

Challenges and Responses for China's Academic Journals in the Big Data Era (Postprint)

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Abstract

[Purpose] With societal development and technological advancement, the era of big data has arrived, inevitably impacting the development of academic journals. This study aims to provide recommendations for the future development of Chinese academic journals by analyzing the operational requirements in the big data era and the current status of Chinese academic journals.

[Methods] The challenges faced by academic journals in the big data era are analyzed in terms of requirements for timeliness, innovation, accurate positioning, and technical capabilities.

[Results] Chinese academic journals exhibit problems such as lengthy publication cycles, ineffective utilization of new media and big data, and a shortage of professional data personnel.

Conclusion Chinese academic journals can meet the challenges of the big data era by leveraging big data to support editorial work, enhancing editorial competencies, improving service functions, and increasing investment in hardware infrastructure and talent development.

Full Text

Preamble

ChinaXiv Collaborative Journal: Challenges and Responses for Chinese Academic Journals in the Big Data Era

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Abstract

[Objective] With social development and technological advancement, the era of big data has arrived, inevitably impacting the development of academic journals.

This paper aims to analyze the requirements for operating academic journals in the big data era and the current state of Chinese academic journals, offering recommendations for their future development. **[Method]** The challenges facing academic journals in the big data era are examined through the lenses of timeliness requirements, innovation requirements, accurate positioning requirements, and technical requirements. **[Results]** Chinese academic journals suffer from lengthy publication cycles, suboptimal utilization of new media and big data, and a lack of professional data personnel. **Conclusion** Chinese academic journals can address the challenges of the big data era by leveraging big data to support editorial work, enhancing editor competencies, improving service functions, and increasing investment in hardware infrastructure and talent development.

Keywords: big data; academic journals; new media; editorial work; talent development

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Introduction

With social development and technological advancement, every individual's social activities and personal behaviors have been swept into a massive data torrent, generating enormous impacts across all industries. The arrival of the big data era has inevitably influenced journal development. As traditional information dissemination platforms, journals must confront this new era. How Chinese academic journals should respond to opportunities and challenges under these new circumstances to create new prospects for development is an issue that urgently requires discussion. This paper will elaborate on the challenges facing academic journal development in the big data era and propose recommendations for addressing them.

1. The Emergence of the Big Data Concept

As early as the 1980s, the renowned American futurist Alvin Toffler introduced the concept of "big data" in his book *The Third Wave*, predicting that it would be the magnificent movement in humanity's wave of informatization. In 2008, Austrian data scientist Viktor Mayer-Schönberger and data editor Kenneth Cukier brought the "big data" concept back into public view when compiling *Big Data: A Revolution That Will Transform How We Live, Work, and Think*. The authors challenged human thinking patterns, arguing that as information storms rapidly transform people's lives, the focus would shift from "why" to "what," posing challenges to traditional cognitive and communication modes. Due to

its characteristics of massive volume, diverse data types, rapid processing speed, and high timeliness requirements, the technological revolution brought by big data has profoundly impacted all sectors.

2. Requirements and Challenges for Academic Journals in the Big Data Era

2.1 Timeliness Requirements

Although academic journals do not require the same level of timeliness as newspapers, they still have strong timeliness needs as platforms for disseminating academic information. In the big data era where information spreads at lightning speed, the value of information is often directly related to its dissemination speed—the faster, more comprehensive, and more accurate the information release and dissemination, the higher its value. For example, during the early outbreak of COVID-19, overwhelming information of mixed quality flooded the public view, including numerous errors and even rumors that inevitably caused social tension and, to some extent, panic. Facing a novel virus that spread rapidly and was largely unknown to the public, society urgently needed rigorous, scientific, and professional information. At this moment, academic journals served as crucial channels for providing scientific, reliable, and authoritative information to the public, making timeliness particularly critical. Those who could fastest provide academic insights into the truth about the novel coronavirus, offer theoretical foundations for further international research, and act as a “sedative” for public panic—providing methods to combat the epidemic and confidence to overcome it—could enhance their journals’ academic value and social benefits, increase citation and reprint rates, and expand academic and social influence. Therefore, timeliness requirements are essential for academic journal development and for maintaining a competitive edge, even becoming the most critical factor to some extent.

2.2 Innovation Requirements

Innovation is also a key factor for the survival and development of academic journals. Only innovative journals can be competitive, stand out among numerous journals, and establish their own brand and influence. The big data era has brought even greater digital impacts to traditional journals while providing broader space for development. It directly affects journals’ survival and development environment [1], changing the traditional platform model of editorial offices as units and the single-field development direction of academic research. Readers now demand multi-angle, comprehensive, and intelligent content from journals, requiring continuous innovation in editorial philosophy, distinctive features, and quality improvement to keep pace with the times and maintain brand “freshness.” This enhances core competitiveness and ensures continuous development. Moreover, big data era demands for innovation extend beyond editorial philosophy to encompass publication formats, business processes, evaluation

rules, marketing methods, and other aspects. Maintaining the status quo will inevitably lead to elimination, making innovative development an urgent priority.

