# Postprint: Exploring Pathways to Enhance Knowledge Service Capabilities of Scientific Journals in the Digital-Intelligence Era

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## Abstract

【Purpose】In the context of the digital intelligence era, this study aims to explore how to effectively enhance the knowledge service capabilities of scientific journals to respond to changes in technological innovation and market demand, and to promote the transformation and upgrading of the scientific journal industry.

【Method】 This paper adopts the literature research method, collecting and analyzing relevant literature to comprehensively review the pathways for enhancing the knowledge service capabilities of scientific journals in the digital intelligence era, conduct an in-depth analysis of the cutting-edge characteristics and potential value of digital intelligence technologies, and examine the current status and problems of knowledge service capabilities in scientific journals, thereby providing a basis for formulating targeted improvement pathways.

【Results】 Digital intelligence technologies can enable precise push services for scientific journals, enhance user experience, and optimize service processes. Simultaneously, the knowledge service capabilities of scientific journals face issues such as technological bottlenecks, content homogenization, and insufficient service innovation. To address these problems, this paper proposes strategies including strengthening digital infrastructure construction, introducing high-quality manuscripts, optimizing the peer review process, enhancing the professional competence of journal editorial staff, and innovating service models, aiming to improve the knowledge service capabilities of scientific journals and drive their development toward greater intelligence, personalization, and efficiency to meet the growing needs of readers.

【Conclusion】 The digital intelligence era presents both new development opportunities and challenges for scientific journals. By strengthening digital infrastructure, optimizing content quality, and innovating service models, scientific

journals can effectively enhance their service capabilities and competitiveness, providing more robust support for scientific progress and academic exchange.

## Full Text

## Preamble

### Exploring Pathways to Enhance Knowledge Service Capabilities of Scientific Journals in the Digital-Intelligence Era

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## Abstract

[**Objective**] Against the backdrop of the digital-intelligence era, this study aims to explore effective pathways for enhancing the knowledge service capabilities of scientific journals to address technological innovations and evolving market demands, thereby facilitating the transformation and upgrading of the scientific journal industry. [**Method**] This paper employs a literature research methodology, collecting and analyzing relevant documents to comprehensively review pathways for improving knowledge service capabilities of scientific journals in the digital-intelligence era. It provides an in-depth analysis of cutting-edge characteristics and potential value of digital-intelligence technologies, examines the current status and challenges of knowledge services in scientific journals, and establishes a foundation for developing targeted improvement strategies. [**Results**] Digital-intelligence technologies can enable precise content delivery, enhance user experience, and optimize service workflows for scientific journals. However, challenges persist, including technological bottlenecks, content homogenization, and insufficient service innovation. To address these issues, this paper proposes strategies including strengthening digital infrastructure, attracting high-quality submissions, optimizing peer review processes, enhancing editorial staff professionalism, and innovating service models. These initiatives aim to elevate knowledge service capabilities and drive scientific journals toward greater intelligence, personalization, and efficiency to meet growing reader demands. [**Conclusion**] The digital-intelligence era presents both new opportunities and challenges for scientific journals. By strengthening digital infrastructure, optimizing content quality, and innovating service models, scientific journals can effectively enhance their service capabilities and competitiveness, providing more robust support for scientific advancement and academic exchange.

**Keywords:** digital-intelligence era; scientific journals; knowledge service capability; enhancement pathways; innovative service models

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## Introduction

In May 2022, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the *Opinions on Promoting the Implementation of the National Cultural Digitalization Strategy*, proposing eight key tasks including consolidating cultural digital infrastructure, developing new scenarios for digital cultural consumption, accelerating the digital layout of cultural industries, and building a cultural digital governance system. This demonstrates that China has made strategic deployments for cultural digitalization construction, driving the digital transformation of production, lifestyle, and governance. As crucial platforms for knowledge dissemination and academic exchange, scientific journals shoulder the important mission of promoting scientific communication and development [1]. Traditional publishing refers to the process and form of publishing where products are primarily print-based. However, with the development of emerging technologies such as artificial intelligence, big data, and cloud computing, journal knowledge services have entered a new era characterized by digitalization, networking, and intelligence. Against this backdrop of integrated publishing, knowledge service forms have become more diversified and content more abundant. Enhancing service capabilities not only meets the demands of the times but also drives high-quality development. In social development practice, new quality productive forces serve as the driving force for high-quality development, bringing richer resources and more advanced technological means to scientific journals, enabling more efficient and precise leaps in knowledge services. Therefore, exploring pathways to enhance knowledge service capabilities represents an inevitable trend for adapting to the times and achieving high-quality integrated development.

