

Library Transformation from Resource Capability to Service Capability in the Post-Print Era

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Abstract

Purpose/Significance To investigate the changes in library capability structure and element relationships resulting from the evolution of user needs and behaviors in the digital and networked era. **Method/Process** This study dissects transformations in the library environment and user demands, demonstrating that libraries should undertake a transformative shift from resource-based capabilities to service-oriented capabilities. **Results/Conclusion** To address emerging user needs, libraries must establish corresponding new service capabilities, accelerate the transition from resource-based capabilities to new service capabilities, and develop new service capabilities for libraries.

Full Text

Library Capacity Transformation from Resource-Based to Service-Based Models

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Abstract

[Purpose/Significance] This article explores how changes in user needs and behaviors in the digital and networked era have transformed the structure and elements of library capacity. **[Method/Process]** By analyzing shifts in the library environment and user demands, we demonstrate that libraries should implement a transformation from resource-based capacity to service-based capacity. **[Result/Conclusion]** To meet new user needs, libraries must establish corresponding new service capabilities, accelerate the transition from resource capacity to new service capacity, and rebuild a new library capacity system.

Keywords: resource-based capacity; service-based capacity; library capacity; transformation

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With the rapid development of information technology represented by the internet, the environment for knowledge creation, dissemination, and utilization that libraries and users rely on has undergone fundamental changes. Many factors influence library development, and the intensity of their impact is also shifting, forming different driving forces for library development and constituting a new library capacity system. The fundamental issue in library development is one of capacity. Library transformation and reform essentially represent changes in library capacity structure and relationships, with the core being the reconstruction of service capacity. We must confront the changes in the library environment and the corresponding demands on library capacity, re-examine the primary forces driving library transformation, and build a new library capacity system that is user-demand-driven, adaptable to contemporary changes, and powered by service capacity.

1. Acknowledging Environmental Changes in Libraries

As Ranganathan stated, “The library is a growing organism.” Digital library expert S. Nicholson’s assessment is even more pointed: “The changes in libraries over the past five years have exceeded those of the previous hundred years, while the changes in the next five years will make the past five years seem insignificant” [1]. The British Library’s strategic plan notes: “The environment we inhabit has changed more in the past twenty years than in the previous two hundred years, particularly driven by technological development. This transformation is gradually altering traditional academic research’s reliance on physical libraries as important information sources...moving toward a complex network with multiple choices (different access levels, authority, depth)” [2]. The theme of the 2018 International Federation of Library Associations and Institutions (IFLA) conference was “Libraries Transform, Societies Transform.”

Today’s libraries face the greatest challenge of users shifting from primarily relying on physical libraries to primarily depending on networks and search engines for information acquisition. Contemporary users operate under the basic assumption that “if it cannot be found online, it does not exist.” Users (especially researchers) treating the internet as their primary or even sole source of information demonstrates their dependence on and trust in the internet, databases, and search engines. At the 2011 IFLA conference, foreign scholars posed this hypothesis: When all information can be obtained online, do we still need libraries? [3] While one might argue that not all information is available online and users still need libraries, many users disagree, believing they can access sufficient resources through networks without requiring libraries. *Phoenix Urban Magazine* featured a theme in November 2015: “Do You Still Go to the Library?” [4], indicating serious public questioning of libraries’ significance and necessity. Therefore, we

must reflect, re-examine, and redesign how libraries provide services through what means, approaches, and methods, and what new services users need. This concerns whether libraries can adapt to changes in user needs and behaviors and determines the success or failure of library transformation.

1.1 Changes in User Needs and Behaviors

Libraries always exist within a certain social environment, which is dynamic and rapidly changing. If one word could describe the current library environment, it would be “change,” and the requirement for libraries is “transformation”—a pace of change and transformation that exceeds our imagination. The most important question is what services libraries can provide and what capacities they possess. If libraries’ resources and services can meet evolving user needs and better adapt to new demands, transforming from traditional to new libraries, they will thrive. If libraries cannot provide needed resources or satisfy new demands, users will not need them, and libraries will inevitably become marginalized and lose their significance.

