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## Construction and Practice of Science and Technology Journal Cluster Platform under New Information Technology: Postprint

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**Date:** 2023-10-08T00:00:00+00:00

### Abstract

[Objective] New information technologies have catalyzed a disruptive revolution in the media sector, and the successful transformation of traditional media necessitates comprehensive reforms across conceptual frameworks, technological infrastructure, and operational strategies. [Methods] In response to a complex and evolving external landscape, traditional media must leverage their domain expertise and accumulated professional and brand equity, capitalize on technological advancements, and endeavor to translate traditional media brand advantages into competitive strengths within emerging media platforms. [Results] This study introduces the cluster model of domestic academic journal knowledge service platforms and, taking the publisher-led archetype as an example, presents a practical case study of the architectural design and functional implementation of the Information and Communications Academic Journal Network. [Conclusion] The Information and Communications Academic Journal Network introduces advanced technological platform support and deepens content construction to facilitate the extension of traditional media content production into emerging media platforms.

### Full Text

#### Preamble

**Title:** Construction and Practice of a Cluster Platform for Scientific Journals Under New Information Technology

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## Abstract

**Objective:** New information technology has brought disruptive revolution to the media field, and the successful transformation of traditional media requires changes in concepts, technology, business strategies, and many other aspects. **Methods:** Faced with a complex and changing external environment, traditional media must build upon their professional and brand advantages accumulated over the years, fully utilize technological development achievements, and focus on transforming traditional media brand advantages into emerging media advantages. **Results:** This article introduces the cluster model of domestic academic journal knowledge service platforms and, taking the publisher-led model as an example, presents a practical case study of the architecture and functional implementation of the Information and Communications Technology (ICT) Academic Journal Network. **Conclusion:** The ICT Academic Journal Network introduces advanced technology platform support, deepens content construction, and promotes the extension of traditional media content production to emerging media platforms.

**Keywords:** new information technology; scientific journals; cluster platform; transformation; practice

**CLC Number:** G23

**Document Code:** A

**Article ID:** 1671-0134(2023)04-045-04

**DOI:** 10.19483/j.cnki.11-4653/n.2023.04.009

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From the August 2014 “Guidelines on Promoting the Integrated Development of Traditional and Emerging Media” passed by the Central Leading Group for Comprehensively Deepening Reform, to the September 2020 “Opinions on Accelerating the In-Depth Integrated Development of Media” issued by the General Office of the CPC Central Committee and the State Council, the evolution from “promoting” and “integration” to “accelerating promotion” and “in-depth integration” marks a new stage in China’s media convergence development. Promoting the integrated development of traditional and emerging media requires following the laws of news communication and emerging media development, strengthening internet thinking, adhering to the complementary advantages and integrated development of traditional and emerging media, and insisting on advanced technology as the support and content construction as the foundation. We must vigorously promote the deep integration and development of traditional media and mobile new media, accelerate the layout of mobile internet position construction, and build a batch of new-type media groups with strong strength, communication power, credibility, and influence. By supporting innovation in key mainstream media and promoting convergence development to move from “addition” to “integration” as quickly as possible, we can form a new communication model. We must deeply understand the importance and urgency of this work in the all-media era, build a batch of new mainstream media with strong

influence and competitiveness as soon as possible, gradually build a mainstream public opinion pattern that integrates online and offline, domestic and foreign propaganda, and establish an all-media communication system based on content construction, supported by advanced technology, and guaranteed by innovative management. This series of policies has brought unprecedented development opportunities to the media industry and rare development opportunities for the transformation of traditional media.

The current wave of technological revolution and industrial transformation, along with the continuous emergence of talent and achievements and the accelerated development of digitalization and networking, has created a rare historical opportunity for the construction of China's scientific journals. Traditional media has undergone long-term development at both theoretical and practical levels, accumulating unique advantages through the test of time. These advantages are the magic weapons for traditional media to cope with competition and achieve self-development in the all-media era, and they are also what new media needs to learn from in deepening development. Therefore, traditional journals must further strengthen their traditional media advantages. First, in the all-media era, one of the core advantages of traditional media is content productivity. In China, this advantage of traditional media is particularly decisive. Traditional media has stronger political awareness and sense of responsibility, and its ability to control content is particularly outstanding. Much of the news information published on new media platforms today is sourced from traditional media. Second, traditional media possesses professional news communication concepts and operational mechanisms. Traditional media has established multi-faceted operational mechanisms in its development process, ensuring the authority and credibility of its content. Finally, traditional media enjoys brand and reputation advantages. A brand represents a taste and culture that transcends time and space, and a good brand can lock in loyal audiences and influence future audiences. In summary, although new media has captured some market share, traditional media still possesses traditional advantages over new media in terms of talent, resources, authority, and brand. These are unique advantages accumulated through long-term historical development and important footholds for the transformation of traditional media. To gain dominance in the emerging media industry environment, traditional media must focus on its traditional advantages in future development, achieve integration with new media, and remain invincible in the all-media era.

