
AI translation · View original & related papers at
chinaxiv.org/items/chinaxiv-202304.00011

The Integration of Public Knowledge Space and Public Cultural Space: An Exploration of the National Science Library, Chinese Academy of Sciences Integrating into the Public Cultural Service System (Postprint)

Authors: Yang Lin, Guo Jiamei, Qu Yunpeng, Ren Peng, Zhao Yao, Yu Wenbo, Zhang Haoyun

Date: 2023-04-01T16:16:05+00:00

Abstract

[Purpose/Significance] As important public knowledge spaces and public cultural spaces, it is incumbent upon libraries to innovate service models and enhance public cultural service levels, while actively aligning with international library development trends. [Method/Process] This study summarizes the practical experience of the National Science Library, Chinese Academy of Sciences in facilitating the organic integration of public knowledge spaces and public cultural spaces through the establishment of an institutional history museum, and explores and proposes integration strategies and service models. [Results/Conclusion] The key priorities for libraries to improve public cultural service functions based on spatial integration are: balancing “internal integration” and “external integration” strategies to enhance libraries’ social participation functions; strengthening integrated correlation research to achieve comprehensive integration of resources, services, and promotion; improving library education functions based on spatial integration to construct lifelong education bases; integrating into national public digital cultural service construction to shape new cultural service models based on big data; improving mobile services to enhance scenario-based smart cultural services; promoting diversified exchanges and cooperation to facilitate sharing of cultural service resources; improving research on integration models and sharing mechanisms to achieve co-construction and sharing, rational use, and data security based on reasonable resource decentralization by rights and domains.

Full Text

Integration of Public Knowledge Space and Public Cultural Space: The National Science Library's Exploration of Blending into the Public Cultural Service System

Authors: Yang Lin^{1,2}, Guo Jiamei², Qu Yunpeng¹, Ren Peng¹, Zhao Yao¹, Yu Wenbo¹, Zhang Haoyun³

Affiliations:

¹ National Science Library, Chinese Academy of Sciences, Beijing 100190

² Department of Library, Information and Archives Management, School of Economics and Management, University of Chinese Academy of Sciences, Beijing 100190

³ Baidu.com Times Technology (Beijing) Co., Ltd., Beijing 100190

Abstract:

[Purpose/Significance] As important public knowledge spaces and public cultural spaces, libraries bear the responsibility to innovate service models, enhance public cultural service levels, and actively adapt to international library development trends. [Method/Process] This paper analyzes integration strategies and innovative cultural service models based on the National Science Library's practical experience in establishing the Museum of Chinese Academy of Sciences History to promote the organic fusion of public knowledge space and public cultural space. [Result/Conclusion] The key priorities for libraries to improve public cultural service functions through spatial integration include: (1) balancing "internal integration" and "external integration" strategies to enhance libraries' social participation functions; (2) improving linked data integration research to achieve comprehensive integration of resources, services, and promotion; (3) refining library educational functions based on spatial integration to build lifelong education bases; (4) integrating into national public digital cultural service construction to shape new big data-based cultural service models; (5) improving mobile terminal services to enhance context-based intelligent cultural services; (6) promoting diversified exchanges and cooperation to facilitate cultural service resource sharing; and (7) refining research on integration models and sharing mechanisms to achieve rational resource allocation, joint construction and sharing, appropriate use, and data security.

Keywords: public cultural service system; library; public knowledge space; public cultural space

Classification Number: G252.7

DOI: 10.13266/j.issn.0252-3116.2020.24.005

On October 29, 2020, the Fifth Plenary Session of the 19th CPC Central Committee adopted the "Proposal of the CPC Central Committee on Formulating the 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives Through 2035," which explicitly identified a more robust public cultural service system as one of the development guidelines and

main objectives. The “Public Cultural Service Guarantee Law of the People’s Republic of China,” passed in December 2016, defines public cultural services as “cultural facilities, products, activities, and related services provided by the government with social participation to meet citizens’ basic cultural needs.” Libraries, as important public cultural facilities, must innovate service models and enhance public cultural service levels, which also represents an active response to international library development trends. The IFLA 2019-2024 Strategic Report identifies four strategic directions: amplifying the global library voice, inspiring and enhancing professional practice, strengthening unity across the library field, and optimizing the organization to the greatest extent. These strategies will enable libraries to better function in the public cultural service system as primary providers of information, education, research, and social participation, making libraries key participants in political, economic, and social transformation.

1. Integration of Public Knowledge Space and Public Cultural Space: The Value of Libraries in the Public Cultural Service System

Research on China’s public cultural service system began in the new century. The Fifth Plenary Session of the 16th CPC Central Committee in 2005 proposed gradually forming a relatively complete public cultural service system covering the entire society, marking the “first year” of China’s public cultural service system construction. Subsequent meetings in June 2007, October 2011, and November 2013 respectively planned and designed objectives, tasks, basic principles, content frameworks, and strategic tasks. On this basis, in January 2015, the General Office of the CPC Central Committee and the State Council issued the “Opinions on Accelerating the Construction of a Modern Public Cultural Service System,” making detailed arrangements for accelerating the construction of a modern public cultural service system, promoting standardization and equalization of basic public cultural services, and safeguarding people’s basic cultural rights and interests. On January 14, 2015, the State Council passed the “Museum Regulations.” In December 2016, the Standing Committee of the National People’s Congress passed the “Public Cultural Service Guarantee Law of the People’s Republic of China.” In November 2017, the Standing Committee passed the “Public Library Law of the People’s Republic of China.”

