Statistical Analysis of DOAJ-Indexed Chinese Open Access Journals and Their Charging Policies

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Abstract

Objective: To analyze the characteristics of Chinese open access (OA) journals and their charging policies indexed in DOAJ, thereby providing references for establishing an Article Processing Charges (APC) system for Chinese OA journals. Methods: A total of 253 Chinese and English journals indexed in DOAJ were selected as research subjects. Using web-based investigation methods, data were collected from journal official websites and the DOAJ database regarding indexing time, language, publisher distribution, subject distribution, charging policies, etc., to analyze the characteristics of the indexed journals and their charging policies. Results: DOAJ indexes a limited number of Chinese OA journals with unbalanced subject distribution; the degree of publishing intensification for OA journals is relatively low; Chinese and Chinese-English OA journals still adopt the traditional page fee model, which is generally inexpensive; English OA journals have preliminarily established APC charging standards; and APCs vary across different disciplines. Conclusion: Strengthening policy guidance, enhancing information technology infrastructure, improving journal service quality, encouraging Chinese researchers to publish their findings first in Chinese OA journals, and developing a charging system framework suitable for the development of Chinese OA journals will facilitate the healthy development of open access publishing in China.

Full Text

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Abstract:
[**Purpose**] This study analyzes the characteristics of Chinese open access (OA) journals indexed in the Directory of Open Access Journals (DOAJ) and their charging policies, aiming to provide references for establishing an article processing charges (APC) system for OA journals in China. [**Methods**] Using 253 Chinese and English journals indexed in DOAJ as research objects, we employed web-based investigation to collect information from journal official websites and the DOAJ database, including indexing dates, language distribution, publisher distribution, discipline distribution, and charging policies. [**Findings**] The number of Chinese OA journals indexed in DOAJ is relatively small, with uneven disciplinary distribution. The degree of intensification in OA journal publishing remains low. Chinese and Chinese-English OA journals still follow the traditional page charge model with generally low fees. English OA journals have initially established APC charging rules, and significant APC variations exist across different disciplines. [**Conclusions**] Strengthening policy guidance, enhancing information technology infrastructure, improving journal service quality, encouraging Chinese researchers to publish their findings first in Chinese OA journals, and developing a charging framework suitable for China's OA journal development will facilitate the healthy growth of OA publishing in China.

Keywords: Open science; Open Access (OA); DOAJ; Article Processing Charges (APC)

1 Introduction

From November 9–24, 2021, the 41st session of the UNESCO General Conference convened in Paris and adopted the *UNESCO Recommendation on Open Science*, marking a new phase of global consensus on open science. China was among the first to respond to this recommendation, planning and establishing pathways for national open science development while continuously exploring various practical forms of open science. Chinese practices in OA publishing, open data, open platforms, and participatory research have experienced a developmental trajectory from nonexistence to emergence, from small to large, and from few to many [1].

Over the past decade, both the quantity and proportion of Chinese OA papers have continued to increase, representing a growing share of global OA papers. According to the *China Open Access Publishing Development Report (2022)* [2], which is based on Web of Science statistics, the number of international papers published annually by Chinese researchers grew from over 159,000 in 2011 to over 631,000 in 2021. During the same period, OA papers increased from over 25,000 to over 238,000, with their proportion rising from 15.8% to 37.8%—an

average annual growth rate of 25.2%, far exceeding the global OA paper growth rate of 10.6%.

However, the number of Chinese OA journals remains relatively small. Bronze OA journals—those that make full or partial content freely available on their websites without implementing any open license—have become a distinctive feature of China's OA journal landscape. According to the *China Open Access Publishing Development Report 2022*, which surveyed 4,963 scientific journals documented in the *Blue Book of Chinese Science and Technology Journals (2021)* [1], China had 1,810 OA scientific journals as of May 17, 2022, accounting for 36.47% of all Chinese scientific journals. This included 227 gold OA journals (4.57%), 101 hybrid OA journals (2.04%), only 23 diamond OA journals (0.46%), and 1,459 bronze OA journals (29.40%). Notably, most new journals launched under China's Excellence Action Plan for Science and Technology Journals have been positioned as OA journals from their inception, adopting open licensing agreements. As of March 25, 2022, among the 30 newly launched high-starting-point journals, 29 were gold OA journals and one was a hybrid OA journal [2].

