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## Strategic Planning of International Research Libraries and Its Implications for China (Postprint)

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**Date:** 2023-04-01T00:00:00+00:00

### Abstract

[Purpose/Significance] This study examines and benchmarks the latest strategic plans of international research libraries, identifies their underlying patterns and distinctive features, and provides guidance for formulating the “14th Five-Year” strategic plan and medium- to long-term plans for research libraries in China, thereby promoting their transformation and upgrading in the information and digital environment. [Method/Process] Through detailed analysis of strategic planning texts from the U.S. National Library of Medicine, the Library of Congress, and University College London Library, this paper investigates the strategic objectives, strategic positioning, and development pathways of major international research libraries from two perspectives—core development and distinctive development—and proposes a future library strategic planning framework: the “People-Resources-Services” triadic integration model. [Results/Conclusion] International research libraries actively respond to new changes in the information environment and user needs, promoting their transformation and upgrading through proactive strategic planning. China should contextualize these insights, leverage advanced international practices, maintain a user-centered approach, emphasize staff development and technological advancement, prioritize resource system construction, support open science initiatives, advance knowledge service development, and enhance think tank functions, thereby fostering the sustainable and high-quality development of research libraries.

### Full Text

## Strategic Planning of International Research Libraries and Its Implications for China

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**Abstract:**

[Purpose/Significance] This paper investigates and draws lessons from the latest strategic plans of international research libraries, summarizes their patterns and characteristics, and provides references for formulating the 14th Five-Year strategic plan and medium- to long-term plans for China’s research libraries, thereby promoting their transformation and upgrading in the information and digital environment. [Method/Process] Through detailed analysis of strategic planning documents from the National Library of Medicine, the Library of Congress, and University College London Library, this study examines the strategic objectives, development positioning, and pathways of major international research libraries from the perspectives of core development and characteristic development, and proposes a future library strategic planning framework—the “Human-Material-Affair” three-in-one model. [Result/Conclusion] International research libraries are actively responding to new changes in the information environment and user needs through forward-looking layouts that promote their own transformation and upgrading. China should adapt these advanced experiences to its national context, adhere to a user-centered approach, emphasize librarian development and technological advancement, focus on resource system construction, support open science activities, prioritize knowledge service development, and strengthen think tank functions to drive sustainable, high-quality development of research libraries.

**Keywords:** research library; strategic planning; science and technology think tank; knowledge service

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## 1. Introduction

The world today is undergoing profound changes unseen in a century, with a new round of global scientific and technological revolution and industrial transformation continuously emerging and developing [1]. A key characteristic of this transformation is that the information revolution has accelerated the speed of knowledge dissemination and diffusion. Information and network technologies, including artificial intelligence, big data, Internet of Things, and 5G, are rapidly driving the arrival of the digital economy and digital society. Data has gradually become a new strategic resource, with big data emerging as the frontier of scientific and industrial competition. In 2018, the European Parliament released the “Global Trends to 2035” report completed by the Centre for European Policy Studies [2], which pointed out that we must confront the new characteristics of knowledge service demands in the era of scientific big data and

complex information environments, as well as the new challenges of innovation in service models. Only by planning future development strategies and pathways and accelerating the construction of a scientific and technological service system covering the entire value chain of scientific and technological innovation can we address the various challenges of networking, informatization, and digitalization brought by the new round of scientific and technological revolution and product transformation, and seize development opportunities amid crises.

Strategic planning for research libraries is a thinking process and framework for clarifying mission, vision, objectives, and implementation plans for the future, serving as an action guide for library development over a certain period [3]. Strategic planning is forward-looking, predictive, feasible, and effective, reflecting to some extent the unpredictable changes that digital technologies will bring to technological transformation. The digitalization of research libraries will inevitably change existing service models, replacing them with data-driven diversified platforms. In this information and digital environment, the volume of scientific and technological information is expanding dramatically, presenting new opportunities and challenges for research libraries engaged in scientific research data management, scientific data services, and scientific information analysis and knowledge services. To adapt to the major trends of digital and information society development and the transformative impact of big data, IoT, AI, and open access on traditional scientific and technological information service paradigms, research libraries must plan for the future.

