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Historical Trajectory and Driving Factor Analysis of Library and Information Services Development in New China: Postprint

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Abstract

[Purpose/Significance] Review the historical trajectory of library and information science development since the founding of the People's Republic of China, and provide fresh insights for the construction of library and information science in the new era.

[Method/Process] Summarize the main achievements in library and information science construction over the past 70 years from seven aspects; explore the driving factors of library and information science development in New China from three dimensions: societal needs for literature and information, macro-level social environment, and internal factors of library and information institutions; and introduce the landmark achievements in the construction of China's library and information science by taking the construction of literature and information assurance systems such as CALIS, NSTL, and NCPSSD as examples.

[Results/Conclusion] Propose ideas for the further construction of the national literature and information assurance system.

Full Text

Preamble

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An Analysis of the Historical Trajectory and Driving Forces of Library and Information Development in New China

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Abstract:

[Purpose/Significance] This paper reviews the historical trajectory of library and information development since the founding of the People's Republic of China, aiming to provide fresh experience for library and information construction in the new era. [Method/Process] The study summarizes the main achievements of library and information development over the past 70 years from seven aspects, explores the driving forces behind this development from three dimensions—social document information demand, macro-social environment, and internal factors of library and information institutions—and introduces landmark achievements such as the construction of document information guarantee systems including CALIS, NSTL, and NCPSD. [Result/Conclusion] The paper proposes recommendations for the further construction of the national document information guarantee system.

Keywords: Library and information cause in China; Historical development; Motivation analysis; Document information guarantee system construction

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1. An Overview of Achievements in New China's Library and Information Development

Standing at the historical juncture of the 70th anniversary of the founding of the People's Republic of China, looking back on past development and forward to future progress holds special significance. Over the past seven decades, under the leadership of the Communist Party of China, the Chinese people have united and forged ahead with determination, achieving remarkable accomplishments in economic growth, social harmony, scientific and technological advancement, and cultural prosperity. Among these, library and information development has yielded fruitful results with numerous highlights.

The achievements in New China's library and information development can be roughly summarized in the following seven aspects:

First, the establishment of a modern library and information system has constructed a library network with public, university, and research (specialized) libraries as the main pillars. Library types have become complete, numbers have increased dramatically, and quality has improved, fulfilling the social functions of preserving documents, disseminating knowledge, providing intelligence consultation, and promoting civilized society. The formation of library and information service networks has established the industry's status, with libraries and information institutions at all levels playing an irreplaceable role in contemporary social life. Due to the prominent commonalities between libraries and information institutions in terms of resource base and service methods, the trend toward library-information integration has become increasingly apparent. In the 1980s, major research institutions such as the Chinese Academy of Sciences and the Chinese Academy of Social Sciences implemented integrated

library-information management systems, putting literature and information (intelligence) center construction on the right track. The merger of Shanghai Library and Shanghai Institute of Scientific and Technical Information represented substantial progress in integrating provincial-level library and information institutions. As reforms of library and information systems and mechanisms deepen, the true realization of library-information integration may be just around the corner.

Second, the extensive application of modern information technology in library and information fields has promoted modernization and transformation of library and information work. New business forms represented by digital libraries have matured, and smart libraries also show promising development prospects. The library and information field is one of the most active in adopting and applying information technology. As early as the 1960s, libraries began using electronic computers to develop machine-readable catalogs (MACR), marking the beginning of library automation. Modern information technologies including audio-visual technology, microform technology, multimedia, digitization, cloud computing, big data, mobile communications, and artificial intelligence have fundamentally changed the recording methods, storage means, and dissemination paths of document information. Digital libraries, as an information service and knowledge service environment supported by knowledge concept systems, have become important components of social information infrastructure, serving as public information centers and hubs that provide users with high-quality, specialized, and personalized information and knowledge services.

Third, document information resources have become extremely abundant, fundamentally changing the situation of severe scarcity and uneven distribution of resources. The concept of collaborative resource construction and sharing has taken root, and a preliminary document information resource guarantee system has been formed, largely satisfying users' document information needs. Document information resources are the most basic constituent elements of libraries, and resource conditions largely determine library service capabilities and development levels. Building document information resources and enhancing guarantee capabilities have always been the focus and direction of China's library and information community. For a long period after the founding of the PRC, constrained by the macro socio-economic environment, library and information development suffered from severe funding shortages, low per capita collection volume and book purchasing budgets, and most institutions fell into the predicament of resource scarcity and insufficient service capacity, making it difficult to meet growing social demands. Since the reform and opening up, especially in the new era, the prosperity of education, science, and culture and the progress of the publishing industry have gradually improved the document information resource situation. Ancient book preservation has achieved remarkable results, excellent traditional culture has been inherited, print and digital resources have developed in coordination, and document information guarantee capabilities have been substantially enhanced.

Fourth, the library legislation process has accelerated. The promulgation and implementation of the *Public Library Law of the People's Republic of China* has greatly improved the legal environment for library development, established libraries' position in the public cultural service system, safeguarded citizens' reading rights and interests, and made library reading promotion initially effective. The nationwide reading campaign has been steadily advanced, promoting improvement in citizens' cultural and information literacy. By issuing industry regulations and standards for library and information work, standardizing business activities and service standards of libraries and information institutions at all levels, and supervising implementation of relevant regulations through evaluation and grading, healthy development of library and information services has been promoted.