We must recognize that libraries are no longer what they once were. Another British Library strategic plan is titled “Redefining the Library” [7], indicating that our understanding of libraries’ functions, nature, and roles must change. Libraries must prove their value through their own capacities, and this value depends on what services they can provide users. “Value not cherished is valueless” [8]. According to the New York Public Library director, three standards measure library value: first, providing access to knowledge; second, shifting libraries from inward to outward orientation; and third, stimulating relationships. He believes libraries are about relationships: between people, between institutions, and between data [9]. The University of Pittsburgh Library Director R. G. Miller stated years ago that libraries have never been about books, nor about information, but about relationships between people [10]. Another foreign report notes: “Library value is not judged by collection scale but by service quality” [10]. International library evaluation standards have shifted from emphasizing input and scale metrics (collection size, journal types, funding, visitor numbers, reference transactions, training participants) to output and effectiveness metrics (impact on enrollment, retention, graduation rates; influence on student learning; contribution to faculty research productivity; support for faculty grants and teaching) [11]. Foreign colleagues have recognized that collection scale will rapidly lose importance [12]. As more collections become digital and more resources are open access, libraries’ opportunities for survival and development based solely on resources and space will diminish.

1.2 Library Marginalization and Crisis

Traditional libraries are physical institutions based on print literature, characterized by physical space, and centered on simple in-house services. Their status and influence are declining, facing marginalization and even existential crisis. Some foreign predictions suggest librarians will top the list of eight extinct pro-

fessions by 2030 [5] or be among thirteen disappearing professions [6], indicating strong 危机感 abroad about traditional libraries—a crisis we still overlook, dismissing it as crying wolf.

Whether users need libraries, whether libraries will be marginalized or become extinct—these predictions are subjective. The crucial factor is what services libraries can provide and what capacities they possess. Libraries must recognize their changing environment and sense of crisis, analyzing shifts in users' traditional and current needs.

1.3 Traditional vs. New User Needs

Libraries' existence and development fundamentally depend on user needs—a basic yet critical issue where demand determines existence. The transformation from resource capacity to service capacity, from traditional to new libraries, stems from changing user needs. Forgetting or ignoring user needs means losing libraries' foundation.

Nothing is impossible to achieve, only impossible to imagine. If we understand user needs, we will find ways to meet them. The challenge is that we often don't know what users need. Different user types have different needs, requiring consideration of three categories: (1) In-person users whose needs are relatively easy to meet through space, resources, and facilities—services libraries have long explored. (2) Occasional users, mainly graduate students who balance research and study with limited time for physical visits, primarily relying on networks for research needs with minimal in-person learning requirements. (3) Non-visiting users, primarily faculty, researchers, and administrators with heavy workloads who cannot visit physical libraries but have strong, complex, and higher-level needs that networks alone cannot satisfy.

Traditional libraries met traditional needs focused on documents, requiring collection, classification, cataloging, circulation, reference, and reading promotion—defining librarians' professional characteristics: in-house work, document-related, primarily intermediary roles, transactional and skill-based. This didn't demand high disciplinary expertise. Today's users need not only print and digital collections but also deep services where librarians leverage digital resources through their knowledge, expertise, and capabilities. New user demands are forcing changes in librarians' professional characteristics toward research-based service and service-oriented research. Library services must be research-based; without research, there is no service. This research is service-oriented, providing support and 保障. Librarians are no longer intermediaries but partners participating in users' processes, requiring high education and quality.

2. New Library Service Capability System

To meet new user needs, libraries must establish corresponding new service capabilities, accelerating the transition from resource capacity to service capac-

ity. This transformation includes: from resource construction to knowledge organization, from in-house to embedded services, from reference to knowledge consulting, from document retrieval to intelligence analysis, from reading promotion to knowledge discovery, from information literacy to innovation literacy education, from document services to publishing services, from document management to data management, from library services to think tank services, and from manual to smart services.

