

Analysis of Key Issues in the Intensification of Chinese Scientific Journals (Postprint)

Authors: Chu Jingli, Qun Yan

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Abstract

The promulgation of the “Opinions on Deepening Reform to Foster World-Class Scientific and Technological Journals” signifies that China’s scientific and technological journals have ushered in a “spring” of development. However, confronted with the rapid advancement of digital publishing and the plundering of academic resources worldwide by international publishers, achieving intensive development of China’s scientific and technological journals has become imperative. The intensification of scientific and technological journals constitutes a necessary means for realizing scaled development and deep exploitation of content resources. This paper examines the relationships among clustering, intensification, and conglomeration of scientific and technological journals, the necessity for China to achieve intensive development of its scientific and technological journals, the primary obstacles faced, the dimensions for promoting intensification, and the various relationships requiring balance during the promotion process, with a view to advancing the intensive development of China’s scientific and technological journals.

Full Text

Key Issues in the Intensive Development of Scientific and Technical Journals in China

Chu Jingli^{1, 2}, Yan Qun³

¹University of Chinese Academy of Sciences, Beijing, China

²National Science Library, Chinese Academy of Sciences, Beijing, China

³Editorial Office (Preparatory) of *hLife*, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China

Abstract: The issuance of *Recommendations on Deepening Reform and Developing World-Class Scientific and Technical Journals* signals the arrival of a “spring” for China’s scientific and technical journals. However, faced with the

rapid advancement of digital publishing and the predatory acquisition of academic resources by international publishers, realizing the intensive development of China's scientific and technical journals has become extremely urgent. Intensive development is a necessary means to achieve scaled growth and deep mining of content resources. This paper discusses the relationships among clustering, intensification, and collectivization; the necessity, main obstacles, and dimensions of realizing intensive development; and the various relationships that must be balanced during this process, with the aim of promoting the intensive development of China's scientific and technical journals.

Keywords: scientific and technical journals; journal publishing; clustering; intensification; collectivization

In recent years, the Party and the state have attached great importance to the development of scientific and technical journals, and the construction of high-level journals has become an important task facing China's scientific community. The issuance of *Recommendations on Deepening Reform and Developing World-Class Scientific and Technical Journals* has ushered in a "spring" for China's scientific and technical journals. At the national level, the goal is to cultivate world-class scientific and technical journals by optimizing journal structure and layout, enhancing international competitiveness, and promoting scaled and intensive development [1]. On September 19, 2019, seven ministries and commissions including the China Association for Science and Technology jointly launched the "Excellence Action Plan for China Scientific and Technical Journals" (hereinafter referred to as the "Excellence Plan") to vigorously promote the construction of first-class journals and cluster-based development. On May 18, 2019, the Publicity Department of the CPC Central Committee, the Ministry of Science and Technology, and the Ministry of Education jointly issued *Opinions on Promoting the Prosperous Development of Academic Journals*, which stated that pilot programs for cluster-based development should be launched. High-quality academic journals should serve as the leading force to reorganize and integrate resources, building a batch of academic journal clusters with correct orientation, first-class quality, resource intensification, and core competitiveness. Qualified academic journal publishing units are encouraged to transform into enterprises and become stronger. Large-scale publishing enterprises are supported to explore collaborative publishing models, integrating journal publishing resources across regions, departments, and disciplines, connecting industrial chains, reconstructing value chains, forming innovation chains, and creating several academic journal publishing groups with strong communication power and influence [2].

What constitutes a first-class scientific and technical journal? A first-class journal is one that publishes the most original and innovative research achievements and gains widespread recognition worldwide, with disciplinary influence indicators ranking in the top 5% globally in comprehensive or field-specific quantitative statistics [3]. First-class journals require not only original and innovative

academic achievements (first-class academic output) but also first-class platforms for dissemination. The platform itself is influence. Even first-class academic achievements will have limited impact without the support of a first-class platform. With the development and popularization of digital publishing and changes in how people read and access information, a first-class platform is not only a publishing medium but also a medium that supports technological innovation and provides knowledge solutions for users. This cannot be achieved by individual journals alone; it requires intensification to realize scaled development and group operation, pursuing greater communication benefits and broader influence [4]. At present, the core issue and bottleneck in the development of China's scientific and technical journals is intensification.