Fifth, the library and information science education system has gradually become complete, establishing a talent cultivation model that matches China's library and information development needs. Continuous deepening of education and teaching reforms has substantially improved the caliber and quality of library and information professionals, providing continuous talent support for the field. At the beginning of the PRC, only Wuhan University and Peking University had library science programs, and only at the junior college and undergraduate levels, with limited talent cultivation capacity. Starting from the late 1970s, library and information education developed rapidly, with the number of programs reaching nearly 100 at its peak. In the national discipline catalog, library, information, and archival science were established as first-level disciplines, with a rational structure of undergraduate, master's, and doctoral programs. The textbook system, experimental equipment, and faculty have all made positive progress. Large-scale adult education and on-the-job training have improved practitioners' educational levels and professional competence. To meet the needs of the information age, various library and information departments have chosen information management as their development direction, expanding the professional field and enhancing development potential.

Sixth, theoretical research in library and information science has been unprecedentedly active, with high-quality academic achievements being produced continuously and discipline construction continuously strengthened. With high-level project approvals, high-quality papers and monographs, high-level research institutions, high-caliber talent cultivation, and high-impact academic journals as indicators, library and information science has entered the ranks of mature disciplines. Today, it should no longer be considered a weak or small discipline. The number of projects funded by the National Social Science Fund, the National Natural Science Fund, and provincial and ministerial levels has increased year by year, producing a batch of high-quality academic achievements. Library and information societies (associations) at all levels have made indispensable contributions in organizing and promoting academic research. Major academic annual conferences have become grand festivals in the field. Journals such as *Journal of Library Science in China*, *Library and Information Service*, and *Journal of Intelligence* have gained recognition in terms of quality and academic

influence, becoming spiritual homes for scholars and readers.

Seventh, international exchanges and cooperation of library and information institutions have deepened, and China's influence and voice in the international library and information community have gradually increased. Before reform and opening up, China's library and information institutions had very limited exchanges with international counterparts. Since restoring China's legitimate status in the International Federation of Library Associations and Institutions (IFLA), new avenues for international exchange and cooperation have opened up for Chinese libraries. In August 1996, China successfully hosted the 62nd IFLA Conference, showcasing to the world the new face of Chinese libraries after reform and opening up. At the end of 2005, Chinese became an official working language of IFLA, marking a milestone. Twenty-three years have passed since the Beijing IFLA Conference. With enhanced comprehensive national strength and the rapid development achievements of China's library sector and research level, China is fully qualified to host another IFLA Conference, and people look forward to this with great anticipation.

2. An Examination of the Driving Forces Behind New China's Library and Information Development

Like other undertakings, China's library and information development has not been smooth sailing. It has experienced setbacks and still faces many problems and difficulties requiring unremitting efforts to resolve. Many scholars have conducted valuable work in summarizing the development history and experience of New China's library and information sector, publishing a series of works such as Du Ke's *Contemporary China's Library Cause* (Contemporary China Publishing House, 1995), the Compilation and Publication Committee of the China Society of Library Science's *Twenty Years of China's Library Cause 1979-1999* (Beijing Library Press, 1999), and Zhang Shuhua and Zhang Jiuzhen's *China's Library Cause Since the 20th Century* (Peking University Press, 2008). With the arrival of the 70th anniversary of the PRC, more institutions and scholars have produced relevant research results. These achievements have sorted out and discussed the construction achievements, experiences, and existing problems of various periods in the library and information field. Reviewing and summarizing the 70 years of construction achievements and historical experience, and studying and grasping the internal driving forces and general trends of library and information development is a grand topic that requires researchers to fully occupy materials, possess sufficient command ability, and conduct multi-dimensional and comprehensive in-depth research.

Summarizing the experience of library and information development and discussing its driving forces helps clarify the roots, direction, and goals of development and form a joint force to promote it. Previous research has formed two main viewpoints: One examines library and information development within the broader social development environment, concluding that economic, political, scientific, technological, and cultural factors play promoting or constraining

roles. The combined influence of these factors constitutes the driving force for library and information development, which can be called the social environment determinism theory. Fan Xingkun examined and reviewed the impact of political movements on China's library development between 1949-1978, concluding that only a stable and harmonious social and political environment and highly developed socio-economy can guarantee library development, and that "politics is the most important external environmental factor affecting the development of contemporary China's library cause" [1], though this may be somewhat arbitrary. The other viewpoint emphasizes the dominant role of internal library factors in development. Professor Cheng Huanwen, when discussing the historical experience of the Republic's library development, believes that "so-called successful experiences summarized from political, economic, or cultural perspectives are not the essential experiences of the Republic's library achievements. Only 'library spirit' and 'active academic atmosphere and pragmatic scientific attitude' are the 'essence' of the Republic's library success" [2]. This approach of seeking development motivation from libraries themselves has merit, but completely rejecting the influence of the broader social, political, economic, and cultural environment also seems debatable.