2.1 From Resource Construction to Knowledge Organization

The widespread application of mobile internet technology and the arrival of the knowledge economy era are driving libraries to transform from traditional resource construction to knowledge organization, management, and service, with knowledge organization as the foundation. Knowledge organization, developed from library and information science classification systems and thesauri research, represents the highest form of information organization and plays a crucial role in knowledge and information acquisition and interaction, primarily studying language and tool construction and control for knowledge processing and expression [13]. Knowledge organization enables libraries to achieve the transformation from information service to knowledge service, elevating information to knowledge. With digitalization and open access development, libraries' traditional resource construction functions will evolve into knowledge organization functions.

Knowledge organization involves indexing, linking, analyzing, mining, and revealing knowledge (both tacit and explicit)—essentially the activity of ordering objective knowledge [14]. Through forward resource-driven and backward utilization-oriented approaches, knowledge organization uses intelligent technologies like mining, discovery, fusion, customized push, and intelligent search to identify useful information units hidden within information, organize them into knowledge bases, and provide them to users to meet their knowledge needs and deliver effective knowledge services [15]. Thus, knowledge organization and knowledge service are closely linked. Knowledge organization represents intelligent cognition and efficient integration of knowledge, oriented toward user needs, and realized through knowledge organization processes that map and semantically link data, information, and documents to achieve knowledge service. Knowledge organization is librarians' core capability [16], an advanced and extended concept beyond information service, representing service expansion and innovation in response to changing user needs [17].

2.2 From In-House to Embedded Services

Traditional library services are characterized by in-house service—available when users visit, impossible when they don't. Digitalization and networking have led more users to seek information via desktop networks for efficiency and convenience. Declining visitation and circulation rates in recent years have forced us to reconsider the importance of in-house services and redesign service

models for new user needs: embedded services. Embedded services redefine library concepts and nature, reconceptualize user information needs, reestablish librarian-user partnerships, overturn the theoretical foundation of library “intermediation,” and create new understanding of library science [18]. “People in the library, services beyond walls, boundless opportunities”—embedded services create new service spaces and opportunities for libraries.

Johns Hopkins University Medical Library’s embedded informationist exemplifies embedded library services [19]. Such services break through physical barriers, integrating into users’ learning and research processes, leveraging librarians’ information, service, and team advantages to collaborate closely with research, teaching, and management, establishing partnerships, winning user trust, support, and cooperation, and playing an irreplaceable role in users’ tasks. In current and future library development, librarians’ value lies not in in-house service but in embedded services integrated into user processes. Embedded service capacity and effectiveness demonstrate libraries’ service capabilities and influence.

2.3 From Reference to Knowledge Consulting

Reference services have a century-long history. While still meaningful, reference services are fundamentally Q&A based on documents and document clues, not reaching the knowledge level; they are passive services based on library resources and librarian services, not proactively providing problem solutions from user needs; they are simple knowledge work reflecting skills and experience rather than complex intellectual labor, with low knowledge added value; they serve general needs of in-person and online users but cannot meet today’s knowledge-based, disciplinary, and personalized requirements. As early as 1988, F. H. Spaulding noted that professional librarians should become knowledge counselors [20], and S. Weddell advocated transforming reference into proactive knowledge advisory services [21]. As user needs shift from information to knowledge, libraries must innovate reference service models, deepen content, reform methods, and move from reference to knowledge consulting.