1 The Relationship Among Clustering, Intensification, and Collectivization

Journal clustering refers to the integration of two or more journals in some form, collectively presenting the functions and influence of multiple journals. Clustering is the foundation for the development of scientific and technical journals. To move toward intensification, journals must first achieve clustering, expanding scale and realizing standardization, aggregation, and centralized presentation of content. Only by leveraging resource aggregation advantages and conducting deep mining based on historical accumulation can new service products be developed and created [5].

Journal intensification refers to the use of various means to integrate journal-related resources and improve the editorial and publishing efficiency and effectiveness of journal clusters. Intensification is the means to achieve clustering and collectivization. In the economic domain, "industrial clusters" are an inevitable product of market competition reaching a certain stage and an effective way to enhance the competitiveness of entities, which also applies to the journal sector [6]. The intensive operation of scientific and technical journals in developed countries such as the United States and the Netherlands is a model for reducing costs and improving efficiency. Through intensive editing, production, and optimization of resource allocation and publishing processes, the cohesion between journals and platforms is enhanced, achieving intensive publishing models and group-based management. Journal intensification is fundamental to the reform of China's scientific and technical journals and a top priority for their development.

Journal collectivization refers to fully utilizing institutional and mechanism advantages to enhance the operational capacity and market position of journal clusters through market operations. Collectivization facilitates the aggregation of journal resources, creates economies of scale, and stimulates market vitality, representing the goal and direction of cluster-based and intensive development. Group operation of journals in turn promotes clustering and intensification.

2.1 A Necessary Choice for Improving Publishing Efficiency

Intensive management is the basic orientation for modern enterprise groups to improve efficiency and effectiveness [7]. Intensive publishing of scientific and technical journals separates front-end content organization from mid- and back-end production, publishing, and distribution, allowing each component to perform its own functions and leverage respective advantages, thereby improving efficiency. With the development of the internet and the arrival of digital publishing, the advantages of intensive publishing have become increasingly prominent, not only improving efficiency at each stage but also optimizing the publishing process through databases, expert databases, and plagiarism detection systems generated by intensive publishing. This also enhances the efficiency of front-end content organization and content quality, promoting scientific development. Many international scientific and technical journals have introduced a “Transfer” publishing model, where rejected manuscripts that meet the requirements of sister journals or other journals on the platform can be transferred to relevant journals along with review comments, greatly saving re-review time. This publishing model is also based on intensive publishing.

2.2 A Necessary Means for Shaping Brand Influence

Through intensive publishing, scientific and technical journals aggregate high-quality resources and demonstrate stronger user stickiness compared to individual journals. The interconnection among journals increases content exposure, creates a virtuous cycle, and enhances the influence of both individual journals and the cluster. In the 1990s, to meet the needs of digital publishing, the Japanese government addressed the small-scale, independent operation model of society journals by building J-STAGE, a national-level production and distribution platform providing services from submission and peer review to content release [8]. This promoted the intensive development of Japanese scientific and technical journals, creating a mutually beneficial relationship between journals and the platform that has generated good worldwide influence.

2.3 A Necessary Foundation for Developing Knowledge Services

With the development of new publishing models such as digital publishing, open access publishing, semantic publishing, data publishing, and video publishing, the explosion of information and changes in how people access information have made people increasingly inclined to directly obtain knowledge and solutions. The commanding height of scientific and technical journal development must be knowledge services, which then evolve toward intelligence to support scientific development and technological innovation. To take the first solid step toward knowledge services, China’s scientific and technical journals must undertake drastic reforms in production models and processes [9], achieving aggregation and refinement of journal content as well as standardization and unification of

standards. This requires intensive publishing models that cannot be achieved by individual journals. Internationally renowned scientific and technical journal publishers all conduct intensive publishing with standardized data formats, relying on diverse knowledge services to achieve diversified business development.

3 Main Obstacles to the Intensive Development of Scientific and Technical Journals

In recent years, China's scientific and technical journals have conducted beneficial explorations and practices on the path of cluster-based development. Representative examples include the Science Press journal cluster (publisher-based), the Chinese Medical Association journal cluster (society-based), and the Chinese Optics journal cluster (discipline-based). However, these journal clusters are still in the exploratory stage of intensive publishing and cannot yet compete with internationally renowned commercial or society publishers. Fundamentally, this is mainly constrained by domestic institutional mechanisms, insufficient top-level planning and construction momentum, inadequate platform influence, and lack of sustainable operational models.

