From Cooperative to Collective Collection: An 80-Year Retrospective on the Farmington Plan (Postprint)

Authors: Zhang Kang, Li Zhuozhuo, Miao Miao'er

Date: 2023-04-01T16:02:57+00:00

Abstract

[Objective/Significance] This study reviews the exploration journey of library information resource sharing since the Farmington Plan, analyzes the deep value and significance of cooperative collections and collective collections, and establishes anchor points for research and practice in China's library information resource construction in the new era. [Method/Process] The study reviews two "milestones" in the process of library information resource sharing since the 1940s—cooperative collections and collective collections, reveals the underlying value and significance, and analyzes how these values and significance have driven the shift from cooperative collections to collective collections. [Results/Conclusion] The study finds that the Farmington Plan laid the foundation for early cooperative collection development in three aspects: goal orientation, connotation design, and implementation pathways. In the 1970s and 1990s, explorations of cooperative collections successively underwent reflections on "high altruism" and "collaborative cooperative collections," completing transitions toward "respecting member interests" and "complementary cooperative collections," and were reconstructed at the beginning of the 21st century through data-driven significance design that highlighted cooperative benefits, transitioning to collective collections under systematic consciousness. These values and significance provide enlightenment for China's library information resource sharing practice: strengthening the strategic supporting role of library information resource construction, pursuing a win-win concept of "the more precise, the more collaborative," and highlighting the performance orientation of data empowerment.

Full Text

From Cooperative Collection to Collective Collection: Reflections 80 Years After the Farmington Plan

Zhang Kang, Li Zhuozhuo, Miao Miao'er School of Society, Soochow University, Suzhou 215123

Abstract:
[**Purpose/Significance**] This paper reviews the evolution of library information resource sharing since the Farmington Plan, analyzing the deep value and significance of cooperative and collective collections to anchor research and practice in information resource development for Chinese libraries in the new era.
[**Method/Process**] The study examines two "milestones" in library information resource sharing since the 1940s—cooperative collection and collective collection—revealing their underlying values and analyzing how these values drove the shift from cooperative to collective collection.
[**Result/Conclusion**] The study finds that the Farmington Plan laid the foundation for early cooperative collection development in three aspects: goal orientation, conceptual framework, and implementation approach. In the 1970s and 1990s, explorations of cooperative collection underwent two phases of reflection: first on "high altruism" and then on "synergistic cooperative collection," completing a transformation toward "respecting member interests" and "complementary cooperative collection." At the turn of the 21st century, this model was reconstructed under a data-driven framework that highlighted collaborative benefits, shifting toward collective collection with a systems perspective. These values offer enlightenment for China's library information resource sharing practices: strengthening the strategic supporting role of library information resource development, pursuing a win-win philosophy of greater precision enabling greater collaboration, and highlighting the efficiency orientation of data empowerment.

Keywords: Farmington Plan; cooperative collection; collective collection; information resource sharing; information resource development
Classification Number: G250

---

2. Literature Review

Since the Farmington Plan first gave rise to cooperative collection, professional literature in every era has documented the efforts of library scholars and practitioners in information resource development, leaving a valuable legacy for the field.

2.1 Research on the Farmington Plan

The Farmington Plan is widely cited in library and information science and publishing studies primarily for its contributions to information resource sharing. Early research amply demonstrated this conclusion. In 1959, V. Robert's survey of foreign-language books and coverage in the United States noted that the plan represented one of the most important, enlightened, and promising library cooperation initiatives in American library history [5]. Additionally, decennial surveys conducted by the Library of Congress during the plan's operation examining its purpose, scope, and results [6], along with historical reviews by Wang Jinsong et al. [7], powerfully confirmed this assessment. However, following the plan's bankruptcy, some 质疑 emerged. For instance, H. Edelman, based on surveys of participants, argued that the Farmington Plan flooded American libraries with large quantities of low-use foreign materials lacking necessary technical support and funding mechanisms, making it difficult for the established foreign-language literature guarantee system to deliver practical value [8]. Yet C.Y. Shelton, by comparing the Farmington Plan's cooperative collection practices with the achievements of the Pacific Rim Digital Library Alliance, identified the primary cause of its failure as fiscal difficulties in the United States that led to reduced library funding, rather than an inability to conduct information resource development through cooperation—arguing instead that libraries should strengthen such collaboration [9]. These studies, employing historical review and status investigation methods, have fully mined archival materials to outline the basic profile of the Farmington Plan: a library information resource co-construction and sharing practice led by the U.S. national library, aimed at guaranteeing access to foreign research materials. However, few studies have explored the deeper values underlying the Farmington Plan or examined it from the perspective of the entire information resource sharing trajectory, and even fewer have connected it to subsequent cooperative and collective collection developments.