I believe that examining the driving forces behind China's library and information development can be understood from at least three aspects:

First, social document information demand is the source of power for library and information development. The driving force of human social development originates from material and spiritual needs. Driven by demand, human society creates increasingly rich material and spiritual civilization achievements. Library and information development originates from the push of social demand. Demand-driven library and information development is the mainstream form of modern library and information development in China. Being demand-oriented is an important principle of library and information construction. To meet society's need for collecting, preserving, and utilizing document information, libraries and information institutions emerged as cultural facilities, along with the library and information profession and practitioners. Ranganathan's famous Five Laws of Library Science state that "books are for use," "every reader his book," and "every book its reader," expressing the entire truth of library activities. Strong social document information demand brings prosperity to library and information development. The several upsurges in library and information development over the 70 years since the founding of New China have been directly related to higher document information demands proposed by socio-economic, political, scientific, educational, and cultural development. Keeping pace with social development trends and building library and information undertakings adapted to various historical periods is the noble mission of library and information workers. When the call to "march toward science" sounded in the early days of liberation, library and information work embarked on a path of standardization under the guidance of the *National Book Coordination Scheme*. In the "spring of science" at the beginning of reform and opening up, library and information development rapidly recovered, initiating steps toward standardiza-

tion and automation. In the new era, in the new journey of comprehensively building a moderately prosperous society and realizing the great rejuvenation of the Chinese nation, the networked and digital construction of library and information services is in the ascendant, nationwide reading and mass innovation have become common practices, and public cultural service system construction has developed in depth. Meeting the ever-growing social document information demand will forever be the ultimate goal of China's library and information development and the mission of library and information professionals.

Second, from a macro-environmental perspective, socio-economic, political, educational, scientific, and cultural factors are crucial. In the preface to *Prospects for Libraries in the New Century* [3], I elaborated on the macro-environmental factors affecting library and information development:

Economy. Library development first depends on good economic conditions. Social library undertakings require substantial material, financial, and human support. Library development history shows that when a society's economy develops well, libraries can develop rapidly and steadily. Conversely, when a society's economy falls into recession, libraries are among the first to be affected and see their development frustrated. The prosperity of China's current library and information development precisely benefits from the dividends of economic development.

Politics. The influence of political factors on libraries is self-evident. Throughout history, in any authoritarian political environment, most people have been deprived of the freedom to access information and reading rights, and library doors could only open to a few. In today's world, the monopoly and competition among various interest groups in information resources and technology are not without political interference.

Science and Technology. Among various external environmental factors, science and technology are the most critical. Scientific and technological progress promotes library development. Papermaking and printing gave birth to ancient libraries; computers, the internet, cloud computing, big data, and artificial intelligence are changing today's libraries. The evolution of library forms develops alongside changes in document carrier materials, production processes, and dissemination paths. At the end of the last century, the emergence of digital libraries marked the entry of library development into a new era. Digital libraries themselves are products of social informatization, and their organic combination with research informatization will greatly improve research productivity and promote human civilization.

Culture. In a broad sense, culture refers to the sum of material and spiritual wealth created by humans in the process of social and historical development. Profound cultural accumulation and a good cultural atmosphere create the best environment for library survival and development. Libraries themselves are a cultural phenomenon. Modern libraries, as the backbone of the public cultural service system, play an increasingly important role. As an intermediary institu-

tion for information exchange, library development is an inevitable requirement of information culture development.

Third, internal factors in library and information institutions' own construction cannot be ignored. These include the advancement of library and information systems, the perfection of legal construction, and the determination of library status and functions through legislation, clarifying government responsibilities in public cultural services and safeguarding citizens' rights to access information and reading. For library and information development, demand is the driving force, resources are the foundation, and talent is the key. High-quality library and information development requires high-quality professionals, including theoretical, technical, and service-oriented talents. High-level librarian teams have become the most active force driving library and information development. The moral cultivation, professional spirit, business capability, and academic level of library and information practitioners largely determine service quality. Therefore, strengthening library and information workforce construction is imperative.

On September 9, 2019, General Secretary Xi Jinping wrote to senior experts at the National Library of China, congratulating it on its 110th anniversary. The letter highly evaluated the value and functions of libraries and further pointed out the direction for library development. General Secretary Xi emphasized that libraries are important indicators of national cultural development levels and important places for nourishing national spirit and cultivating cultural confidence. He hoped the National Library would adhere to the correct political direction, promote excellent traditional culture, innovate service methods, promote nationwide reading, better meet people's spiritual and cultural needs, and make new contributions to building a socialist cultural powerhouse.

New China's library and information development has gone through 70 years. The unremitting efforts of several generations of library and information professionals have brought about today's prosperity. Our predecessors were pioneers in building New China's library and information undertakings, while our generation are witnesses and participants in the 40 years of development since reform and opening up. Colleagues working in library and information positions must never forget their original aspirations, keep their mission firmly in mind, persevere, and dedicate themselves professionally, creating a brand-new situation in library and information development with first-class work performance.

