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Research on the Development Status and Countermeasures of China' s Preprint Platforms

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Abstract

Preprints are characterized by rapid dissemination, facilitation of academic exchange, and strong timeliness, which have broken the journal-centered scientific communication system and realized researchers' vision of timely communication and interactive sharing, thereby reconstructing and recreating a more open modern scientific communication system. The urgent demand for rapid knowledge acquisition and sharing during the COVID-19 pandemic has significantly accelerated the development of preprints. Currently, China has established a total of four preprint platforms, among which ChinaXiv is the first domestic preprint platform operating in accordance with internationally accepted standards; CSPO has the largest number of publications, exceeding 100,000; biomedRxiv is the first biomedical preprint platform in China operating according to international standards; while the China Preprint Service System, established in 2004, has only slightly more than 10,000 publications with sluggish growth and its web services remain to be improved. Domestic preprint platforms face the following problems: low quantity and quality of publications, and low recognition by domestic research institutions and universities; limited journal partnerships, which is not conducive to the subsequent publication of preprint articles in academic journals; low comment activity and limited academic exchange and interaction. It is recommended to make efforts in increasing publicity, strengthening content review, enhancing cooperation with journals, and clarifying the academic value of preprint articles to improve their recognition by research institutions and universities, thereby promoting the enhancement and expansion of China' s preprint platforms.

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Full Text

Development Status and Countermeasures of Preprint Platforms in China

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Abstract

Preprints feature rapid communication, facilitation of academic exchange, and strong timeliness. They have broken the journal-centered scientific communication system, realizing researchers' vision of timely communication, interactive sharing, and reconstructing a more open modern scientific communication framework. The COVID-19 pandemic' s urgent demand for rapid knowledge acquisition and sharing has greatly accelerated preprint development. Currently, China has established four preprint platforms. ChinaXiv is the first domestic preprint platform operating in accordance with international norms. CSPO has the largest number of submissions, exceeding 100,000 articles. biomedRxiv is the first biomedical preprint platform in China operating under international standards. The Chinese Preprint Service System, established in 2004, has published only slightly over 10,000 articles with slow growth and inadequate website services. Domestic preprint platforms face several problems: low submission quantity and quality, limited recognition by domestic research institutions and universities, few cooperating journals that hinder subsequent publication in academic journals, and low comment activity with minimal academic interaction. We recommend efforts to strengthen publicity, enhance content review, increase journal collaboration, and clarify the academic value of preprints to improve institutional recognition, thereby promoting the development and strengthening of China' s preprint platforms.

Keywords: preprint; open science; peer review

Introduction

A preprint refers to research papers, technical reports, or other articles voluntarily released by researchers at academic conferences or via the internet for peer communication before formal publication in journals. Since Paul Ginsparg created the world's first preprint platform arXiv in 1991, numerous platforms including SSRN, bioRxiv, medRxiv, and chemRxiv have emerged with rapid development momentum [1]. Preprints enhance the dissemination scope of scientific achievements, offering characteristics such as fast communication, convenient

access, broad distribution, and strong timeliness. They counter academic monopolies, realize academic freedom, break the journal-centered scientific communication system, and fulfill researchers' vision of timely exchange and interactive sharing, thereby reconstructing a more open modern scientific communication framework [2]. Preprints also expand publication scope, facilitating the emergence of validation studies that traditional publishing cannot support [3]. In June 2021, Chinese scholars Zhang Rongjia and Liu Yuhuan published an animal experiment on successful male rat pregnancy in bioRxiv, which was later voluntarily withdrawn by the authors due to controversy [4].

Preprints accelerate academic exchange and result sharing, providing crucial theoretical support for addressing public health challenges. During the Ebola and Zika virus outbreaks, preprints showcased the latest research findings and data at the fastest speed, at least 100 days ahead of traditional journal publishing. From December 2019 to May 2020, 51.1% of global academic papers related to COVID-19 were first published on preprint platforms, providing theoretical guidance for COVID-19 research and prevention strategy formulation [5]. Domestic preprint platforms in China started relatively late. This paper analyzes the current development status and existing problems of China' s preprint platforms to provide theoretical references for their better development.

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1. Overview of China' s Preprint Platforms

1.1 China Sciencepaper Online (CSPO) China Sciencepaper Online (CSPO, http://www.paper.edu.cn), hosted by the Ministry of Education' s Science and Technology Development Center, is the largest preprint platform established in China. Founded in 2003, it is also China' s first Open Access (OA) online submission platform. As of June 11, 2022, CSPO had published 104,802 first-posted papers and collected over 1.3 million scientific and technical papers, all freely accessible.