2.2 Research on Cooperative Collection

Since the 1940s, cooperative collection theory and practice have yielded abundant results, particularly with the advancement of cooperative collection projects in the United States, Finland, Australia, and other countries, further enriching the research landscape. Related studies have focused on project examinations, conceptual analyses, and operational mechanisms. For example, J. Sohn, reviewing the history of cooperative collection development and combining it with case practices from northern U.S. libraries, found that cooperative collection holds important value in saving library space and operational management costs, improving library services, and enhancing user satisfaction and social trust, with financial support and sound mechanisms serving as important foundations for project sustainability [10]. Guo Xiaohong examined the Maine Shared Print Collection Project [11] and the Western Regional Storage Trust [12], introducing their backgrounds, profiles, management models, and

operational mechanisms, noting that organizational system guarantees, technical support, member coordination, and agreement formulation are essential for successful cooperative collection. Similar studies include those by C.Y. Shelton and G.N. Dannelly. Shelton surveyed 18 successful cooperative collection projects in print selection, electronic acquisition, resource access, storage, and preservation, identifying effective communication and negotiation, clear goal and priority area determination, and corresponding technical infrastructure as prerequisites for success [9]. Dannelly argued that with changes in library online public access catalogs and related technologies, the future of cooperative collection lies in building closely linked library consortia, focusing on providing richer resource repositories, using funds economically, and developing common action programs [13]. M. Mallory's survey of 84 U.S. cooperative collection projects found that such collaboration had become a universal attempt at information resource sharing, with university libraries participating far more than public libraries, and cooperative objects gradually shifting from print to electronic documents, with collaborative electronic procurement sparking a boom in cooperative collection development [14]. Bosch et al., examining the Western U.S. library alliance cooperative collection project, used a balanced scorecard to survey resource data, financial data, usage data, and user satisfaction, proposing quantitative evaluation indicators for cooperative collection success [15]. These studies mostly rely on cooperative collection project cases to introduce backgrounds, operations, and effectiveness, with strong promotional characteristics. They examine cooperative collection as a means of information resource sharing but lack deeper reflection on the underlying significance, and few studies have attended to the conceptual and formal transformations of "respecting member interests" and "complementary cooperative collection" in its development, resulting in relatively weak theoretical research. This represents a deep-seated reason why cooperative collection has encountered development bottlenecks and been replaced by collective collection in recent years.

2.3 Research on Collective Collection

As a relatively new concept, collective collection has received less attention compared to the abundant results on cooperative collection. R.H. Kieft, in reviewing the history of U.S. print collection policies, noted that collective collection represents a more advanced information resource sharing strategy than cooperative collection, offering greater adaptability in an environment of increasingly rich digital collections, continuously restructured knowledge production and distribution, and changing technology and library operations [16]. Building on this, S. Demas argued that while cooperative collection strengthens connections between libraries and users and among libraries themselves, libraries must reconsider information resource sharing within the context of local, regional, and national priorities, proposing a collaborative framework for collective collection serving regional and national strategies [17]. Similar to views held by G. Jeremy and L. Dempsey, these attempts seek to elevate information resource sharing

to a strategic height at the full-system level, positioning collective collection as the mainstream direction for future information resource sharing [18]. Meanwhile, with the success and development of collective collection projects, some studies have employed case study methods to focus on specific initiatives. For instance, N.L. Helen provided a comprehensive introduction to the GreenGlass for Groups tool used in Michigan's collective collection project for analyzing sharing mechanisms and retention requirements data [19]. T. Bakker, reviewing the history of national information resource sharing in the Netherlands, pointed out that traditional cooperative collection projects did not provide genuine "solutions" to the dilemmas facing information resource sharing, whereas collective collection, born in the transition to a digital environment, offers libraries new opportunities. Bakker selected three collective collection projects as cases to explore how collective collection is superseding cooperative collection [20]. Wang Hongxia examined the BTAA collective collection project from strategic, collection scale, main project, and collection evaluation perspectives, noting that Chinese libraries should establish strong partnerships, emphasize strategic planning and policy frameworks, promote staged development by type, and attach importance to collection development assessment when advancing collective collection construction [21]. Xu Wei et al., responding to the demands of disciplinary specialization, shared granularity, and explicit benefits under the "Double First-Class" background, introduced the concept of collective collection and proposed data-driven collective collection and precise collaboration under a systems consciousness [22]. Similar to cooperative collection research, collective collection studies exhibit evident evidence-based practice thinking, related to the social science attributes and problem-oriented nature of library and information science. Collective collection research is closely integrated with practical project development, aiming to solve practical problems in implementation, with obvious tracking and purposive characteristics focusing on experience summarization during implementation. However, these studies lack further theoretical interpretation of the information resource construction theories underlying collective collection.

Based on this observation, this study adopts a historical review method, using the Farmington Plan as a starting point to reflect on the evolution of information resource construction concepts underlying the shift from cooperative to collective collection. It aims to reveal the deep significance of these values and how they drove the transition, providing useful insights for information resource sharing in China.

3. Origins of the Farmington Plan and the Emergence of Cooperative Collection

The Farmington Plan can be traced back to a special meeting held in Farmington, Connecticut in 1942, which directly led to the formation of the Farmington Plan from 1948-1972 [23]. Deeply influenced by the "Wartime Publications Cooperative Acquisition Plan (federally led)," the plan aimed to systematically

collect all types of publications from around the world, ensuring that any foreign publication of interest to American researchers would be held by at least one U.S. library, promptly listed in the *National Union Catalog*, and made available for interlibrary loan or photocopying. The plan's emergence was inseparable from America's post-WWII rise and adjustments in library collection policies. At that time, motivated by international strategic considerations, the U.S. federal government provided special funding. Under the coordination of the Foreign Publications Acquisition Committee (Farmington Plan Committee), research libraries and public libraries collectively cooperated to purchase foreign books, helping libraries overcome funding shortages and enhance their competitiveness while establishing a cooperative foreign research materials collection system in the United States.