3. Landmark Achievements in New China's Library and Information Development: Document Information Guarantee System Construction

The guarantee of document information resources is a basic demand and important task that national economic and social development, education, science, and cultural prosperity place on library and information institutions. Weak document resources, especially inadequate support for high-level teaching and research, have affected the development of higher education and scientific re-

search. How to solve this problem? Through long-term exploration, it was discovered that relying on a single library and information institution's resources and services cannot meet users' growing document information needs, and only through collaborative construction, sharing, and coordinated guarantee can this dilemma be resolved. Taking document information guarantee system construction as a breakthrough point is the ideal response.

3.1 The Ideological and Theoretical Foundation of Document Information Resource Guarantee System Construction

The ideological and theoretical foundation of document information resource guarantee system construction is the resource sharing concept. Resource sharing is one of the greatest legacies of 20th-century library and information science. The formation and development of the resource sharing concept in China's library and information field has undergone a long process. As early as September 1957, the State Council approved the *National Book Coordination Scheme* formulated by the Science Planning Committee. This scheme decided to establish a book group under the State Council Science Planning Committee—a cross-departmental, high-level, authoritative coordination body responsible for the overall planning and coordination of book work serving scientific research nationwide. According to the scheme's requirements, the first and second national central library committees were successively established in Beijing and Shanghai, plus nine regional central library committees to coordinate collection procurement and other business work among libraries, focusing on foreign language publications, coordinating procurement of specialized libraries in Beijing according to disciplinary division, reducing duplicates and avoiding redundant purchases. The “National Union Catalog Editing Group” was established at the National Library of China to compile union catalogs, conduct interlibrary loans among cooperative libraries, and enhance literature guarantee capabilities for scientific research [4].

I believe that 1986 was an important year in the formation and development of the resource sharing concept in China, which could be called the “first year of Chinese document resource sharing.” That summer, with funding from UNESCO, the National Library of China held the “UAP (Universal Availability of Publications) Domestic Academic Symposium” in Beijing. UAP means “universal availability of publications” or “publication resource sharing,” a concept proposed and promoted globally by UNESCO in the 1970s. UAP is both a goal and a plan. As a goal, it requires maximizing the satisfaction of readers' broadest needs for publications anytime and anywhere. As a plan, it urges countries to take active measures to establish a national literature guarantee system with basic functions including publication, distribution, procurement, processing, storage, preservation, utilization, and interlibrary cooperation. Participants reached consensus and issued the “Proposal for Promoting the Realization of UAP in China,” calling on China's library, information, and publishing communities to actively align with international society, accept the UAP concept,

implement the UAP plan, take effective measures, start from one region or one system, explore paths to resource sharing, cooperate wholeheartedly in collection procurement, circulation, and utilization of publications, and make unremitting efforts to achieve the goal of resource sharing [5]. This conference is considered a mobilization meeting for comprehensively promoting resource sharing in China's library and information community, generating positive influence in both professional and academic circles. In September of the same year, the China Society of Library Science held a symposium on collection construction and layout in Nanning, Guangxi, continuously deepening research on library resource collaborative construction and sharing. Participants enthusiastically discussed macro-layout plans for collections, subsequently launching large-scale national surveys on literature resource layout, taking solid steps from theory to practice in Chinese library resource sharing. The 1980s-1990s was an active period for theoretical research in China's library and information community. Since the mid-1980s, when the concepts of literature resources and literature resource construction were formally proposed, they have attracted widespread attention in the library and information field and were quickly recognized and accepted by the academic community. Professor Fan Bingsi commented that this was "the first time Chinese library scientists used their own concepts to establish a research field, and no term has so scientifically encompassed the issues in this field. In this field, Chinese scholars have stood at the forefront of the world" [6].

Since the late 1990s, against the backdrop of the resource collaborative construction and sharing concept gradually being accepted and put into practice by China's library and information community, document information resource guarantee system construction was put on the agenda. China's libraries and information departments at all levels worked together and, after more than ten years of unremitting efforts, achieved gratifying construction results. They built a batch of document information resource and service centers such as the China Academic Library & Information System (CALIS), the National Science and Technology Library (NSTL), and the National Center for Philosophy and Social Science Documentation (NCPSD), forming strong document information guarantee capabilities that have powerfully promoted the development of China's library and information undertakings. I believe that CALIS, NSTL, and NCPSD can be considered the most representative achievements in China's library and information construction since the founding of the PRC.

3.2 Construction and Application of the China Academic Library & Information System (CALIS)

The China Academic Library & Information System is a large-scale document information guarantee system project constructed by China's university library community at the end of the 20th century. In November 1998, the former State Planning Commission officially approved the *Feasibility Study Report on the CALIS Construction Project*, launching CALIS Phase I construction. By

July 2001, this phase passed acceptance organized by the Ministry of Education, the Development and Reform Commission, and the Ministry of Finance, initially establishing a higher education literature guarantee system based on print literature sharing among university libraries. CALIS Phase I laid a reliable foundation for subsequent Phase II and III projects. In September 2002, the Ministry of Education, the Development and Reform Commission, and the Ministry of Finance issued the *Several Opinions on Strengthening the Construction of the “211 Project” During the 10th Five-Year Plan Period*, incorporating CALIS Phase II construction into the public service system construction of the “211 Project” during the 10th Five-Year Plan period, and merging it with the first phase of the China-America Digital Academic Library (CADAL) under the name “China Academic Library & Information System.” The specific division of labor was: CALIS would undertake the construction of the “China Higher Education Digital Library” application system, operation service system, and resource integration; CADAL would be responsible for digitizing (scanning) millions of Chinese and English books as important digital resource databases in CALIS. In August 2006, CALIS Phase II construction passed project acceptance by the three ministries [7]. Through the joint efforts of the CALIS Management Center and hundreds of university libraries, a literature information guarantee system serving higher education innovation development was initially formed. Among the public service system construction projects of the “211 Project,” the CALIS project was highly praised for its small funding input, strong guarantee strength, and wide user benefits, and was widely welcomed by university teachers and students.