APC payments by Chinese corresponding authors have increased annually. According to the *2022 Global OA Journal and APC Monitoring and Analysis Report* [3], in 2022, Chinese corresponding authors spent approximately RMB 4.3 billion on APCs in 4,936 OA journals indexed in SCIE, representing a 43% increase from 2021. Payments to questionable journals totaled approximately RMB 400 million, with unreasonable APC expenditures reaching about RMB 58.14 million. According to JCR (2022) data, mainland China had 406 journals indexed in SCIE, of which only 164 were OA journals, representing just 3.32% of the 4,936 OA journals.

Although research shows that the international influence of Chinese scientific journals has been expanding, and the tendency of Chinese researchers to publish in foreign journals is being reversed—with more important Chinese research findings now published in domestic journals [4]—the scale of high-quality, internationally influential OA journals in China remains far from meeting the demand from the growing number of excellent OA papers. With continued consolidation and price increases in OA fees from major international publishers [5], the outflow of outstanding research findings and substantial research funding remains concerning.

Cheng Weihong and Ren Shengli [6-7] investigated OA publication fees for SCI papers from major countries and APC standards of internationally renowned publishers and OA journal societies, concluding that China's scientific and journal communities need to address OA publishing issues and explore mechanisms for establishing reasonable APC pricing systems. Yu Linxi et al. [8] studied the APC framework developed by cOAlition S for OA papers and surveyed APC conditions in 117 Chinese OA journals, emphasizing the necessity of transparent cost analysis frameworks. Ding Zuoqi and Li Chuwei [9] analyzed OA characteristics of journals selected for China's Excellence Action Plan for Science and

Technology Journals, arguing that China should establish a quantified, reasonable price standard for APCs. Tang Shuai et al. [10] statistically analyzed 68 Chinese OA journals indexed in DOAJ and recommended developing scientific charging policies to promote homogeneous and equal pricing of APCs for domestic and international academic journals. However, these studies focused primarily on foreign journal charging policies or general OA characteristics of domestic journals, without providing detailed introductions to Chinese OA journal charging policies.

Building upon this foundation, the present study examines Chinese OA journals indexed in DOAJ, focusing on statistical analysis of charging policies—including fee items, methods, and scopes—and analyzing correlations between journal language, discipline, and charging policies. This investigation aims to understand the current status and main characteristics of Chinese OA journal charging policies, providing theoretical references for reforming charging policies and establishing a distinctive Chinese OA journal charging framework.

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2 Concept Definitions, Data Sources, and Research Methods

Traditional scientific journals primarily charge authors review fees, page charges, and figure fees. In recent years, with the development of OA journals, APCs have become increasingly familiar to researchers.

2.1 Review Fees

Review fees generally refer to charges levied by journal publishers to cover costs incurred during peer review, such as remuneration for reviewers. Both OA and subscription-based journals may charge this fee after a paper passes initial editorial review. As labor costs continue to rise, many journals adjust their review fee standards annually. However, many journals do not charge review fees. Some argue that review fees may accelerate peer review speed and positively impact journal quality and influence.

2.2 Page Charges

Page charges have both narrow and broad definitions. In the narrow sense, page charges refer to fees paid by authors solely for the publication process, typically calculated based on the number of pages or word count of the accepted paper. In the broad sense, page charges encompass all service fees from manuscript registration to academic misconduct detection, editorial 初审, expert review, final editorial decision, typesetting, proofreading, publication, and distribution [11].

China's policy documents on scientific journal charging remain limited to the *Notice on Recommending That Academic Journals of Various Societies Charge*

Page Fees issued by the China Association for Science and Technology in 1988, which encouraged journals to develop page charge methods and standards according to disciplinary and economic conditions without compromising journal quality. Page charges are generally collected after a paper passes peer review and is accepted, or even when the publication issue is basically determined. Most traditional subscription-based journals charge based on the final page count, while a few charge a flat fee per article.

2.3 APC

The APC concept emerged in 2002, proposed by the two largest OA publishers at the time—the Public Library of Science (PLoS) and BioMed Central (BMC)—evolving from traditional page charges. In the traditional publishing model, journal revenue primarily comes from subscription fees (a reader-pays model), whereas OA journals adopt an author-pays model, with revenue mainly from APCs paid by authors (or their institutions). APCs typically cover various costs throughout the publishing process, including development and maintenance of online manuscript handling systems, peer review, language editing, copyediting, figure production, typesetting, proofreading, online pre-publication, post-publication article promotion, indexing services, and long-term archiving. For a specific journal, APCs are usually relatively fixed and largely independent of manuscript length, though they vary significantly across journals—from as low as $10 to over $10,000 per paper.