From the plan's implementation background and actual effects, its promoters and participants seemingly anticipated two types of value from the outset: use value and existence value. Use value referred to building a shared guarantee system for American foreign research materials to meet scholars' needs for effective access and support further scientific research—an objective similar to the value concept advocated by Bush in *As We May Think* regarding guaranteeing effective access, utilization, and transformation of scientific and technological achievements [24]. Existence value meant that cooperative collection, as an innovation, marked the birth of a co-construction and sharing model for information resource development, demonstrating that libraries could enhance their competitiveness through cooperation and highlighting the value of library information resource sharing in an open, sharing, and collaborative social environment. To realize these values, the plan adopted a phased approach to gradually expand collection scope, striving to comprehensively collect all research materials worldwide. In 1948, the plan initially collected publications from France, Sweden, and Switzerland; from 1948-1951, following disciplinary division of labor, it added publications from 13 Western European countries plus Australia, New Zealand, and South Africa; from 1951, it implemented a strategy of one library collecting all recent publications from one country, further expanding collection scope; by 1953, it covered 79 countries, and by 1961, it had extended to 123 countries and 805 categories of research materials [25]. Notably, two-thirds of the monographs collected through the plan were unique exclusive resources difficult to obtain elsewhere, and 12.5% of collected publications met researchers' usage needs.

Beyond this, to ensure effective use value, the plan's leaders required participating libraries to systematically organize collected documents according to unified standards to guarantee effective sharing of co-constructed resources. The plan improved the Library of Congress Card Union Catalog, exercised bibliographic control over collected materials, uniformly published the printed *National Union Catalog*, and implemented fully open systems across all member libraries, attempting to promote resource sharing through bibliographic information control [5]. Particularly with the development and promotion of MARC in 1965, the organization and utilization of library cataloging information fundamentally

changed, forming a cooperative collection system based on a bibliographic community. Foreign research materials collected through this approach peaked in 1972 at over 115,000 titles [6], effectively meeting U.S. demand for foreign literature.

Thus, the United States formed a foreign-language literature guarantee system with low duplication and comprehensive disciplinary coverage, enabling researchers to share collected materials through interlibrary loan or copying. This pioneering initiative was called the first practice of cooperative collection. Although led by the Library of Congress representing the federal government, it held epoch-making significance in the history of information resource sharing. This review reveals that as the origin of cooperative collection, the Farmington Plan bequeathed several valuable legacies.

The first legacy was providing a reference for determining cooperative collection goals. As described above, the concepts supporting the Farmington Plan included: (1) meeting American scholars' needs for foreign research materials by comprehensively collecting worldwide research materials, at minimum covering literature needed by key disciplines and important scholars; (2) achieving research material sharing through systematic organization and processing of collected documents and mutual dependence and coordination among members. The fundamental question derived from these concepts was how to establish a "large and comprehensive" resource sharing system through collective collaboration to meet American researchers' effective access to worldwide research materials. Therefore, in nature, the Farmington Plan's influence on subsequent cooperative collection was constituted by its goals, providing reference for cooperative collection objective-setting—namely, achieving quality service by providing resources not held locally, maximizing unnecessary duplication reduction through interdependent and coordinated approaches, and guiding future cooperative collection development around this goal.

The second legacy was establishing cooperative collection as the prerequisite and foundation for library consortia to conduct information resource sharing. The Farmington Plan broke the single-library collection development model, creating a multi-type library co-construction and sharing approach called cooperative collection, which became an important basis for early single libraries to aggregate demand and form library consortia.

The third legacy was the various operations and activities undertaken to realize use value. To achieve this, the plan's leaders established principles for cooperative collection development, methods (thematic cooperation, disciplinary cooperation, regional division of labor), and organizational techniques and methods, providing main content for cooperative collection implementation approaches. For example, the Farmington Plan's cooperative collection functional system included supporting interlibrary loan, compiling union catalogs, interlibrary photocopying services, document delivery, procurement information notification, cooperative purchasing, and thematic division of collection responsibilities [26].

However, around the 1970s, the Farmington Plan's leaders discovered that this decentralized collection strategy showed no obvious superiority in reducing resource development costs, instead creating enormous financial burdens and operational pressures for both the federal government and member libraries. Some funders consequently questioned the plan's value. Subsequently, with substantial federal funding cuts for libraries, the Farmington Plan ended with the closure of the Tokyo Center in 1981. Yet cooperative collection practice did not cease; rather, against the backdrop of funding reductions, it ushered in new development—cooperative collection led by the Library of Congress gave way to regional and spontaneous practices represented by OCLC and the Greater Western Library Alliance.

4. Cooperative Collection Since the 1970s

Beginning in the 1970s, as the United States entered a period of economic recession and political conservatism, national support for libraries declined and some cooperative collection projects ceased due to funding shortages, forcing the Farmington Plan to discontinue. However, cooperative collection did not stop. After undergoing adjustments in value reflection, mission reconstruction, functional design, service reshaping, and the shift from ownership to access, cooperative collection transformed from synergistic to complementary models, redefining its objectives, characteristics, and implementation approaches under information resource sharing, and resurgent under the organizational guarantee of numerous new library consortia. During this process, two significant changes emerged: first, reflection on the high altruism of cooperative collection; second, reflection on synergistic cooperative collection.