Currently, to adapt to new developments in internet and information technology and new challenges in digital society, many foreign research libraries have formulated future-oriented strategic plans. These include the National Library of Medicine (NLM), the Library of Congress (LOC), University College London Library (UCLL), Bodleian Libraries University of Oxford, and Cambridge University Library (CUL). These internationally renowned research libraries are seeking competitive advantages for data analysis and knowledge service work in future digital society to provide powerful scientific information analysis and consulting services for scientific research. The strategic plans of these libraries share common features—clear objectives, strong forward-looking vision, systematic approaches, and strong operability—while each maintains distinctive characteristics. For instance, NLM's strategic plan emphasizes data-driven approaches, LOC's plan highlights library experience, and UCLL and CUL's plans reflect the comprehensive service features of university libraries.

To analyze and reveal the characteristics of research library strategic planning from multiple perspectives, this paper selects three institutions—NLM, LOC, and UCLL—for interpretation. The rationale includes: First, these three institutions all developed their latest strategic plans around 2018, which to some extent reflects and represents current international thinking on future development directions for research libraries and offers certain guiding significance. Second, these libraries have relatively complete strategic planning systems, mostly establishing dedicated strategic planning teams that conduct extensive consulta-

tion and research before formulation. Therefore, their latest strategic planning texts have absorbed excellent historical experience and represent high standards. Third, these three institutions represent outstanding examples of professional libraries, public libraries, and university libraries respectively, offering certain representativeness. During this critical period when China is formulating its 14th Five-Year strategic plan and medium- to long-term plans, studying the objectives, positioning, pathways, and characteristics of the latest development strategic plans of internationally representative research libraries can provide useful references for China' s research library planning.

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## 2. Strategic Planning of Representative Research Libraries

**2.1 The National Library of Medicine and Its Strategic Planning** The National Library of Medicine is one of the world' s largest research libraries and the world' s largest biomedical library. Its strategic positioning is to become a global leader in the utilization of medical information resources. In December 2017, NLM released the “National Library of Medicine Strategic Plan 2017-2027” [4], with the theme of building a biomedical discovery and data-driven health platform, and formulated strategic objectives from three levels: resources, users, and management.

**(1) Accelerating scientific discovery and promoting health through data-driven research tools.** NLM' s fundamental goal is to aggregate as comprehensively as possible various information resources including literature, patents, policies, standards, software, clinical data, and public health information. Amid constantly changing information environments, scientific technologies, and user needs, NLM aims to create a sustainable physical computing infrastructure to meet future computational demands while modernizing data management construction, including data mining, analysis, visualization, and data modeling. Leveraging rich data resources, NLM provides knowledge services in various forms such as analysis, forecasting, and discovery for universities, enterprises, and governments. Furthermore, NLM vigorously promotes open science thinking, collaborates with other institutions to formulate policies related to data sharing and privacy protection, and actively develops tools, systems, and services for open science.

**(2) Enhancing user experience and expanding user groups through enriched participation and promotion channels.** First, NLM emphasizes “people-oriented” principles, requiring full understanding of user information needs and the formulation of reasonable, personalized service content and methods to optimize user experience. Second, NLM strives to become a recognized and trusted provider of biomedical information services, proposing to design advanced interactive and retrieval systems to promote health information dissemination, enhance user awareness and trust in health information resources, and drive NLM' s brand building. Additionally, NLM emphasizes market coop-

eration and service marketing awareness, actively conducting relevant training and lectures in collaboration with educational institutions and public libraries to enhance public understanding and usage of collection resources.

**(3) Building a team for data-driven health research.** As we move into an era of interdisciplinary science, NLM focuses on cultivating interdisciplinary talents, actively recruiting research personnel from fields such as information science, biomedicine, and computer science to build a strong interdisciplinary team. Based on the era of open science and the data foundation of biomedical big data, NLM urgently needs to expand and improve existing librarian training content, optimize training systems, and cultivate a group of biomedical information experts who can adapt to future technological development.

**2.2 The Library of Congress and Its Strategic Planning** The Library of Congress is the earliest federal cultural institution in the United States and one of the world's top national research libraries. Its strategic positioning is to attract, inspire, and educate the American people as a broadly enduring resource of knowledge and creativity. In October 2018, LOC released the "Library of Congress FY2019-2023 Strategic Plan" [5], with the theme of "Enriching the Library Experience," proposing development objectives from four aspects: interaction methods, user experience, resource construction, and influence.

