication. Russia's International Publisher LLC offers full-chain services including ghostwriting, authorship transfer, fake peer review, and data fabrication through www.123mi.ru, claiming cooperation with journals to ensure publication [86], with over 4,000 papers published in Scopus or WoS-indexed journals in recent years [87].

5.3 Dissemination Model

Lasswell's 5W model reveals predatory journals' entire dissemination process through five angles: communicator, content, channel, audience, and effect.

(1) **Communicator**: While legitimate journals are their own communicators, predatory journals partner with third-party intermediaries, illegally outsourcing manuscript solicitation, editing, and printing, disrupting the publishing environment [88].

(2) **Content**: Academic journals' true value lies in disseminating scientific knowledge. Predatory journals, lacking rigorous peer review and editing, mostly publish mediocre, under-researched work, some containing erroneous or harmful conclusions [89], with mixed low-quality works undermining academic publishing credibility [90].

(3) **Channel**: With new media development, academic journals build diverse, legitimate communication channels [91]. Predatory journals attract readers through spam emails and social media misinformation [92], using random, unstable channels.

(4) **Audience**: Academic journals have clear missions and academic styles with targeted audiences. Predatory journals have scattered research and unclear positioning, troubling genuine researchers; their audience is more accurately termed victims [93].

(5) **Effect**: B.C. Björk et al. [89] found predatory journal articles averaged 2.6 citations over five years, with 56% never cited, versus 18.1 citations for Scopus peer-reviewed journals with only 9% uncited. Articles in predatory journals have virtually no scientific impact.

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6. Future Research Outlook

Current research shows: (1) Predatory journals have deep theoretical roots and derived concepts that are relatively vague, independent yet interconvertible, creating major definitional challenges. (2) Some research focuses on characteristic indicators and institutional tracking lists, but predatory journals adjust strategies and present new features as research deepens and lists are exposed, requiring smarter identification and tracking methods. (3) List development enables empirical analysis of publishing, authorship, reviewing, and citation countries. Developing countries with underdeveloped research are both main originators and victims, directly related to "Western knowledge hegemony" and "uneven East-West knowledge power distribution" [25]. (4) Predatory journals mimic legitimate journals' establishment, profit, and dissemination models, increasing governance difficulty. Based on these characteristics, future research should focus on five areas.

6.1 Conceptual Definition of Predatory Journals

A major obstacle to combating predatory journals is the lack of a consistent definition [19]. On one hand, predatory journals resist simple description and standardization, with over 90 checklist items showing overlaps and differences

across lists [19], making consensus definitions difficult. On the other hand, subjective obstacles exist: some scholars willingly pay to publish in these journals to enhance their CVs, while some publishers seek economic benefits through this model, creating resistance to definition. Only when academia reaches definitional consensus can comprehensive, reasonable intervention measures be developed.

6.2 Tracking Predatory Behavioral Characteristics

Predatory journal evolution resembles predator-prey dynamics in ecology—academic responses trigger new predatory strategies [94]. Early predatory journals showed obvious features like fraudulent websites. Over time, new characteristics emerge: appearing in legitimate citation databases but with poor peer review or ethics; forging peer review or using fake metrics to appear legitimate, even fooling experienced authors [95]. Academia must continuously monitor this field, track new behavioral features in real-time, precisely identify wolves in sheep's clothing, timely incorporate newly emerged predatory journals, and remove reformed ones.

6.3 AI-Assisted Precision Identification

Governance is a social engineering project requiring technical support. The online tool "Think Check Submit" helps scholars identify reputable journals through comprehensive criteria [96]. L.X. Chen et al. [97] used machine learning to distinguish predatory from legitimate journals, providing an online Academic Journal Predatory Checking (AJPC) system. Internet companies and social media platforms also use AI to correct and combat misinformation sources, using machine learning to study misinformation origins and propagation paths, identifying key phrases and linguistic features in fake resources [95]. The rise of ChatGPT in late 2022 has dramatically impacted researchers' work; *Nature* noted AI is useful for detecting predatory journals, but such detection may soon be circumvented by purified AI technology—a double-edged sword [98]. AI identification remains highly complex: behavioral analysis often still requires knowledgeable researchers or experienced librarians for subjective judgment, and algorithms have "black box" problems that are difficult to audit or understand. Combining automated monitoring programs from companies with researchers' subjective cognition offers broad prospects for solving predatory journal problems.