4.1 Reflection on High Altruism

The first reflection began in the 1970s. After the Farmington Plan's bankruptcy, some participants realized that the high altruism emphasized by cooperative collection might lack economic efficiency and produce unpredictable outcomes [27], with the plan's bankruptcy illustrating this point. For member libraries, their greatest expectation in joining cooperative programs was to obtain more benefits, such as overcoming limited funding and enriching available collections. Therefore, members tended to prioritize purchasing materials needed by their own users to enrich local collections, only secondarily developing non-core, infrequently used materials (those with obvious value to other members). However, in the Farmington Plan's cooperative collection, members' self-interested characteristics were often diluted by the shared use-value objective, instead highlighting members' collective effort to build a "large and comprehensive" collection structure to meet overall needs—an information resource development practice developed under the concept of "ownership." By ignoring members' original motivations for joining, the plan had inherent defects in mobilizing participant enthusiasm and promoting sustainable, healthy project development.

In contrast, when establishing their cooperative collection plan, the librarians

of Duke University and the University of North Carolina agreed that members should not be required to sacrifice any interests; rather, benefits of participation should be made explicit. This principle established a foundation for the long-term sustainability of their cooperative collection. In 1961, Duke University Library and the University of North Carolina Library renegotiated their cooperation agreement, weighing the pros and cons of participating in local versus national cooperative acquisition plans (such as the Farmington Plan). In 1963, Duke librarian Powell wrote to North Carolina librarian Orne to discuss whether both libraries should abandon their Latin American studies cooperative collection agreement to support the national plan. Orne replied that participating in the national plan must align with each library's self-interest. After discussion, both libraries concluded that the Farmington Plan's emphasis on high altruism contradicted the inherently self-interested nature of cooperative collection, violating their established principles [28]. Consequently, they decided not to join the Farmington Plan and continued supporting the Latin American cooperative collection program.

4.2 Reflection on Synergistic Cooperative Collection

The second reflection began in the 1990s. With the growing importance of multidisciplinary research, widespread application of computers, databases, multimedia, and communication technologies in libraries, especially the emergence and promotion of digital libraries, and the formation of new-generation library cooperation networks characterized by regionalism and spontaneity, cooperative collection underwent revolutionary change—synergistic cooperative collection gave way to complementary cooperative collection. In terms of the Farmington Plan's inherent attributes, cooperative collection mostly consisted of library resource co-construction and sharing practices connected mainly through interlibrary loan and union catalogs [29]. Libraries could identify collection resources through union catalogs, determine collection scope, and provide access to readers through interlibrary loan and copying. Under high-altruism guidance, collected materials pursued comprehensiveness, attempting to collect all research materials completely. Member libraries' division of labor was determined based on comprehensive needs of the entire research community for disciplinary materials, thematic materials, and regional languages, emphasizing service reciprocity while lacking deep and detailed resource coordination. Thus, this cooperation was called collection resource service coordination—sharing whatever resources were owned.

However, with library funding cuts, geometric growth of research materials, and rising per-unit resource acquisition costs, libraries shifted from emphasizing "ownership" to highlighting "access," forcing them to consider a more effective information resource co-construction and sharing approach—complementary cooperative collection. Complementary cooperative collection, based on the principle of respecting member interests, establishes differentiated collections around core local needs, attempting to use limited funds to purchase research materials

for advantageous and key disciplines and develop multidisciplinary cooperative collection. For example, in the renowned Triangle Research Libraries Network cooperative collection plan, the University of North Carolina at Chapel Hill purchased professional books and dictionaries for language studies, plus high-priced publications, microforms, newspapers, and back issues; North Carolina State University purchased U.S. patent microforms; and Duke University purchased foreign area studies materials. Later, due to dramatic increases in scientific and medical journal quantities and prices, and to address funding shortages and expand cooperation scope, the three libraries reached agreements in 1990 for cooperative collection of non-print materials, government documents, and medical and scientific resources. Similar cases include the AAU/ARL Global Resources Program [30]. These practices successfully demonstrated that even with limited funding, libraries could meet user needs through cooperation, injecting fresh vitality into further cooperative collection development.

5. From Cooperative to Collective Collection: The Visualization of Shared Value Through Data-Driven Approaches

The concept of collective collection has become widely known as representing the future of library collection management—marking libraries' continuous development toward cooperation and collaboration, creating opportunities for individual libraries to maximize value through collective action and function sharing. It has been adopted in various ways in practice with certain achievements.

5.1 Aspirations of Collective Collection

In the 21st-century network environment, libraries face overloaded collections, with critical mass becoming an unavoidable issue in information resource development [31]. In other words, the continuous accumulation of print resources increases spatial pressure on libraries, forcing a transition from ownership to access-based models to release space and value, making libraries increasingly rooted in network environments. Meanwhile, collections are no longer the core of users' information lives—they live in a resource-rich network. Libraries' goal is no longer to build large local collections but to facilitate user access to resources needed for research and learning. Consequently, libraries must often choose between print and digital resources, maximizing value for money and service benefits while minimizing content duplication. Any library may need to rely on the vast resource system of one or several library consortia. These two transformations pose new requirements for information resource sharing: establishing a large-scale information resource sharing vision that highlights collaborative benefits, and connecting it to users' areas of interest through stronger information resource sharing networks and closer resource synergy systems [32].