3.1 Institutional and Mechanistic Constraints

Scientific and technical journal powerhouses such as the United States, the Netherlands, and Germany have relatively relaxed publishing environments, generally adopting a registration system. Whether publishing institutions are for-profit or not, their survival and development must withstand market tests [10]. In contrast, China adopts an approval system for founding journals, long implementing multi-party management by supervising, hosting, and publishing units as well as territorial management, retaining vestiges of the planned economy in ideology, resource allocation, management systems, and operational mechanisms, resulting in weak market competitiveness [4]. China's scientific and technical journal supervising, hosting, and publishing units are scattered, with overall publishing characterized as "small, scattered, and weak" [11]. In 2020, China had 4,963 publicly issued scientific and technical journals, involving 1,311 supervising units, 3,140 first hosting units, and 4,261 publishing units. On average, each supervising unit owned 3.79 journals, each hosting unit owned 1.58 journals, and each publishing unit owned 1.16 journals [12]. This journal management model seriously affects intensive development. In recent years, government authorities have issued documents such as *Opinions on Deepening the Reform of Non-current Affairs Newspaper and Periodical Publishing Units* and *Implementation Measures for the Reform of Newspaper and Periodical Editorial Office Systems* to promote institutional reform. Many institutions have also made attempts, but due to inconsistent understanding and implementation of reforms within the scientific and technical journal community, a mature market-oriented operation path beneficial to intensive development has not yet been formed.

3.2 Insufficient Top-Level Planning and Construction Momentum

Currently, China's scientific and technical journal supervising, hosting, and publishing units are diversified, with different entities having different understandings of the positioning of journal clustering and intensification, lacking unified top-level planning [4]. Administrative-led journal intensification essentially involves redistributing responsibilities, rights, and interests, dampening the enthusiasm of parties that lose power and resulting in insufficient momentum for advancement [13]. The intensive development of China's scientific and technical journals exhibits a phenomenon of being "clustered but not integrated" [7]. Under different publishing systems, individual journals have their own plans and practices based on their own interests, preventing ideal outcomes in intensive development.

3.3 Inadequate Journal Platform Influence

In the process of intensive development, the platform is key but also difficult. The platform is influence. Without a journal platform with independent intellectual property rights, the development of China's scientific and technical journals will inevitably be constrained by others. In recent years, some domestic institutions have conducted beneficial explorations in building international publishing and communication platforms. However, overall, China's scientific and technical journal platforms lack internationally advanced technical specifications and standards, have insufficiently powerful functions, have not demonstrated brand advantages, and lack international influence [14]. High-quality domestic journals mainly rely on international platforms for intensive publishing and communication. The Excellence Plan funded 22 leading journals, all top-tier journals in their respective disciplines, of which 16 rely on international publishing institutions [15].

3.4 Lack of Sustainable Operational Models

The core driving force for intensive construction of scientific and technical journals is to formulate operational strategies and allocate resources based on market orientation from the perspective of overall journal development. China's scientific and technical journal industry still bears the imprint of the "planned economy." Current intensive pilot projects mostly rely on national project funding, with weak market awareness and competitive consciousness, resulting in a lack of benign, sustainable self-operating models and "self-generating" capacity. Many projects have stagnated due to resource aggregation issues, unresolved technical standards, insufficient follow-up funding, and lack of timely platform updates and iterations. The intensive development of foreign scientific and technical journals has grown and strengthened through market tests. Only through fierce market competition, keenly capturing changes in market demand, and conducting self-improvement and optimization can sustainable development and brand

building be ensured. While China's scientific and technical journals require strong support from the state and relevant departments in the early stages of intensive development, they cannot rely on state support indefinitely and must quickly achieve transformation from "blood transfusion" to "blood generation," realizing sustainable operation through market mechanisms.

