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Comparative Study on the Impact of Scientific Journals (Postprint)

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Abstract

This paper addresses the current development status of relatively low overall influence of Chinese scientific journals, describes the scope of constituent elements of journal influence, conducts a differential comparative analysis of influence among scientific journals through literature review and comparative methods, proposes relevant recommendations for improving the influence of scientific journals, and holds certain reference value for strengthening the comprehensive quality management construction of scientific journals and enhancing the effectiveness of scientific information dissemination.

Full Text

Comparative Study on the Influence of Scientific Journals

ChinaXiv Collaborative Journal

Abstract

This paper addresses the current situation of relatively low overall influence of Chinese scientific journals, delineates the scope of components constituting journal influence, conducts a comparative analysis of influence differences among scientific journals through literature review and comparative methods, and proposes recommendations for enhancing journal influence. This study offers valuable reference for strengthening comprehensive quality management in scientific journals and improving the effectiveness of scientific information dissemination.

Keywords: Scientific Journals; Impact Factor; Development Recommendations

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Scientific journals play an indispensable role in the development of science and technology. Notably, expanding the proportion of funded papers can naturally enhance journal influence.

2.1 Current Development Status of Scientific Journals

Overall positive trends in socio-economic development and scientific-technological progress have created a favorable environment for scientific journal development. China now ranks among the world's top producers of scientific journals, becoming the "world's second largest scientific journal producer," with a relatively comprehensive system covering virtually all disciplinary fields. Digitalization and networking have begun to take shape, and digital profit models are emerging. However, compared with the United States, China's scientific journal industry faces numerous challenges, including stagnant management systems, severe loss of high-quality manuscripts, and low marketization. High-quality journals with substantial international influence remain scarce, with few included in SCI, and both average impact factor and total citation frequency lag far behind international averages. The industry continues to confront a complex development landscape and severe challenges.

1.1 Basic Definitions

Scientific journals are periodicals that publish research in natural sciences and technology. They serve as the primary vehicle for documenting scientific and technological history, constitute a vital component of knowledge innovation systems, and occupy a critically important position in scientific communication. Journal influence refers to the capacity of a journal's published academic research within a specific timeframe to impact scientific research and technology promotion in its field. By providing a platform for showcasing and disseminating research findings, highly influential scientific journals reflect, to a considerable extent, a nation's scientific research and academic caliber. Enhancing journal influence represents a shared objective of government agencies, relevant industries, publishing institutions, and editorial teams.

1.2 Components and Causal Relationships

The primary evaluation metrics for journal influence include total citation frequency, impact factor, immediacy index, and influence index. Total citation frequency represents the total number of citations received in a given year by all papers published in previous years, serving as a broad indicator. The impact factor is calculated as the ratio of citations in the statistical year to papers published in the preceding two years relative to the total number of papers published during those two years, reflecting influence over the recent biennial period. The

immediacy index measures the ratio of papers cited within the same year of publication to the total number of papers published that year, indicating immediate impact. The influence index derives from vector-weighted calculations after linear normalization of both impact factor and total citation frequency, enabling comprehensive evaluation of a journal set's influence. Broadly speaking, total citation frequency and actual circulation directly affect journal influence: higher citation frequency correlates with stronger influence and larger circulation, and vice versa. Additionally, the proportion of funded papers constitutes another influence component. Generally, grant-funded research projects emphasize innovation, depth, and high academic value; thus, increasing the proportion of funded papers naturally enhances journal influence.

2.2 Differences in Influence Among Scientific Journals

To evaluate the international influence of Chinese scientific journals, the internationally recognized Journal Influence Index (Ic) should be employed, as it comprehensively reflects a journal's international academic standing and influence intensity. The algorithmic formula is: [Note: formula missing in original] where If and TC represent the standardized impact factor and total citation frequency, respectively, after linear normalization. Using international influence indicators of Chinese English-language scientific journals as an example, Figure 1 [Figure 1: see original paper] demonstrates that from 2011 to 2014, both the total cited frequency and impact factor of these journals showed continuous and stable growth, indicating a positive development trend. In comparative analysis between Chinese journals and SCI journals, this study adopts a double logarithmic coordinate system and unified statistical data to ensure intuitiveness and fairness. The coordinate displays reveal that SCI journals prioritize impact factor as a selection criterion, with impact factor positively correlating with citation frequency, thereby achieving high academic influence and value. Chinese scientific journals, conversely, focus primarily on citation counts, abstract counts, indexing counts, Web downloads, and funded paper counts, while largely neglecting impact factor. The development gap between China's top journals and SCI journals extends beyond what the coordinates illustrate. To narrow this gap, systematic measures must be implemented, leveraging the influence index to comprehensively enhance journal influence.