### 1.1 Definition and Characteristics of Digital-Intelligence Technology

Digital-intelligence technology, as an emerging concept in information technology, represents the integration of digital and intelligent technologies [2]. Its core lies in leveraging advanced technologies such as big data analytics, cloud computing, and artificial intelligence to achieve efficient data processing, intelligent decision-making, and automated operations. This technological innovation not only represents a breakthrough in information technology but also creates new development opportunities across industries. In data processing, digital-intelligence technology demonstrates powerful computational capabilities. Through cloud computing platforms, rapid data storage and retrieval become possible, enabling the processing of massive datasets. Simultaneously, big data analytics can deeply mine value from data, providing robust support for decision-making. In information dissemination, digital-intelligence technology achieves precise information delivery through intelligent push and personalized

recommendations, effectively enhancing communication efficiency. In intelligent decision-making, algorithmic models enable rapid and accurate decisions, significantly improving scientific rigor and precision.

The characteristics of digital-intelligence technology primarily include: (1) **Efficiency**: the ability to quickly process large volumes of data to meet real-time demands; (2) **Intelligence**: automated operations through algorithmic models that reduce human intervention; (3) **Security**: reliable data protection through encryption and access management; and (4) **Scalability**: support for customized development across multiple application scenarios and requirements.

### 1.2 Application Value of Digital-Intelligence Technology in Scientific Journals

As vital platforms for academic exchange, enhancing knowledge service capabilities of scientific journals is crucial for promoting the dissemination of research findings and academic progress. The emergence of digital-intelligence technology presents significant opportunities for scientific journal development.

First, digital-intelligence technology enables precise content delivery. In the knowledge economy era, users require not merely information but knowledge extracted and mined from vast amounts of data to solve problems [3]. Through big data analytics, scientific journals can identify cutting-edge trends and hot topics in research fields, providing valuable reference information for editors and authors. Meanwhile, artificial intelligence can intelligently screen and review submissions, effectively reducing editorial workload and improving efficiency.

Second, digital-intelligence technology enhances user experience. Through intelligent push and personalized recommendations, scientific journals can provide customized article recommendations and subscription services based on users' reading habits and interests. This service model not only meets personalized needs but also improves user stickiness and engagement. Additionally, digital-intelligence technology supports online communication and interaction functions, facilitating academic exchange and collaboration among scholars.

Finally, digital-intelligence technology optimizes service workflows. Through automated processing and intelligent decision-making systems, scientific journals can achieve rapid manuscript processing, automated peer review, and intelligent publishing and distribution. This service model not only improves editorial office efficiency and shortens publication timelines but also reduces operational costs and enhances profitability. Furthermore, digital-intelligence technology supports copyright protection and anti-piracy functions, safeguarding the legitimate rights and interests of scientific journals.

### 2.1 Concept and Characteristics of Knowledge Services

As an advanced stage of information services, knowledge services are defined as services based on the ability to search, organize, analyze, and reorganize

information and knowledge. These services integrate into the entire process of problem-solving according to users' needs and contexts, providing effective support for knowledge application and innovation [4]. In scientific journals, knowledge services encompass not only simple document retrieval but also in-depth analysis, processing, and organization of literature to meet researchers' comprehensive needs for knowledge acquisition, innovation, and application.

Knowledge services exhibit several key characteristics: (1) **Depth and Professionalism**: they involve in-depth research and analysis of specific fields or topics, providing comprehensive and thorough knowledge content. In scientific journals, this manifests as in-depth reporting and interpretation of the latest research findings, academic perspectives, and technological advances. (2) **Personalization and Customization**: services can provide personalized content recommendations and customized services based on user needs and interests. In scientific journals, this means delivering information resources and service support aligned with users' research directions and academic levels. (3) **Interactivity and Collaboration**: knowledge services emphasize user interaction and collaboration by building platforms for knowledge sharing and exchange to promote academic communication and cooperation. In scientific journals, these characteristics are reflected in establishing forums, communities, and other exchange platforms that encourage interaction among readers, authors, and editors.

### 2.2 Current Status of Knowledge Services in Scientific Journals

Scientific journals have made certain progress in knowledge services, yet several issues and deficiencies remain.

First, regarding service models, most scientific journals still adopt traditional subscription-based or purchase models, charging readers fees to provide knowledge services. This model somewhat limits the popularization and promotion of knowledge services. In recent years, with the development and 普及 of internet technology, an increasing number of scientific journals have begun experimenting with new service models such as Open Access (OA), expanding their influence and reach by providing free full-text access [5], thereby promoting the dissemination and sharing of scientific knowledge. However, the promotion and application of these new service models still face numerous challenges and difficulties.

Second, concerning content quality, the quality of papers in scientific journals varies considerably, with some suffering from repetitive content and insufficient innovation. This affects readers' trust and loyalty to some extent. To improve paper quality, scientific journals must strengthen manuscript review and screening, establish rigorous peer review systems and evaluation mechanisms, and ensure published papers maintain high academic standards and innovation.