Building on comprehensive top-level design deployment, scholars have conducted extensive research on library development within the public cultural service system, exploring future directions. Research suggests libraries should improve policies and regulations based on new public service concepts, highlight public welfare services while properly handling the relationship between public welfare and paid services, and strengthen industry and alliance mechanisms to enhance public service socialization. Studies have also indicated that public libraries should improve service effectiveness, enhance development momentum through socialization, promote technology integration through digital service platform construction, innovate ideas, increase efforts, and improve guarantees.

Implementing libraries' public cultural service functions requires relying on service venues—library spaces. Alongside discussions on libraries' overall development strategies in the public cultural service system, scholars have deepened research on libraries' value as public spaces by drawing on Habermas's public sphere theory, Arendt's three criteria for the public sphere (accessibility to all, usability by all, and ability to transcend generations through collective historical memory), and Madanipour's concept of public space as urban space provided by public institutions, open to and serving the entire public and shared by all members of society. Representative research findings mainly include two dimensions:

First, libraries constitute an important form of public knowledge space. Public knowledge space combines physical and virtual spaces as venues for knowledge resource convergence and dissemination, where people can freely exchange and interact. Its basic characteristics include aggregating explicit knowledge, being an independent "public instrument," possessing an open "field," and having the capacity for enlightenment, reshaping social individuals, and fostering public intellectual groups. Libraries assume the permanent memory function of public space, presenting their own unique qualities: libraries are essentially knowledge collections organized according to the principle of equality and freedom. As filters and long-term protectors of human thought and knowledge essence, libraries offer the greatest openness in public knowledge space, providing endless opportunities for lifelong education and learning. Therefore, libraries represent an irreplaceable important form of public knowledge space.

Second, libraries possess significant value as public cultural space. Public cultural space comprises the physical domain formed by public cultural service systems, including public cultural facilities, venues, and cultural activities, serving as an important carrier of public cultural life for urban and rural residents. From a cultural theory perspective, "cultural space" represents a scale for observing cities, reflecting scholars' renewed understanding of cultural space and urban development. Concretely, it refers to venues involved in various public cultural lives, such as museums, libraries, art galleries, theaters, concert halls, and cultural squares. As venues with cultural display and communication functions, places with profound historical and cultural accumulation, and public spaces representing modern urban style with special cultural value, libraries face severe challenges as "tools," yet public cultural space represents libraries' value rationality in the new social environment, demonstrating infinite vitality.

Beyond theoretical research, scholars have analyzed relevant domestic and international practice progress. Comprehensive analyses of Finland's new Helsinki Oodi Central Library—a model for space reconstruction in the new era—have examined its exemplary integration as a communication center, learning center, knowledge center, and cultural center, summarizing its practical experience and model characteristics in serving urban innovation, enhancing urban character, and supporting human comprehensive development. Case studies have also examined specific measures such as spatial layout design, spatial service con-

tent optimization, and reading alliance construction in national libraries and provincial/municipal public libraries.

In summary, achieving the organic integration of public knowledge space and public cultural space represents the value of libraries in the new era's public cultural service system and an effective path for libraries to better integrate into the public cultural service system.

2. Integration Strategies and Service Models for Public Knowledge Space and Public Cultural Space

2.1 Integration Strategies for Public Knowledge Space and Public Cultural Space

2.1.1 “External Integration” Strategy The “external integration” strategy is characterized by libraries seeking multi-channel collaboration with governments, enterprises, communities, other institutions, and individuals to jointly develop public cultural services. Through forms such as “library-museum linkage,” “library-school linkage,” “library-community linkage,” and “library-tourism linkage,” this strategy achieves diversified cooperation in funding, resources, promotion, talent, and mechanisms, thereby promoting integrated public cultural service construction and improving service effectiveness (see Figure 1 [Figure 1: see original paper]). For example, Hangzhou Library’s “Reading Therapy” project positions the library as the main platform for information collection and services, using literature resources to provide relevant materials to users; the 12355 Youth Service Platform undertakes human resource training and organization, leveraging abundant psychological resources to form a professional psychotherapy team; and the Zhejiang Psychological Society serves as a third-party professional evaluation institution, providing independent and objective professional assessments throughout the “Reading Therapy” activity process. This activity serves hundreds of people annually, receiving continuous coverage from *Library Gazette* and local mainstream media, and attracting attention from the Reading Promotion Committee of the Chinese Library Association.