2.3 Accurate Positioning Requirements

To achieve long-term development in the big data torrent, academic journals must have a reasonable positioning. First, they must dare to uphold their founding philosophy, remain true to their original mission, maintain distinctive features, and prioritize “high quality” and “professionalism” as the solid foundation for development. By serving scholars and researchers in their fields, journals can become guides for scientific research and platforms for academic discussion, serving and promoting growth in their disciplines [2]. Only then can journals avoid drifting with the tide and create their own characteristics and brand.

Simultaneously, academic journals must dare to continuously develop. Upholding distinctive features does not mean being complacent. In the rapidly evolving big data era, journal development must keep pace with the times while adhering to its philosophical characteristics. Maintaining sensitivity to cutting-edge academic achievements, grasping the pulse of the era, and aligning with contemporary themes will enable journals to achieve greater development through innovation while preserving their distinctive features [3], better serving China’s academic development and readership.

2.4 Technical Requirements

In the big data era, successfully operating an academic journal requires editors to possess not only solid professional knowledge and academic foundation but also the technical ability to utilize various digital platforms. The era of paper submissions, paper-based peer review, and paper editing and proofreading has passed. Academic journal operations increasingly rely on digital platforms—virtually all processes from submission to external review, editing, and proofreading can be completed on a computer. Network platforms have broken geographical limitations, making remote work possible. Furthermore, relying solely on print media is no longer sufficient for vibrant academic journals. Full utilization and integration of new media such as official websites, WeChat public accounts, mini-programs, and Apps are essential for continuous development and maintaining a competitive edge. These digital applications place higher demands on editors’ proficiency with information technology, presenting new challenges for editors to enhance their digital capabilities.

3. Current State of Academic Journals in the Big Data Era

3.1 Lengthy Publication Cycles

Although traditional paper submissions and paper-based peer review have become obsolete, and digital submission and review through email or submission

systems have long become the mainstream workflow for modern journals—saving time to some extent—many academic journals still suffer from untimely manuscript processing, inefficient external review processes, slow editing and proofreading, and poor coordination between various stages from topic planning to manuscript handling. It has become common practice for an article to take anywhere from six months to over a year from submission to formal publication. Such publication cycles significantly diminish the academic and practical value of research findings, affect priority of publication, and to some extent cause devaluation of academic achievements. Additionally, since most academic journals still focus on print publication as their operational priority, the disadvantages of print journals in terms of printing and distribution speed also affect article publication cycles.

3.2 Suboptimal Utilization of New Media and Big Data

In the big data era, digital promotion of journals is incomparable to print promotion in terms of speed and reach, making official websites and WeChat public accounts important platforms for journal promotion. However, China's academic journals currently face prominent problems in website and WeChat public account development: monotonous and dry content forms, predominantly text-based content without utilizing multimedia expressions such as audio and video to engage readers' senses, lack of highlights, and even simple reposting of print content. Most platforms merely display journal tables of contents and original articles without secondary processing, innovation, or appeal, failing to demonstrate the superiority of web and WeChat platforms, making them unsuitable for readers' fragmented reading time, and not achieving optimal integration between print and new media [4].

3.3 Lack of Professional Data Personnel

Currently, most academic journal websites purchase ready-made professional software systems and rely on professional companies for design and production. Most publishing units already have talent with computer science backgrounds for support, but they still lack technical professionals in network data dissemination, omnimedia applications, and digital editing [5]. Consequently, WeChat public account operations are mostly handled by text editors, who, due to the heavy demands of editing and proofreading work, often treat public account operation as a secondary, ancillary part-time task. This results in insufficient utilization of this important promotion platform.

Moreover, without professional backgrounds in omnimedia and digital knowledge, editors lack professional aesthetic standards and innovative capacity in content and format selection and design for WeChat promotion. They cannot propose constructive opinions or suggestions for public account promotion and operation, nor flexibly adjust to meet reader needs. Therefore, many academic journal WeChat public accounts suffer from rigid content and patterns over long

periods, failing to maintain platform vitality and fully realize their promotional value.

4. Solutions

4.1 Leveraging Big Data to Serve Editorial Work

Big data has the function of “discovering patterns and trends from massive data” [6], and editors should fully utilize these features to provide services and convenience for editorial work such as topic planning and manuscript review [7]. Through big data analysis, research hotspots and difficult issues in the field can be quickly identified from vast data sources. By thoroughly understanding, analyzing, and comparing these results, conclusions can provide important auxiliary guidance for academic journal topic selection, helping editors rapidly and accurately select high-interest content that aligns with the journal’ s academic background, thereby increasing citation rates and attention.

