Innovation in Public Library Service Models in the Digital Era

Cao Ruizhe

Nanjing Vocational Institute of Transport Technology, Nanjing, Jiangsu 211188, China

Abstract: Digital technologies have transformed how public libraries organize resources, deliver services, and maintain relationships with users. Current digital development in public libraries nevertheless continues to face problems such as fragmented resources, duplicated platforms, inadequate identification of user needs, and insufficient services for digitally disadvantaged groups. Public libraries should integrate physical spaces with digital platforms; develop knowledge consultation, digital reading, social education, and community collaboration services; and improve mechanisms for regional resource sharing, librarian capacity development, data governance, and outcome evaluation. These measures can support the establishment of an open, convenient, and equitable model of public cultural services.

Keywords: public libraries; digital services; service innovation; digital reading; public culture

Introduction

Public libraries are responsible for providing documentary information services, promoting reading among the general public, supporting social education, and preserving local culture. Traditional services have centered primarily on library buildings, print collections, and on-site borrowing, creating certain temporal and spatial limitations. The development of the mobile internet, cloud computing, artificial intelligence, and digital resource management technologies has transformed document production, knowledge communication, and public reading practices. Users can obtain resources through websites, mobile applications, and digital terminals, gradually extending the service reach of public libraries beyond their physical buildings.

Digital development does not merely involve converting printed documents into electronic files or adding self-service borrowing and return equipment. Innovation in service models requires systematic adjustments to resource organization, user identification, business processes, service spaces, and librarians' capabilities. Without operational integration, digital platforms may simply replicate physical services, leaving users to search and authenticate themselves repeatedly across multiple systems.

In 2024, public libraries in China recorded 1.34 billion user visits, representing a year-on-year increase of 15.8%. The number of books and periodicals loaned reached 840 million items, an increase of 7.0%. Public libraries organized 332,000 activities during the year, attracting 260 million participant attendances, an increase of 20.2% [1]. This growth in service scale demonstrates that public libraries continue to meet substantial social demand. In the digital era, public libraries need to establish new connections among open access to resources, knowledge services, social education, and cultural equity.

1. Digitalization and the Transformation of Public Library Service Models

1.1 Fundamental Scope of Digital Services in Public Libraries

Digital public library services use digital resources, network platforms, and information technologies to provide the public with access to documents, knowledge inquiries, reading guidance, cultural education, and opportunities for communication and participation. These services include collection digitization, the acquisition of digital resources, online searching, mobile borrowing, remote reference services, online activities, and digital literacy education.

Digital services are characterized by openness, immediacy, and accessibility across geographical boundaries. Users can search collections, renew borrowed items, or access licensed resources outside library opening hours. Residents in remote areas can also access public cultural resources through local service points and mobile terminals. The service population therefore expands beyond in-person visitors to include registered platform users, activity participants, and people with temporary information needs.

Wang characterizes a smart library as interconnected, efficient, and convenient and emphasizes the sharing and coordination of resources, facilities, personnel, and services [2]. This perspective indicates that the value of technology must be realized through resource connectivity

and user services. The central purpose of innovation in public library service models remains the protection of the public's cultural rights rather than growth in equipment numbers or system scale.

1.2 The Internal Logic of Service-Model Transformation

Users' information needs are gradually shifting from simple borrowing toward more complex knowledge requirements. In addition to books, members of the public may seek learning courses, local documents, employment information, health knowledge, and guidance on digital tools. A unified bibliographic search cannot fully satisfy such needs. Public libraries must integrate books, journals, audiovisual materials, databases, and openly available information to provide thematic services.

The service relationship is also shifting from users making requests in the library toward libraries proactively connecting with users. Traditional borrowing assumes that users already know the title or subject they require. Digital platforms can identify needs through search records, activity registrations, and reference questions and can provide notifications about new books, recommendations of thematic resources, and activity reminders. Such services must comply with personal information protection requirements and allow users to determine the scope of any recommendations they receive.

The social role of public libraries is also changing. Digital learning, remote work, and community cultural activities have created new demands for public space. A library is both a resource-preservation institution and a learning space, a source of digital-skills support, and a platform for community exchange. Its service model must therefore integrate physical spaces, digital platforms, and social collaboration.