Compared to traditional reference, knowledge consulting differs in many aspects: (1) Reference provides documents, data, and materials according to user needs [22], while knowledge consulting addresses user needs with library and information science expertise, using advanced technologies to extract, organize, and optimize information throughout users’ knowledge acquisition processes, providing effective knowledge solutions for decision-making and innovation. (2) Reference typically serves explicit needs with explicit knowledge, while knowledge consulting emphasizes latent needs and tacit knowledge. (3) Reference often provides structured (or standardized) literature information, data, and clues or simple data analysis products, while knowledge consulting focuses on specialized, knowledge-based, personalized needs, providing knowledge to solve users’ ultimate problems, collaborating with users to create knowledge services and user-oriented knowledge management [23].

To transform from reference to knowledge consulting, libraries must truly be “user-centered,” based on user needs, develop new knowledge consulting services, and cultivate highly qualified professional librarians capable of providing knowledge services. Especially in the big data era, knowledge consulting librarians must master not only basic competencies like information retrieval, analysis, organization, and platform/tool usage essential for disciplinary and embedded services but also big data knowledge and skills like data mining and knowledge organization in big data environments [23].

2.4 From Document Retrieval to Intelligence Analysis

Document retrieval has long been a core librarian competency and focus of library services. However, with networks and search engines, users can often conduct retrieval independently without librarian intermediation. Yet facing vast, disordered information oceans, intelligence analysis has become increasingly important. Intelligence analysis has become a crucial means for libraries to deepen service content and provide high-level services. Libraries’ influence often depends on intelligence analysis services, which are fundamental guarantees for disciplinary services, consulting, data services, think tank services, and smart services. Library intelligence analysis focuses on: (1) Integrating with disciplinary services to provide disciplinary intelligence services—the dominant direction of disciplinary services—embedding into research processes to provide project progress and research trend analysis; (2) Embedding into research management and decision-making processes, using intelligence analysis to support strategic management and decision-making, conducting domain development trends, competitive conditions, and dynamic analysis to provide evidence for management and decisions; (3) Using informetrics tools to evaluate and analyze talents and disciplines, identifying active or potential talents for recruitment, collaboration, or comparative analysis of disciplinary development status to reveal problems and propose development needs, thereby promoting disciplinary construction.

2.5 From Reading Promotion to Knowledge Discovery

With the development of public cultural services and the construction of a scholarly society, reading promotion has become an important library function, conducting effective work to improve public reading quality and establish a social reading culture. However, as databases and digital resources become the mainstay of library collections, services should extend from document reading to knowledge discovery. Knowledge discovery uses various technologies, methods, and means to systematically analyze, mine, discover, and utilize knowledge within and beyond databases, extracting implicit, useful, undiscovered, and potentially valuable knowledge resources [24], including implicit association knowledge discovery, non-related literature knowledge discovery, and database knowledge discovery [25].

Based on reading promotion, delving into digital knowledge content is an in-

evitable way for libraries to continuously reveal and utilize collection resources. As digital collections increase, revealing, mining, analyzing, and utilizing digital resources becomes increasingly important. Library services must organize, manage, and serve these vast digital resources, with knowledge discovery being the most important highlight. In big data environments, knowledge discovery applications are gradually expanding [26]. Libraries must skillfully use knowledge discovery tools to stimulate user needs and maximize the value of digital resources.

2.6 From Information Literacy to Innovation Literacy Education

The Association of College and Research Libraries (ACRL) released the *Information Literacy Competency Standards for Higher Education* in 2000 and the *Framework for Information Literacy for Higher Education* in 2016, signifying that information literacy alone is insufficient and must integrate with many other concepts and ideas in research and scholarship, combining information literacy with the research and academic process [27]. This is because: information literacy is not an end in itself but is field- and context-related; information literacy education must advance, with innovation literacy education posing new and higher requirements; information literacy education needs perspective transformation, recognizing and treating information literacy from an innovation literacy viewpoint; the ultimate goal of information literacy education is to foster innovation awareness, thinking, spirit, knowledge, ability, and personality.