CSPO provides detailed introductions to the online submission process (template download, editing, review and publication, peer review, formal publication, etc.) with clear operational procedures, facilitating use by domestic and international scholars. First, template downloads include both Chinese and English versions in Word and LaTeX formats. Second, for review and publication: after submission, papers are reviewed by subject editors, with initial review results available within approximately 3 working days and official publication within 7 working days after passing the initial review. After the paper' s first-posting announcement, authors can submit errata or revised manuscripts to modify or improve the article, with all versions displayed on the paper' s detail page for users to track its status. Papers published on CSPO can still be submitted to other formal journals without affecting formal publication. Third, peer review includes two types that authors can choose based on personal preference. Dynamic public review allows authors to select multiple reviewers with

review authority to conduct separate evaluations, synthesizing various reviews to produce dynamic review results. Traditional peer review: if authors choose the conventional evaluation model, the paper enters the platform' s expert review system after online announcement, randomly assigned to two experts by discipline; review cycle: 1-3 months; review results: star rating certificate + specific review comments, with 3-star and above eligible for printed and mailed certificates, and extended services for star rating inquiries. Additionally, the platform features a comment function allowing readers to express opinions on paper content.

CSPO covers eight fields: mathematical sciences, earth resources and environment, life sciences, medicine and health, chemistry and materials, engineering and technology, information science, and economic management. The platform displays paper views and downloads, pushes popular articles, stipulates citation formats, and enables sharing to WeChat, Weibo, and QQ. It also operates Weibo and WeChat official accounts to strengthen promotion. Currently, 41 institutions nationwide, including renowned universities such as Beijing Jiaotong University, Hunan University, and Lanzhou University, recognize papers published on CSPO as meeting graduate graduation and professional title evaluation requirements. This measure is significant for promoting preprint development and expanding their usage scope.

1.2 Chinese Preprint Service System Established in 2004 by the Institute of Scientific and Technical Information of China and the National Science and Technology Library (NSTL), the Chinese Preprint Service System was integrated into NSTL in 2018 (https://www.nstl.gov.cn), with preprints featured in the homepage' s special services. The system enables users to freely submit, search, browse full-text preprint articles, and post comments. After simple registration, users can directly submit electronic manuscripts and subsequently add or modify submitted articles as needed. The system strictly records the time of submission and modification, conducting only simple reviews of submitted articles to facilitate authors' immediate disclosure of their innovative achievements.

The Chinese Preprint Service System lacks detailed operational instructions, sharing functions, and promotional activities via Weibo or WeChat official accounts. It does not display views or downloads, offers no popular article recommendations, and currently has no cooperating journals. The system' s subject categories include natural sciences, medical sciences, humanities and social sciences, engineering and technical sciences, and agricultural sciences. As of June 2022, the system had published only slightly over 10,000 articles with slow growth.

1.3 ChinaXiv Established in 2016 by the National Science Library of the Chinese Academy of Sciences, ChinaXiv (http://chinaxiv.org) provides preprint deposit and open archiving services for published scientific papers in both Chinese

and English for researchers nationwide. It is the first domestic preprint platform operating in accordance with international norms. ChinaXiv operates a series of sub-platforms including PsyChinaXiv (Psychology Preprint Platform), China Biomedical Engineering Preprint Publishing Platform, Geotechnical Mechanics Preprint Platform, Chinese Language and Music Rhythm Preprint Platform, Chinese Library, Information and Archives Preprint Platform, Guizhou Provincial Academic Preprint Platform (trial), and Nursing Discipline Preprint Paper Online First Platform. It accepts various Chinese and English scientific paper preprints and provides query services for preprint policies of over 26,000 academic journals worldwide, with service tenets of academic autonomy, open deposit, open access, and first-posting registration. As of June 11, 2022, ChinaXiv had collected 16,295 articles, primarily in biology, physics, computer science, and medicine.

ChinaXiv features a reasonable interface and convenient usage. Users can query paper submissions by field, time, author, and institution to understand publication trends. It pushes key articles such as popular and hotly discussed papers and operates a WeChat official account for promotion. The comment function is well-developed, including options for public comments, anonymous comments, and comments sent only to authors. The sharing function is robust, enabling article sharing via WeChat, Weibo, QQ, Renren, Baidu Tieba, Douban, and other platforms. The platform stipulates preprint citation formats to help expand article dissemination and academic influence.