Against this backdrop, the concept of collective collection emerged. In July 2014, OCLC Research was awarded the ALCTS Presidential Citation for contributions to collective collection. In June 2016, OCLC published the report

Strength in Numbers: The Research Libraries UK, in which researchers described the current library information resource development environment [32]: (1) All library services and activities extend beyond local collections; (2) In the broad network environment, there is demand for acquiring and disseminating aggregated library resources (collective collection is an aggregated resource); (3) At the macro-system level, opportunities exist for optimizing library resource supply and demand. The report defined collective collection as "the merged collection resources of two or more institutions." This definition elevates the concept of library information resource development to a level higher than individual libraries, expanding its boundaries to include all collection resources within a library system (viewed as specific collective assets). Collective collection is not a simple sum of several libraries' holdings but rather a collection formed after merging and deduplication to produce a unique set of different collection resources held by a group of libraries, thereby highlighting the distinctive value of each library's resources [18]. As a new information resource construction mechanism, collective collection symbolizes a new shift in library management strategy: moving from providing local library collections and services to greater reliance on cooperative mechanisms, collective collections, and shared technology platforms—management "above the institution."

5.2 Collective Collection Under Meaning Reconstruction

From the above background and definition, collective collection seems to have been expected to deliver three values from the outset: (1) As an analytical tool for collection status, helping understand the scope and depth of collective holdings and providing a data foundation for identifying individual member strengths and group redundancies; (2) Through systematic cooperative consciousness, helping individual libraries make decisions by using collective collection data to formulate more scientific collection development strategies (acquisition, retention, and cancellation) within a broader context; (3) For the dispersion of special collection resources (such as distinctive holdings), helping libraries systematically aggregate collection resources to expand the scope of individual libraries and generate critical mass, enabling more specialized and extensive contributions within defined responsibilities.

The above analysis of collective collection's background and significance shows that: (1) Collective collection establishes a full-system perspective for information resource sharing. Unlike cooperative collection's emphasis on high altruism or self-interest, it stresses that libraries and their service institutions should focus more on full-system information resource development (whether regional, national, or global). That is, collective collection is not simple information resource aggregation but aims to provide deep, comprehensive support for knowledge tracking, learning, evaluation, utilization, and creation. (2) Different from cooperative collection's focus on pre-collection cooperative purchasing, collective collection refers to all collection resources available in the library system, which can be books, journals, data, or other special materials. For example, the

BTAA and UKRL collective collections consist largely of print literature, while the New York Art Library Alliance's collective collection mainly comprises exhibition catalogs and atlases from the Frick Art Museum Library, Metropolitan Museum of Art's Thomas J. Watson Library, Brooklyn Museum Library, and Museum of Modern Art Library. (3) Collective collection helps identify and disperse information resource reserve risks. Being data-based, it can precisely identify the scarcity level of a resource across the system using multi-source complete data, enabling tiered preservation systems based on scarcity, such as UKRL's distributed collective collection model requiring at least two copies of low-use print materials to be permanently preserved and accessible. (4) Collective collection highlights collaborative benefits. Unlike cooperative collection's pursuit of coverage scope, collective collection integrates resources around user needs to highlight the degree of support for user requirements. Moreover, due to its data-driven characteristics, collaborative benefits are visible and explicit. (5) Collective collection emphasizes a multi-center system for information resource guarantee and sharing. Compared with cooperative collection, collective collection places greater emphasis on filling gaps and supplementing deficiencies in libraries' core and distinctive resources. Since each library's collection structure has relative scarcity characteristics, different resource guarantee and sharing centers form within the alliance around different resources.

5.3 Collective Collection Project Practice

Since its proposal in 2013, collective collection has attracted significant attention and has developed into the theoretical foundation for OCLC's global library co-construction and sharing strategy. Project practices have demonstrated its unique value in explicitizing collaborative benefits through data empowerment.

5.3.1 BTAA Collective Collection: Data-Driven System Optimization Consciousness The BTAA collective collection is established on a data-driven basis, aiming to form a full-system consciousness and overall benefits, representing a retrospective and developmental coordination model [33]. Data is the key and foundation of the BTAA collective collection. On one hand, data determines how BTAA member libraries participate in building the collective collection project; on the other hand, data serves as a dynamic value analysis tool that can highlight the value members gain from participation and their contributions to the entire system from quantitative and visual perspectives. Simply put, BTAA's data-driven system optimization consciousness is realized through data management, which provides evidence for members' participation in collective action and helps them make optimal whole-system benefit decisions. BTAA's data management work mainly includes three aspects [34]: (1) Systematically integrating collection resource metadata by establishing unified universal metadata standards to consolidate all collection data (such as cataloging data) from BTAA member libraries and depositing it in the WorldShare ILL platform's ReCAP shared collection. (2) Submitting operational data using unified data identifiers (such as ISBN and DOI) to maintain statistics on

interlibrary loan, circulation, and e-resource download usage data for the BTAA collective collection, providing dynamic evidence for project development. (3) Aggregating member libraries' collection development policy data, summarizing and researching these policy data to provide decision-making basis for scientifically coordinating members' collection development policies and achieving consistency in collective action. Based on these data, BTAA has formed a data-driven, full-system information resource development consciousness, providing intelligence support for monitoring, benefit evaluation, and optimization of collective action, and assisting members in pursuing overall optimal collective action in resource sharing (expanding accessible collections), digitization strategy selection (expanding access to available collections), and replication sharing (integrating collections to acquire and preserve academic and cultural memory).