In February 2008, CALIS ushered in new development opportunities. The National Development and Reform Commission, Ministry of Education, and Ministry of Finance jointly issued the *Overall Construction Plan for the “211 Project” Phase III*, explicitly proposing to “use informatization to drive educational modernization and build a higher education public service platform with international advanced levels.” Higher education literature guarantee system construction was once again listed as a main project of this platform construction, and the main tasks and overall objectives of CALIS Phase III were determined, namely “to strengthen the introduction of databases, Chinese and English full-text resources, and literature reporting system construction, establish an open literature acquisition system and resource storage and disaster recovery system, accelerate the construction of educational and research digital libraries, and further improve the overall informatization level of university libraries nationwide” [8]. The CALIS Phase III stage coincided with the peak period of China’s library development. With the wide application of advanced information technology in the library and information field, user groups’ information needs and behavior patterns underwent tremendous changes. Various literature information guarantee systems with distinctive features were built and put into operation, showing good development prospects. Building on previous achievements, CALIS Phase III chose to use advanced technology to build and integrate global academic resources and services, creating a higher education

digital library that supports the knowledge service environment for high-level teaching and research in “211 Project” institutions, continuously serving Chinese higher education and even universal education, and promoting global academic exchange and innovation. The CALIS Phase III construction budget was 210 million RMB, focusing on resource construction, application system construction, and operation service system construction, with certain investments also arranged for human resource training, standard specification system construction, and security guarantee system construction. Ultimately, it formed a network application service platform that could support massive literature information retrieval, acquisition, and information exchange and transmission both domestically and internationally, realizing a distributed higher education digital library with unified authentication, joint consultation, proxy search and inspection, resource acquisition, and information exchange functions. In May 2012, CALIS Phase III achieved its construction goals and passed final acceptance.

From the launch of CALIS Phase I in 1998 to the acceptance of CALIS Phase III in May 2012, the project spanned 14 years and accumulated important construction experience worth careful summarization and reference. I summarize CALIS’s successful experience in three points: First, adhering to the concept of collaborative construction and sharing, and innovating management mechanisms. Decades of practice in literature resource construction and services have proven that relying on a single library and information unit’s resources and services cannot meet users’ growing literature information needs. Coordinated guarantee by numerous library and information institutions is conducive to solving this problem. CALIS organized hundreds of universities nationwide to participate in the joint construction and development of literature resources, representing a successful attempt in terms of scale and efficiency. The multi-level guarantee system architecture of management centers, discipline centers, and regional centers established by CALIS has proven to be an ideal management model in practice. Second, adhering to resource construction as the center, focusing on overall improvement of literature guarantee capabilities, establishing a joint resource ordering system for universities, optimizing and balancing resource procurement among libraries, avoiding duplicate purchases, achieving complementary advantages of relevant resources, emphasizing coordinated development of print and digital resources, organic combination of self-built and introduced resources, and particularly stressing the construction of foreign language academic resources to meet the literature information needs of university teaching and research. Third, adhering to user demand orientation, implementing the “user first” principle, and providing convenience for users to utilize CALIS resources and services through developing and building the e-du, e-de, and e-wen systems. The e-du academic search engine can search and access over 100 million items, greatly enhancing literature guarantee capabilities. The e-de full-text service system realizes “one account, nationwide access” and “searchable means obtainable.”

CALIS Phases I, II, and III were established as engineering projects. With the overall completion of the “211 Project,” their subsequent development has be-

come a major issue. In recent years, CALIS has only been able to maintain basic operations with limited funding from education authorities, significantly affecting system function improvement and development. The follow-up engineering construction long awaited by the university library system has yet to arrive, which is a major regret. Currently, as the country advances the construction of “Double First-Class” universities, first-class literature information guarantee cannot be absent. Without first-class university libraries and first-class literature information services, there cannot be first-class teaching and research achievements, and it is impossible to build first-class universities. There is a strong appeal to national education authorities and university leaders to pay close attention to and actively resolve this urgent issue.