2. Foundations for the Development of Digital Public Library Services

2.1 Continued Growth in Public Cultural Facilities and Documentary Resources

Innovation in public library services depends on foundational conditions such as library buildings, collections, personnel, and funding. Statistics from the Ministry of Culture and Tourism show that public library resources per capita and the overall scale of services increased between 2023 and 2024, providing basic conditions for integrated online and offline services.

Table 1. Selected Public Library Service Indicators in China, 2023–2024

Indicator	2023	2024	Reported change
Public library floor area per 10,000 residents	160.3 m²	166.0 m²	Increase of 5.7 m²
Library holdings per capita	1.02 volumes	1.07 volumes	Increase of 0.05 volumes
Total user visits	1.161 billion	1.34 billion	Increase of 15.8%
Books and periodicals loaned	783 million items	840 million items	Increase of 7.0%
Borrowing transactions or borrower visits	330 million	360 million	Increase of 7.7%
Reader activities organized	293,500	332,000	Increase of 13.0%
Attendances at reader activities	214 million	260 million	Increase of 20.2%

Source: Compiled from the Ministry of Culture and Tourism's statistical bulletins on cultural and tourism development in 2023 and 2024 [1].

Table 1 shows that both total user visits and participation in public library activities continued to grow in 2024. Attendance at activities increased faster than the number of books and periodicals loaned, indicating growing public demand for integrated services such as lectures, exhibitions, reading promotion, and social education. Innovation in public library services should therefore extend beyond the digitalization of borrowing procedures to include cultural programs and learning support.

2.2 The Shift from In-Person Library Use to Multichannel Access

Public library websites, official social media accounts, mobile applications, self-service terminals, and electronic reading terminals form a multichannel service system. Users can search collections, reserve books, renew loans online, register for activities, and read digital resources. Digital channels extend service hours and reduce pressure on some

counter-based services.

Multichannel services must nevertheless address system connectivity. In some libraries, bibliographic searches, electronic books, activity registration, and user consultations operate separately, with inconsistent account authentication and interface structures. Users must remember multiple access points, reducing the discoverability of digital resources. Service innovation should establish unified portals, single sign-on, and cross-resource searching.

Physical library buildings retain independent value in a multichannel environment. Reading printed materials, parent–child activities, thematic exhibitions, and face-to-face consultation require on-site space. Digital platforms are suited to immediate, remote, and reusable services, whereas physical libraries support in-depth reading, social interaction, and cultural experience. Only by complementing each other can the two environments meet the needs of different users.

2.3 Expansion of Social Education and Cultural Exchange Functions

Public libraries possess relatively stable venues, documentary resources, and professional personnel and can organize social education in areas such as reading, history, science, art, and digital skills. Online lectures, digital exhibitions, and online courses extend the reach of activities, while in-person activities provide opportunities for exchange and practice.

Digital literacy education has become a new area of public library service. Older adults may need guidance on mobile payments, online medical registration, and the identification of unreliable information. Young people need to understand online information retrieval, personal privacy, and the appropriate use of digital resources. Job seekers may require support with office software and employment information. Public libraries can design courses according to the characteristics of different groups and help members of the public use digital tools safely and effectively.

Local cultural resources also provide content for service innovation. Libraries can organize local gazetteers, genealogies, historical photographs, oral histories, and materials relating to intangible cultural heritage to create thematic local-memory databases. Members of the public can participate in collecting materials, interviewing local figures, and supplementing historical information. Local-document services can thus expand from internal preservation to collaborative social documentation.

3. Practical Problems Facing Innovation in Public Library Services

3.1 Fragmented Digital Resources and Mismatches Between Supply and Demand

Libraries at different administrative levels independently acquire electronic books, journal databases, and audiovisual resources, resulting in some duplicated development. Databases use different search rules, while local libraries may lack the funding and technical capacity necessary to obtain stable access to digital resources. When regional resource-sharing mechanisms are inadequate, inequalities in public cultural services can extend from disparities in physical facilities to disparities in digital resources.