ChinaXiv has established a two-way push mechanism for excellent manuscripts. Cooperating journals can select high-quality manuscript sources from ChinaXiv and recommend suitable journals to submitters. With authors' consent, cooperating journals can also push high-quality preprints to the ChinaXiv platform [6], distinguishing it from platforms like biomedRxiv and bioRxiv. Currently, ChinaXiv has 33 cooperating journals, including *Bulletin of Chinese Academy of Sciences* and *Vertebrata PalAsiatica*, with many platform articles coming from cooperating journals. In 2022, influential journals such as *Chinese Journal of Scientific and Technical Periodicals*, *Think Tank: Theory & Practice*, and *Journal of Data and Information Science* (JDIS) established cooperation with ChinaXiv, encouraging and supporting authors to deposit manuscripts intended for publication in these journals to ChinaXiv, which greatly helps improve preprint quality and platform development.

1.4 biomedRxiv Established in 2020 by the Institute of Medical Information of the Chinese Academy of Medical Sciences, biomedRxiv (https://www.biomedrxiv.org.cn/index) is the first biomedical preprint platform in China operating under international norms. It accepts Chinese and English preprints in biomedical-related fields, featuring "sharing the latest research results at the first moment, aligning with international standards for depositing and publishing research papers, and rapid review by authoritative experts" to support rapid pre-publication of high-level medical research papers

and sharing and innovation in China' s medical research field. Due to the special nature of the discipline, biomedRxiv strengthens ethical review of papers. The website' s ethics statement specifies that submitters must provide relevant documents from local ethics committees and informed consent forms from participants or their relatives. Experimental ethical standards must comply with the World Medical Association' s Helsinki Declaration regarding ethical guidance for animal experiments and human subject research. Any clinical trials described must be registered in internationally/nationally recognized trial registries, with trial numbers provided in the manuscript. biomedRxiv does not accept papers already submitted to journals, but papers rejected by journals can be submitted to biomedRxiv. After publication, authors can make error corrections or supplementary explanations by uploading new versions. Once successfully submitted, biomedRxiv automatically assigns a temporary ID number; papers only receive formal DOIs after passing review, and articles cannot be withdrawn after DOI acquisition. If authors need to withdraw papers for special reasons (such as acknowledging fundamental errors), they can contact the platform via email.

biomedRxiv' s publication scope covers 20 first-level disciplines including COVID-19, basic medicine, clinical medicine, preventive medicine, traditional Chinese medicine, and oncology, encompassing over 160 second-level disciplines. The platform operates sub-platforms for cancer progress and medical informatics. biomedRxiv has fixed paper templates requiring format-compliant submissions. As of June 11, 2022, biomedRxiv had published 435 articles, showing slow growth compared to medRxiv established in 2019. The platform displays paper views, downloads, and comment counts, pushes popular papers, and enables sharing to WeChat, Weibo, and QQ Space. It operates a WeChat official account for promotion, stipulates article citation formats, and allows preprint citation. Currently, there are no cooperating journals.

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2. Development Analysis of bioRxiv and medRxiv

2.1 bioRxiv Founded by Cold Spring Harbor Laboratory in 2013, bioRxiv (https://www.biorxiv.org/) accepts preprints covering all aspects of life science research and is a globally renowned biology preprint platform. After receiving funding from the Chan Zuckerberg Initiative in May 2017, the site published over 10,000 papers in less than three years [7]. During the COVID-19 pandemic, bioRxiv published numerous articles on the novel coronavirus and pandemic-related topics, greatly facilitating scientific result sharing and prevention measure formulation. The platform now has over 100,000 published articles. Articles published on bioRxiv receive a Digital Object Identifier (DOI) for retrieval and citation. bioRxiv has nearly 180 cooperating journals.

On September 30, 2019, Cold Spring Harbor Laboratory, bioRxiv' s host institution, announced the launch of Transparent Review in Preprints (TRiP),

which publicly discloses the entire process of open review of preprints by scientific journals and third-party organizations, including review content and author responses, regardless of whether the preprint is eventually published. bioRxiv stipulates that TRiP requires preprint authors' consent. Additionally, bioRxiv supports academic community comments on preprints without requiring author consent. bioRxiv' s exploration of open commenting has improved preprint quality, realized full academic exchange, and promoted the transformation of preprint platforms from content publishing platforms to open exchange platforms [5].