4.1 Strengthening Policy Guidance

Policy is the guide for the intensive development of China's scientific and technical journals. China's unique journal publishing system and the "small, scattered, and weak" journal landscape, where even journals under the same hosting unit adopt different publishing processes and operate independently, require policy-level guidance to promote cluster-based development. Continue deepening journal system reform, encourage cross-regional, cross-unit, and cross-disciplinary integration of resources, achieve cluster-based development, and then advance the intensive process to enhance the overall level and competitiveness of China's scientific and technical journals.

4.2 Formulating Institutional Intensive Development Plans

Institutional planning is key to the intensive development of China's scientific and technical journals. The *Interim Provisions on the Responsibilities of Hosting and Supervising Units of Publishing Units* states that "publishing units shall carry out various business activities under the leadership and management of supervising and hosting units." Given administrative relationships, guiding and promoting cluster-based and intensive development through supervising and hosting units is one of the most feasible approaches. In response to the current situation of China's scientific and technical journals, the China Association for Science and Technology, the Ministry of Education, and the Chinese Academy of Sciences have actively explored journal intensive development [14]. Taking the Chinese Academy of Sciences as an example, its *13th Five-Year Development Plan Outline* proposed that "the reform of the scientific and technical journal system should achieve major breakthroughs. Through editorial office integration and multi-mode centralized publishing, a first-class international scientific and technical journal cluster should be initially established, with integrated management and operation mechanisms, successfully exploring innovative publishing models and international communication systems for scientific and technical journals." The 2021 CAS work conference proposed to "increase support for first-class scientific and technical journal construction and accelerate the development of digital publishing and paper-linked data storage platforms." The direction and requirements of supervising units point the way for cluster-based and intensive development, promoting intensive publishing processes at the levels of hosting units, publishing units (libraries), and discipline clusters.

4.3 Strengthening Platform Technology Support

The technology platform is the guarantee for the intensive development of China's scientific and technical journals. The platform's role is to "build nests to attract phoenixes." Advanced publishing concepts, complete publishing functions, and internationally influential journal platforms are requirements for intensive development. Only platforms with these elements can attract journals to join, and these elements must be realized through technical means.

First, adopt international standard data specifications to achieve structured, standardized, and unified underlying database data. The structuring, standardization, and unification of underlying data are the foundation for platforms to achieve one-stop retrieval, enhanced publishing, semantic linking, knowledge association, and knowledge services, as well as the basis for data exchange between platforms, thereby enriching platform resources, improving platform functions, and enhancing platform influence.

Second, adopt agile platform development to ensure effective implementation of requirements. Technical factors are one of the main factors affecting the future development of scientific and technical journal clustering and intensification [4]. Without technology, even the best ideas remain at the conceptual level and have no significance. Only through the application of technology, transforming needs and ideas into platform functions, can the development needs of journals be effectively met, service capabilities enhanced, more journals attracted to join, and better service to technological innovation promoted.

4.4 Content Integration Oriented Toward Knowledge

Content integration is the foundation for the intensive development of China's scientific and technical journals. To enhance scaled, intensive, and professional levels and achieve digital transformation and upgrading, journal clusters must provide content support. The commanding height of scientific and technical journal development must be knowledge services, and content aggregation and integration are the foundation for achieving knowledge services. Based on a certain amount of integrated resources, effective organization, revelation, linking, and discovery of content can ultimately realize knowledge services, transformation from content provision to solution provision, and secondary and in-depth development and utilization of journal content.

4.5 Leveraging the Subjective Initiative of Editorial Offices

Editorial offices are the core of the intensive development of China's scientific and technical journals. China's unique publishing system and the widespread phenomenon of "honorary" editors-in-chief result in characteristics of individual journal or small-scale operations. Whether China's scientific and technical journals can be well-run largely depends on the editorial office's ability to plan manuscripts, its influence in the industry, and its driving and execution power.

Whether intensive development can be achieved requires recognition and support from both “top-down” and “bottom-up” perspectives. The “top” refers to the government level, and the “bottom” refers to individual editorial offices. Guidance from the “top” determines the overall direction of journal development and is crucial. The “bottom” consists of practitioners who best understand journal operations and existing problems, and their recognition, cooperation, and promotion of intensive development are equally vital. The subjective initiative of editorial offices must be fully leveraged.