2.1.2 “Internal Integration” Strategy The “internal integration” strategy involves setting up other functional areas or venues within public library spaces to provide public cultural services beyond traditional library functions (see Figure 2 [Figure 2: see original paper]). The “museum within a library” model represents a typical example of this strategy, rooted in the concept of thematic libraries—characterized by resource construction and service development centered around specific themes, typically concentrating various carrier resources on a topic and reflecting thematic elements in library construction and services. The emergence of thematic libraries reflects the continuous innovation and development of library undertakings in the new era, demonstrating the evolution of library functions from meeting people’s basic cultural needs to satisfying their high-quality cultural demands. For instance, the National Library established

the “National Museum of Classic Books” in the south area of its main building, relying on its rich collections to display Chinese classics and promote Chinese culture, representing a new expansion of the National Library’s social education functions. Similarly, Hangzhou Library utilized its underground exhibition hall to build a film library through cooperation with the China Film Archive and other institutions, establishing it as the Hangzhou Digital Image Museum of the China Film Art Research Center and China Film Archive.

2.2 Bidirectional Circulation Service Model Based on Public Knowledge Space and Public Cultural Space Integration

Wu Jianzhong argues that traditional libraries focus on collection, following an outside-in model (outsider-in) that aggregates resources from outside to inside. However, with information explosion, decreasing costs, and massive information production within institutions and by readers themselves, libraries must adopt an inside-out model (insider-out) that expands information from inside to outside, enabling sharing of institutional readers’ information with the external world. Based on this, this paper extends the concept to propose a bidirectional circulation model for the National Science Library’s public cultural services based on public knowledge space and public cultural space integration, as shown in Figure 3 [Figure 3: see original paper].

One end of the circulation is the “outside-in” integrated service module. On one hand, through the library’s public knowledge space function, it aggregates knowledge information such as monographs, papers, and scientific data to provide knowledge services to the public. On the other hand, through the library’s public cultural space function, it provides resources such as institutional development history, scientific achievements, and scientist spirit after popular science interpretation to provide cultural services to the public. In this process, with the gradual deepening application of artificial intelligence technology, the characteristics of human-computer interaction and co-construction and sharing will become increasingly prominent and gradually become mainstream.

The other end of the circulation is the “inside-out” integrated effectiveness module, reflecting the service effects of library empowerment for users. On one hand, through public knowledge space services, the public’s information literacy (including data literacy, intelligence literacy, ethical literacy, writing literacy, research literacy, and innovation literacy) is enhanced, promoting the fit between information literacy and specific needs, tasks, and scenarios (referred to as “context”). On the other hand, through public cultural space services, the public’s scientific literacy is also improved, mainly reflected in understanding necessary scientific knowledge, mastering basic scientific methods, establishing scientific thinking, advocating scientific spirit, and possessing certain abilities to apply them to solve practical problems and participate in public affairs.

3. Practical Exploration of the National Science Library's Public Cultural Services Based on Knowledge Space and Cultural Space Integration

The Chinese Academy of Sciences, to which the National Science Library belongs, is one of China's national research institutions. National research institutions mainly refer to research institutions established and funded by the state, including large national comprehensive research institutions, research institutes affiliated with federal or central government departments, or federal (national) laboratories. Their characteristics include state funding and ownership, independent administrative existence, independent economic accounting, and funding primarily from state budget allocations and national science and technology funds. The main research tasks undertaken by national research institutions should include: strategic major scientific and technological issues related to national interests and national security; basic science and technical science, certain high technologies, pre-competitive technologies, and common technologies that enterprises, universities, and other social organizations are unwilling or unable to conduct due to high costs and risks; social public and welfare field scientific research to improve people's quality of life, such as medicine and agriculture; and scientific research required for government performance of duties, including technical supervision, measurement standards, quality inspection, and environmental protection. The top experts in various disciplines, scientific research facilities, scientific research data, and scientific patents and inventions owned by national research institutions constitute unique scientific and cultural communication resources, offering great potential in the national public cultural service system.

As a national research institution library, the National Science Library has actively aggregated multi-party characteristic scientific and cultural resources and integrated into the national public cultural service system construction. By formulating the "13th Five-Year Plan for the Documentation and Information System of the Chinese Academy of Sciences and the Positioning Adjustment Plan of the National Science Library," the library clarified its new positioning to meet the challenges of global open science research, serve national innovation-driven development needs, and follow the requirements of the Academy's "Pioneer Initiative" plan. Centering on the main line of knowledge resource collection, organization, processing, service, preservation, and dissemination, it develops knowledge services in business, expands cultural functions in space, carries out literature resource guarantee and services, knowledge product development and services, intelligent knowledge application environment construction, scientific and cultural exchange and dissemination, and sci-tech journal management and innovation. It builds scientific and technological knowledge infrastructure and coordinates the coordinated development of the documentation and information system across the Academy to become an internationally first-class and domestically leading national scientific and technological knowledge service center.

Based on the positioning adjustment plan, the Chinese Academy of Sciences es-

tablished the Museum of Chinese Academy of Sciences History at the National Science Library in July 2016, defining its development positioning as “a display base for Academy history and culture, a research base for Academy history and current situation, and an education base for Academy and national conditions, as well as a dissemination base for scientific spirit and culture.” This provides top-level guidance for the National Science Library to promote the organic integration of public knowledge space and public cultural space. On this basis, the National Science Library adopted the “museum within a library” model, based on characteristic scientific and cultural resources and combined with representative research results on library transformation and development in the new era, to formulate the development strategy for the Museum of Academy History to guide practical advancement.

