# Research on International Dissemination Strategies for Scientific Journals Under Intelligent Recommendation Algorithms: A Case Study of Journals Selected for the China Sci-Tech Journal Excellence Action Plan

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## Abstract

**Purpose:** In the era of artificial intelligence, intelligent recommendation algorithms provide new ideas for the international dissemination of scientific journals. This paper aims to analyze the current status and problems of applying intelligent recommendation algorithms in Chinese scientific journals, and explore how scientific journals can utilize intelligent recommendation algorithms to promote international dissemination.

**Methods:** Starting from the compatibility between intelligent recommendation algorithms and the international dissemination of scientific journals, 280 journals from the "Excellence Action Plan for Chinese Science and Technology Journals" were selected as samples. Attribute data representing the application of intelligent recommendation algorithms in the sample journals were collected, and a combination of statistical analysis, content analysis, and comparative analysis methods was used to explore the problems existing in the application of intelligent recommendation algorithms in Chinese scientific journals.

**Results:** The sample journals underutilize platforms with recommendation functions; user attribute data need further improvement; international cooperation and exchange need to be strengthened; and insufficient attention is paid to overcoming language barriers.

**Conclusion:** To effectively apply intelligent recommendation algorithms and achieve precise international dissemination of scientific journals, strategies may be adopted such as utilizing existing international dissemination platforms while advancing the construction of self-owned platforms; providing more effective

data for intelligent recommendation algorithms; strengthening international cooperation to increase international dissemination channels and influence; and while encouraging the establishment of English-language scientific journals, intensifying the translation and editing of Chinese scientific research achievements.

## Full Text

# Research on International Communication Strategies for Scientific Journals Under Intelligent Recommendation Algorithms: A Case Study of Journals Selected in the "Excellence Action Plan for China Science and Technology Journals"*

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### Abstract

[**Purpose**] This study analyzes the current status and challenges of applying intelligent recommendation algorithms in Chinese scientific journals, and explores how these journals can leverage such algorithms to enhance international communication. [**Method**] Starting from the compatibility between intelligent recommendation algorithms and international journal communication, we selected 280 journals from the "Excellence Action Plan for China Science and Technology Journals" as our sample, collected attribute data representative of these journals' application of intelligent recommendation algorithms, and employed comprehensive methods including statistical analysis, content analysis, and comparative analysis to investigate existing problems. **Results** The sample journals underutilize platforms equipped with recommendation functions; user attribute data requires further improvement; international cooperation and exchange need strengthening; and insufficient attention is paid to addressing language barriers. **Conclusion** To effectively apply intelligent recommendation algorithms and achieve precise international communication, journals should

adopt strategies including: utilizing existing international communication platforms while developing independent platforms; providing more effective data for recommendation algorithms; strengthening international cooperation to expand channels and influence; and encouraging the establishment of English-language journals while increasing translation and editing of Chinese research outputs.

**Keywords:** intelligent recommendation algorithms; scientific journals; international communication; strategies

## Introduction

With the rapid development of science and technology, a technology revolution centered on Artificial Intelligence (AI) is driving innovation in international communication paradigms and shaping the future order and ecological landscape of international communication [1]. Intelligent recommendation algorithms can model user interests based on user profiles and interest characteristics, model academic resources based on resource descriptions and features, and then employ corresponding recommendation algorithms to match user interest models with academic resource models, thereby recommending relevant academic resources to users [2]. This approach is gradually becoming the mainstream method for international communication of scientific journals. Currently, scholars at home and abroad have made progress in personalized recommendation of academic resources, with recommendation algorithms mainly falling into three categories: collaborative filtering-based, content-based, and social network-based recommendations [3]. In collaborative filtering research, scholars primarily analyze rating matrices for journal recommendations. Gazdar et al. used feedback data on associations between authors and papers to generate recommendations [4]. Alhoori and Furuta proposed a collaborative filtering-based journal recommendation framework that fully considered user reading behavior, temporal factors, and other relevant information [5]. Content-based recommendation algorithms can be further divided into traditional content-based and deep learning-based approaches. The former includes Wang et al., who extracted key features from abstracts and titles of scientific papers using chi-square feature selection and employed a softmax regression classifier for journal recommendation ranking [6]. The latter includes Li et al., who proposed a multi-dimensional feature fusion model incorporating semantic information from manuscript titles, abstracts, and journal names, effectively achieving content-based scholarly journal recommendation [7]. Additionally, some scholars have approached journal recommendation from social network perspectives, such as Huang et al., who performed community division in social networks based on friend relationships to recommend academic papers within communities [8], and Xu et al., who constructed a heterogeneous information network from scholars, papers, conferences, and their relationships to propose a recommendation method based on heterogeneous network embedding [9]. In recent years, these intelligent recommendation algorithms have shown a trend of integration with deep learning