5.1 Parallel Top-Level Design and Pilot Reform

Do not get entangled in the system but activate mechanisms; do not complain about the top level but pilot first. The development of China’s scientific and technical journals has reached a time for reform. Taking intensive development as the breakthrough point for journal reform and forming influential and distinctive journal clusters is extremely urgent. During the 13th Five-Year Plan period, the Chinese Academy of Sciences launched pilot projects for cluster-based development of scientific and technical journals, using typical cases as pilots to lead by example, aiming to build several scientific and technical journal clusters with diverse forms, significant effects, and good sustainable development capabilities, enhancing the overall scale effect, operational capacity, and development momentum of CAS journals, and achieving phased results [16].

5.2 Balancing Public Welfare and Market Mechanisms

Scientific and technical journals have dual attributes of public welfare and commodity characteristics. Emphasizing the public welfare of journals does not mean ignoring market mechanisms but rather respecting market laws and conducting market operations under the premise of adhering to social benefits to achieve win-win outcomes [17]. China’s current academic evaluation system has led domestic scientific and technical journals to focus on journal metrics and authors’ publication markets while neglecting readers’ reading markets, resulting in poor market-driven force and weak operations [17]. Currently, the government invests heavily in domestic scientific and technical journals, while foreign academic journals mainly rely on market development for growth. To achieve intensive development of China’s scientific and technical journals, market mechanisms must be relied upon to achieve survival of the fittest, resource aggregation, and building a stronger journal industry.

5.3 Interactive Development Between Journal Clusters and Platforms

The relationship between journal clusters and platforms is like that of “chicken and egg.” Scientific and technical journal clusters and influential platforms are mutually causal, interactive, and develop together. Given China’s unique publishing system, platform support must come first to achieve intensive develop-

ment. Currently, several domestic institutions have explored full-process journal publishing platforms, but none can compete with platforms of internationally renowned publishers. In the initial stages of platform development, support from journal clusters of certain scale and influential scientific and technical journals is needed [13].

5.4 Moving from Individual Journals to Journal Clusters

High-quality individual journals and journal clusters will coexist for a long time in the intensive development of China's scientific and technical journals. However, in the long run, the individual journal operation model is not conducive to sustainable development. For high-quality individual journals, they should be encouraged to establish subsidiary journals to create cluster effects, with more journals in related disciplines gathering into clusters. This is an important experience in international journal development. For example, *Cell* was founded as a single journal in 1984. With scientific development and discipline subdivision, Cell Press now publishes over 50 journals, forming a complete, hierarchically developed, cluster-published life science journal cluster, and has begun expanding into chemistry and other fields with new journals such as *Joule* and *Chem*.

5.5 Moving from “Borrowing a Boat to Go to Sea” to “Building a Boat to Go to Sea”

Moving from “borrowing a boat to go to sea” to “building a boat to go to sea” is the current and future national strategy and action for China's scientific and technical journal development [18]. Among the 226 Chinese SCI journals, 194 cooperate with foreign publishing platforms in various ways [19]. In earlier years, when China's English scientific and technical journals were in their infancy, cooperating with international publishers' influence and communication power to explore ways to integrate into the international academic ecosystem was an expedient measure [13]. To safeguard the autonomy and information security of China's academic achievements, China urgently needs to build an international publishing and communication platform with independent intellectual property rights, using key points to drive broader progress, achieving intensive operation and development of China's scientific and technical journals, and enhancing international competitiveness [7]. Simultaneously, China should fully utilize its self-developed preprint platforms (such as the ChinaXiv preprint platform of the Chinese Academy of Sciences [20]) to coordinate with journal publishing and enable network-first publication of Chinese authors' original research.

The process of promoting intensive development of China's scientific and technical journals has been proposed for many years, but practice remains in its initial stages. With the rapid advancement of digital publishing and facing the predatory acquisition of China's academic resources by international publishers, achieving scaled development and building stronger scientific and technical journals is extremely urgent. Intensive development is a necessary means to achieve

scaled journal development. In recent years, a series of national policies and documents have demonstrated unprecedented state attention toward scientific and technical journals. China's scientific and technical journal and publishing communities should respond to national and era development needs, overcome difficulties, and promote intensive development from multiple dimensions, fulfilling the national and people's trust and achieving the mission of supporting national scientific and technological innovation. The difficulty lies in change; victory lies in change.

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