6.4 Improving Peer Review Mechanisms

Predatory journals exploit peer review system loopholes: opaque review processes and insufficient reviewer competence/knowledge allow low-quality, fake, unreviewed content to infiltrate academia disguised as scientific peer review, turning processes designed to eliminate bias into accomplices [6]. L. Dobusch et al. [99] proposed open peer review as a new governance mechanism, with transparent review distinguishing reputable from predatory journals. In October 2022, the biology journal *eLife* announced it would adopt the eLife assessment

model in 2023, publishing all peer-reviewed articles alongside expert reviews on its website to make review more "transparent and open," which *Science* called a "disruption" of tradition [101]. However, *eLife* admits it cannot review all submitted preprints [102], and for general readers, lacking authoritative expert/editor control makes distinguishing article quality harder. In 2023, this model faced opposition from *eLife's* former editor-in-chief (a Nobel laureate) and many editorial board members. With numerous international journals of uneven quality, editorial boards and peer reviewers bear heavy responsibility as quality "gatekeepers," playing crucial roles in academic quality, viewpoints, and ethics. Whether traditional, open-access, or new publishing models, more open, fair peer review processes and more robust oversight mechanisms are essential.

6.5 Transnational Exchange and Collaborative Governance

Predatory publishing spans nearly all fields, specialties, and regions, especially non-English and non-mainstream science countries [103]. As scientific exchange and academic publishing internationalize, with more authors choosing international journals, predatory publishing should be elevated from national to international discussion. Organizations like the Committee on Publication Ethics (COPE) strengthen publishing standards, and major publishing platforms should regulate fee structures and details. Addressing predatory journals requires a "shared response" responsibility [5], needing coordinated reactions from all stakeholders (regulators, institutions, funders, researchers, victims) to block their influence [104]. At the research management level (regulators, institutions, funders), raising awareness and establishing reasonable research orientation is the most fundamental measure, including creating journal black/whitelists, improving research policy rewards/penalties, project application, promotion, and evaluation rules to achieve comprehensive prevention, precise strikes, and serious accountability. At the researcher level (researchers, victims, vested interests), deepening cognition and understanding, strengthening prevention and identification capabilities, improving research integrity education, and establishing nationally applicable academic reputation mechanisms are crucial. At the publishing level (journals, database vendors, publishing community), strengthening publishing review mechanisms, standardizing review and publication processes, avoiding publishers' rent-seeking through knowledge advantages, and exploring new models while improving quality, fairness, and reliability are essential.

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7. Conclusion

Predatory journal research has become an important international academic issue. Through literature review and web-based investigation, this paper synthesizes predatory journals' theoretical foundations, characteristic indicators, country distribution, and operational models, clarifies predatory journals and

derived concepts, analyzes deep theoretical roots from economic, political, psychological, and sociological perspectives, examines establishment, profit, and dissemination models, and proposes "five future outlooks": conceptual definition, behavioral characteristic tracking, AI-assisted identification, peer review mechanism improvement, and transnational collaborative governance. These results provide important references for domestic scholars' in-depth research. However, limitations exist: (1) Characteristic identification and assessment involve complex factors (specific indicators, weights, temporal trends) not analyzed in depth due to focus and length constraints, requiring future qualitative and quantitative analysis; (2) While "transnational collaborative governance" was mentioned, effective governance mechanisms were not elaborated, awaiting future multi-dimensional research.

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Meng Ping: Topic and framework guidance, revision and finalization
Wen Tingxiao: Topic participation, revision

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Note: Figure translations are in progress. See original paper for figures.