Transformation is a process of conceptual innovation. In the current industrial environment, media should treat content as a product for production and management, follow the processes and laws of product production, use data analysis and other means to study all aspects of content production, use, and promotion, and establish and optimize a new media decision-making model based on data analysis. Scientific journals must adapt to user demands for media in the internet era and better serve national scientific and technological innovation. Gathering industry journal groups in the form of network platforms, extracting new knowledge services from traditional media resource accumulation based on

the broad field of communications, and providing users with a better journal exchange processing and knowledge service platform is one of the core models for the future cluster and digital development of scientific journals.

## 1. Cluster Models of Domestic Scientific Journal Knowledge Service Platforms

The cluster development of scientific journals presents a diversified development trend due to differences in internal/external environments, organization, and architecture. The main models of professional scientific journal clusters can be divided into the following categories [1-4].

**Publisher-Led Scientific Journal Cluster Platform.** Publishing units form branded journal clusters through internal resource advantages and continuously expand service models and enhance influence on this basis, such as international famous publishing groups like Elsevier and Wiley. In China, journal publishing units are scattered and complex in nature, and enterprise operation is not yet mature enough, making it difficult to form publisher-led scientific journal cluster platforms. This article mainly takes the ICT Academic Journal Network as an example to introduce the architecture and functional implementation of scientific journal knowledge service platforms.

**Industry Organization-Led Scientific Journal Cluster Platform.** These platforms mainly rely on non-profit industry organizations, such as societies, based on the brand effect, influence, and cohesion of the organization's existing professional disciplines, supported by authoritative experts and resources, and mutually reinforcing with the formed journal clusters to further enhance industry influence. Mature international cases include the journal cluster hosted by the American Chemical Society (ACS), while domestic representative examples include the Chinese Medical Association's scientific journal cluster.

**Core Journal-Led Scientific Journal Cluster Platform.** This model uses a highly influential journal as the core, with other journals from different disciplines or sub-journals converging toward it to form a journal cluster. For example, the *Science China* journal cluster, co-sponsored by the Chinese Academy of Sciences and the National Natural Science Foundation of China, was founded in 1950. After more than 70 years, it has developed from one series to 17 series, making positive contributions to reporting Chinese scientific research achievements, strengthening academic exchanges, and promoting the development of scientific research.

## 2. Information and Communications Technology Academic Journal Network

How academic journals can adapt to user demands for media in the internet era and better serve national scientific and technological innovation is a question worth considering. To adapt to changes in the media industry in the new

era and promote the integrated development of traditional and emerging media, the ICT Academic Journal Network has introduced advanced technology platform support, deepened content construction, promoted the extension of traditional media to emerging media platforms, shaped and extended the brand value of scientific journal publishing, enhanced product competitiveness and content quality, and better served users, the industry, and the government. At the same time, the ICT Academic Journal Network also aims to better adapt to the trends of great development, great integration, and great transformation in the ICT field in the new era, promote the integrated development of ICT and traditional industries, formulate a development strategy for academic journals to transform from single paper publications to full-media and knowledge services for journal clusters, seize the opportunities of the rise and development of knowledge services, promote the construction of digital and knowledge service platforms for academic journals, and thus better serve the construction of informatization for the whole society [5-12].

The ICT Academic Journal Network integrates resources from eight journals—*Journal on Communications*, *Telecommunications Science*, *Space-Integrated-Ground Information Networks*, *Big Data*, *Chinese Journal on Internet of Things*, *Journal of Cyber Security*, *CAAI Transactions on Intelligent Technology*, and *China Communications* (English)—to form a “central kitchen” style intensive media operation model. This model more efficiently leverages the resources and brand advantages of scientific journals, attaches equal importance to content construction and technology construction, uses advanced technology as support, deepens content construction, innovates editorial processes, optimizes information services, and further promotes the extension of scientific journal content production to emerging media platforms. It disseminates high-quality content of academic publishing and demonstrates the value of academic services through multi-channel, multi-dimensional, multi-method, and audience-specific approaches, aggregates and mines the resources and data of scientific journals to provide more accurate and higher-quality academic publishing services, wins development advantages with content superiority, and enhances the brand value of academic journal publishing and services. The architecture of the ICT Academic Journal Network is shown in Figure 1 [Figure 1: see original paper].

## 2.1 Multi-Journal Collaborative Editorial Platform

This platform can effectively adapt to and meet the development and construction needs of journal groups, achieving cluster-based and platform-based manuscript process management and data integration sharing based on permission control. The platform can achieve the following functions: arbitrarily create and add associated journals; support substantive journal groups and virtual journal groups; data integration based on permission control can form independent databases for each journal or a comprehensive database for multiple journals; each journal has its own process, parameters, and templates; each journal can establish its own editorial characteristics; the system realizes

automatic manuscript storage and distribution, and through setting up submission columns and corresponding column editors, can achieve automatic storage according to columns; it can recommend reviewer lists based on manuscript keywords and subject classification, recommending the top five experts based on matching scores; it provides the function to view rejected and resubmitted manuscripts in the editorial center and counts the number of rejected and resubmitted manuscripts.

