

Research on Smart Transformation Pathways for Public Libraries from a Strategic Planning Perspective

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Abstract

Abstract: [Purpose/Significance] This study constructs a conceptual framework for smart library development in public libraries during the 14th Five-Year Plan period, aiming to provide reference and innovative insights for the smart transformation of public libraries in China. [Method/Process] The strategic planning texts of 32 provincial-level public libraries and 15 sub-provincial-level public libraries in China were selected as analytical samples. Content related to smart libraries, including overall objectives, development strategies, and specific actions, was used as the basic analytical unit for manual category coding to reveal the relevant content of smart library construction in the planning texts. [Results/Conclusion] Actively developing smart libraries has become a fundamental consensus among public libraries. The study finds that the smart transformation path of public libraries primarily revolves around six dimensions: technology, space, resources, services, management, and collaboration/coordination. Future public library practices can gain insights for their own smart transformation from three aspects: the overall construction of Digital China, the national cultural digitization strategy, and building a quality-strong nation.

Full Text

Research on Smart Library Construction Trends of Public Libraries in China Based on the “14th Five-Year” Plans

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Abstract:

[Purpose/Significance] This study constructs a framework for intelligent library construction in Chinese public libraries during the “14th Five-Year” Plan

period, aiming to provide reference and innovative insights for the intelligent transformation of public libraries in China. **[Method/Process]** The study selected strategic planning texts from 32 provincial-level and 15 sub-provincial public libraries as samples. General objectives, development strategies, and specific actions related to smart libraries in these plans served as basic units for manual coding to reveal the key elements of smart library construction. **[Result/Conclusion]** Active development of smart libraries has become a fundamental consensus among public libraries. The path to intelligent transformation primarily revolves around six dimensions: technology, space, resources, services, management, and collaboration. Future practices can draw insights from three perspectives: the overall Digital China initiative, the National Cultural Digitization Strategy, and the drive toward becoming a quality powerhouse.

Keywords: Intelligent transformation; Public library; “14th Five-Year” Plan; Smart library

2 Research Methods

2.1 Research Sample

The strategic development plans for the “14th Five-Year” period from provincial and sub-provincial public libraries constitute the research sample. These planning documents represent the official blueprints for public library development during the 14th Five-Year period, with strong authority and guiding significance. The sample covered 32 provincial libraries and 15 sub-provincial libraries. By March 15, 2023, a total of 29 planning documents were successfully obtained, including 20 provincial and 9 sub-provincial plans, forming a relatively complete sample set.

Table 1 presents the basic distribution of the sample libraries. The selected libraries are widely distributed across eastern, central, and western China, with varying levels of economic development and library sizes, ensuring the sample’s representativeness.

2.2 Research Process

This study employed qualitative content analysis methods. Using NVivo 12 software, we conducted manual coding and analysis of the smart library-related content in the planning texts. The coding framework was built around three dimensions: (1) general objectives and development strategies, (2) specific action measures, and (3) implementation safeguards. Through open coding, axial coding, and selective coding, we ultimately identified six main categories and 32 sub-categories related to smart library construction. **Figure 2** illustrates the coding framework and category system.

The analysis focused on extracting explicit and implicit information about smart library construction from the plans, including technological applications, space

transformation, resource development, service innovation, management optimization, and safeguard mechanisms. By systematically organizing and analyzing this content, we constructed a comprehensive framework for smart library construction during the 14th Five-Year period.

3 Research Findings

3.1 Technology Empowerment: Resources, Space, and Management

Technology serves as the foundational driver for smart library transformation. The planning documents extensively discuss the application of emerging information technologies, including artificial intelligence, big data, cloud computing, the Internet of Things, blockchain, 5G, and virtual/augmented reality. These technologies are primarily applied across three domains: resource management, space services, and operational management.

In resource management, technologies such as big data analytics and artificial intelligence enable intelligent resource selection, processing, and organization. Digital resource management platforms and institutional repositories facilitate unified management and sharing of digital assets. For space services, IoT sensors, intelligent monitoring systems, and location-based services support the creation of perceptible, interactive smart spaces. In operational management, data-driven decision-making systems and automated management platforms enhance the efficiency and precision of library operations.

The integration of 5G technology is particularly emphasized, enabling high-speed mobile services, immersive experiences, and massive IoT connectivity. Libraries are actively exploring 5G-powered applications such as mobile library services, AR/VR experiences, and intelligent navigation systems, significantly expanding service boundaries and user experiences.