technology, effectively improving recommendation accuracy and providing new technical support for international communication of scientific journals.

However, existing research primarily focuses on the algorithms themselves, lacking systematic analysis of the current status and challenges of Chinese scientific journals' use of intelligent recommendation algorithms, and offering limited discussion on how these journals should adapt to and leverage such algorithms in the AI era. In view of this, starting from the compatibility between the practical dilemmas and solutions of Chinese scientific journals' international communication and intelligent recommendation algorithms, this study takes journals selected in the "Excellence Action Plan for China Science and Technology Journals" as examples to analyze deficiencies in applying intelligent recommendation algorithms, and discusses how scientific journals can meet the requirements of these algorithms and utilize them for effective international communication in the AI era.

### 1.1 Academic Resource Overload and Insufficient International Exposure

According to the 52nd "Statistical Report on Internet Development in China" released by the China Internet Network Information Center, China's internet user population has reached 1.079 billion [10], making the internet the central hub for information dissemination. In the academic resource domain, the continuous growth of academic literature on internet platforms has created an increasingly prominent problem of academic resource overload. On one hand, researchers typically need to spend substantial time searching for truly useful academic resources. According to data from the U.S. National Science Foundation, researchers spend 51% of their total research time on data collection during academic activities, indicating low research efficiency [11]. On the other hand, for scientific journals, the lack of search exposure for some academic resources results in poor international communication outcomes for those journals. Intelligent recommendation algorithms, characterized by real-time and dynamic capabilities, offer a new solution to academic resource overload. Faced with the continuous emergence of academic literature on the internet, these algorithms can rapidly capture and analyze new data streams to achieve real-time recommendations, effectively addressing the problem of academic resource overload. This agile recommendation mechanism not only enables researchers to promptly grasp the latest research trends but also promotes immediate collaborative exchanges across different disciplines and internationally [12], significantly improving research efficiency.

In May 2021, during the 30th collective study session of the Political Bureau of the CPC Central Committee, General Secretary Xi Jinping emphasized the need to "adopt precise communication methods tailored to different regions, countries, and audience groups, and to promote the global, regional, and segmented expression of Chinese stories and voices to enhance the affinity and effectiveness of international communication" [13]. This essentially sets forth

requirements for precision in the international communication work of Chinese scientific journals. However, due to China's unique communication system and culture, the international communication efforts of Chinese scientific journals lack audience awareness and understanding of target audience information consumption habits, resulting in a passive situation of "random casting of nets" and "extensive but thin planting." Intelligent recommendation algorithms possess the capability to create labeled user profiles and precisely deliver information content, offering natural advantages in audience data collection, processing, and prediction. They are well-suited to solving the challenge of lacking precision in international communication, enabling personalized recommendations for scientific journals and achieving customized content for individual users.