**(1) Expanding access and enhancing user-library interaction.** Given users' diverse needs and geographic distribution, LOC will continue to improve existing products while seeking new interaction methods so that users can access needed collection resources, services, and expertise anytime and anywhere. Specific objectives include: improving the discoverability and usability of collection resources; using connectors to expand coverage and promote products and expert services; expanding visibility by proactively disseminating library information to the public to enhance awareness and understanding of the library.

**(2) Improving user experience and establishing lifelong connections with users.** LOC upholds a "user-centered" service philosophy, developing new software tools and expanding digital projects to build a data-driven digital library. Specific objectives include: enhancing digital experience, improving online services, and promoting online content management; focusing on exhibitions, lectures, learning spaces, and education and training to transform users from service recipients to active users; providing various forms of knowledge services to enrich service content and usage forms, enhancing the availability and accessibility of library collections.

**(3) Optimizing resources and enhancing library operational capacity.** This involves identifying, integrating, and utilizing resources and talents scattered within organizational units, while actively seeking and discovering more external resources for further integration and optimization. Specific objectives include: coordinating and enriching library functions to achieve optimal operational efficiency while expanding user service content; modernizing operations

to achieve information sharing and using entire-collection data to serve users; strengthening librarian capabilities by recruiting multi-faceted talents and cultivating a group of experts; broadening funding sources by attracting Congress, private donors, and other additional funding.

**(4) Assessing impact and using data to evaluate resources, services, and librarians.** LOC will appropriately disclose information collection and usage methods to obtain high-quality data while ensuring privacy security, and then use data for performance evaluation and resource planning. Specific objectives include: using data to understand users and their needs, evaluating service efficiency while protecting user privacy; making evaluation results transparent to all stakeholders to enhance public recognition; fully utilizing data information to plan resources and set goals to promote sustainable institutional development.

### **2.3 University College London Library and Its Strategic Planning**

University College London Library is a renowned research library that positions itself as a diverse knowledge community. It aims to promote UCL as a world-leading university through user-centered services, world-class resources, state-of-the-art learning spaces, and outstanding expertise. Its latest “UCL Library Services Strategy 2019-2022” [6] focuses on six strategic areas: user experience, personnel management, information management, system optimization, sustainable development, and open science.

**(1) Excellent user experience.** This includes: enriching service delivery methods while ensuring information consistency to enable effective user access and benefit; further improving information skills training programs to ensure all students receive high-quality and timely training; actively providing industry-leading support for UCL researchers and promoting the development of embedded services.

**(2) Adhering to equality, diversity, and inclusive management principles.** This includes: librarians having equal opportunities for professional skills training and broad career development space; establishing sound work review processes based on data information while giving employees the right to provide feedback and supporting them to drive change; actively recruiting professional talents with a focus on comprehensive abilities and emphasizing knowledge diversity.

**(3) Establishing a data-driven management system.** This includes: collecting the latest library data information to provide reference indicators for policy formulation; fully leveraging the value of data resources to explore efficient service concepts and expand new service models; actively seeking cooperation with enterprises and research institutions to provide them with information consulting and strategic planning services to increase funding income.

**(4) Enriching resources and optimizing systems.** This includes: developing promotion plans and marketing methods to enhance the visibility of

special and rare collections and increase collection usage rates; integrating cutting-edge technologies to upgrade service systems, enhance user experience, and provide value-for-money services; developing systems that support special user experiences and continuously optimizing system services through user feedback.

**(5) Sustainable development.** This includes: providing innovative and inspiring teaching, learning, and social spaces; improving the library's working environment to promote high-quality service delivery and employee well-being; encouraging students and other users to actively participate in library management to promote sustainable library management.

**(6) Emphasizing communication and interaction, supporting the open science movement.** This includes: actively holding outreach and academic exchange activities to enrich communication forms between the library and users; open science provides for sharing research results, requiring enhanced library support for open science; improving education and training systems to encourage public participation in open science practice projects.