3.3 National Science and Technology Library (NSTL)—A Shared Platform for Scientific and Technical Literature

The National Science and Technology Library was established in June 2000. It is a virtual scientific and technical literature information service institution jointly formed by several national-level scientific and technical literature and information units. Its member libraries include the Documentation and Information Center of the Chinese Academy of Sciences, the Engineering and Technology Library (Institute of Scientific and Technical Information of China), the Machinery Industry Information Research Institute, the Metallurgical Industry Information Standard Research Institute, the China Chemical Industry Information Center, the Library of the Chinese Academy of Agricultural Sciences, and the Library of the Chinese Academy of Medical Sciences. Its online co-construction units include the China National Institute of Standardization and the National Institute of Metrology, China. NSTL follows the principles of “unified procurement, standardized processing, and joint online access,” collecting, preserving, and developing scientific and technical literature resources in various disciplines including science, engineering, agriculture, and medicine based on national scientific and technological development needs, and providing scientific and technical literature information services nationwide.

In 2002, with State Council approval, the Ministry of Science and Technology, together with the Development and Reform Commission, Ministry of Finance, Ministry of Education, and other relevant departments, officially launched the pilot work of the national science and technology infrastructure platform construction project. In 2004, the General Office of the State Council issued the *Outline for the Construction of the National Science and Technology Infrastructure Platform (2004-2010)*, and the Ministry of Science and Technology, Development and Reform Commission, Ministry of Finance, and Ministry of Education subsequently issued the *Implementation Opinions on the Construction of the National Science and Technology Infrastructure Platform During the 11th Five-Year Plan Period*, incorporating NSTL into the special platform construction fund established by the Ministry of Finance, mainly responsible for the construction of the scientific and technical literature platform. Using internet

technology, it introduced and built a batch of scientific and technical literature resources such as scientific and technical journals and books, forming a national scientific and technical literature resource guarantee system to comprehensively support various national scientific and technological innovation activities [9]. In 2011, the literature sharing platforms of public library systems, university library systems, and specialized library systems organized and implemented by NSTL passed the recognition of the Ministry of Science and Technology and the Ministry of Finance.

For over a decade, print scientific and technical book and literature resource construction has been NSTL's core business. NSTL has maintained stable acquisition of foreign scientific and technical print resources while introducing multiple foreign scientific and technical databases under the "national license" model, providing scientific and technical literature services for research users nationwide. NSTL's overall goal is to base itself on the overall, strategic, and authoritative nature of national scientific and technical literature information resource construction and services, organize various systematic scientific and technical information institutions to relatively completely collect domestic and foreign scientific and technical literature information resources. According to the overall deployment of the national science and technology basic condition platform, the NSTL scientific and technical literature resource sharing platform construction aims to integrate and expand various types of scientific and technical literature resources, gradually forming a scientific and technical information service network with international advanced levels. On the basis of fully utilizing various communication facilities, it forms a nationwide network system of scientific and technical information resources and services at all levels and of various types. The NSTL network service system (www.nstl.gov.cn), as a public welfare network scientific and technical service platform, integrates multi-language and multi-type scientific and technical literature abstract information, bibliographic information, and full texts. With the purpose of "user-oriented, honest service" and the goal of "resources to the unit, services to the desktop," it operates 7×24 hours, providing users nationwide with various literature information services including scientific and technical literature retrieval, document delivery, network reference consultation, international scientific citation database, and foreign back-issue journal full-text retrieval [10].

In March 2012, NSTL and CALIS signed a strategic cooperation agreement and officially launched the "NSTL Document Delivery Service (University Edition)." The strong alliance between the two major guarantee systems pushed collaborative construction and sharing to a higher level. NSTL resources were effectively embedded into the CALIS interlibrary loan service system, allowing university users to directly use their university library accounts to access NSTL's rich scientific and technical literature resources, thereby further improving the guarantee capability of scientific and technical literature information resources for university research users.

The wave of informatization is rapidly changing today's social life, triggering

significant changes in research paradigms. The emergence of e-Science, data-intensive research, and digital humanities has made the supporting role of scientific data in research activities increasingly significant. As the external digital information environment deepens, research user needs change, and information service providers expand their businesses, the print resource-based scientific and technical literature resources originally designed by NSTL cannot fully meet the requirements of research informatization in terms of either service content or service levels, requiring timely adjustments. Therefore, in the digital information environment, NSTL is winning new development momentum by enriching its digital resource system, deepening service levels, and innovating management systems and mechanisms in response to the requirements of the times. NSTL's nearly 20 years of construction, operation, maintenance, and management experience is worth careful summarization, especially its sustainable development strategies, models, and paths, which provide extremely valuable references for future similar projects.

3.4 National Center for Philosophy and Social Science Documentation (NCPSSD)—A Guarantee Condition for Philosophy and Social Science Innovation Development

The National Center for Philosophy and Social Science Documentation was approved by the Central Propaganda Department and is a philosophy and social science literature information service institution under the supervision of the Chinese Academy of Social Sciences and constructed by the CASS Library. On May 17, 2016, General Secretary Xi Jinping presided over the Philosophy and Social Science Work Symposium and delivered an important speech (the “5.17” speech), first proposing the major proposition of “accelerating the construction of philosophy and social sciences with Chinese characteristics,” emphasizing the need to focus on building philosophy and social sciences with Chinese characteristics that fully embody Chinese style and Chinese spirit in terms of guiding ideology, discipline system, academic system, and discourse system. The speech also profoundly expounded the basic principles for constructing philosophy and social sciences with Chinese characteristics. The “5.17” speech is a programmatic document guiding the long-term development of philosophy and social sciences in the new era. “Accelerating the construction of philosophy and social sciences with Chinese characteristics” reflects the Party Central Committee’s high regard for philosophy and social sciences and is also the noble mission of philosophy and social science workers. Similarly, constructing library and information science with Chinese characteristics is precisely the responsibility of library and information workers. In the “5.17” speech, Comrade Xi Jinping pointed out the need to use internet and big data technology to strengthen infrastructure and informatization construction of philosophy and social science books, literature, networks, and databases, accelerate the construction of the National Center for Philosophy and Social Science Documentation, and build a convenient and resource-sharing philosophy and social science research platform [11]. This is the clear instruction and specific deployment made by the Party