### 1.3 Lack of Systematic Understanding and Insufficient Driving Force for International Communication

Today, the international communication of Chinese scientific journals is undergoing "profound changes unseen in a century." In this new development stage, General Secretary Xi Jinping has particularly emphasized the need to "strengthen research on international communication theories and master the laws of international communication" [13], which provides an action guide for Chinese scientific journals to enhance their international communication capacity and effectiveness. The complexity of international communication has led to a lack of comprehensive analysis and integration of international communication patterns in China, preventing the formation of sustainable development strategies. AI-driven intelligent communication technologies have fundamentally changed the logic of traditional communication methods from multiple levels, including communication subjects, channels, content, and environment [14]. Intelligent recommendation algorithms can analyze and process large amounts of seemingly unrelated, fragmented individual behaviors to identify inherent relationships and characteristics, forming precise grasp of patterns. They reflect overall trends while recording individual conditions, uncovering important hidden associations among individuals and between individuals, thereby enabling precise recommendations for scientific journals and addressing the problem of insufficient driving force for international communication.

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## Research Design and Methods

### 2.1 Research Design and Framework Construction

Currently, Chinese scientific journals mainly apply intelligent recommendation algorithms in three ways: first, by relying on international academic resource platforms or academic social networking platforms with recommendation functions, such as ResearchGate, TrendMD, and Academia.edu; second, by relying on recommendation algorithms embedded in web search engines and academic search engines, where journals optimize content related to researchers, topics,

keywords, and abstracts to improve their search rankings and achieve global exposure; and third, by relying on intelligent recommendation services provided by technology companies, such as the academic journal intelligent services offered by Zhipu AI, which are primarily implemented through paid purchases by journals and are not the focus of this discussion. Therefore, in examining the application of intelligent recommendation algorithms in Chinese scientific journals, this study first considers journals' utilization of platforms with recommendation functions, and second considers their collection and optimization of data required by recommendation algorithms embedded in search engines.

The "Excellence Action Plan for China Science and Technology Journals" (hereinafter referred to as the "Excellence Plan") represents a significant initiative in Chinese academia and the scientific community aimed at enhancing the international competitiveness and influence of domestic scientific journals. Launched on November 22, 2019, the plan includes a directory of selected journals comprising leading journals, key journals, tiered journals, and high-startup new journals. This directory is considered a marker of quality and influence for Chinese scientific journals, with selected journals generally recognized as internationally competitive and high-quality academic publications. This study takes journals selected in the "Excellence Plan" as research subjects to examine their utilization of platforms with recommendation functions and their collection and optimization of data required by search engine recommendation algorithms, thereby exploring the current status and problems in applying intelligent recommendation algorithms. The research framework is shown in Figure 1 [Figure 1: see original paper].

### 2.2 Research Methods

(1) ResearchGate (https://www.researchgate.net/) is an academic social networking platform with embedded intelligent recommendation functions that has attracted 25 million scholars from over 190 countries. ResearchGate helps researchers build academic networks, share research findings, seek collaboration opportunities, participate in academic discussions, and track research impact, with its recommendation functions enabling precise dissemination of research outputs. Therefore, establishing and operating accounts on ResearchGate can significantly increase a journal's exposure and influence while facilitating academic social interaction and content sharing. This study investigates the utilization of ResearchGate by journals selected in the "Excellence Plan" to reflect their application of platforms with recommendation functions.

(2) In the field of academic resource recommendation, data involved in intelligent recommendation algorithms mainly includes: first, researcher attribute data—by collecting basic information such as age, gender, occupation, title, and research field, algorithms can better understand researchers' academic backgrounds and characteristics to provide customized recommendation services for different users; second, researcher

behavior data—including browsing, reading, downloading, and bookmarking behaviors on platforms, which help analyze researchers' interests and needs to provide more precise recommendations; third, research output content attribute data—algorithms can analyze titles, abstracts, keywords, and other attributes to identify similarities and associations between documents, helping to push academic papers to potentially interested readers; fourth, academic association data—including cooperation relationships between journals and collaboration or citation relationships between scholars; and fifth, social network data—by analyzing user interactions on academic social networks such as following, liking, and commenting, algorithms can discover users' social relationships and interest circles to achieve effective recommendations. This study focuses on data that scientific journals need to improve and update when applying intelligent recommendation algorithms, thus emphasizing the investigation of journals' collection and optimization of user attribute data, content attribute data, and academic association data.