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### 3. New Strategic Positioning and Development Characteristics of Research Libraries in the New Era

Globally, academic communication is shifting from offline monopolies to online sharing, with data and knowledge becoming increasingly important [7]. Through specific analysis of the strategic plans of the three research libraries above, we can see that the positioning of research libraries has transformed from document services to data services, and from information services to knowledge services. Research libraries in the new era have become institutional repositories, with "research-oriented" characteristics mainly reflected in their ability to conduct information resource construction, support research activities, and provide information value-added and decision-making consulting services [8]. The development of research libraries in the new era can be summarized into core development and characteristic development, where core development represents the essential mission of libraries, while characteristic development refers to the latest industry trends.

**3.1 Core Development (1) Enriching collections and promoting resource construction.** Collection resources are the foundation and guarantee for libraries to provide services to the public. Major research libraries attempt to build a comprehensive platform aggregating traditional print resources and digital collections, covering various types of data including but not limited to literature, patents, standards, plans, reports, and tools. Collections need not be comprehensive but should have distinctive features and certain authority in specific areas. For example, NLM's collection resource construction system includes not only traditional literature resources but also genomics data, data

science tools, clinical biological data, and public health information with disciplinary characteristics. UCLL's plan emphasizes enhancing the visibility of special and rare collections to improve their utilization rates.

**(2) User-centric approach to enhance user experience.** Serving users is the fundamental mission of libraries. The strategic texts show that foreign research libraries attach great importance to user experience, pay close attention to user needs, and analyze and mine user data to continuously improve service quality. For example, NLM mentions enriching dissemination channels to enhance user recognition and using data-driven approaches to understand users' real needs. UCLL focuses on users' information acquisition skills by providing high-quality training and lectures. Before implementation, the University of Tokyo Library first widely publicizes its plans both on and off campus and launches pilot projects [9]. Strategic plans also emphasize library marketing and promotion, such as regularly holding lectures and forums to enhance users' awareness and trust of collections and services, improve resource utilization rates, and promote library brand building.

**(3) Supporting research and improving service models.** In the era of data science, research paradigms are evolving toward data-intensive approaches. As a center for scientific research data aggregation, providing research data support for scientific activities is a basic function of libraries. Librarians must transform from traditional supporters of research activities to collaborators, using professional knowledge, skills, and tools to assist research and accelerate its progress, thereby participating more effectively in research activities. For example, NLM emphasizes establishing a data-driven knowledge service model that maximizes the value of data through data mining and analysis technologies. LOC mentions using data for performance evaluation and resource planning while ensuring privacy security.

**3.2 Characteristic Development (1) Emphasizing data-driven approaches, knowledge services, and think tank construction.** As early as 2000, scholars proposed that the strategic positioning of libraries should be knowledge services—personalized services that can effectively support knowledge application and knowledge innovation according to users' problems and external environments [10]. Today, with rapid changes in the external environment and information technology, research users' needs have gradually shifted toward knowledge discovery. Foreign library and information institutions have already transformed toward knowledge services and think tanks. According to the strategic texts, institutional repository construction has become normalized abroad, with research libraries actively studying data management and conducting in-depth knowledge-level mining, analysis, and processing of existing data to reveal knowledge content and relationships and maximize the value of data resources for preservation, dissemination, and reuse. This expands service content, seeks partners, and provides information consulting, analysis, and forecasting services using existing and secondary data. For example, NLM

proposes using data-driven tools to accelerate scientific discovery and promote health; LOC focuses on digital construction by developing new software tools and using entire-collection data to serve users; UCLL aims to update resource data, broaden service models, and enrich funding sources.

**(2) Supporting open science and promoting sustainable knowledge development.** The development of digitalization and networking has made information discovery, acquisition, and sharing important components of library services [11]. The current knowledge environment supports the move toward openness, and all major libraries actively respond to this call by seeking cooperation with other scientific research institutions and intelligence agencies, providing publishing and interlibrary loan services, continuously expanding open boundaries, and promoting open data, open access, and open educational resources. For example, the Australian National University Library stated in its 2018 strategic plan that research conducted by world-class universities should be open to the world [12]. In recent years, rapid development of digital information technology has enabled libraries' digital construction to promote long-term preservation of resources and improve resource accessibility, aligning with sustainable development concepts. The Library of Congress released its "Digital Strategy 2019-2023" [13] alongside its 2018 strategic plan. Analysis of the strategic text reveals that digital construction is not simply about resource digitization but focuses more on using digital resource platforms for knowledge discovery, knowledge mining, and knowledge organization activities. This aligns with the development theme of the Association of European Research Libraries (LIBER) for 2018-2022—promoting sustainable knowledge development in the digital age [14].