and state's top leader on literature information center construction. "Accelerating the construction of the National Center for Philosophy and Social Science Documentation" is an important component of "accelerating the construction of philosophy and social sciences with Chinese characteristics," with the former being the foundation and guarantee for the latter.

According to the arrangements of relevant central departments, the Chinese Academy of Social Sciences took the lead in constructing the National Center for Philosophy and Social Science Documentation, with the main tasks assigned to the CASS Library for implementation. After six months of intensive planning, the center was officially launched at the end of 2016. Over the past three years, the center has focused on the National Philosophy and Social Science Academic Journal Database, integrating over 2,000 domestic philosophy and social science academic journals (including excellent journals funded by the National Social Science Fund and authoritative and core journals in various disciplines), covering more than 10 million papers, over 8,000 foreign academic journals with more than 7 million papers, 150,000 academic achievements of the Chinese Academy of Social Sciences, as well as ancient books, pictures, and other materials. The online data totals more than 17 million entries, initially forming a batch of characteristic resource databases such as the National Philosophy and Social Science Academic Journal Database, Foreign Open Access Academic Journal Database, CASS Scientific Research Achievement Database, and Ancient Books Database. It has realized one-stop retrieval, browsing, and downloading of literature information and has become the largest professional information platform in philosophy and social sciences, providing public welfare and free academic information services to the whole society. In May 2019, the center's APP was officially launched, allowing users to access various resources of the center anytime and anywhere through mobile phones and tablets. Currently, the number of users is constantly rising, with over 1 million individual registered users and more than 10,000 institutional users covering domestic universities and research institutions in various fields, with cumulative clicks exceeding 400 million and downloads surpassing 26 million. Additionally, there are institutional users in more than 30 countries in North America, Europe, and along the "Belt and Road," receiving widespread attention from the international academic community [12]. The construction of the National Center for Philosophy and Social Science Documentation has provided great convenience for philosophy and social science workers. The center's public welfare and free principle has been widely recognized by scholars, and objectively, it has also opened a door for Chinese academia to "go global."

Constructing the National Center for Philosophy and Social Science Documentation to serve national philosophy and social science research requires sufficient funding guarantees. Currently, the center's funding mainly comes from the academy's information technology special funds and partial support from the National Philosophy and Social Science Planning Office. It is necessary to appropriately broaden channels and increase investment, and to innovate the management system and mechanisms of the center. At present, the center is under

the jurisdiction of the Chinese Academy of Social Sciences, and the management strategy relying on the CASS Library is feasible. However, consideration should be given to jointly establishing a philosophy and social science literature guarantee consortium with major domestic philosophy and social science literature information institutions as soon as possible, and strengthening cooperation with university CASHL. It is necessary to leverage the resource and service advantages of each collaborative unit, and consider establishing several discipline sub-centers, such as economics, law, literature, philosophy, history, and international studies. It is essential to strengthen the center's coordination capabilities, effectively schedule resources and services, and comprehensively improve literature information guarantee levels and the ability to support philosophy and social science innovation development.

3.5 Conceptualizing the National Document Information Guarantee System

Summarizing China's experience in document information resource guarantee system construction, we find that the major guarantee systems built and operational basically belong to a system-coordination-based guarantee model. There are two main modes of literature information coordination: regional coordination and systematic coordination. In early discussions on literature resource construction coordination and layout models, there was debate over whether to prioritize "regional coordination" or "systematic coordination," with "regional coordination" once holding the upper hand, advocating for the establishment of national, large-regional, and provincial three-level literature guarantee systems according to geographical scope. Why was the "systematic coordination" approach ultimately chosen and successful in practice? This is probably directly related to China's current library and information management system. China's major library and information units are respectively under the jurisdiction of education, science and technology, culture, and other competent authorities, with clear vertical hierarchical relationships. Institutions within each system have close connections and full cooperation, and user needs within the system show obvious convergence. In contrast, among numerous library and information institutions within a certain geographical area, business connections are relatively loose, funding sources are diverse, and user needs vary, making coordinated guarantee more difficult. Moreover, with the advancement of communication technology, especially the emergence of the internet, online information dissemination and document delivery have become rapid and convenient, effectively overcoming geographical barriers to literature utilization. In the foreseeable future, the systematic coordination-based literature information resource guarantee model will remain the mainstream trend. An important future task is to strengthen coordination among various systematic guarantee systems, substantively integrate various systematic platforms, and ultimately form a cross-regional, cross-departmental, and cross-system national document information guarantee system. This is a construction task with overall and strategic significance.