### 2.3 Data Sources and Acquisition Methods

This study selected representative academic social networking platforms and attribute data required by intelligent recommendation algorithms for analysis.

(1) Platform utilization: Through the search interface provided by the ResearchGate platform, we searched for the 280 journals in the "Excellence Plan" using their English names to determine whether they had established accounts and to examine academic community interactions.

(2) User attribute data: We selected ORCID and author research directions as examples. ORCID, known as the "academic ID for global researchers," is a unique digital identifier for authors that helps establish a more transparent, traceable, and high-quality academic publishing ecosystem. Information on author research directions helps build more open, collaborative, and organized academic communities. Such information enables intelligent recommendation algorithms to better understand researchers' academic backgrounds and provide customized services. The study searched for journal names on academic websites, downloaded open-access articles from these journals, and examined whether they collected ORCID information and author research directions.

(3) Content attribute data: We downloaded 280 articles through CNKI, Wanfang Data, VIP, Baidu Scholar, Google Scholar, and journal official websites to examine their English abstracts, keywords, etc.

(4) Academic association data: We examined cooperation with international publishers as an example. First, we checked journal official websites to determine whether journals were published by international publishers, whether publisher logos appeared on journal covers, whether official websites linked to international publishers, and verified cooperation through

introductions at journal founding. Second, we used search engines such as Google and Baidu to directly search for whether journals cooperated with international publishers.

(5) Impact factor: For journals included in the latest Journal Citation Reports (JCR), we used online academic resources such as LetPub and journal official websites to obtain the latest impact factor data. For Chinese journals not included in the SCI impact factor database, we retrieved corresponding journals on CNKI by verifying their hosting and sponsoring institutions to obtain impact factor data.

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## Results

### 3.1 Insufficient Utilization of Platforms with Recommendation Functions

To investigate the utilization of platforms with recommendation functions by the 280 journals in the "Excellence Plan," this study examined whether these journals had registered accounts on ResearchGate and created a pie chart based on the survey data, as shown in Figure 2 [Figure 2: see original paper].

The figure reveals that 279 journals (99.64%) had not registered accounts on ResearchGate, while only 1 journal (0.36%) had registered. Notably, *Carbon Energy* is the only journal among the 280 that has registered an account on ResearchGate (as shown in Figure 3 [Figure 3: see original paper]) and maintains regular updates and interactions. From the perspective of ResearchGate platform usage, Chinese scientific journals show insufficient utilization of international academic community platforms with recommendation functions.

### 3.2 User Attribute Data Requires Further Improvement

Intelligent recommendation algorithms can calculate similarity between researchers to identify neighboring groups with similar interests, thereby recommending academic papers to target researchers. To investigate the collection of data required by search engine recommendation algorithms by journals in the "Excellence Plan," this study first examined whether these journals collected certain user attribute data from authors.

The investigation focused on two aspects: whether journals collected ORCID information, and whether author introductions included research directions. Pie charts based on these surveys are shown in Figure 4 [Figure 4: see original paper] and Figure 5 [Figure 5: see original paper], respectively.

Figure 4 shows that only 28 journals (10%) in the "Excellence Plan" collected ORCID information. Figure 5 reveals that the proportion of journals including author research directions in author introductions is also low at only 16%. Overall, most selected journals perform inadequately in user data collection. When

recommendation systems crawl data, insufficient user attribute data may hinder effective recommendations.

### 3.3 International Cooperation and Exchange Need Strengthening

Cooperation with renowned academic institutions can provide academic association data for intelligent recommendation algorithms and enhance their academic authority and credibility. According to available information, Elsevier has applied intelligent recommendation technology on its online platforms, and Springer Nature has launched a Recommended feature based on recommendation algorithms for its journals. Cooperation with such institutions can also provide scientific journals with more exposure opportunities and promote the global dissemination and sharing of research findings.