**(3) Cultivating interdisciplinary teams and enriching service content.** Librarians are the main force in providing knowledge services, and their scientific literacy and capability levels directly determine library service effectiveness. Due to diversified service content, librarians' expertise is not limited to library and information science but welcomes professionals from information science, computer technology, law, and other fields. In terms of librarian recruitment and cultivation, foreign libraries emphasize diversity, professionalism, and equality. For example, NLM, as the world's largest biomedical library, actively recruits professional talents in computer science and information science. The University of Oxford Libraries propose focusing on librarian diversification by considering background diversity in recruitment [15]. MIT Libraries [16] propose a new initiative in their plan to gather interdisciplinary talents in information science and scholarly communication for research and development. Both UCLL and LOC mention improving existing librarian training and review systems to enhance professional capabilities and eliminate barriers related to geography, ethnicity, and gender.

#### 4. Implications and Considerations

The strategic planning systems of foreign research libraries are basically well-developed, having become standardized, regularized, and dynamic, with emphasis on evaluability of goal achievement. Based on advanced foreign experiences and combined with China's national conditions, drawing on Bu Hongjie's concept of "human, material, and affair" [17] and further expanding and improving it, this paper proposes a "Human-Material-Affair" three-in-one strategic planning framework. As shown in Figure 1 [Figure 1: see original paper], the three components have mutually constraining, mutually promoting, and mutually developing relationships.

**4.1 Human-Centered Strategy and Development** "Human" refers to library users and librarians—users are the consumers of library resources, while librarians are the providers of resource construction, knowledge services, and think tank consulting services. Libraries should continuously pay close attention to changes in user needs and enhance user experience. Currently, new technologies such as cloud computing, big data, artificial intelligence, and IoT are developing rapidly, bringing new opportunities for user service models. User profiling research has attracted extensive discussion in the library field [18-20]. However, user profiling is more widely applied in commercial fields and has not yet been popularized in libraries. User profiling enables libraries to rely not only on static data such as user identity, occupation, institution, educational background, research direction, and contact information during registration but also on massive dynamic data from user searches, browsing, and downloads to accurately understand user needs, match collection resources, provide personalized services, and achieve precision marketing.

This requires cultivating professional librarians who meet the development trends of the times and master new technologies, capable of actively conducting in-depth knowledge-level processing, analysis, and integration of various data resources to fully reveal knowledge content and relationships. Therefore, future strategic planning should fully emphasize the cultivation of librarians' professional qualities, guided by diversity, equality, and professionalism, and improve librarian recruitment, training, and review mechanisms to build a team of librarians with comprehensive knowledge structures and strong technical capabilities to meet the talent needs of research libraries in the information environment.

**4.2 Material-Centered Strategy and Development** "Material" refers to library resources and related technology research and development, forming the foundation for providing high-quality services to users. Resources mainly include print and digital resources. The development trend of libraries is to pay greater attention to digital construction to achieve long-term preservation and reuse of resources. Research libraries should always focus on formulating clear collection development policies, undertake the task of long-term preserva-

tion of resources, and incorporate print resources, digital resources, and special collections into the resource construction system. They should study intellectual property issues related to research and formulate corresponding long-term preservation strategies for data resources.

While pursuing resource quantity, libraries should also focus on overall resource planning, integrating distributed data, aggregating various types of data at the knowledge unit level, building big data management platforms, and constructing specialized databases according to the needs of library service objects to provide resource reserves for accurate and reliable knowledge services. Some domestic libraries have built characteristic databases, but these face issues such as limited influence and low utilization rates [21]. Therefore, facing large-scale resource organization, processing, and storage, management departments should emphasize technological innovation, build technology platforms, develop open-source tools, and improve technical facilities to achieve new technological breakthroughs. For example, Cambridge University has built a one-stop retrieval platform for books, e-journals, and e-books, continuously improving and upgrading it based on user feedback [22]. Oxford University Libraries have used new technologies to build the latest catalog retrieval systems and cooperate with other departments on resource discovery projects to develop intelligent retrieval tools and improve retrieval efficiency [15]. Chongqing University Library has attempted to build a new-generation smart library system with three characteristics: literature metadata management integrating print and digital resources, consistent PC and mobile portals, and an internet-thinking library service alliance [23].