In the construction of the national document information guarantee system, the National Library of China should play a greater organizational and coordinating role. The National Library of China is the national team and pacesetter of China's library cause. For over a century, the National Library has adhered to the purpose of "inheriting civilization and serving society," building and accumulating rich and vast traditional and digital resources, and has become the world's largest Chinese literature collection and preservation center. It currently holds 39,011,900 items in physical collections, including 26,880,300 Chinese documents and 12,131,600 foreign documents, with collections growing at an average annual rate of 1.3 million items. The National Library has achieved remarkable results in digital construction. In 1996, the "China Experimental Digital Library" project led by the National Library was launched, one of China's earliest digital library research projects. Subsequently, it implemented projects such as the National Digital Library Project, Digital Library Promotion Project, and Cultural Information Resource Sharing Project, greatly enriching digital resources and strengthening literature information guarantee capabilities. After years of construction and accumulation, by the end of 2018, the National Library's digital resources totaled 1,960.91 TB, including 1,390.41 TB of characteristic resources, 191.6 TB of purchased databases, 209.98 TB of network navigation and collection resources, 162.4 TB of solicited digital resources, and 6.48 TB of deposited electronic newspapers. It has 254 purchased databases, including 126 foreign databases and 128 Chinese databases. Resource types include text, images, audio, video, network resources, and other forms, covering modern literature, Republic of China period literature, and rare ancient books [13]. The National Library's high-quality resources occupy an important position in the national document information resource guarantee system. With relatively adequate funding guarantees, superior library conditions, high-quality personnel, and management advantages, the National Library will certainly play a greater role in library services in the new era.

Document information resources are, after all, strategic resources whose important value in national economic construction, social development, and scientific and technological progress cannot be underestimated. The strategic significance of high-end scientific and technical literature information resources is particularly prominent. In current international competition, hostile forces' ambition to contain China's development is obvious. They use extreme pressure such as increased tariffs and, under the guise of intellectual property protection, implement blockades on high-end technology and restrict talent exchanges, seriously disrupting normal international order and state relations. Therefore, the long-term preservation and secure utilization of digital resources must be highly attended to, and the strategic national reserve of literature information resources should be put on the agenda early. Practical work should be done well in self-building, introduction, preservation, and utilization of resources, with particular emphasis on information security and taking preventive measures.

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An Analysis of the Historical Trajectory and Driving Forces of Library and Information Development in New China

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Abstract: [Purpose/significance] To review the historical trajectory of library and information development since the founding of the People's Republic of China, and to provide fresh experience for library and information construction in the new era. [Method/process] Summarized the main achievements of library and information development over the past 70 years from seven aspects; discussed the development motivation of library and information in New China from three dimensions: social document information demand, macro-social environment, and internal factors of library and information agencies; took the construction of document information guarantee systems such as CALIS, NSTL, and NCPSD as examples, and introduced the landmark achievements of China's library and information construction. [Result/conclusion] Proposed suggestions for the further construction of the national document information guarantee system.

Keywords: Library and information cause in China; Historical development; Motivation analysis; Construction of document information guarantee system

2017-2019 *Library and Information Service* Outstanding Papers

Since 2014, this journal has published the TOP10 highly cited papers of the current year and the previous two years. In 2019, *Library and Information Service* continued the selection method of the previous year, selecting highly cited and highly downloaded papers published in the past three years. Based on the TOP50 of each year and taking into account the publication time, the editorial department finally selected 20 papers for publication. The outstanding papers of *Library and Information Service* for 2017-2019 are as follows:

1. A Preliminary Study on the Operation Mechanism of Citizen Science Projects Based on the Crowdsourcing Model—Taking EvolutionMegaLab as an Example
2. Analysis of User Churn Behavior Model and Influencing Factors of University Library WeChat Official Accounts
3. Research on the Influence Mechanism of Mobile Game User Stickiness: Integrating Flow Theory and TAM Theory
4. Analysis of Emergency Event Microblog Public Opinion Evolution Integrating Topic and Sentiment Features

5. Construction of Issues in China's Government Data Opening and Sharing Policy
6. A Review of Fine-Grained Sentiment Analysis Research
7. Research on Influencing Factors of Knowledge Sharing in Online Health Communities
8. Current Status and Enlightenment of Cultural and Creative Product Development in American Libraries
9. Rational Examination of Library Reading Promotion
10. Review of Research on the Digitalization of Intangible Cultural Heritage
11. Research Review and Prospect of User Fear of Missing Out (FoMO) in Mobile Social Media Environments
12. Review of Digital Literacy Training Model Development in the United States, Europe, Japan, and China
13. Research on Book Sharing Models Under Internet Thinking
14. New Positioning and New Understanding of Intelligence Science and Intelligence Work in the New Era—Insights from the “Intelligence Science and Intelligence Work Development Forum (2017)”
15. Construction of a Digital Library User Persona Model Driven by Data
16. Research on the Influence Mechanism of Mobile Game User Stickiness: Integrating Flow Theory and TAM Theory
17. Research on Influencing Factors of Knowledge Sharing in Online Health Communities
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