2.2 medRxiv medRxiv (https://www.medrxiv.org/) is a preprint platform created by Yale University, Cold Spring Harbor Laboratory, and BMJ Publishing Group, publishing articles in medicine, clinical, and related health science fields. Authors can submit manuscripts to medRxiv at any time (before the manuscript is accepted by a journal). Once published on medRxiv, manuscripts receive DOIs, can be indexed by search engines and third-party services, and cannot be deleted.

From its first paper in June 2019 to May 27, 2020 (one year), medRxiv collected 1,811 medical field papers, averaging 180 papers per month. During the COVID-19 outbreak, medRxiv collected 3,448 COVID-19-related papers, greatly promoting medical scientific result sharing and exchange, and promptly providing the latest medical information for humanity' s response to public health emergencies [9].

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3. Advantages of bioRxiv and medRxiv

3.1 Superior Institutional Conditions Founded in 1890, Cold Spring Harbor Laboratory is a non-profit private scientific research and education center researching cancer, neurobiology, plant genetics, genomics, and bioinformatics, with major achievements in molecular biology. The institute has produced eight Nobel laureates and is renowned as a world life science sanctuary and "cradle of molecular biology," ranking among the world' s top ten most influential research institutes. This provides strong academic guarantee for the rapid development of bioRxiv and medRxiv.

3.2 COVID-19 Pandemic Impact The COVID-19 outbreak in 2019 accelerated academia' s urgent need for rapid research access. Numerous scholars worldwide published their latest research findings on COVID-19 and SARS-CoV-2 on bioRxiv and medRxiv, with submissions growing explosively and the platforms entering a rapid development phase. On February 3, 2020, Shi Zhengli' s team from the Wuhan Institute of Virology formally published an article in *Nature* revealing bats as possible hosts of the novel coronavirus, which had already been posted on bioRxiv on January 23, 2020, gaining global scientists ten precious days to promptly conduct virus gene and protein-level mechanism research

[10]. On December 10, 2021, Peking University published research results on bioRxiv evaluating Omicron' s escape from nine antibody drugs through IC50 (half-maximal inhibitory concentration) assessment [11]. Chulalongkorn University in Thailand investigated heterologous boosting after two doses of Sinovac vaccine and published results on medRxiv [12]. bioRxiv and medRxiv accelerated academic exchange and result sharing, enabling scholars from different regions to learn about the latest research findings immediately, providing theoretical references for in-depth virus research and epidemic prevention strategy formulation.

3.3 Open Science Background The 2002 Budapest Open Access Initiative, followed by the Bethesda Statement and Berlin Declaration, effectively promoted open science development. In January 2021, UNESCO' s General Conference adopted the *Recommendation on Open Science*, marking a new stage of global consensus on open science. Against this background, the urgent requirements for knowledge sharing and free access have greatly promoted preprint development as a new form of academic achievement presentation.

3.4 Review Mechanism Advantages On May 14, 2020, bioRxiv launched a new service integrating all open comments, transparent reviews, and author responses for each paper, displaying them to readers to enhance preprint credibility through fully public open review. bioRxiv strengthened paper content review, improving preprint quality and platform academic influence [5].

3.5 DOI Provision Expanding Citation and Influence Articles published on bioRxiv and medRxiv receive DOIs, can be indexed by search engines and third-party services, and obtain citations before formal journal publication, expanding paper result display scope and citation counts, and enhancing academic influence.

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4. Problems with China' s Preprint Platforms

4.1 Low Submission Quantity and Quality, Failing to Reflect Latest Research Chinese scholars lack understanding and recognition of domestic preprint platforms like ChinaXiv, with low usage rates. Major research results are mostly published in well-known journals or famous foreign preprint platforms, with few significant achievements first posted on domestic platforms. Foreign preprint platforms have relatively higher submission quantity and quality, reflecting latest research results and hot topics. In 2022, arXiv submissions exceeded 2 million, while bioRxiv and Research Square reached 100,000 [13]. As of February 5, 2020, bioRxiv had published 20 preprint papers from Chinese research institutions on the novel coronavirus, while only 1 related paper was posted on ChinaXiv. COVID-19 significantly promoted preprint development, with related platform submissions during the pandemic: arXiv 1,109,

bioRxiv 814, medRxiv 3,448, ChinaRxiv 34, and China Sciencepaper Online 18 [9]. Foreign major platforms had significantly higher submission numbers than domestic platforms, especially medRxiv established in 2019, where many Chinese COVID-19 studies were published during the initial pandemic period.