Additionally, research libraries should actively participate in the formulation of international open access policies, further expand cooperation and exchanges, provide cross-database and cross-institutional knowledge linking and discovery, and strive to improve resource discoverability, accessibility, and availability.

**4.3 Affair-Centered Strategy and Development** “Affair” refers to research and services—the process by which professional librarians fully utilize existing resources to provide users with digital information management, information analysis, and information consulting services. The information civilization brought by the information revolution has led to the transformation of library service models, greatly improving library service effectiveness [24]. In the big data era, library functions have become richer, with libraries no longer merely resource providers but also participants in research activities. Service content has become more diversified. Based on massive literature data resources, extensive practical surveys, and public opinion research, libraries can provide policy consulting, industry development trend analysis, intelligence visualization, and frontier science and technology consulting services for governments, enterprises, and universities.

First-class foreign scientific and technological intelligence service institutions have begun to transform toward think tanks. For example, the Intelligence Advanced Research Projects Agency (IARPA) has established four business de-

partments (collection, analysis, computation, and forecasting) to specialize in providing information consulting, analysis, and forecasting services [25]. Chinese libraries have also noticed this new service growth point and are actively building data platforms, focusing on linked data and semantic organization development to help users obtain consultation and services more efficiently. For example, the Chengdu Library and Information Center of the Chinese Academy of Sciences clearly stated in its “13th Five-Year Development Plan Outline” that it would comprehensively carry out scientific and technological strategy research and consulting services, disciplinary knowledge services for scientific research innovation, regional and industrial development strategy policy research and consulting services, and build a national-level professional science and technology think tank. However, overall, the think tank construction of China’s research libraries is not yet mature, with problems such as unclear positioning, imperfect systems, and lack of talent teams [26]. In the future development of research libraries, specialized think tank groups for knowledge services should be established, creating departments based on existing institutional facilities, collection resources, and personnel configurations to form an “online + offline” development model. The online model involves building knowledge service platforms using big data, cloud computing, and data mining technologies to facilitate user information retrieval and product selection, with intuitive visual analysis and display of data and policies. The offline model involves introducing multi-disciplinary and high-level talents to establish comprehensive knowledge architectures and provide information consulting, strategic planning, development forecasting, personalized customization, and achievement evaluation services.

In the process of conducting research and services, research libraries must particularly emphasize marketing and promotion to enhance library influence and user recognition and utilization rates of library services. For example, UCLL provides a platform supporting the ReadingLists@UCL service and emphasizes maintenance and review to ensure users can easily access materials in reading lists from anywhere and freely create and update their material lists.

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## 5. Discussion and Outlook

Against the backdrop of scientific and technological revolution and industrial transformation, data analysis tools and models will reshape the structure and form of traditional industries, spawning numerous new industries, new business forms, and new models, with increasingly frequent cross-boundary competition between industries. In future digital society, the traditional structure and functions of libraries will undergo qualitative changes. Faced with an environment of accelerated information technology development, transformed scientific research paradigms, and diverse knowledge forms, both information management and user demands are driving library service models toward knowledge discovery and knowledge services.

“Preparedness ensures success; unpreparedness spells failure.” How to scientifically and reasonably formulate the 14th Five-Year development plan and medium- to long-term plans for research libraries has become extremely urgent. China’s research libraries should combine national conditions, follow international trends, and formulate scientific strategic plans according to the “Human-Material-Affair” three-in-one strategic planning framework. It is recommended to always adhere to a user-centered approach, emphasize librarian cultivation and technological development, focus on resource system construction, support open science activities, prioritize knowledge service levels, strengthen think tank functions, and thereby promote the transformation of China’s research libraries to ensure sustainable, high-quality development. In particular, they should seize the opportunity of the country’s comprehensive promotion of new-type think tanks with Chinese characteristics and pilot work on high-end think tank construction, fully utilize their resource and talent advantages, and actively carry out research and consulting services on scientific and technological policies, strategic planning in scientific and technological fields, and scientific and technological evaluation issues, striving to become one of the main forces in building professional science and technology think tanks in China.

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**Author Contributions:**

Cao Lingjing: Drafted the paper, conducted research and data collection;

Chen Yunwei: Proposed the topic, designed the framework, revised the paper.

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

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