Libraries' information literacy education plays an important role in enhancing users' innovation quality. Libraries should fully recognize their important role in innovation literacy education under new circumstances, using their advantages to conduct innovation literacy education: advocating reading activities to provide students with broad scientific and humanistic knowledge, perfecting their knowledge structure, and inspiring creative inspiration; through embedded disciplinary services, helping students strengthen specialized knowledge learning; through expanded information literacy education, improving college students' ability to acquire, analyze, discriminate, and judge knowledge, enhancing innovation, writing, and academic communication abilities. Libraries are not just places to obtain information but incubators for cultivating innovative talents.

2.7 From Document Services to Publishing Services

In traditional academic communication, publishing is upstream. After journals, books, and databases are published, libraries act as intermediaries, purchasing and providing them to users. Users create new results using these resources, becoming authors who output their 成果 to publishers through papers and monographs, which publishers then supply to libraries. In the digital environment, this process is changing. A foreign report notes that in the digital world, the roles of publishers, libraries, integrators, and authors in information creation and dissemination will merge [2], meaning information creators and disseminators' roles are increasingly blurred.

In digital and open access environments, we must 重新认识 libraries' positioning and role in publishing, extending from information purchasers to creators and disseminators, playing a role in information creation and dissemination. This mainly manifests in two aspects: (1) Extending downward to establish academic relationships with authors, such as building institutional and disciplinary repositories where authors' published and unpublished 成果 can be stored, managed, and disseminated through library-established knowledge bases; (2) Extending upward to provide publishing services for authors, even conducting library publishing. According to the Library Publishing Coalition's *Library Publishing Directory* (2017 edition) [28], 118 institutional libraries in the US, Canada, Brazil, UK, Germany, and Australia conduct library publishing, offering 49 types of publishing 附加 services. Library publishing and publishing services represent new development directions and trends for libraries, meaning business extension and expansion and new growth points.

2.8 From Document Management to Data Management

In the *NMC Horizon Report: 2017 Library Edition*, research data management is listed as a mid-term trend in academic and research library information technology development. Libraries should strengthen research data lifecycle management to truly improve service convenience and information accessibility [29]. The Association of College and Research Libraries' *2016 Top Trends in Academic Libraries* states that research data management services facilitate collaboration between libraries and research management institutions, changing traditional cooperation methods and representing a future trend for US academic libraries [30]. Research data, as research 成果, is receiving increasing attention. Libraries should further emphasize and develop research data management services.

Libraries' research data management services can ensure complete data storage, avoiding research interruption due to personnel changes, while providing guidance and support for researchers. Research funding agencies require project data integrity and transparency, which research data management services can ensure. Libraries can accurately grasp research project status for funding agencies.

2.9 From Library Services to Think Tank Services

Traditional library services seem unrelated to think tanks. However, as think tank construction has become a national strategy receiving high attention from government and society, and since think tanks are information-based and require support from social forces, libraries as information institutions should actively participate in think tank construction, playing an active and key role. This requires leveraging libraries' disciplinary and intelligence service advantages to extend services to think tank services, fulfilling proper roles and functions in think tank construction. Library participation in think tank construction is not only necessary for business development but also an important strategy in the new era [31].

Libraries' roles and functions in think tank construction mainly include four aspects: (1) Providing direct or specialized literature resource support for think tank institutions and research—traditional library strengths where resource 保障 and support are crucial foundations and new development tasks. (2) Establishing or collaboratively building databases and knowledge management systems supporting think tank research, organizing, revealing, and mining these systems to provide targeted services. (3) Providing intelligence services embedded in think tank research processes. Think tank research undoubtedly needs intelligence services—the more accurate, timely, and effective, the better they support think tank research 成果 and policy recommendations. (4) Providing evaluation analysis suggestions for think tank institutions, talents, and 成果 influence, plus think tank 成果 dissemination systems. Librarians excel at evaluation, with good foundations in journal, database, and academic evaluation that should extend to think tank evaluation, playing a positive guiding role. Simultaneously, libraries should use their information dissemination advantages to better disseminate think tank 成果 through various platforms.