5.3.2 UKRL Collective Collection: Explicit Shared Value By aggregating member data, the UKRL project mapped a collective collection development blueprint shared by 32 member libraries, highlighting shared value from both internal overlap and relative scarcity perspectives [35]. First, UKRL systematically examined internal and external collection overlaps. Internal overlap refers to knowledge duplication within the collective collection, with UKRL using duplicate rates of single works as the statistical unit, including duplicate copies and different editions of the same work. The UKRL project established 45,800 distinct subject term facets using Faceted Application of Subject Terminology (FAST) [36] by comparing with WorldCat bibliographic records for internal overlap deduplication, aiming to identify potential redundancies and sharing advantages among members. External overlap refers to the similarity between UKRL collective collection resources and other resource sets, aiming to measure the development potential of the full-system collection and help formulate long-term strategies, such as comparing with HathiTrust's digital literature resources to provide decision-making intelligence for digital preservation strategies. Second, based on precise identification of collection overlaps, UKRL further clarified that relative scarcity and uniqueness are important references for determining cooperation methods and themes, providing a basis for measuring individual members' unique contributions to the collective collection—thanks to FAST's successful application in helping identify members' cooperative interests and development potential in specific themes (complementarity of relatively scarce resources).

6. Implications of Cooperative and Collective Collection for China's Library Information Resource Sharing

As a pioneering initiative in information resource sharing, cooperative collection provided experience and direction for solving problems such as funding shortages, collection overload, and suboptimal collection structure and resource allocation. However, in the new information environment, collective collection has deepened information resource sharing again, building a more robust "circle of

friends" based on deep resource cooperation under the grand sharing agreement, offering the following enlightenment for China's information resource sharing.

6.1 Strengthening the Strategic Supporting Value of Library Information Resource Guarantee

The strategic supporting value of library information resources is an important goal and development direction for current information resource sharing. For individual libraries, current information resource development emphasizes ownership in guarantee and benefits in sharing, highlighting the explicitization of libraries' external strategic support role and requiring them to change from the past resource-dominated model of "providing whatever services we have" [37] to seeking cooperation with other libraries based on strategic service needs and customizing cooperation plans. For library consortia, development goals should not only focus on achieving their own strategic objectives but also attempt to integrate these objectives into the national context of information resources as strategic resources, considering the supporting role of library information resource guarantee in national and regional development strategies and treating literature information resources as essential strategic innovation resource elements [38]. Compared with cooperative collection, collective collection holds greater advantage in this regard, helping China's library information resource sharing consider the reliability, stability, and quality of China's literature information resource guarantee system in the global allocation of literature information resources under national innovation strategy [39]. For member libraries, collective collection can help assess visible benefits in resource and cost investment; for the system, collective collection focuses on performance evaluation of the guarantee system, emphasizing service benefits of literature information resource guarantee systems, helping library consortia and member libraries examine questions of "what information resources can we have," "what do we need," "what else do we need," and "can we continuously have these resources" from the strategic height of service demand, rather than merely "what we have" and "how much we have."

Currently, under the national strategy of scientific and technological self-reliance, information resources as strategic resources pose new requirements for information resource sharing from a macro-system perspective: examining security and efficiency issues of information resource guarantee from higher levels [40], focusing on uncertainties faced by information resource guarantee systems in complex environments (such as blockades and monopolies of foreign information resources, destruction of print literature in wars and natural disasters), thereby using data to conduct evaluation and forecasting of information resource guarantee security, efficiency, and supporting role under the guidance of the scientific and technological self-reliance strategy [41], breaking existing block barriers in library consortia and supporting cross-system deep library cooperation driven by fine-grained precise resource services, assisting libraries in pursuing collective action for overall optimization around strategic support

in information resource development practice.

6.2 Pursuing a Win-Win Philosophy of Greater Precision Enabling Greater Collaboration

Precise and collaborative development is an important pathway to improving the overall efficiency of library information resource guarantee systems and promoting deep library cooperation. During the cooperative collection period, most library consortia pursued "large and comprehensive" scaled collection construction, striving to include as many member libraries as possible. Member libraries' motivation for cooperation was mainly to obtain literature resources and services they lacked, with consortia coordinating collective action through joint procurement, bibliographic comparison, and interlibrary loan. For member libraries, joining consortia tended toward "formal cooperation," mostly generating sharing connections only when interlibrary loan needs arose, while lacking substantive connections in co-construction, thus failing to form substantive co-construction and sharing activities [22]. For example, examining China's university library consortia from the perspective of machine-readable cataloging data, by 2018, CALIS had over 1,700 member libraries, but only 695 actually participated (about 40%), with merely 136 core active members (only 8%) [42]. For entire consortia, although increasing member libraries enriched collection quantity and variety, such resources often had high overlap, with relatively insufficient scarce and distinctive resources. According to CALIS union catalog data from 2015-2018, exclusive collection resources in Chinese university libraries accounted for about 0.42% of total volumes, approximately 11.22% of total categories, while distinctive collection resources accounted for 5.74% of total volumes, about 32.42% of total categories [25]. This high homogeneity and massive scale increased costs and difficulties for deep coordination among members, affecting the entire system's flexibility and specificity.

Under collective collection, however, information resource sharing must first clarify which resources and services are strategically needed, what support these can provide for strategy, and how to provide such support, thus helping libraries make more precise choices regarding cooperation partners, methods, and content. Consortia can help member libraries explore optimal cooperation paths based on cooperative efficiency and strategic support, using data visualization of collection benefits and advantageous holdings, transforming from formal cooperation to deep collaboration and achieving two-way cooperation in co-construction and sharing. For example, guided by the philosophy of greater precision enabling greater collaboration, the BTAA project uses WorldCat to analyze collective collection, organizing data from different sources and structures to form dashboards that reveal collective collection structure, analyze member cooperation benefits, predict future status and cooperation prospects, and dynamically monitor collective collection changes, providing data foundations and intelligence support for precise cooperation among members.