Regarding library transformation, Wu Jianzhong believes that libraries are entering the third-generation era. Compared with the first generation centered on collection and the second generation highlighting open access, the main characteristics of the third generation are people-oriented, focusing on human needs, accessibility, openness, ecological environment, and resource integration, and committed to promoting knowledge circulation, innovating communication environments, emphasizing multiple literacies, and stimulating community vitality. Chu Jingli et al. believe that smart libraries result from the interaction and integration of intelligent technology, smart librarians, and library business and management. Driven by IoT and AI technology, libraries will inevitably evolve from physical libraries and digital libraries to smart libraries. Ke Ping believes that library transformation in the post-knowledge service era consists of four elements: space, resources, services, and management. Drawing on these professional perspectives, the National Science Library condensed the development strategy for the Museum of Academy History (see Figure 4 [Figure 4: see original paper]), emphasizing the integration of cultural space and knowledge space, focusing on realizing open communication functions, and focusing on gathering characteristic scientific and cultural communication service resources of national research institutions through the smart museum model, incorporating them into smart library transformation.

3.1 Innovative Content Construction (outside-in): From Aggregating Document Resources to Aggregating Cultural Resources

To achieve “outside-in” integrated services, the National Science Library continuously innovates content construction by aggregating characteristic cultural theme content resources both inside and outside the Academy through multiple channels, including scientific history, Academy history, scientific achievements, scientists, scientific events, scientific spirit, and scientific culture. Together with existing paper and digital document resources such as relevant monographs, papers, reports, and patents, this continuously enhances the ability to meet the public’s thematic knowledge service needs regarding the Chinese Academy of Sciences’ development history and scientific culture.

3.1.1 Aggregating Academy History Characteristic Cultural Resources Through Exhibitions The Museum of Academy History at the National Science Library has two permanent exhibition areas and has undertaken the design and layout of Academy-level overall exhibitions such as “Pioneer Action, Striving Forward—Innovation Achievements Exhibition of the Chinese Academy of Sciences’ ‘Pioneer Action’ Plan” and “Serving the Country Through Science and Technology for Seventy Years, Innovation Supporting the Dream of a Strong Country—Innovation Achievements Exhibition of the Chinese Academy of Sciences,” as well as key special exhibitions such as the “Earth Big Data Prototype System Demonstration Environment.” These have received full affirmation from multiple national leaders, ministry leaders, and various social publics. Additionally, it has assisted competent Academy units in undertaking the design and layout of national-level large-scale achievement exhibitions such as “Great Journey, Glorious Achievements—Celebrating the 70th Anniversary of the People’s Republic of China,” “Great Transformation—Celebrating the 40th Anniversary of Reform and Opening-up,” and “Five Years of Striving Forward,” benefiting millions of public visitors and receiving widespread acclaim.

During implementation, the team leveraged the library’s information accumulation and information discovery expertise, utilized research accumulation on achievement tracking and Academy history, actively established collaborative mechanisms with competent Academy business bureaus and affiliated research institutes, assisted in script drafting, and aggregated a large number of characteristic cultural resources including literature, images, manuscripts, and audio-visual materials related to the Chinese Academy of Sciences’ development history, scientific and technological leapfrog development, national innovative talent highland construction, national high-level sci-tech think tank construction, and international first-class research institution construction, laying a foundation for expanding public cultural services with Academy history culture and scientific culture.

3.1.2 Aggregating Academy Overall Image Cultural Resources Through Projects Commissioned by the competent Academy bureau, the National Science Library specifically implements the “Construction of the Chinese Academy of Sciences Image Resource Database,” systematically displaying the Chinese Academy of Sciences’ overall social image positioning as “national team, locomotive, pioneer, think tank, and university,” providing basic data support for innovative development of public cultural services.

Leveraging its experience in characteristic resource discovery and knowledge organization, the National Science Library continues to exert its advantages in data discovery and standardized integration, continuously discovering and aggregating publicly published and open access data resources serving the image resource system construction, improving the construction of the image resource knowledge graph, and enhancing the scale effect and quality of the Chinese

Academy of Sciences Image Resource Database. On the other hand, relying on special project guidance, it actively coordinates with pilot units to jointly build a characteristic image resource data system covering the entire lifecycle of image resources, constructing a full process from resource acquisition and management to content production and release. Combined with the institute coordination mechanism, it achieves modular and task-based management of processes. Simultaneously, it comprehensively supervises and evaluates the dissemination effect of image resources to realize a closed loop of resource utilization. Ultimately, it provides mechanism, resource, and service guarantees for building the Chinese Academy of Sciences image resource network system.