Foreign preprint article quality is also relatively high. In 2002, Grigori Perelman published his proof of the Poincaré Conjecture on arXiv, becoming one of the 2006 Fields Medal recipients for solving the conjecture, which changed the status of preprint websites. In physics, there is even a saying: if a paper is not on arXiv, it does not exist. On January 23, 2020, Shi Zhengli' s team from the Wuhan Institute of Virology published an article on bioRxiv confirming that bats might be the animal host of the novel coronavirus, which was later accepted by *Nature*.

4.2 Low Recognition by Domestic Research Institutions and Universities Foreign preprint platforms developed earlier, with higher recognition by research institutions and funding organizations that mostly hold positive attitudes toward preprints, encouraging project applicants and implementers to promptly release research results through preprint platforms [14]. In March 2017, the U.S. National Institutes of Health (NIH) announced that starting May 25, 2017, preprint papers and other interim research products could be cited in NIH project applications and research performance progress reports [15], clarifying relevant norms for researchers when citing and submitting preprint results and receiving NIH funding. The UK Medical Research Council announced support for preprints from April 2017; the Wellcome Trust stated in January 2017 that it would accept preprints as basis for project applications and completion; Cancer Research UK announced on May 30, 2017, that it would accept preprints in project applications; the Howard Hughes Medical Institute, Helmsley Trust, Simons Foundation, and others also expressed support for preprints [14]. Currently, only 41 Chinese universities recognize CSPO-published articles for graduate graduation and professional title evaluation. Since the vast majority of research institutions and universities do not recognize preprints as equivalent to journal papers for graduation and title evaluation, researchers and university students have low recognition and usage of domestic preprint platforms, representing an important reason for ineffective preprint promotion.

4.3 Few Cooperating Journals, Hindering Subsequent Publication After the American Chemical Society announced support for preprint exchange in August 2016, its society journals successively launched preprint support policies, allowing authors to varying degrees to place manuscripts on preprint platforms before journal submission [14]. bioRxiv and medRxiv cooperate with multiple journals, forming B2J (bioRxiv to journal) and M2J (medRxiv to journal) cooperation models [16], where preprints are directly recommended to journals for peer review after publication, eliminating the need for authors to find suitable journals, solving the problem of subsequent preprint publication in academic journals. bioRxiv currently has nearly 180 cooperating journals, and medRxiv has 30. Domestically, only ChinaXiv has journal cooperation relationships, with

a small number (33), which is not conducive to subsequent preprint publication in academic journals.

4.4 Low Comment Activity and Limited Academic Interaction All four domestic preprint platforms have comment functions, but few readers comment on article content during reading, resulting in low comment activity that fails to fully realize academic exchange functions.

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5. Recommendations for Improving China' s Preprint Platforms

5.1 Increase Publicity to Enhance Influence Domestic preprint platforms should increase publicity targeting audiences including researchers, university faculty and students, and journal staff through multiple new media channels (such as WeChat official accounts, Zhihu, Bilibili), academic exchange conferences, and lectures. This will help more people understand preprints as a new academic exchange method and their research value, encouraging domestic scholars to publish papers in China. Special emphasis should be placed on university faculty and students, as universities constitute an important part of China' s research force and students are future research leaders. Promoting awareness and understanding of domestic preprint platforms among this group is crucial for platform development. Universities can incorporate preprint and open science content into daily courses (such as thesis writing and literature retrieval courses) to familiarize students with cutting-edge academic publishing developments, which also helps students conduct research and publish results.

5.2 Strengthen Review Mechanisms to Improve Preprint Quality Preprint articles can be quickly published on preprint platforms after simple review, eliminating cumbersome editorial and peer review procedures, enabling rapid public access and sharing of research results, much faster than traditional journal publication. However, the lack of peer review has also drawn criticism about preprint quality. According to Retraction Watch statistics, as of October 2, 2020, preprint platforms had retracted 10 papers related to COVID-19 [5]. To improve paper quality, bioRxiv has attempted to launch transparent review services to compensate for preprints' lack of peer review. bioRxiv' s transparent review services include two types: one is platform-cooperation-led, represented by Review Commons, with top scientists as review leaders, featuring high reliability, openness, and transparency, following traditional strict and standardized review models; the other is community-advocated, represented by PREreview, with diverse researchers as review teams, featuring high openness and transparency but relatively loose communicative review models with potential low-quality reviews [5]. bioRxiv' s attempts provide references for other preprint platforms to conduct content review. Currently, only CSPO conducts peer review domestically, and it is voluntary with relatively loose content review. In the future, China' s preprint platforms could strengthen

exchanges and cooperation with scientific journals and conduct preprint review services through academic communities to improve article quality.