Self-developed digital resources are also affected by inconsistent standards. Local documents may lack unified standards for classification, cataloguing, file formats, and copyright information, making cross-library searching and long-term preservation difficult. Some digital projects emphasize the quantity of resources while paying insufficient attention to content updates and user engagement, resulting in an inability to sustain operations after the initial development stage.

There are also mismatches between service provision and user demand. Libraries may base acquisitions on database titles and resource scale without comprehensively analyzing search records, reference questions, and user feedback. Some specialist resources consequently have low utilization rates, while urgently needed information on everyday life, digital skills, and local culture remains insufficient.

3.2 Tensions among Technology Use, Digital Equity, and Data Security

Self-service equipment, intelligent recommendations, and online consultation can improve service efficiency but may also create new barriers for some users. Older adults, persons with disabilities, low-income groups, and residents of areas with inadequate internet access may lack intelligent devices or the skills necessary to use digital services. If public libraries reduce human assistance excessively, they may widen inequalities in digital services.

The use of AI also raises questions about information accuracy. Automated question-answering systems may generate incorrect bibliographic information or unreliable explanations, while personalized recommendations may confine users to a narrow range of interests. Professional

librarians must participate in developing knowledge bases, reviewing content, and handling exceptional cases. Important reference responses should remain subject to human verification.

User registration, borrowing, and participation in activities generate personal data. Chen and Deng argue that public libraries undergoing digital transformation must maintain the authority of their information and preserve social trust [3]. Unclear limits on data collection, undefined responsibilities for external platforms, and weak access management can all undermine public confidence in digital services. Libraries should adhere to the principles of necessity, transparency, and security in their use of data.

4. Pathways for Innovation in Public Library Service Models in the Digital Era

4.1 Developing an Integrated System of Physical and Digital Services

Public libraries should establish unified digital service portals that integrate collection searching, electronic resources, activity registration, user consultation, and personal borrowing information. A unified portal does not require all resources to be stored centrally. Instead, application interfaces and metadata standards can support linked searching and reduce the need for users to move repeatedly among different systems.

Online services can extend the functions of physical library buildings. After viewing a thematic reading list online, users can reserve printed books. After attending an online lecture, they can register for an in-person practical activity. While viewing a digital exhibition, they can search for related collection items and local documents. Physical and digital services can share themes, resources, and user access points to form a continuous reading experience.

Local service points should also be incorporated into regional platforms. County libraries, township branches, community reading rooms, and mobile service points can share resource catalogues and activity information. Requests from local users can be coordinated by a regional central library, reducing duplicated development and improving the efficiency with which limited resources are used.

4.2 Transforming Resource Provision into Knowledge Services

Digital services should strengthen the organization and interpretation of resources rather than focusing solely on quantity. Librarians can integrate books, journals, open courses, and authoritative websites around themes such as family education, local history, healthy living, employment, and entrepreneurship and prepare thematic resource guides. Users then receive not only bibliographic listings but also explanations of relationships among resources and guidance on how to use them.

Reference services can include online appointments, real-time question answering, and thematic consultation. Knowledge bases can provide preliminary answers to general questions, while librarians analyze complex needs and recommend appropriate resources. AI can assist with searching and content classification, but professional personnel should review the final results.

Local-document services can move from digital display toward knowledge linking. Libraries can establish relationships among people, place names, historical events, and cultural heritage to create thematic knowledge bases. Members of the public can use maps, timelines, and thematic indexes to understand local history, while researchers can obtain more complete pathways to relevant materials.

Chen argues that libraries should participate proactively in the digital transformation of public culture and assume foundational responsibilities in cultural resource development, knowledge organization, and public services [4]. Public libraries must maintain the authority of their resources and their public-interest orientation and prevent digital platforms from becoming mere gateways to commercial content.

4.3 Establishing Tiered Services for Different User Groups

Services for children can integrate picture-book reading, digital storytelling, parent–child activities, and reading guidance. Digital content should limit screen time and be combined with print reading, hands-on activities, and parent–child interaction. Services for young people can incorporate information retrieval, science education, cybersecurity, and creative activities to strengthen learning capabilities and media literacy.