3.2 Innovative Service Space Design (inside-out): From Traditional Library Space to Public Cultural Space

To achieve “inside-out” integrated effectiveness, libraries need to utilize corresponding public cultural spaces to enable the public to experience the scientific knowledge, scientific methods, scientific culture, and scientific spirit carried by the composite resource system through exhibitions, forums, scientific experiences, and other cultural activities, as well as corresponding monographs, patents, scientific data, and other document resources provided by libraries, thereby enhancing their own information literacy and scientific literacy.

Based on the above functional requirements and objectives, and according to relevant Chinese Academy of Sciences deployments, the National Science Library transformed its original second-floor reading and office areas into exhibition spaces for the Museum of Academy History. Through the “museum within a library” model, it explored and expanded public cultural space construction, transforming traditional library space into scientific and cultural display space. Combining the site conditions, through design, technology, and material innovation, it laid the foundation for a science museum and enhanced public cultural perception experience. Through multiple communication methods, it systematically displays the Chinese Academy of Sciences’ major historical contributions, important innovation achievements, and reform and development achievements to China’s scientific and technological progress, economic and social development, and national security, popularizing scientific knowledge, promoting scientific spirit, disseminating scientific thought, and advocating scientific methods.

3.2.1 Creating a “Disappearing Skyline” to Expand Audience “Psychological Space” According to relevant Chinese industry standards, the net height of museum exhibition halls should be 4.5-5.5 meters, and science and technology museum exhibition halls should be 4.5-6.0 meters on the first floor and 4.0-5.0 meters on upper floors. However, the National Science Library’s building has a net height of only 3.8-4.2 meters. To overcome the limitation of relatively low floor height, without increasing large power load, the design employs a new energy-saving 6000K (color temperature) double light strip design in grooves along the walls to enhance venue brightness, creating a visual illusion

of the ceiling extending upward to create a “disappearing skyline” that expands the audience’s “psychological space.” Simultaneously, the Academy history area features a customized blue-sky-and-white-clouds ceiling grid, overall expanding the spatial effect.

3.2.2 Creating Interlaced Space Through “Embedded” Exhibition Layout to Enhance Visual Comfort While ensuring construction safety standards, the physical exhibition walls employ an “embedded” exhibition layout model, arranging large models in staggered concave-convex configurations to increase exhibition content while effectively expanding passage width and exhibition space, enhancing visual comfort.

3.2.3 Utilizing New Ultra-Thin All-Aluminum Materials to Achieve Lightweight Display Effects Under controllable costs, new ultra-thin all-aluminum materials are used to produce exhibition boards, combined with laser engraving technology, breaking through the limitations of traditional compressed boards, enabling multi-content text and image displays and irregular combination displays, and enhancing exhibition effects.

3.2.4 Innovatively Integrating Intelligent Display Technology in Physical Venues to Achieve Dynamic Large-Capacity Immersive Exhibitions The exhibition hall is the first in China to design and implement “mirror LED” technology, creating a three-dimensional exhibition space through interactive display of bilateral screen content, achieving organic integration of theme backgrounds and scientific research achievement content. Meanwhile, VR and AR technologies, panoramic exhibitions, and other modern virtual and information technologies are reasonably applied in the exhibition hall to actively enhance immersive exhibition effects. To a certain extent, it achieves human-computer interaction and object-object interaction, attempting breakthroughs in human-number interaction and number-object interaction, continuously deepening the public’s understanding of the Chinese Academy of Sciences’ development history, scientific research achievement connotations, scientist spirit, and scientific culture, providing various forms of scenes for the public to experience scientific culture.

3.3 Innovative Service Design: From Resource Services to Context-Based Services

The core of the library’s public cultural service bidirectional circulation model lies in two aspects: first, forming resource integration capabilities by continuously expanding external resource acquisition channels and building associated service mechanisms for resources from different sources and types through scientific convergence and integration; second, expanding service contexts to promote the continuous improvement of library users’ comprehensive literacy, thereby bringing higher-quality user groups and information sources to libraries. The

National Science Library continuously innovates service design by exploring the construction of resource association service mechanisms and new media communication platforms, achieving the improvement and development from resource services to context-based services, and ultimately realizing a virtuous bidirectional circulation of integrated services (outside-in) and integrated effectiveness (inside-out).

3.3.1 Exploring the Construction of a Scientific Communication Characteristic Data Resource Integration Mechanism and Innovative Association Service Model After aggregating multi-channel data, the key is how to achieve effective integration and service. The Museum of Academy History explores establishing semantic associations between characteristic scientific communication resources and the center's characteristic document resources and other multi-source data through knowledge organization technology by undertaking central research projects, to achieve semantic and targeted service association of scientific communication characteristic resources. By constructing a scientific and effective resource organization platform to link scattered scientific communication resources, it achieves centralized preservation and management. It explores implementing association and discovery services based on characteristic scientific communication resource data, using knowledge organization and data mining technologies for multi-layer description of scientific communication characteristic resources, using linked data to describe published data, and achieving effective organization and services of characteristic resources. It explores establishing name authority lists for scientific communication data resources, including personal names, institutional names, and place names, sorting out metadata frameworks for different types of resources, combining the association characteristics of scientific communication resources, and developing knowledge ontologies and knowledge graphs for scientific communication data resources to meet domain users' comprehensive application needs from scientific communication information resources to knowledge data, gradually enhancing the extension functions of the characteristic scientific communication resource system service platform. Meanwhile, in subsequent development planning, it clearly aims to build a smart museum, embedding associated services into offline and online public cultural services through integrated platforms and mechanisms to further improve service guarantee capabilities for enhancing public information literacy and scientific literacy.