2.10 From Manual to Smart Services

Traditional library services rely on human wave tactics, depending on physical labor. In the era of big data, IoT, and intelligent technology, traditional libraries will evolve from digital to intelligent and smart libraries, achieving a qualitative leap in library functions. Smart libraries will become the dominant model and highest form of future library development, representing a new revolution in library development [32].

Smart libraries must address two aspects: (1) Smart library management, such as intelligent positioning systems and building management; (2) Smart library services, including intelligent acquisition, book recommendation, retrieval, and intelligence analysis. Smart libraries include two key elements: intelligent technology and librarians' wisdom. Smart libraries are the organic combination of intelligent technology application and librarian wisdom. Combining technology, especially AI, with librarians' wisdom to address library business and management needs can better solve development problems. For example, intelligent acquisition previously relied heavily on librarians' manual judgment with limited effectiveness. If semantic and big data analysis is established, book acquisition can better adapt to user needs with good development prospects.

3. Conclusion: Rebuilding New Service Capabilities

Facing new user needs, libraries should have new positioning and strategies—transformation from resource capacity to service capacity. The core involves shifting: from library-centered to librarian-centered, from librarian-centered to user-centered, from resource-centered to service-centered, from in-house service-centered to embedded user process-centered, and from service process-centered to service effect-centered.

3.1 From Library-Centered to Librarian-Centered

Previously, we focused more on libraries themselves: image, building area, equipment advancement, space layout, investing energy and funds in physical libraries. Today, we should focus more on librarians. Libraries' role depends more on librarians' capacity, dedication, and enthusiasm. Without capable and motivated librarians, no matter how good, large, or well-resourced the library, it cannot effectively function. This is the most critical shift in perception needed today.

3.2 From Librarian-Centered to User-Centered

Librarian-centered is merely a means, not the ultimate goal. The ultimate goal is to serve users better through librarians and their capacities, achieving a fundamental shift to user-centeredness. User-centered means “where users are, services are,” using various means to 千方百计 meet diverse user needs and maximizing user satisfaction.

3.3 From Resource-Centered to Service-Centered

This requires transforming literature potential into knowledge capacity. Through analyzing user needs and librarians' information capabilities, translating them into services that directly support teaching, research, and management activities truly unleashes literature potential into meeting users' real needs, fully realizing library value.

3.4 From In-House Service-Centered to Embedded User Process-Centered

Library functions need not occur within library buildings but in users' environments. Therefore, library service priorities should embed in user processes—in offices, meeting rooms, teaching and research labs—where librarians use their knowledge and skills to better connect information resources with user needs. Integrating into frontlines, embedding in processes, entering teaching, 融入 research, and supporting management should become libraries' new business layout and development direction.

3.5 From Service Process-Centered to Service Effect-Centered

Providing services is not merely about delivery but about solving user problems and producing effects. Service evaluation should be effect-based and user satisfaction-based, using evaluation to improve library services better.

In summary, the transformation from resource capacity to service capacity fundamentally depends on librarian capacity. Library capacity manifests as librarian capacity, which in turn drives the development from resource to service capacity. Without librarian capacity, there is no service capacity. Library capacity requires two transitions: from resource capacity to service capacity, and

from traditional to new service capacity. Libraries must meet not only traditional user needs but also new service demands.

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Abstract: [Purpose/significance] The article aims for exploring the transformation of library capability structure and elements brought by the changing of user needs and behaviors in the digital and networked era. [Method/process] By analyzing the changes of library environment and user needs, demonstrates that libraries should implement the transformation from resource-based to service-based capability. [Result/conclusion] Libraries need to establish new service capabilities to adapt to the new needs of users, speed up the capabilities transformation from resource-based to service-based ones, and rebuild the new capacity of libraries.

Keywords: resource-based capability; service-based capability; library capacity; transformation

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

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