## 2.2 Online Publishing Platform

The ICT Academic Journal Network possesses an internationally advanced journal online publishing platform and information integration content publishing platform, which can achieve journal pre-publishing functions, interconnect with multiple major global databases, and enable rapid entry of journals into the international academic literature interconnection system. The platform's functions should include: internationalized and rich article display styles; powerful and precise search functions; rich article clustering functions; automatic interconnection between references and international mainstream databases; support for online electronic journal distribution and operation and maintenance; and support for online advertising operation and maintenance. The construction of this platform can help domestic first-class academic journals effectively connect with international academic journals, achieve pre-publishing, accelerate content entry into the knowledge sharing field, enhance the influence of academic journals, realize online electronic journal distribution, and significantly improve the quality level of academic journals through rich functional modules.

## 2.3 Journal Digital Resource Platform

In the middle and later stages, the ICT Academic Journal Network processes digital resources and continues to build a literature integrated retrieval system, literature display platform, information publishing platform, and member management system based on the earlier stage.

**2.3.1 Visual Publishing Platform** Based on domestic and international advanced experience, the ICT Academic Journal Network has comprehensively processed existing journal resources according to platform functional requirements. Traditional paper publication resources have been categorized, organized, and tagged through a series of XML (Extensible Markup Language, a subset of Standard Generalized Markup Language) processing to transform paper resources into digital resources that can be browsed and retrieved on different mobile terminals and computer terminals. Based on XML files, using text analysis technology and according to standard lexicons, the platform automatically extracts knowledge points from full texts, calculates the weight of knowledge points in articles and their interrelationships, and forms a knowledge graph of an article. This improves users' reading efficiency and enhances the visibility and dissemination power of journal articles.

## 2.4 Journal Promotion Platform

The enhanced functions of the ICT Academic Journal Network can further accelerate the speed and scope of literature dissemination, achieve multi-dimensional and audience-specific dissemination of journal content, enable more real-time interaction with authors and readers, increase author and reader stickiness, and further expand the reader and author communities.

**2.4.1 WeChat Public Publishing Platform** The journal WeChat public publishing platform refers to a service program installed on the server side. Users (readers/authors) can receive information published from the server side and have certain interactive functions by following this application. This platform is developed based on the WeChat public accounts of each journal. Specific functions are as follows: providing users with journal introductions, news, current issue tables of contents, and back issue browsing; browsing by column and recommended articles; searching for relevant article information by article title, author name, and keywords; providing users with online submission and review information queries; and multimedia value-added publishing services, including audio, video (video playback supports download and streaming), and picture collections. Through these functions, value-added publishing services for academic papers can be carried out, such as presentation of paper-related data and experimental conditions, wonderful review comments, audio/video abstracts, academic news, etc.

**2.4.2 Information and Communications Technology Journal Cluster Portal Platform** Currently, an integrated digital journal group of eight journals and an external portal platform have been built, which is open and scalable and can be extended to integrate new journals in the future. All the above functional modules are displayed on the ICT journal cluster portal platform, supplemented by small functional features such as precision push and recommended reading. Precision push is an active article data push service for specific personnel, achieving the purpose of pushing relevant articles accurately through semantic matching between keywords, abstracts, and other information with authors, experts, and readers. Recommended reading refers to the platform automatically recommending other articles most read by all users who have also read a certain article. Articles are arranged in reverse order according to the number of times they have been read. The recommended reading function is provided on the article abstract page. Ultimately, an open and scalable digital journal group has been formed, where authors, readers, editors, and reviewers can conveniently conduct submission and review processing, as well as paper and keyword retrieval through this cluster platform. In the future, if more ICT industry scientific journals join, the platform will be able to integrate rich, excellent, and professional publishing and knowledge resources from domestic journals of the same category, further expand resource utilization and service methods, increase resource utilization rates, better provide systematic and practical journal digital publishing services for readers, authors, editors, and journal

offices, gather popularity of authors and experts in the field to lay a foundation for the further development of journals, promote exchanges and cooperation among Chinese ICT industry scientific journals, advance the networking process of journals, enhance the visibility and influence of Chinese ICT industry scientific journals through cluster operation models, become a disciplinary portal in the ICT field, provide various information services such as disciplinary trends, academic conferences, research institutions, scholar homepages, personal digital libraries, disciplinary reports, academic evaluations, and academic services in the ICT field, formulate disciplinary academic norms, and promote the healthy development of the field.

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(Executive Editor: Zhang Xiaojing)

**Funding:** This work was supported by the 2018 Central Cultural Enterprise State Capital Operation Budget Funding Project.

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The construction of scientific journal knowledge service platforms will effectively reshape scientific journal publishing service processes in a digital manner, achieve intensive use of publishing and data resources of relevant scientific journals, provide extended or value-added academic publishing services through rich media and new media methods, and better provide personalized, accurate, and effective extended and value-added knowledge services and publishing services for users in the field. The digital transformation and upgrading of traditional publishing enterprises, especially the digital transformation of traditional journals and book publishing, is crucial to the future survival and development of publishing houses. We must keep pace with the times, grasp readers' needs, and boldly adopt the latest information technology achievements to continuously deepen the transformation and upgrading of publishing houses in the continuous integration of publishing and technology.

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

*Source: ChinaXiv – Machine translation. Verify with original.*