2.4 Data Sources and Research Methods

According to statistics from the PUBLISHERS' COUNTRIES section on the official DOAJ website (https://doaj.org), as of April 8, 2023, the distribution of OA journals by country among the 19,190 journals indexed in DOAJ is shown in [Figure 1: see original paper]. China ranked 20th globally with 253 indexed OA journals. The top four countries each had over 1,000 OA journals, while all other countries had more than 300.

This study employed web-based investigation to systematically retrieve and examine detailed information for each of these 253 journals from their official websites and the DOAJ database. We collected, recorded, and organized data on indexing dates, language distribution, publisher distribution, discipline distribution, and charging policies, analyzing the development characteristics of Chinese OA journals in the context of China's scientific journal development.

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3 Overview of DOAJ-Indexed Chinese Open Access Journals

3.1 Indexing Timeline

Statistics on the 253 Chinese OA journals indexed in DOAJ by year of inclusion are presented in [Figure 2: see original paper]. DOAJ first indexed a Chinese journal in 2008—the Chinese-language *Chinese Journal of Lung Cancer*. The first English-language Chinese journal, *China Foundry*, was indexed in 2012. New journals have been added annually, with numbers fluctuating but increasing significantly in recent years. Notably, 33 journals were newly indexed in 2020 (1 Chinese, 32 English), 46 in 2021 (4 Chinese-English, 18 Chinese, 24 English), and a record high of 71 in 2022 (10 Chinese-English, 31 Chinese, 30 English), accounting for 28% of the total 253 journals. As of April 2023, DOAJ had newly indexed 22 Chinese journals in 2023.

3.2 Language Distribution

Among the 253 indexed journals, 178 accept English manuscripts and 99 accept Chinese manuscripts, roughly indicating 154 English journals (approximately 61%), 75 Chinese journals (approximately 30%), and 24 Chinese-English journals (approximately 9%). However, further investigation of official websites revealed that on March 20, 2023, *Earth and Planetary Physics* was officially indexed in DOAJ. From 2023 onward, this journal changed its language from Chinese to Chinese-English (*Earth and Planetary Physics (Chinese-English)*), though DOAJ still lists it as accepting only Chinese manuscripts. The corrected distribution is: 154 English journals (approximately 61%), 74 Chinese journals (approximately 29%), and 25 Chinese-English journals (approximately 10%), as shown in [Figure 3: see original paper].

3.3 Publisher Distribution

The 253 journals involve approximately 99 publishers, including commercial publishers, universities, academic societies and associations, and editorial offices self-published by universities and research institutes. The top 12 publishers by total number of journals published account for 152 journals, as shown in , representing approximately 60% of the 253 journals. Notably, KeAi (co-founded by Elsevier and China Science Publishing & Media Ltd.) publishes 99 journals, accounting for about 40% of the 253 journals, with 43 of these 99 journals showing no APC charges.

3.4 Discipline Distribution

DOAJ categorizes its indexed OA journals into 20 disciplinary subjects. China's 253 journals cover only 12 of these subjects, as shown in [Figure 4: see original paper], indicating uneven disciplinary distribution. Journals in technology, science, and medicine are relatively numerous, with English journals predomi-

nating. Some fields, such as library and information science, historical auxiliary sciences, and fine arts, have only Chinese or only English journals, with overall low journal numbers.

3.5 Publication Frequency Distribution

Based on official website investigations, the 253 Chinese OA journals indexed in DOAJ were categorized by publication frequency, as shown in . Quarterly and bimonthly journals account for the majority, representing 64.8% of the total. Interestingly, among the 2 English semiannual journals (one volume with two issues per year) and 26 English annual journals (one volume per year), 27 come from the KeAi publishing group, while the one annual journal comes from Maximum Academic Press, an institution specializing in gold OA journal publishing.

3.6 Charging Policies of DOAJ-Indexed Chinese OA Journals

3.6.1 Review Fees Through online queries of journal official websites, fee-related information found in sections such as "Submission Guidelines," "Open Access Statements," and "Copyright Agreements" includes submission fees, review fees, page charges (black-and-white or color), article publication fees, expedited publication fees, English editing fees, figure fees, processing fees, publication fees, and publishing fees (including review fees and page charges).