Finally, regarding user experience, scientific journals need improvement in website design, information retrieval, and interactive experience. Some journal web-

sites feature overly simplistic and crude designs lacking user-friendly interfaces and functions. Information retrieval functions are not powerful or intelligent enough to meet personalized user needs. Interactive experiences are poor, lacking mechanisms for user interaction and feedback. To enhance user experience, scientific journals should focus on aesthetic and user-friendly website design, strengthen intelligent and personalized information retrieval functions, and establish user feedback mechanisms and service support systems.

### 2.3 Challenges and Problems

Scientific journals currently face numerous challenges in knowledge service delivery.

First, technological bottlenecks constitute a significant factor constraining the enhancement of knowledge service capabilities. Although recent developments in internet, big data, and artificial intelligence technologies have provided more tools and means for scientific journals, these applications still have limitations. For instance, data mining and analytics technologies require substantial investment in human, material, and financial resources, while AI applications in knowledge services remain in their early stages and require further refinement and optimization.

Second, content homogenization represents another critical issue. As research fields continue to expand and develop, an increasing number of research findings have emerged, yet many exhibit similarity or even duplication in content, methods, and conclusions. This creates intense competitive pressure for scientific journals in content selection, reporting, and interpretation, leading to homogenization.

Finally, insufficient service innovation poses a challenge. While some scientific journals have begun adopting new service models and technologies to enhance knowledge services, overall innovation remains inadequate. For example, development in digitalization, networking, and intelligence is not sufficiently comprehensive or deep; knowledge service content and forms remain relatively singular and traditional; and user communication requires further strengthening.

### 3.1 Strengthening Digital Infrastructure Construction

In the big data era, scientific journals occupy a crucial and irreplaceable position in national big data strategies. They should actively utilize modern new media technologies to forge a path of integrated media development, transforming from academic publishing to knowledge services [6]. Enhancing knowledge service capabilities is inseparable from robust digital infrastructure, which serves as the cornerstone for content digitalization, service networking, and management intelligence, as well as a key driver for high-quality journal development. The *Opinions on Deepening Reform and Cultivating World-Class Scientific Journals* jointly issued by the China Association for Science and Technology, the Publicity Department of the CPC Central Committee, the Ministry of Education,

and the Ministry of Science and Technology identified "building a big data center for scientific journal papers" as a key task [7]. Currently, for scientific journal publishers, a relatively feasible initiative is constructing knowledge service network platforms. Such platforms serve as important channels for journals to deliver services to users. A well-functioning, user-friendly platform not only improves user experience but also enhances journal brand image and influence. When building these platforms, several aspects require attention: (1) The platform should support article search and browsing functions, enabling users to quickly retrieve and read full-text content from the journal' s entire archive. This requires user-centric design with clean interfaces and convenient operation. (2) The platform should offer personalized recommendation functions. By analyzing users' reading preferences and academic backgrounds, the platform can recommend relevant articles and information to meet individual needs, thereby increasing user satisfaction and promoting content dissemination [8]. (3) The platform should support academic exchange and collaboration functions, allowing users to post comments, ask questions, and participate in discussions with other scholars. This promotes academic exchange and advances disciplinary development. (4) The platform should provide online service support, including online payment, subscription management, and consultation services, offering users convenient support that enhances both experience and journal competitiveness. (5) The platform can add knowledge dissemination functions, expanding related popular science knowledge for users. Cutting-edge academic achievements can be presented through popularized writing in audio, video, or web formats to stimulate reading interest and enhance public influence. For implementation, advanced web development and cloud computing technologies should be employed to ensure platform stability and scalability, while partnerships with third-party service providers can offer richer services and support.

### 3.2 Optimizing Journal Content Quality

In information dissemination practice, content production always occupies the front end of the media industry chain and value chain. Content quality is the foundation of a journal, and the principle of "content is king" remains the winning formula for scientific journals [9]. Optimizing content quality not only improves academic standards and influence but also enhances user satisfaction and loyalty.

**3.2.1 Introducing High-Quality Manuscripts** Scientific journals should actively attract and introduce high-quality manuscripts to elevate academic standards and influence. Journals can organize paper writing and submission workshops to attract outstanding scholars, identify potential authors, expand manuscript sources, and maintain a stable group of excellent authors to ensure manuscript quality. They can also organize experts and scholars across various fields to plan special issues, publish special issue plans in advance, attract submissions from relevant fields, and promote cutting-edge research and innovative outputs. Strengthening collaboration with universities, research insti-

tutions, and other academic organizations, establishing outstanding manuscript incentive mechanisms, and actively promoting journal branding and distinctive features can also attract excellent scholars. Additionally, during the manuscript introduction process, journals must strengthen screening and review procedures, establish rigorous peer review systems and standards, and ensure published papers maintain high academic standards and innovation. Furthermore, enhancing communication and collaboration with reviewers and leveraging digital-intelligence technologies can improve review quality and efficiency.