According to the *Blue Book of China Science and Technology Journals (2022)*, China has 4,482 Chinese-language scientific journals and 420 English-language journals [15], with over 400 journals choosing to cooperate with international publishers [16], representing only 8% cooperation rate. To further examine the importance attached to academic association data by journals in the "Excellence Plan," this study investigated their cooperation with international publishers, categorized by publisher name, and calculated the average impact factor for each category to understand the impact of international exchange on journals. The results are shown in Figure 6 [Figure 6: see original paper] and Figure 7 [Figure 7: see original paper].

According to Figure 6, among the 280 journals selected in the "Excellence Plan," 173 journals (62%) have established cooperative relationships with international publishers, significantly higher than the national average. Cooperation with Elsevier and Springer Nature dominates, accounting for over 50% of cooperative journals. Compared with journals without international cooperation, those with international cooperation have significantly higher average impact factors, reaching 6.78 versus 2.48 for non-cooperative journals—a 2.73-fold difference. Figure 7 shows that journals cooperating with Oxford University Press have particularly high impact factors, averaging 10.18. Additionally, journals cooperating with Springer Nature and Elsevier also perform well, with average impact factors of 8.06 and 8.37, respectively. These results demonstrate that international cooperation and exchange play an important role at the journal level.

### 3.4 Insufficient Attention to Addressing Language Barriers

To investigate the optimization of research output content attribute data by journals in the "Excellence Plan," this study examined the number of English-language journals among them. The survey data show that among the 280 selected journals, there are 102 Chinese-language journals, 176 English-language journals, and 2 bilingual journals.

These data indicate that English-language journals dominate in the "Excellence Plan," highlighting that the plan's goal is not only to expand the influence of

Chinese-language journals but also to further enhance the international impact of Chinese scientific journals. By collecting and comparing impact factor data for journals in the "Excellence Plan," we found that English-language journals have an average impact factor of 6.94, while Chinese-language journals average only 2.29—a threefold difference, as shown in Figure 8 [Figure 8: see original paper]. Furthermore, the highest impact factor for English journals reaches 44.1, while the highest for Chinese journals is only 6.95. This demonstrates that English journals generally have higher impact factors and reflects that domestic Chinese journals have relatively low visibility and citation rates in the international academic community, partly due to language barriers.

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## Strategies and Discussion

### 4.1 Utilize Existing International Communication Platforms While Advancing Independent Platform Construction

First, scientific journals should strengthen their awareness of utilizing international communication platforms. Journals can cooperate with international academic social platforms that already have intelligent recommendation functions, such as ResearchGate and Academia.edu, by establishing official pages on these platforms to share research findings and increase international communication opportunities. Account homepages should be clear and attractive, focusing on the most representative and influential achievements. By managing and optimizing page content and regularly updating information, journals can enhance their exposure on these platforms. Journals should also actively interact with other researchers on these platforms, paying attention to and responding to comments, questions, and suggestions to demonstrate support for academic social platforms, enhance their affinity in international communication, and provide traction for academic association data. Simultaneously, journals should regularly track and analyze promotion effectiveness on these platforms; for instance, ResearchGate's analytics tools provide key data on page performance. Journals can use these data to understand page visits, downloads, citations, and other metrics, making adjustments and optimizations accordingly.

Additionally, independent digital publishing and communication platforms should be actively developed. Currently, the international communication of Chinese scientific journals primarily relies on digital publishing platforms built by international publishers. To achieve precise international communication, it is essential both to "sail by borrowing boats" and to "build boats for sailing," keeping platform tools in our own hands. Through the "Excellence Action Plan," scientific journals can secure special funds to build influential independent digital publishing and communication platforms. By embedding personalized recommendation functions, these platforms can enable Chinese scientific journals to be discovered and accessed by international research communities and academic circles, enhancing the exposure of domestic journals

in the international academic community.