6.3 Highlighting the Efficiency Orientation of Data Empowerment

The shift from cooperative to collective collection in information resource sharing has integrated data across previously fragmented information resource sharing systems. This unified data foundation provides crucial support for conducting precise cooperation and establishing dynamic complementary information resource guarantee systems. For China's library consortia, integrating fragmented heterogeneous data and building high-quality underlying data foundations are major obstacles to establishing dynamic complementary information resource guarantee systems [43], particularly for China's current foreign resource guarantee system distributed among the National Library, National Science and Technology Library, China Academic Digital Associative Library, and some public libraries—resources that play important roles in supporting scientific research. Although comprehensive cross-system cooperation is difficult, resource integration based on data aggregation can be achieved among specific types and disciplines, effectively preventing cooperation from becoming formalistic and lacking substantive progress. For example, based on the *National General Bibliography* and *National New Book Bibliography*, an information resource data sharing platform with cooperative service nature could be established. Drawing on collective collection concepts, all member collections could be managed as a specific integrated resource, using quantitative data to depict collection boundaries and scale, and through precise data characterization, integration, and mining, provide member libraries with decision-making data support on "who to cooperate with" and "how to cooperate."

The more comprehensive and detailed the data foundation, the more explicit the collaborative benefits of collective collection, the more diverse members' cooperation choices, the richer the content and forms of collective collection, and the more obvious its strategic support role and value for deep precise cooperation. For example, the U.S./Canada Collective Collection Project uses WorldCat data to conduct precise quantitative analysis of print literature, dividing it into 12 regions based on collection types and quantities, formulating regional collective collection cooperation plans. Members can cooperate at the U.S./Canada collective collection level, conduct small-scale cooperation based on needs, or even cooperate on complementary needs for specific disciplinary thematic resources [44]. Meanwhile, since data only provides decision-making intelligence for member cooperation without mandatory force, it more easily breaks through organizational structure constraints of library consortia, forming multi-center collection circles with multiple libraries as centers and achieving the leap from data integration to service integration. For example, in the BTAA collective collection project, the University of Minnesota Library is a major member of the Minitex project, while Ohio University Library is a core member of OhioLINK.

7. Conclusion

Since the 1942 Farmington Plan, cooperative collection has undergone nearly 80 years of history. During its development, environmental changes, funder 质疑, and libraries' reflections on their own influence have all impacted this historical initiative: after reflections in the 1970s on high altruism and the 1990s shift toward complementary cooperative collection, it completed the transformation from cooperative to collective collection through meaning reconstruction. In this series of transformations, strategic goal orientation, functional-level collaborative strategy positioning, and dynamic-level data value mining have played irreplaceable roles. In today's era, library information resource sharing has been endowed with new connotations and requirements, necessitating continuous strengthening of the strategic supporting role of library information resources, pursuing precise and refined collaboration methods, emphasizing data-driven value to innovate library information resource service methods, elevate library service levels, and demonstrate the spiritual significance and existence value of openness, sharing, and cooperation.

References

[1] DEMPSEY L, MALPAS C, LAVOIE B. Collection directions: the evolution of library collections and collecting[J]. Portal: libraries and the academy, 2014, 14(3): 393-423.
[2] NANCY E. OCLC research: past, present and future[J]. Journal of library administration, 2009, 49(7): 5-11.
[3] CLEMENTS S, K. From collaborative purchasing towards collaborative discarding: the evolution of the shared print repository[J]. Collection management, 2012, 37(3/4): 153-167.
[4] DEMPSEY L. Library collections in the life of the user: two directions[J]. Liber quarterly, 2016, 26(4): 332-338.
[5] VOSPER R. Farmington redvivus: the years of coordinated foreign book procurement in the U.S.[J]. Library journal, 1959, 11(2): 327-334.
[6] GIBB I P. Foreign book procuremen: the decennial Farmington Plan survey and afterwards[J]. Journal of documentation, 1960, 16(1): 1-9.
[7] WANG Jinsong, LIANG Li. Comparative study on government behavior in information resource co-construction and sharing between China and the United States[J]. New century library, 2009, 37(1): 26-28.
[8] EDELMAN H H. The death of the Farmington Plan[J]. Library journal, 1973, 17(5): 25-32.
[9] SHELTON C Y. Best practices in cooperative collection development[J]. Collection management, 2008, 28(3): 191-222.
[10] SOHN J. Cooperative collection development[J]. Collection management, 1986, 8(2): 1-10.
[11] GUO Xiaohong. Research on print collection sharing mechanism based on distributed cooperative storage: a case study of Maine Shared Print Collection Project[J]. Library theory and practice, 2017(2): 49-53.