**3.2.2 Optimizing the Peer Review Process** The peer review process constitutes a critical link in ensuring journal content quality. Scientific journals should establish robust review systems and strengthen standardization and scientific rigor in review procedures. Specific measures include: (1) Clarifying review standards and requirements to ensure fairness and objectivity, while strengthening reviewer training and management to enhance reviewer competence. (2) Building and managing a high-quality reviewer pool to provide excellent review services. This can be achieved by recruiting experienced and knowledgeable reviewers and strengthening their training and evaluation. (3) Strengthening supervision and inspection of the review process. Establishing strict monitoring mechanisms ensures efficiency and standardization. Intelligent review management systems can track and monitor the review process in real time to identify and resolve issues promptly.

**3.2.3 Enhancing Editorial Staff Professional Competence** Facing the new information environment and service demands, editorial staff of scientific journals should adapt to the times, transform their thinking, improve service awareness and professional competence, and continuously explore new forms of knowledge services to meet user needs. As China' s scientific level continues to develop, a high-level, high-quality editorial team enables scientific journals to adapt more quickly to integrated development trends. Such a team depends on the professional competence of all editorial staff, making it crucial to enhance their professional qualities. Approaches include: (1) Strengthening editorial training and learning. Editorial staff should regularly participate in academic activities and conferences to understand publishing trends, follow academic developments, improve professional competence, and strive to become expert or scholar editors [10]. (2) Strengthening talent recruitment. To adapt to current new media technologies, journals should hire outstanding talents familiar with digital technologies to operate new media platforms, complementing traditional editors and continuously enhancing team cohesion [11]. (3) Establishing evaluation and incentive mechanisms. Developing scientific and reasonable evaluation standards and mechanisms for regular assessment and motivation of editorial staff can improve work enthusiasm and responsibility while enhancing editorial quality. (4) Strengthening communication and collaboration between editors, authors, and reviewers. Establishing good communication channels and collaboration mechanisms facilitates timely and effective information exchange and

cooperation, helping resolve issues during editing and ensuring content accuracy and standardization while building trust and support from authors and reviewers. (5) Focusing on user experience and service quality. In enhancing knowledge service capabilities, journals should emphasize user experience and service quality, continuously optimizing service processes and methods to improve satisfaction and loyalty. User research and surveys can provide timely understanding of needs and feedback for targeted service improvements.

### 3.3 Innovating Service Models

With the rapid development of digital-intelligence technologies such as artificial intelligence and big data, users no longer accept singular knowledge dissemination forms. Scientific journals must leverage new technologies to continuously innovate service models and keep pace with the times to meet diverse user needs and improve service efficiency.

**3.3.1 Personalized Recommendation Services** Personalized recommendation services employ information mining and recommendation algorithms to quickly match relevant research findings based on users' reading preferences and academic backgrounds, achieving precise personalized information delivery [12]. In the digital-intelligence era, scientific journals can establish user profiling systems to collect and analyze reading behaviors and interest preferences. By matching data resources with user information [13], journals can achieve intelligent and precise content delivery, enhancing user experience and meeting personalized needs.

**3.3.2 Intelligent Q&A Services** Intelligent Q&A services are question-answering systems based on natural language processing and machine learning technologies that provide timely and accurate academic consultation. Journals can build Q&A knowledge bases by collecting and organizing common academic questions and answers, preprocess and index these using natural language processing, design and implement intelligent Q&A algorithms for automatic responses, and provide user interfaces with Q&A service entry points and interaction methods. This enables users to ask questions and obtain answers anytime, resolving doubts and confusion during reading.

**3.3.3 Online-Offline Integrated Service Model** Scientific journals can fully utilize both online and offline resources to provide comprehensive knowledge services. Online platforms can publish information about offline events such as academic conferences and seminars to attract user attention and participation. Offline activities can promote journal branding and services, enhancing user recognition and trust. Online platforms can share outcomes and feedback from offline activities to expand influence and attract more participants. Strengthening interaction and connection between online and offline activities achieves resource sharing and complementary advantages. This service model

not only enhances journal brand influence but also increases user stickiness and loyalty.

With the development of artificial intelligence and big data technologies, today' s publishing industry faces both opportunities and challenges. In this context, scientific journals should proactively embrace change, actively apply digital-intelligence technologies in daily operations, fully leverage AI' s enabling role in the publishing industry, and positively contribute to the digital-intelligence transformation of scientific journal publishing. This paper explores cutting-edge characteristics and potential value of digital-intelligence technologies, confronts current challenges in knowledge services, and proposes strategies for strengthening digital infrastructure, optimizing content quality, and innovating service models to enhance knowledge service capabilities, thereby contributing to the prosperous development of scientific innovation and knowledge services.

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