Seventeen Chinese journals and eight Chinese-English journals explicitly charge review fees, ranging from RMB 30–300 per paper, with more than half charging RMB 200 per paper. One Chinese journal, *Telecommunications Science*, includes review fees in its overall publication fee collected together with page charges, while two journals explicitly state that re-review fees are RMB 100 per paper.

3.6.2 Page Charges During our investigation, some indexed journals used various terms such as publication fees, printing fees, publication charges, article publication fees, article processing fees, or processing fees. This study uniformly interprets these as page charges. For journals without detailed fee breakdowns on their official websites, DOAJ-listed fees were used and calculated on a per-article basis.

Excluding page charge reduction policies, 62 Chinese journals and 20 Chinese-English journals explicitly charge page charges, as shown in . Excluding color printing and expedited publication fees, among these 82 journals, 41 (50%) charge by page number, with 35 charging less than RMB 500 per page; 29 (35%) charge per article, with 28 charging less than RMB 5,000 per article; and 12 (15%) charge per thousand characters.

3.6.3 APC Our investigation found that only one Chinese journal shows "No charges" on DOAJ but states on its official website that it "charges an article

processing fee of RMB 1,000 per article after acceptance." We included this journal in the APC category.

As mentioned above, 22 English journals show "No charges" on DOAJ but require APC payment according to their official websites. Excluding fee reduction policies, among the 154 English journals indexed, 86 actually adopt the APC payment model (56%). Considering the variability of APCs, when official website fees differ from DOAJ listings, the former takes precedence. The survey found that 84 English journals charge a flat APC per article, while two charge "RMB 1,000 per page but no more than RMB 16,000 per paper" and "RMB 900 per page for Chinese authors, and no more than RMB 7,900." For simplified statistics, we calculated these at their maximum rates of RMB 16,000 and RMB 7,900, respectively. One journal shows a charge of "EUR 2,200 (or RMB 15,000) per paper"; given that most journals use USD as the billing currency, we converted these three journals to approximately USD 2,328, USD 1,149, and USD 2,182 per article based on the exchange rate on April 13, 2023 (rounded).

Statistics show that APCs range from USD 300–3,650 per article, with a mean of USD 1,168 per article. The highest APC was for a biology journal, and the lowest for a medical journal. Overall APC distribution is shown in , with 68 journals (78% of the 87 charging APCs) below USD 1,000 per article, and only two journals (2%) above USD 3,000 per article.

3.6.4 APC Comparison Across Disciplines for English Journals Using the primary discipline category in DOAJ as the classification basis, we analyzed APC charging across different disciplines for English journals, as shown in . Among the 10 first-level disciplines covered by English journals, four charge no APCs. Social Sciences has the highest proportion of journals using the APC model (67%), followed by Medicine, Science, and Technology at 60%, 59%, and 57%, respectively. The mean APC ranking across six disciplines is: Science (USD 1,383/article) > Medicine (USD 1,368/article) > Social Sciences (USD 1,250/article) > Agriculture (USD 1,066/article) > Technology (USD 929/article) > Geography, Anthropology, Recreation (USD 885/article). Since Technology and Science have numerous journals, we further analyzed their subdisciplines: Science: Physics has the highest mean APC at USD 2,026/article, followed by Science: Biology and Medicine at USD 1,681/article and USD 1,368/article, respectively, while Technology: Hydraulic engineering has the lowest at USD 700/article.

3.7 Characteristics of Chinese OA Journals and Their Charging Policies

Based on the investigation and analysis of Chinese OA journals indexed in DOAJ, combined with the current development status of China's scientific journals, we summarize the following characteristics:

1. Although China has a large total number of journals, the OA movement

has developed slowly compared to developed and some developing countries, with a relatively small number of true OA journals.
2. The increasing number of Chinese OA journals indexed in DOAJ indicates gradually improving international influence, but problems persist, including few high-impact Chinese OA journals and uneven disciplinary development.
3. The distribution of publishers reveals low intensification and clustering in China's scientific journal publishing, with most journals still relying on individual editorial offices for self-publishing and low marketization and commercialization.
4. Chinese and Chinese-English OA journals continue using the traditional page charge model with generally low fees. English OA journals have initially established APC charging rules, but none have formed complete, transparent charging systems. Some journals fail to publish charging information on their websites, with only a few briefly explaining fee components and discount/waiver rules.
5. APCs for Chinese OA journals are generally low. Compared to the average USD 2,000–3,000 per article or even over USD 10,000 charged by internationally renowned publishing groups and professional OA publishers, Chinese OA journal APCs are far below international averages and have not yet formed a profit-oriented business model based on APCs.
6. Chinese authorities and research institutions actively support the establishment of international, high-impact English journals. These newly launched journals have deeply integrated into the international OA framework, aligning with international OA journal publishing models in terms of open licensing agreements, publishing policies, and APC policies.