3.3.2 Exploring the Construction of New Media and Digital Museum of Academy History Communication Platforms to Actively Expand Service Contexts Robert Scoble and Shel Israel point out in *The Age of Context: Mobile, Sensors, Data and the Future of Privacy* that big data, mobile devices, social media, sensors, and positioning systems are the five key elements closely related to the contextual era. The key function of context-based communication is to effectively disseminate corresponding information according to user preferences. To meet public scientific and cultural needs under cir-

cumstances such as the pandemic, on one hand, the museum actively develops and continuously improves exhibition websites and 360-degree panoramic exhibition halls such as the “Chinese Academy of Sciences Innovation Achievements Exhibition,” providing online exhibition cloud services to enhance public online viewing experiences and create “never-ending exhibitions.” On the other hand, it gets closer to public needs by continuously improving new media communication platforms such as the “Academy History World” WeChat official account, pushing online services including audio guides, panoramic exhibition halls, and visit reservations, tracking progress in Academy history research, popular science knowledge, and scientific and technological achievements. Through audience forwarding, viewing, and friend circle sharing, it achieves interactive communication. Relying on exhibition achievements and collaborating with research institutes, it carefully designs the “Cloud Exhibition, Micro Popular Science” series of extended interpretation popular science articles and the “Science Anywhere Door” series of popular science videos, enabling users to connect with frontline scientists and enter frontline laboratories through new media service platforms, experiencing the mysteries and hardships of scientific research and the persistent exploration spirit of scientist teams, further expanding the “context” creation of network-based public cultural services and enhancing user service experience and dissemination effects.

3.4 Innovative Service Effectiveness: From Equalization of Internal Cultural Services to “Going Global” of External Cultural Services

China attaches great importance to equalization of basic public cultural services. As public welfare cultural service institutions, libraries adopt an “open door” model to ensure Chinese citizens’ equal access to relevant services, including the National Science Library’s literature information, popular science exhibitions, popular science lectures, and online services mentioned above. While actively providing equalized internal cultural services, the National Science Library, as a national research institution library, also actively elevates its position and explores effective paths for external cultural “going global” under the guidance of the Academy’s development plan.

3.4.1 Exploring Cultural “Going Global” Through Organizing Domestic and International Touring Exhibitions Drawing on the “main-branch library” model adopted by libraries in cultural service equalization, the “Chinese Academy of Sciences Annual Science and Technology Innovation Touring Exhibition” (hereinafter referred to as the “Touring Exhibition”) undertaken by the National Science Library and specifically implemented by the Museum of Academy History adopts a “main-branch station” model. Relying on the main content of innovation achievement exhibitions undertaken by the library and based on the overall situation of Academy-local cooperation, it continuously expands domestic and international communication scope. In addition to the Beijing main station, it deepens cooperation with local branches, jointly planning innovative touring exhibition models, enriching exhibition content, and

improving exhibition effects, launching more than 10 branch touring exhibitions annually across the country, benefiting nearly a million public visitors and receiving widespread praise. Additionally, it was invited to Thailand for the first overseas touring exhibition of Chinese Academy of Sciences' scientific and technological innovation achievements, further promoting the docking of scientific and technological innovation policies, talents, and achievements between China and Thailand and facilitating cooperation in key priority areas. The touring exhibition was also invited to Hong Kong for the first independent overall exhibition, enabling Hong Kong citizens to timely understand the frontier trends of national scientific and technological innovation development and experience new changes brought by scientific and technological innovation, creating a good scientific and cultural atmosphere for promoting the construction of the Guangdong-Hong Kong-Macao Greater Bay Area and contributing to China's scientific and technological diplomacy and united front work. This expands the temporal and spatial scope of library cultural service positions and successfully explores an effective path for libraries to participate in China's cultural "going global" strategy.

3.4.2 Exploring Cultural "Going Global" Through Participation in Publishing According to the Academy's earlier deployment, the Museum of Academy History at the National Science Library, as the implementation team, has jointly and carefully created popular science publishing products such as the "Serving the Country Through Innovation for 70 Years" reportage series with Zhejiang Education Publishing House under the guidance of a multi-layered decision-making structure. The National Science Library actively participates in topic planning, drafts topic selection criteria, promotes topic creation, organizes manuscript review processes, and assists in publication implementation. Through the full-process implementation of the project, it explores the organic integration of library cultural services and popular science publishing, continuously enhancing the influence of cultural service brands.