3.2 Space Reconstruction: Creating Intelligent Environments

Smart space reconstruction represents a key focus of library transformation. Planning documents reveal two main approaches: physical space reengineering and virtual space expansion. Physical spaces are being redesigned to incorporate intelligent elements such as smart seating, automated book storage and retrieval systems, self-service equipment, and environmental monitoring systems. Virtual spaces are being expanded through digital platforms, mobile applications, and immersive experience zones.

The concept of “space as a service” is gaining prominence. Libraries are transforming from traditional book-lending venues into multifunctional knowledge spaces that support learning, creation, communication, and experience. This includes makerspaces, digital creativity zones, virtual reality experience areas, and collaborative learning spaces. The integration of online and offline spaces

creates seamless service experiences, allowing users to access library services anytime, anywhere.

3.3 Resource Construction: Digitalization and Specialization

Resource construction follows two parallel tracks: comprehensive digitalization and specialized development. Digitalization involves large-scale conversion of physical collections, development of digital resources, and establishment of institutional repositories. Specialization focuses on developing unique collections, local literature databases, and subject-specific knowledge bases that reflect regional characteristics and institutional strengths.

Planning documents emphasize the importance of open access and resource sharing. Libraries are building digital resource platforms that integrate purchased resources, self-built databases, and open-access materials. The development of characteristic resources is closely tied to local culture, history, and industrial development, forming distinctive collection systems that support regional research and cultural preservation.

3.4 Service Innovation: Scenario-Based and Ubiquitous

Service innovation centers on meeting diverse user needs through intelligent, personalized, and scenario-based services. Key developments include intelligent recommendation systems, knowledge services, decision support services, and embedded services in user workflows.

Libraries are shifting from passive service models to proactive, predictive services. Using big data analytics, libraries can understand user behavior patterns and provide personalized resource recommendations and customized information services. Scenario-based services integrate library functions into specific user contexts, such as learning, research, and daily life situations.

Ubiquitous services extend library reach beyond physical premises through mobile applications, social media platforms, and partnerships with other institutions. This creates a pervasive service network that follows users across different environments and devices.

3.5 Management Upgrade: Refinement and Collaboration

Management transformation focuses on refined operations and collaborative governance. Refined management employs data analytics to optimize resource allocation, service processes, and performance evaluation. Intelligent management platforms integrate various business systems, enabling unified monitoring and coordinated operations.

Collaborative governance involves establishing partnerships with government agencies, educational institutions, cultural organizations, and technology companies. Libraries are moving beyond isolated operations toward ecosystem-based

development, participating in broader cultural and educational networks. This includes collaborative collection development, shared digital platforms, and joint service initiatives.

3.6 Safeguard Mechanisms: Standardization and Sustainability

Safeguard mechanisms ensure the sustainable development of smart libraries through standardized systems, evaluation frameworks, talent development, and diversified funding sources. Standardization covers technical protocols, data formats, service specifications, and management procedures, ensuring interoperability and consistent service quality.

Evaluation systems assess smart library development through multidimensional indicators covering technology adoption, service innovation, user satisfaction, and social impact. Talent development focuses on cultivating professionals with interdisciplinary skills in library science, information technology, and data analytics. Sustainable funding models combine government investment, social capital, and self-generated revenue to support long-term development.

4 Conclusion

This study, based on content analysis of 29 public library “14th Five-Year” development plans, reveals that smart library construction has become a strategic consensus and core task for public libraries. The analysis identifies six key dimensions of transformation: technology empowerment, space reconstruction, resource construction, service innovation, management upgrade, and safeguard mechanisms.

The findings indicate that Chinese public libraries are actively responding to national strategies such as Digital China and cultural digitization. Future smart library development should focus on three aspects: First, align with national digital strategies to promote deep integration of library services with digital government and digital society initiatives. Second, strengthen collaborative development by building regional library consortia and industry alliances. Third, emphasize sustainable development through standardized systems, professional talent cultivation, and diversified funding mechanisms.

The study provides a comprehensive framework for understanding smart library construction trends and offers practical guidance for libraries at different development stages. However, the research is limited to plan analysis; future studies should track implementation outcomes and conduct comparative analyses to validate and refine the framework. The dynamic evolution of smart libraries requires continuous research to capture emerging trends and innovative practices.

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

Source: ChinaXiv — Machine translation. Verify with original.