Simultaneously, through rapid, objective, and accurate big data analysis of manuscripts, editors can quickly obtain evaluation reports, saving substantial time and energy required to assess academic value during review, precisely identifying and preventing publication of papers with academic misconduct or excessive similarity, improving review efficiency, reducing workload and pressure [8], controlling publication cycles, enhancing timeliness, and preventing academic value depreciation due to excessive publication delays, thereby attracting high-quality submissions.

During external review, big data enables precise identification and targeted delivery of manuscripts to experts in the field, ensuring review quality and avoiding time wasted on reassigning manuscripts due to mismatched expertise, thus shortening publication cycles. Additionally, since most authors currently submit through journal network platforms that record their educational background, professional credentials, and research directions, big data applications can enable “database management” of the extensive author pool. Through statistics, analysis, and selection of the journal’ s authors and even domestic and international scholars, targeted solicitation can be conducted for authors aligned with the journal’ s research direction and topics, improving solicitation efficiency and quality, thereby ensuring journal quality.

4.2 Enhancing Editor Competencies

In the big data era, possessing strong professional knowledge alone no longer satisfies the developmental needs of journals. Editors must also have the ability to continuously expand their knowledge domains and accurately discern information. Only by continuously expanding their knowledge structure can they keep pace with the big data era and avoid being eliminated by information age development. Only by possessing the ability to analyze and select complex information to extract valuable insights can they promote continuous journal development.

These competency enhancements require editors to continuously participate in training and learning, making the expansion of knowledge breadth and depth a habitual practice. Simultaneously, they should actively attend domestic and international academic conferences, communicate extensively with experts and scholars in the journal's field, and follow the latest academic achievements to understand and grasp academic frontiers, thereby providing important guidance for journal topic directionality.

Moreover, in the big data era, speed and convenience have become key factors attracting readers. Therefore, academic journal editors cannot limit their work to print media operations but must also possess information data processing and application capabilities, learning to fully utilize networks for journal promotion. Network data platforms such as official websites, online submission systems, WeChat public accounts, and paper search platforms all require editors to master usage methods proficiently and apply them flexibly, providing convenient services for readers and authors while enhancing journal influence.

4.3 Improving Service Functions

Big data represents the integration, statistics, and analysis of massive data resources, with each data value in the academic journal field generated through actual author and reader behaviors. Therefore, to maintain vitality, academic journals must not only possess service consciousness for authors and maintain good contact and interaction with them but also have service consciousness for readers, establishing communication bridges to timely grasp reader opinions and feedback [9]. Only with good service consciousness can journals broaden business models and better complete operational and sales work [10].

In the big data era, academic journals can leverage new media devices to improve traditional communication modes, making communication no longer limited by time or space [11], eliminating invisible barriers between journals and readers, attracting readers, forming customer bases, expanding influence, and injecting stronger momentum into journal dissemination and development [12]. Therefore, while satisfying readers' information needs, journals must also pay attention to reader feedback and interact with readers. This requires journals to utilize platforms such as official websites and WeChat public accounts to set up diverse and convenient information feedback and service functions, preventing these data platforms from merely serving data output functions and realizing their true application value [13].

4.4 Increasing Investment in Hardware Equipment and Talent Development

Increasing investment in technical equipment is crucial for academic journal development, and hardware technical facilities important for information search and usage must be boldly invested in without creating obstacles that hinder journal development. Simultaneously, emphasis should be placed on financial

investment in and policy support for talent development. In the big data era, journals must pursue digital development by incorporating digital construction into overall journal development. For example, performance incentive mechanisms can be implemented with corresponding performance assessment methods, providing rewards to editorial staff who make significant contributions to digital construction such as operating official websites and WeChat public accounts. Competitive compensation should be offered to outstanding new media editorial talent to stimulate their enthusiasm and initiative.

Technical professionals in network data dissemination, omnimedia applications, and digital editing should be recruited. In the professional title evaluation system, specialized promotion pathways should be established for editors responsible for new media and digital communication management, with “bonus points” given to editors 兼任 new media work during title evaluations, encouraging the development and advancement of new media and digital talent. This will provide economic and social value recognition for those engaged in new media and digital editorial work for academic journals [4].

Conclusion

The arrival of the big data era has posed new requirements and major challenges for academic journal development while also bringing development opportunities. Chinese academic journals should fully and flexibly utilize big data to serve various processes in editorial work, ensure journal quality, enhance editors' competencies and capabilities, and simultaneously employ new media and digital means to promote and publicize journals, capture readership markets, improve academic influence, and drive continuous development toward higher levels.

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

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