The "Serving the Country Through Innovation for 70 Years" reportage series project is a large-scale reportage literature creation and publishing project jointly planned and implemented by the Chinese Academy of Sciences, the China Writers Association, and the China Association for Science and Technology. The project has been selected as a key publication topic for the 2019 theme publication by the Publicity Department of the CPC Central Committee, listed as a key publication project in the national "13th Five-Year Plan," and received support from the 2019 National Publishing Fund. As of December 2020, 17 books have been successfully published. Among them, *The Story of Migratory Locusts* was selected as one of the "2019 China Good Books" organized by the Publicity Department of the CPC Central Committee and the China Book Review Society; *China's Sky Eye: The Biography of Nan Rendong* and *The Light of the Roof of the World* won the "2019 30 Good Books" award from the China Publishing Association; and *Exploring the Ocean* with Beijing Radio's 配乐连播 was selected for the "2020 National Excellent Audio Books Project" by the National Press

and Publication Administration. Additionally, the series has performed well in China's cultural "going global" efforts. The series publisher, Zhejiang Education Publishing Group, has signed copyright export agreements for English, German, Romanian, and Arabic versions with Canada's Royal Collins Publishing Group, Germany's De Gruyter Publishing Group, Romania's Libris Publishing House, and the Arab Scientific Publishing House, effectively enhancing the brand influence of cultural services and making unique contributions to publicizing the Chinese Academy of Sciences' major innovation achievements and outstanding scientific and technological worker groups.

Although the National Science Library has conducted preliminary explorations in actively promoting the integration of public knowledge space and public cultural space, combined with continuous changes in social development and public needs, subsequent efforts should timely follow up with strategic scanning of well-known domestic and international museums, library association organizations, representative institutions, and ubiquitous peers, and improve the following research and practical advancement to play a more important role in the public cultural service system: (1) balancing "internal integration" and "external integration" strategies to construct a national reading paradigm based on scientific characteristic professional libraries through scientific reading promotion and other approaches, enhancing library users' prosocial behavior and improving libraries' social participation functions; (2) improving linked data integration research to achieve comprehensive integration of resources, services, and promotion; (3) refining library educational functions based on spatial integration to build lifelong education bases; (4) integrating into national public digital cultural service construction to shape new big data-based cultural service models; (5) improving mobile terminal services to enhance context-based intelligent cultural services; (6) promoting diversified exchanges and cooperation to facilitate cultural service resource sharing; and (7) refining research on integration models and sharing mechanisms to achieve rational resource allocation, joint construction and sharing, appropriate use, and data security.

References

- [1] Proposal of the CPC Central Committee on Formulating the 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives Through 2035 [EB/OL]. [2020-10-29]. http://www.xinhuanet.com/mrdx/2020-11/04/c_{139489949}.htm.
- [2] Li Guoxin. Historic breakthrough in legal guarantee of public cultural services [N]. *China Culture Daily*, 2016-12-28(7).
- [3] IFLA Strategy 2019-2024. [EB/OL]. [2020-09-10]. <https://www.ifla.org/files/assets/hq/gb/strategic-plan/ifla-strategy-2019-2024-en.pdf>.
- [4] IFLA Strategic Plan 2016-2021. [EB/OL]. [2020-09-10]. <https://www.ifla.org/files/assets/hq/gb/strategic-plan/2016-2021-zh.pdf>.

- [5] Li Guoxin. Library science in the perspective of public cultural service system [J]. *Journal of Library Science in China*, 2019, 45(6): 4-11.
- [6] Ke Ping, Gong Ping, Wei Yanxia. Review of research on China's basic public cultural services [J]. *Journal of the National Library of China*, 2015, 24(2): 10-17.
- [7] Xu Jianye. Library development direction in the construction of public cultural service system—Also on the enlightenment of new public service theory to library cause reform [J]. *Journal of the National Library of China*, 2006(3): 44-48.
- [8] Li Guoxin. Modern public cultural service system construction and public library development—Analysis of the “Opinions on Accelerating the Construction of a Modern Public Cultural Service System” [J]. *Journal of Library Science in China*, 2015, 41(3): 4-12.
- [9] Chen Zhu, Ye Min. What is real public space?—Western urban public space theory and judgment of spatial publicity [J]. *Urban Planning International*, 2009, 24(3): 44-49, 53.
- [10] Chen Zhu, Ye Min. Western urban public space theory—Exploring comprehensive public space concepts [J]. *City Planning Review*, 2009, 33(6): 59-65.
- [11] Xing Zhuoyuan, Sun Yi, Qu Jianfeng. Self-service in library physical venues under multi-terminal environment [J]. *Library Work and Study*, 2016(4): 45-51.
- [12] Wang Zizhou. Public knowledge space and library [J]. *Journal of Library Science in China*, 2006(4): 10-16.
- [13] Chen Bo, Hou Xueyan. Public cultural space and cultural participation: Empirical research based on cultural scene theory [J]. *Hunan Social Sciences*, 2017(2): 168-174.
- [14] Ma Shuhua. Public cultural service system and urban cultural space expansion [J]. *Fujian Tribune (The Humanities & Social Sciences)*, 2010(6): 58-61.
- [15] Xiao Ximing. The value of library as public cultural space [J]. *Library Tribune*, 2011, 31(6): 62-67.
- [16] Wu Jianzhong, Cheng Huanwen, Diana, et al. Openness, inclusiveness, and sharing: Model for library space reconstruction in the new era—Expert interview on the opening of Helsinki Central Library, Finland [J]. *Library Journal*, 2019, 38(1): 4-12.
- [17] Wu Jianzhong. From “library of books” to “library of people”—Enlightenment from Helsinki Central Library [J]. *Journal of the National Library of China*, 2019, 28(5): 93-97.
- [18] Sa Zhibin. Space reconstruction of Helsinki Oodi Central Library and its enlightenment [J]. *Library Work and Study*, 2020, 3: 62-67.