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4 Development Strategies for China's OA Journal Charging Mechanisms

Promoting OA publishing in scientific journals is an urgent requirement for deeply implementing China's scientific innovation strategy and aligns with the practical need to build world-class scientific journals. Although China's OA practices have been influenced by developed countries like those in Europe and America, specific practices should be based on China's actual national conditions to explore localized OA development.

4.1 Strengthen Policy Guidance and Develop a Charging Framework Suitable for China's OA Journal Development

In May 2020, cOAlition S, aimed at promoting OA, announced through "Plan S" that starting July 1, 2022, only publishers complying with the *Publishing Services and Fee Breakdown* developed by the Fair Open Access Alliance (FOAA) or the *Plan S Price and Transparency Framework* developed by Information

Power would be eligible for funding from cOAlition S members. Both APC frameworks essentially cover the entire publishing chain, clearly outlining cost expenditures per article and providing justification for APC collection.

It is well known that most Chinese scientific and OA journals still rely on government funding, host institution support, or research grants for operation, lacking market competition awareness and commercial operation models. Therefore, we recommend that relevant Chinese authorities or academic societies conduct thorough investigations to develop a journal publishing cost-profit analysis framework. This would enable OA journals collecting page charges and APCs to record annual operations, improve cost management awareness, clarify publishing expenditures and revenues, and provide basis for timely adjustments to page charges and APCs. For authors, readers, funders, and libraries involved in the publishing chain, this information would help them better understand which publishing elements their fees support, thereby increasing trust in journals.

4.2 Enhance Information Technology Infrastructure and Improve Charging Policy Transparency

To meet DOAJ indexing standards, all Chinese OA journals have official websites. However, charging policy information appears in various sections such as "Submission Guidelines," "Open Access Statements," and "Copyright Agreements," with inconsistent terminology. Some journals fail to publish charging information on their websites, only informing authors after acceptance, while only a few briefly explain fee components and discount/waiver rules. We recommend that Chinese scientific journals, building on improved national policies, fully utilize digital and information technologies to enhance transparency in page charges and APCs, strengthen interactive experiences between journals and authors/readers, help journals efficiently guide research services, and promote academic exchanges.

4.3 Establish Reasonable Charging Standards and Maintain Publishing Reputation with Research Service as the Center

Journals provide services for academic research and exchanges, and charging authors is based on providing such services. When establishing reasonable charging standards, journals should prioritize authors' actual needs, fully consider current policy and research environments, and develop scientific, flexible charging standards and methods tailored to different disciplines and journal quality levels. Journals must strictly maintain academic quality, control academic integrity, and safeguard publishing reputation.

4.4 Encourage Chinese Researchers to Support OA Publishing in Chinese Scientific Journals

China is a major country in research output, with diversified funding sources for papers. In recent years, national reforms on education evaluation have proposed

"breaking the five-only" criteria (over-reliance on specific metrics). However, in practice, researchers still highly value journal rankings and impact factors, and journals continue chasing prestige through indexing in internationally renowned databases. Chinese journals should continue guiding Chinese researchers to publish in domestic OA journals with national policy support, encouraging papers funded by national and local fiscal projects to debut in domestic OA journals, thereby creating conditions for the transformation of Chinese scientific journals to OA publishing.

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5 Conclusion

China's scientific journal system is large, with Chinese-language journals comprising the vast majority (4,044 journals, 88.74%). This study, examining 253 Chinese journals indexed in DOAJ, only reflects the current status of a portion of Chinese OA journals during this period and cannot comprehensively summarize all characteristics of Chinese OA journals. Issues such as the management system, publishing scale, operation models, journal influence, and their correlation with APCs warrant further in-depth exploration. As Chinese universities, research institutions, funding agencies, and publishers actively respond to the open science movement and develop OA standards and related work with national policy support, China is poised to become a global leader in open science.

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