[12] GUO Xiaohong. Research on distributed regional cooperative storage of academic print resources under library transformation: a case study of Western Regional Storage Trust[J]. Information and documentation services, 2017(4): 68-74.
[13] DANNELLY G Y. The center for research libraries and cooperative collection development[J]. Collection management, 1998, 23(4): 37-45.
[14] MALLERY M, THEUS. New frontiers in collaborative collection management[J]. Technical services quarterly, 2012, 29(2): 101-112.
[15] BOSCH S, LYONS L. Measuring success of cooperative collection development[J]. Collection management, 2004, 28(3): 223-238.
[16] KIEFT R H, PAYNE L. Collective collection, collective action[J]. Collection management, 2012, 37(3): 137-152.
[17] DEMAS S, MILLER E M. Rethinking collection management plans: hoping collective collections for the 21st century[J]. Collaborative librarianship, 2016, 8(2): 3-7.
[18] GARSKOF J, MORRIS J. Towards the collective collection: lessons learned from PALCI's DDA pilot projects and next steps[J]. Document delivery & electronic reserve, 2014, 25(3): 89-105.
[19] HRLWNN L. Michigan shared print initiative and GreenGlass for groups[J]. Resource sharing & information networks, 1998, 13(2): 15-27.
[20] BAKKER T. Resource sharing in Dutch academic libraries[J]. Collection management, 1999, 24(13): 241-253.
[21] WANG Hongxia. Research on collective collection construction of academic library consortia: a case study of the Big Ten Academic Alliance[J]. Library science research, 2020(15): 71-77.
[22] XU Wei, LI Zhuozhuo. Data-driven collective collection and precise cooperation in university libraries under the "Double First-Class" background[J]. Library science research, 2020(21): 23-31.
[23] MIRSKY L. From Farmington Plan to the Pacific Rim Digital Library Alliance[J]. Collection management, 1999, 24(13): 241-253.
[24] ZHOU Xiaoying, CUI Jiajia, TANG Yuping, et al. The origin and direction of information science: starting from Bush's As We May Think[J]. Information science, 2004(2): 129-132.
[25] WOLFGANG M. Cooperative collection development and resource sharing among art libraries: past and present[J]. Art libraries journal, 1986(11): 19-32.
[26] Joint Research Group of Shanghai Area Literature Resource Sharing Cooperation Network and East China Normal University Department of Information Science. History and current status of library information resource sharing in the United States[J]. Library journal, 1999(10): 19-22.
[27] TERENCE K. Collaborative collection development comes of age[J]. Computers in libraries, 2015, 35(3): 25-27.
[28] DEMPSEY D. A history of the Farmington Plan[J]. Libraries & culture, 2004(4): 473-475.
[29] KENNETH S. Warren the evolution of selective biomedical libraries and their use in the developing world[J]. Journal of the American Medical Association, 1987, 257(19): 67-71.

[30] LONG Xumei, WANG Xianlin. Overview of the development of cooperative collection development in the United States[J]. Chinese medical library journal, 2000, 36(5): 17-21.
[31] XIAO Ximing. Choice of collection development model: ownership or access?[J]. Library forum, 2002, 22(1): 56-59.
[32] DEMPSEY L. The emergence of the collective collection: analyzing aggregate print library holdings[M]. Dublin, OH: OCLC Research, 2013: 8.
[33] LAVOIE B, DEMPSEY L, MALPAS C. Reflections on collective collections[J]. College & research libraries, 2020, 81(6): 112-125.
[34] DEMPSEY L, MALPAS C, SANDLER M. Operationalizing the BIG collective collection: a case study of consolidation vs autonomy[EB/OL]. [2021-01-13]. https://digitalcommons.unl.edu/scholcom/119.
[35] MALPAS C, LAVOIE B. Strength in numbers: the Research Libraries UK (RLUK) collective collection[EB/OL]. [2020-05-28]. http://www.oclc.org/content/dam/research/publications/2
strength-in-numbers-rluk-collective-collection-2016-a4.pdf.
[36] OCLC. FAST (Faceted application of subject terminology)[EB/OL]. [2021-01-13]. https://www.oclc.org/research/areas/data-science/fast.html.
[37] LIU Ziheng. The past and future of library literature resource construction[N]. Xinhua Book News, 2020-12-25(025).
[38] KIEFT B A. College library, its print monograph collection and the new information ecology[J]. Against the grain, 2014, 22(5): 7-10.
[39] YE Jiyuan. Focusing on core disciplinary areas and reconstructing the literature information resource guarantee system[J]. Library and information, 2020(5): 1-8.
[40] GUO Jing. Empowering stock, optimizing increment, and grasping variables: thoughts on literature information resource construction in Chinese university libraries for the 14th Five-Year Plan period[J]. Library and information work, 2021, 65(1): 47-54.
[41] ZENG Jianxun. Development thoughts on NSTL resource construction in an open and integrated environment[J]. Journal of academic libraries, 2020, 38(6): 63-70.
[42] DING J, YU S, WANG H, et al. Member structure and sharing behavior: social network analysis of CALIS online cataloging data in China[J]. The journal of academic librarianship, 2020, 46(2): 102-115.
[43] PEI Chengfa, WEN Fangfang. Research progress on foreign library consortium information resource construction systems (2005-2014)[J]. Library and information work, 2015, 59(15): 122-132.
[44] LAVOIE B. The US and Canadian collective print book collection: a 2019 snapshot[EB/OL]. [2021-04-07]. https://www.oclc.org/research/publications/2019/oclcresearch-us-and-canadian-collective-print-book-collection-2019.html.

Author Contributions:
Zhang Kang: Manuscript writing and revision;
Li Zhuozhuo: Research concept and framework design, manuscript revision and finalization;
Miao Miao'er: Data collection and manuscript revision.