### 4.2 Provide More Effective Data for Intelligent Recommendation Algorithms

First, precise international communication depends on accurate construction of researcher user profiles. Journals should guide authors to improve user attribute data and generate behavioral data. On one hand, journals should encourage researchers to complete personal profiles on personal websites, journal systems, and open academic platforms, and to timely update and share their research findings. On the other hand, journals should encourage researchers to actively participate in interactions on academic social networks to generate sufficient user behavior data. Only based on detailed user attribute and behavior data can recommendation algorithms construct more accurate user profiles, provide more precise recommendation services, and enhance international communication efficiency.

Second, journals should require researchers to optimize content attribute data, focusing on refining and optimizing paper titles, abstracts, and keywords. Attention should be paid to the connotation and extension of keywords and abstracts, and to using academically recognized, easily promotable language. Intelligent recommendation algorithms can use this information to accurately push relevant academic papers to other researchers in related fields, increasing the probability that research findings are read and cited, thereby enhancing the journal's international influence.

Finally, journals can innovate publishing models such as open access and digital publishing. These innovative models and technologies can provide more effective data for intelligent recommendation algorithms, thereby increasing journal and paper readership and citations and improving communication efficiency. They also make research findings more accessible and citable by international research communities and academic circles, expanding their influence in the international academic community.

### 4.3 Strengthen International Cooperation to Increase Communication Channels and Influence

Currently, international cooperation remains one of the important ways for scientific journals to achieve international communication. Specifically, journals can establish cooperative relationships with renowned academic institutions and international publishers. Through such cooperation, journals can share database and recommendation system resources from international publishers. Additionally, journals can organize international academic conferences, forums, and other exchange activities to build an international academic social network "circle of friends." Intelligent recommendation algorithms will recommend academic resources to academic peers within these circles based on social network relationships among authors, broadening journals' international communication

channels.

Furthermore, journals should guide authors to strengthen cooperation with influential scholars, particularly highly-cited scholars in scientific fields. Intelligent recommendation algorithms utilize cooperation relationships between researchers for recommendations. By jointly publishing research reports, participating in academic activities, or co-authoring papers with high-impact scholars, journals can increase the exposure of their own research outputs.

### 4.4 Encourage English Journal Development While Increasing Translation and Editing of Chinese Research

On one hand, the development of English-language scientific journals should be strengthened. Undeniably, due to the widespread use of English, English-language journals are more easily communicated internationally. Moreover, most language models used in current mainstream personalized recommendation algorithms for academic resources are trained on English data, enabling more precise recommendations for English-language journals. Currently, China has relatively few English publications with small output volumes; existing English journals publish only equivalent to the scale of medium-sized international publishers, leaving considerable room for development. The process of English scientific journal construction should continue to be advanced to enhance the international communication capacity of Chinese scientific journals.

On the other hand, policy support for translation and editing of Chinese scientific journals should be increased. Some excellent Chinese scientific journals face language barriers that limit effective international communication of their findings. To ensure exposure of excellent Chinese research on the international stage, increased efforts in editing and translation are needed, providing financial, talent, and technical support for aspects such as English long abstracts to break down language barriers in international communication and promote more outstanding Chinese scientific journals "going global."

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## Conclusion

In the AI era, when scientific journals face international communication challenges such as academic resource overload, insufficient communication effectiveness, and lack of systematic understanding, intelligent recommendation algorithms can provide new ideas and options. Currently, Chinese scientific journals show insufficient utilization of platforms with recommendation functions and incomplete collection of required data. To enhance international communication effectiveness, journals can achieve this by utilizing platforms, providing more effective data for recommendation algorithms, strengthening international cooperation, and addressing language barriers. Since this study focuses on scientific journals without specific discussion of researchers and management departments, there may be issues of incomplete analysis. Future research could

conduct specialized investigations on how researchers, journals, and management departments can form positive interactions with technology, enrich application cases of intelligent recommendation algorithms, and provide references for precise international communication of Chinese scientific journals.

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