Additionally, platforms should strengthen review of preprint research ethics, especially in biomedicine, by formulating specific rules to improve ethical review of clinical trials and animal experiments and patient informed consent review. They should also strengthen publication ethics review, such as data and content authenticity, to improve article quality and academic recognition of preprints.

5.3 Enhance Cooperation Between Preprint Platforms and Academic Journals Currently, among China' s four preprint platforms, only ChinaXiv has journal cooperation relationships, with a small number (33). After researchers publish results on preprint platforms, they must still find suitable journals for submission themselves, affecting the final publication speed of academic achievements. Preprint platforms' inability to facilitate journal publication for authors seriously affects researchers' enthusiasm for submitting to preprint platforms.

During preprint promotion, attention should be paid to educating journal staff to recognize preprints' tremendous influence in academic exchange and scientific result dissemination, encouraging journals to cooperate with preprints for mutual development. Against the open science background, international academic publishers such as Springer Nature, Wiley, Elsevier, and Taylor & Francis are committed to promoting preprint development. For example, authors can choose to synchronize their papers to In Review (a preprint platform) when formally submitting to Springer Nature journals [17]. China should also promptly introduce relevant policies to promote cooperation between high-quality academic journals or large publishing institutions and preprint platforms, timely publishing latest research results and creating a favorable academic exchange environment. For instance, China' s Excellence Action Plan for Science and Technology Journals could encourage outstanding Chinese science and technology journals to cooperate with preprint platforms, thereby promoting domestic preprint platform development.

5.4 Clarify Preprint Academic Value and Expand Application Scope National research management departments should fully recognize preprints' important role in academic exchange, acknowledge their academic value, and adopt active measures to expand their application scope. Following NIH's example [15], they should clarify relevant norms for researchers when citing and submitting preprint results, encourage domestic funding organizations to accept preprint articles as basis for project applications and completion, encourage project applicants and implementers to promptly release research results through preprint platforms, allowing results to be read and reviewed by more people, thereby enhancing fund project research rigor and academic value.

Currently, only 41 universities such as Beijing Jiaotong University, Hunan University, and Lanzhou University recognize CSPO online-published papers

as meeting graduate graduation and professional title evaluation requirements. Corresponding policies should be introduced to encourage more domestic universities and research institutions to recognize preprint articles for student graduation, scholarship selection, and professional title evaluation. If successfully implemented, this would significantly expand domestic preprint usage, improve preprint quality, and encourage researchers to publish papers in China.

To reverse China' s SCI-only journal evaluation policy, scholars have proposed implementing equivalent evaluation policies for domestic and international journal papers and Chinese and English papers, advocating single-paper evaluation schemes and promoting representative work systems. Journal evaluation schemes should keep pace with academic publishing development trends and consider the academic value of preprints as a product of the times. Whether preprint articles can be equivalent to Chinese papers, ordinary Chinese papers, or core Chinese papers; in the open science context, preprint articles should also serve as personal representative works participating in journal article evaluation and professional title assessment. Universities or research institutions should reward scholars who contribute to preprint development. Clear regulations on preprint academic value would help expand preprint usage scope in universities and research institutions and promote their development.

Conclusion

The scholar-community-based preprint academic exchange model is changing the traditional journal-centered single academic exchange model. With characteristics of rapidity, openness, and free access, preprints have played important roles in public health emergencies. China has established four preprint platforms: ChinaXiv is the first domestic preprint platform operating under international norms; CSPO has the largest submission quantity, exceeding 100,000 articles; biomedRxiv is the first biomedical preprint platform operating under international norms; and the Chinese Preprint Service System, established in 2004, has only slightly over 10,000 articles with slow growth and inadequate website services.

Domestic preprint platforms face problems: obvious gaps in submission quantity and quality compared to foreign platforms; low recognition and usage by domestic research institutions and universities; few cooperating journals, hindering subsequent preprint publication; and low comment activity with limited academic interaction. Addressing these problems and drawing from bioRxiv and medRxiv development experience, we recommend efforts in increasing publicity, strengthening content review, enhancing journal cooperation, and clarifying preprint academic value to improve institutional recognition and promote platform development.

China should attach importance to national-level science and technology preprint platform construction, providing financial and policy support. Follow-

ing open science trends and seizing opportunities, China should develop new academic exchange models conforming to international trends, strive to build internationally influential preprint publishing platforms, meet China' s rapidly growing research demands, and enhance China' s leadership and discourse power in international academic exchange [18], striving to make science a common product of humanity.

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