- [19] National Library won four highest awards for public cultural services [J]. *Library Theory and Practice*, 2009, 11: 97.
- [20] National Library has practical measures to expand public cultural services. [EB/OL]. [2020-10-16]. <http://finance.china.com.cn/roll/20150424/3080008.shtml>.
- [21] Wang Xiaowen, Wang Tianni. Practice and reflection on public library space reconstruction from the perspective of public cultural services—Taking the new building of Liaoning Provincial Library as an example [J]. *Library*, 2017, 4: 40-43, 64.
- [22] Zhou Yulin, Lin Yanfei. Exploration of social cooperation in public libraries from the perspective of diversified cultural activities [J]. *Library Research and Work*, 2019(4): 60-64.
- [23] Ke Ping, Yuan Zhenzhen, Zhang Chang. Chinese practice of thematic libraries [J]. *Library Construction*, 2020(1): 8-15.
- [24] Introduction to National Museum of Classic Books. [EB/OL]. [2020-11-30]. <http://www.nlc.cn/nmcb/bwgjj/djbgjs/>.
- [25] Wu Jianzhong. Toward the third-generation library [J]. *Library Journal*, 2016, 35(6): 4-9.
- [26] Chu Jingli, Liu Jingyi, Zhang Dongrong, et al. From information literacy education to ubiquitous information literacy education—15 years of practice and exploration at the University of Chinese Academy of Sciences [J]. *Library and Information Service*, 2020, 64(6): 3-9.
- [27] General Office of the State Council. Implementation plan for the national science literacy action plan (2016-2020) (excerpt) [J]. *Science & Technology Review*, 2016, 34(12): 2.
- [28] Chinese Academy of Sciences “National Innovation System” Research Group. Basic situation of national research institutions in major countries of the world [J]. *World Sci-Tech R&D*, 1999(1): 3-5.
- [29] Gu Haibing, Wang Baoyan. China’s national research institutions: Problems and solutions [J]. *Academics*, 2004(3): 50-65.
- [30] Wu Jianzhong. Re-discussion on ten hot topics of library development [J]. *Journal of Library Science in China*, 2017, 43(4): 4-17.
- [31] Chu Jingli, Duan Meizhen. Smart library and smart services [J]. *Library Development*, 2018(4): 85-90, 95.
- [32] Ke Ping, Zou Jinhui. Library transformation in the post-knowledge service era [J]. *Journal of Library Science in China*, 2019, 45(1): 4-17.
- [33] Wang Hongjun. *Fundamentals of Chinese Museology* [M]. Shanghai: Shanghai Ancient Books Publishing House, 2006.

- [34] Construction Standards for Science and Technology Museums. [EB/OL]. [2020-10-16]. <http://www.jskpcg.cn/kpcg>.
- [35] Scoble, Israel. The Age of Context: Mobile, Sensors, Data and the Future of Privacy [M]. Translated by Zhao Qiankun, Zhou Baoyao. Beijing: Beijing United Publishing Co., Ltd., 2014.
- [36] Han Xiao. Virtual interactive scene characteristics of social media public opinion [J]. Media, 2020(3): 61-63.
- [37] Zhang Wenyan, Lu Di. National reading in China: Paradigm, community, and transformation [J]. China Editor, 2020(4): 41-46.
- [38] Li Wu, Ai Pengya, Zhou Dong. Does reading make people more prosocial?—A preliminary exploration based on CGSS data [J]. China Publishing Journal, 2020(16): 8-14.

Author Contributions:

Yang Lin: Conceived the paper's theme and outline, proposed main ideas, drafted the paper, searched for materials, revised and finalized the manuscript.
Guo Jiamei: Searched for materials, participated in writing the introduction, Section 1 introduction on China's public cultural service policy review, and the conclusion section on future research and practice prospects.

Qu Yunpeng: Participated in writing Section 3 on the Museum of Academy History development strategy and Section 3.3.1 on associated service models.

Ren Peng: Participated in writing Section 3.1.2 on characteristic cultural data resource aggregation models.

Zhao Yao: Participated in writing Section 3.4.2 on exploring cultural "going global" through participation in publishing.

Yu Wenbo: Participated in writing Section 3.3.2 on exploring the construction of new media and digital Museum of Academy History communication platforms.

Zhang Haoyun: Searched for materials, participated in writing the introduction section overview of IFLA development strategies and the conclusion section on future research and practice prospects.

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

Source: ChinaXiv — Machine translation. Verify with original.