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3.1 Enhancing Scientific Strength as the Foundation

Fundamentally enhancing the core influence of Chinese scientific journals requires strengthening national scientific and technological capabilities as the essential foundation. Although China has achieved considerable scientific progress, its overall technological level and the academic value of its research papers remain relatively weak compared with developed nations, severely constraining journal influence. Only through comprehensive advancement of scientific standards can academic development be promoted and journal

quality improved. To this end, China should intensify its efforts to identify and cultivate high-caliber talent, develop comprehensive scientific talent pipelines, and encourage research and development of scientific achievements. Concurrently, scientific workers must uphold the scientific spirit, engage in diligent and pragmatic research, and fundamentally elevate the nation's scientific and technological level.

3.2 Strengthening National Policy Guidance as the Priority

While the government has provided policy guidance for cultural, information, industrial, and agricultural sectors, support for scientific journals remains relatively weak. China's research evaluation system remains imperfect, with scientific journals receiving far less attention than database citations, resulting in slow improvement in the variety and quality of outstanding Chinese journals. This underscores the critical importance of strengthening government policy guidance for orderly journal development. The journal industry's environment is intimately linked to research and production; the accelerated construction of national innovation systems continuously generates new scientific achievements, creating opportunities for journal development. The fate of scientific publishing depends fundamentally on competitiveness, making quality enhancement and influence improvement paramount.

First, the relationship between marketization and public welfare must be balanced. Completely market-driven journals would see their focus fluctuate with market changes, creating social issues, while purely public welfare journals would dampen publisher and author enthusiasm. Therefore, neither approach should be adopted absolutely; instead, a sound integration based on content and objectives is necessary to enhance competitiveness and influence.

Second, a unified journal publishing platform should be established. China's current journal networks—including CNKI, Wanfang, Longyuan, Chongqing VIP, China Journal Network, and China Academic Journal Network—lack unified planning, with numerous small platforms emerging. This fragmentation disperses dissemination efficiency, and disorderly competition without unified standards undermines quality improvement. International platforms such as SCI, EI, and ISTP offer valuable models. China should build an authoritative, appropriate publishing platform to protect scientific resources and enhance journal influence.

Third, business models must be innovated. Traditional operational constraints should be broken; future trends point toward diversification, specialization, and systematization. Integrated and collaborative development should be encouraged, with innovative business models that expand scale, enhance influence, and improve publishers' economic benefits, supported by a favorable policy and cultural environment.

Fourth, evaluation and management policies should be improved. Academic confidence must be fostered to create a healthy development environment without

over-reliance on Western databases. A unified journal evaluation management system and scientific paper quality evaluation system should be established to assess researchers, faculty, and students, increasing the weight of domestic publications and improving the proportion of high-quality papers published in China.

Fifth, international journal cultivation should be advanced. Introducing exemplary foreign journals provides learning models for cultivating a cohort of journals with Chinese characteristics, enabling entry into international high-end academic communication systems. This should drive orderly industry-wide development, demonstrating national scientific strength through journal characteristics, information content, and technology promotion achievements. Guided by international journal cultivation, journals should be directed toward specialized, professional development to meet industry needs.

3.3 Building High-Quality Editorial Teams as the Leverage

Building a high-quality editorial team is crucial for journal quality. Editors serve as gatekeepers throughout the production process, responsible for enforcing editorial standards and ensuring content quality. Strengthening the selection and cultivation of editorial personnel is essential, with attention to the appropriate ratio of editorial to scientific professionals, to establish a moderately sized, elite editorial team with strong capabilities. Robust training and assessment protocols, along with merit-based selection mechanisms, should be implemented through dynamic management to maintain a vibrant and motivated editorial team.

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