Services for older adults should retain staffed counters, telephone consultations, and printed guides. Libraries can offer courses on the use of intelligent devices, the evaluation of online information, and public service platforms, using small-group teaching and repeated practice. Accessible services should provide large-print resources, audiobooks, screen-reader support, and appropriately designed interfaces.

Community residents can participate in collecting local documents, reading groups, and discussions of public issues. Libraries can design services according to the demographic composition and cultural needs of their communities and develop "one library, one specialty" or "one community, one program" initiatives. Only when differences among users are fully considered can digital services realize the inclusive value of public culture.

5. Support Mechanisms for Digital Public Library Services

5.1 Improving Regional Collaboration and Librarian Capacity Development

Public libraries at the provincial, municipal, and county levels can establish a system of collaborative resource development with clearly defined responsibilities. Provincial libraries can take responsibility for foundational platforms, standard setting, and large-scale digital resources. Municipal and county libraries can focus on local resource development, community-level services, and the collection of information about user needs. Joint acquisition, unified authentication, and interlibrary collaboration can expand service reach.

Librarian capacity development should encompass information organization, digital tools, data analysis, intellectual property, and user education. Technical and service personnel should participate jointly in digital projects to prevent system development from becoming disconnected from actual services. Training can use project-based practice, case discussions, and job rotation, with an emphasis on librarians' abilities to identify needs, organize resources, and solve problems.

In Introduction to Smart Libraries, Wang argues that smart transformation involves readers, librarians, documents, facilities, time, and space [5]. Librarians' roles must therefore expand from performing borrowing-related tasks to organizing resources, providing knowledge consultation, and guiding digital learning.

5.2 Establishing Service-Evaluation and Data-Governance Systems

The evaluation of digital services should not be limited to the number of platform registrations, resource downloads, or devices. Indicators should include the number of active users, depth of resource use, reference-resolution rates, activity-completion rates, user satisfaction, and coverage of digitally disadvantaged groups. Online-use data should also be analyzed alongside in-person borrowing, on-site activities, and community services.

Libraries can conduct regular user surveys to understand why different groups are unable or unwilling to use digital services. When a resource has a low utilization rate, its access-point design, content quality, and communication methods should be examined rather than simply concluding that users have no demand for it. Evaluation findings should inform resource acquisition, platform adjustment, and activity design.

Data-governance systems should specify the purposes of data collection, retention periods, access permissions, and deletion procedures. Data involving personal identities, borrowing records, and consultation content should be managed by category. Third-party systems should undergo security reviews before being connected. Users should be able to disable intelligent recommendations, while automated question-answering systems should disclose their technological nature and provide access to human consultation.

Conclusion

Digitalization has extended the service hours, resource coverage, and social connectivity of public libraries while introducing new requirements for resource integration, librarian capabilities, cultural equity, and data security. Innovation in service models cannot remain limited to equipment upgrades and platform development. Its central task is to establish stable relationships among physical libraries, digital resources, professional librarians, and social needs.

Public libraries should integrate multichannel service portals, transform resource provision into knowledge services, and develop tiered services for children, young people, older adults, persons with disabilities, and residents served by local institutions. Regional resource sharing, librarian capacity development, outcome evaluation, and data governance must proceed in coordination. Only when public value, professional expertise, and technological capacity are aligned can digitalization produce more convenient, equitable, and reliable public cultural services.

References

[1] Ministry of Culture and Tourism of the People's Republic of China. Statistical Bulletin on Culture and Tourism Development in 2024 [EB/OL]. 2025-05-30.

[2] Wang, S. W. "Three Defining Characteristics of Smart

Libraries" [J]. Journal of Library Science in China, 2012, 38(6), 22–28.

[3] Chen, C. F., & Deng, Z. Q. "Dimensions of Authority Building in Public Libraries amid Societal Digital Transformation" [J]. Journal of the National Library of China, 2019, 28(5), 52–62.

[4] Chen, C. "Libraries Should Lead the Digital Transformation of Public Culture: Reflections on the Opinions on Implementing the National Cultural Digitalization Strategy" [J]. Journal of Library Science in China, 2022, 48(4), 23–25.

[5] Wang, S. W. Introduction to Smart Libraries [M]. Shanghai: Shanghai University Press, 2022.